

WAYS THAT TEAM LEADERS OF VIRTUAL
TEAMS CULTIVATE TEAM LEARNING

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ABSTRACT

WAYS THAT TEAM LEADERS OF VIRTUAL TEAMS CULTIVATE TEAM LEARNING

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Corporations have become increasingly global over the past number of years. The rapid development and usage of communication technology has allowed global corporations to more readily form virtual teams to take advantage of the skills of its global workforce. Having skilled workers on teams helps to make them more productive. Productive teams tend to reach their objectives and ultimately drive the success of corporations. Team learning has long been linked with a team's ability to reach its objectives. The team leader is seen as a key to enabling learning for the team. This qualitative study of 13 virtual teams sought to find ways that the leaders of these virtual teams cultivated team learning in the IT department of a leading global financial services firm. The study was especially focused on applications development project teams that were geographically and temporally dispersed and had an off-shore component as team members. Using the Dechant, Marsick, and Kasl (1993) model of team learning as a

foundation, the researcher conducted critical incident interviews with the leaders of the virtual teams followed by administering the Dechant and Marsick (1993) Team Learning Survey to the team members. The study yielded insights that could be valuable to organizations that employ virtual team leaders as well as human resource development professionals who create training programs to enhance the skills of this group. Among the most prevalent skills identified included group facilitation, meeting management, process documentation, artifact creation, practicing learning agility, and soliciting input. The virtual team leader exhibited learning leadership by building relationships within the team and with other constituents; utilizing appropriate technology to enable learning; and conducting productive reflection sessions with the team to evaluate the team's actions. Where team leaders needed to improve their efforts was around the monitoring and measuring of their learning efforts in order to gauge their full effectiveness.

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Chapter I

INTRODUCTION

Chapter I of this research study provides a background of the reasons why discovering ways that virtual team leaders (VTL) of virtual project teams cultivate team learning is an important topic for research. Specifically, this study seeks to explore this question with global corporate virtual project teams operating in the information technology (IT) function. The chapter includes a discussion of the context for why virtual teams are employed in a corporate environment; what some of the challenges are in employing them; and how learning for the team is considered a driver of the team reaching its goals. The chapter then presents a discussion of the research problem, purpose, design, participants, definition of terms, assumptions, and significance.

Research Context and the Researcher's Perspective

Working in a virtual environment has long been predicted as becoming more typical in how corporations operate (Townsend, DeMarie, & Hendrickson, 1998). The demands of an ever-changing marketplace have forced corporations to become more flexible to keep pace with their competition (Fredericks, 2005). In corporations, cross-functional teams and matrix organizations have become the preferred structure for organizing work in order to achieve the degree of flexibility required for success (Mohrman, 1993). Improvements in communication technology have enabled the matrix

organization to exist and grow (Ratcheva, 2008). Through these improvements people can more easily share information and knowledge than in the past (Lipnack & Stamps, 2000).

Advances in communication technology have had a significant impact on how corporations organize and conduct their work (Bell & Kozlowski, 2002). Technology enables corporations to create work groups or teams that operate in multiple locations versus a more traditional co-location set up (Hinds & Weisband, 2003). The work groups or teams leverage the advances in electronic communication technology as a way to conduct its work processes (Duarte & Snyder, 2006; Lipnack & Stamps, 2000). Using electronic communication tools like e-mail, instant messaging, teleconferencing, and video conferencing now allow teams to collaborate more easily and take advantage of expertise located in multiple locations to share information in a real-time manner (Malhotra & Majchrzak, 2004). Employing these new types of technology-related communications mediums requires less face-to-face interaction for a work group or team to be productive (Duarte & Snyder, 2006). These advances have spawned the increasing reliance on virtual work groups and teams in today's global corporations (Clemons & Kroth, 2011).

In addition to improvements in technology, the globalization of product markets has been another driver for much of this organizational change (Chutnik & Grzisiak, 2009). Corporations must now continually adapt their organizational structures and processes to meet the rapid pace of change and complexity of a competitive global marketplace (Kotter, 2012). There is continual pressure on corporations to improve productivity, increase efficiency, develop new products, and contain costs as a way of

increasing profits and creating shareholder value in the face of competitive, demographic, and regulatory changes (Ulrich & Brockbank, 2005). Corporations recognize technology as an important enabler of meeting its goals through increasing organizational efficiency and reducing costs as much as possible to address the scope of change (Harreld & Laurie, 2009). Employing advances in communication technology allows corporations to eliminate redundant employees in multiple locations, utilize expert knowledge across these locations, move operations to low-cost areas, and reduce travel costs associated with employee meetings (Clemons & Kroth, 2011). Additionally, product development has been impacted by this trend to penetrate new markets as well as expand market share in existing ones (Mohrman, Klein & Feingold, 2003). Many believe that global virtual teams are an important method to meet these needs (Lampel & Bhalla, 2011). Subsequently, new conditions like globalization, the explosion of new technologies, the expansion of the knowledge-based economy, and the information era have made virtual teams an integral part of many organizations today (Chutnik & Grzisiak, 2009).

Furthermore, as the locations of people who have viable skills become more global, corporations have had to adjust their workforce planning strategies to account for this factor (Newman, 2011). There are organizational pressures to obtain workers in locations that can supply the right types of skills at the right cost (Galbraith, 2006). Corporate leaders want to take advantage of pockets of expertise in various locations across the world by connecting them through utilizing communication technology (Blaskovich & Mintchik, 2011). As more and more corporations begin to utilize this strategy for organizing and communicating, the virtual team has now become a pretty standard feature in global corporations (Hong & Vai, 2008).

Empirical research on global virtual teams and virtual team learning is still emerging (Decuyper, Dochy & Van den Bossche, 2010). Even though forming virtual teams is an increasingly standard item for corporate organizations, not much attention has been paid to virtual team learning (Bell, Kozlowski & Blawath, 2012). There have been studies conducted on team learning, but these have been more in the face-to-face realm (Decuyper et al., 2010). While project teams have been seen as fertile ground for learning, there has been some evidence that teams actually do not learn from their work on projects (Swan, Scarbrough & Newell, 2010). It is from this point where this particular research study starts its investigation.

This research study will focus on looking at virtual team learning in a corporate environment. Specifically, the research occurred in the researcher's work setting. The researcher worked at a large, global financial services firm ("AlphaCo") as a human resource development (HRD) professional serving a number of global corporate support functions. The global information technology (IT) department was one of the functions. The IT department at AlphaCo was responsible for applications development and infrastructure management for the corporation. Much of the actual hands-on programming work of the IT function in the firm has increasingly moved to "off-shore" companies. This business decision made the effective management of these off-shore resources a critical need for AlphaCo.

Within the wider IT community, "off-shoring" is considered the practice of relocating work typically done by a firm in the location (country) where the firm is located to another country (Blinder, 2006; Lewin & Peeters, 2006). The term off-shoring should not be confused with the term "outsourcing". The latter denotes contracting with

another company to conduct some or all of its low-level administrative functions (Halvey & Melby, 2005). Thomas Freidman, in his book *The World is Flat* (2005), popularized these terms by saying they were two of the ten “flatteners” that made the world more connected.

Companies utilize off-shoring as a method to leverage the expertise of the off-shore vendors to increase productivity as well as a way to reduce costs (Chang & Gurbaxani, 2012; Han & Mithas, 2013). Like many other companies who weigh the factors for going in this direction (DiRomualdo & Gurbaxani, 1998), the IT leaders at AlphaCo made the strategic decision to utilize off-shore vendors to assist in its day-to-day applications development and production functions. The off-shore vendors were partnered with on-shore company personnel in the form of global virtual project teams to conduct the work. The leadership of these teams came from designated US-based IT personnel. Given the importance of this decision in reaching the department’s strategic objectives, the effective management of this type of global virtual project team became a critical capability for the IT department.

Typically, most companies structure and manage projects through some sort of project management methodology (Kerzner, 2010). Project management methodology is a disciplined approach whereby the project manager applies specific skills, tools, and knowledge to accomplish some finite piece of work in a specified period of time, within certain budget parameters, and to an agreed deliverable (Project Management Institute, 2013). When project managers employ project management methodology in running projects it can greatly increase the chances of successfully completing the project and meeting business goals (Kerzner & Saladis, 2009).

The IT department at AlphaCo adopted a project management perspective in running its IT projects. The department had historically concentrated its efforts on developing the programming skills of its employees. However, the leaders of the department now saw the value of also focusing on developing project leadership skills due to the changed nature of the work. Having effective leaders of IT projects became an important function in the IT department so it could meet its business objectives. Project managers for these IT projects became a pivotal role for the success of the IT department.

Pivotal roles are those roles that an organization has that truly drive the performance of the organization in meeting its goals and objectives (Boudreau & Ramstad, 2007). The challenge for most companies is to identify what the pivotal roles are and then isolate the key critical competencies required for success in the role (Dalzeil, 2011; Lucia & Lepsinger, 1999). There have been many skills or competencies identified for being a successful project manager – with team leadership among the most important (Kerzner, 2010). As projects are increasingly staffed with team members from across the globe, developing leadership skills for leading projects in a virtual setting is seen as becoming ever more important in project management methodology (Frame, 2003).

Effective leadership of virtual teams is becoming an increasing popular subject for researchers and business writers (DeRosa & Lepsinger, 2010; Duarte & Snyder, 2006; Fisher & Fisher, 2001; Lipnack & Stamps, 2000). The argument is that effective virtual team leadership is an important lever in driving productivity gains and meeting team objectives (Tyran, Tyran & Shepard, 2003). Edmondson (2012) has posited that effective team leaders are ones that promote team learning as an important part of their leadership actions. Edmondson (2002) bases her assertion on the prospective link between team

learning and meeting group outcomes that attain success. Therefore, if the team leader can better facilitate team learning while leading the team, the team could be more successful in meeting its desired outcomes.

Effective leadership skills are an important competency for project managers to drive the successful completion of projects (Kerzner, 2010). Effective team leadership has a strong impact on team performance (Hackman, 2002; Hackman & Wageman, 2005). There is a tangible link between a team successfully performing and its ability to learn (Srivastava, Bartol & Locke, 2006). By the nature of their role, team leaders are well positioned to facilitate learning within the teams they lead that results in successful performance (Edmondson, 2012). Subsequently, facilitating team learning could be considered a critical competency (Lucia & Lepsinger, 1999) for effective project leaders. Additionally, since project teams in global corporations now predominately operate in a virtual environment (DeRosa & Lepsinger, 2010), developing leaders that cultivate team learning in this environment could be recognized as a critical need for all global organizations.

Research Problem

The recent motivation for researchers to investigate team learning was distilled from earlier writings on organizational learning (Edmondson, 2002). Team learning is considered a critical component to creating a learning organization (Senge, 1990; Watkins & Marsick, 1993). Organizations that are capable of learning are more likely to be successful (Garvin, 2000; Marquardt, 2002; Marsick & Watkins, 1999; Pedler, Burgoyne, & Boydell, 1997; Senge, 1990; Watkins & Marsick, 1993). There is a

demonstrated connection between team learning and achieving organizational goals (Yorks, Marsick, Kasl & Dechant, 2003). The leader of a team is best positioned to help drive team learning and team effectiveness (Edmondson, Bohmer & Pisano, 2001; Hackman, 2002; Hackman & Wageman, 2005). Teams that meet their goals ultimately lead to an organization's success (Senge, 1990; Watkins & Marsick, 1993).

Over the last twenty years, leading virtual teams has received a significant amount of attention in both the academic and the business press (DeRosa & Lepsinger, 2010; Duarte & Snyder, 2006; Fisher & Fisher, 2001; Lipnack & Stamps, 2000; Jarvenpaa, Knoll & Leidner, 1998; Kayworth & Leidner, 2002). Many of these books and research articles cover tips and techniques that seek to translate traditional face-to-face management processes of teams into a virtual context (Fisher & Fisher, 2001). These writings have evolved from studies about how to promote team learning and how team learning is facilitated most effectively (Edmondson, 1999; Kasl, Marsick & Dechant, 1997). Through the use of the team learning model constructed by Dechant, Marsick and Kasl (1993), with a focus on the team learning variables of Processes, Conditions and Outcomes, this study seeks to link these two areas together and go deeper into the subject of uncovering ways that team leaders of virtual teams cultivate team learning.

Purpose of the Study

The prescribed role of HRD professionals is to identify and implement learning solutions that address the needs of their client groups (Swanson & Holton, 2001; Yorks, 2005). Building capability around critical competencies for pivotal roles is seen as a continuation of this perspective (Boudreau & Ramstad, 2007; Hunt, 2014). As an HRD

professional, if the researcher identifies ways that team leaders of virtual global teams cultivate team learning then the researcher could further the HRD practice. This would come through addressing a current need that most global corporations have – namely getting their project teams to successfully meet their deliverables as a basis to reaching corporate-wide goals & objectives. Therefore, the researcher seeks to investigate in what ways VTLs cultivate team learning in the global virtual team they lead.

To look at this problem the researcher has formulated the following research questions. These questions look at what the team leader does in the context of the Dechant, Marsick, and Kasl (1993) Team Learning Model.

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

In relation to the Dechant, Marsick, and Kasl (1993) Team Learning Model, the first question equates with Team Learning Conditions. The second question seeks to inform around Team Learning Processes. The final question looks to determine the extent of Team Learning Outcomes. Through these questions the researcher aims to provide a view into what a VTL does to cultivate team learning.

Overview of Research Design and Participants

As will be further detailed in Chapter III on Methodology, to investigate the ways the leader cultivates team learning the researcher employed a qualitative, multiple case

study methodology (Yin, 2009). The unit of analysis was the leaders of the global virtual project teams. The researcher identified 13 VTLs and their teams at AlphaCo that utilized off-shoring in their virtual team composition. These teams were part of the IT organization's applications development (AD) department.

In studying the VTL, the researcher viewed this person through many points of data. The researcher worked with the leader of the company's AD department to identify leaders of global virtual project teams. After soliciting team leaders and securing consent for the 13 VTLs to participate, the researcher sent an on-line background questionnaire. The researcher then conducted a critical incident (Flanagan, 1954) interview with the VTLs using a Critical Incident Protocol (CIP). The intent of the CIP was to draw out examples from the VTL of when the team learned well and not so well.

Following the interview with the VTL, the researcher had members of each of their respective teams take the Dechant and Marsick (1993) team learning survey (TLS). The TLS was distributed through an electronic version. Permission to conduct the survey was obtained from both the VTL and the team members. The intent of distributing the survey to the team members was to give them a voice in how the team learns. To avoid any possible repercussions, the TLS responses were anonymous and strictly confidential.

Definition of Terms

Some scholars have sought to create differences between what is defined as a "team" and what is considered a "group" (Katzenbach & Smith, 1993; Levi, 2011). The researcher will follow the example of others (Decuyper et al, 2010; Sessa & London, 2008) that decided to use these terms interchangeably at times. The level of detail

required for this study does not require such a precise differentiation between the two (Robson, 2002).

The definition of what was considered a global virtual project team was also critical to this research study. The researcher believed this was important in setting the limitations to the study. In corporate settings there are multiple types of teams and each has their defined purpose (Katzenbach & Smith, 1993). This study was concerned with project teams that operate across regional boundaries. Due to the dispersion of the team, the team members needed to primarily communicate through technological means. These technological communication methods (e-mail, voice-mail, phone, teleconferencing, video conferencing, instant messaging, etc.) are found in most modern global corporations (Duarte & Snyder, 2006). Having teams conduct its operations using technology is pretty common in a corporate setting (Kayworth & Leidner, 2002) and in particular with global teams spanning both space and time (Maznevski & Chudoba, 2000). Operating in a virtual setting impacts how the team is organized and the role of leader (Bell & Kozlowski, 2002). Oftentimes the VTL has no direct authority over all the team members from a reporting and control standpoint (Kerzner, 2010). In this type of organizational structure, the team leader sets direction for the team, manages the tasks of several team members from other groups, and is responsible for the delivery of the overall work product (Barczak, McDonough & Athanassiou, 2006).

With these factors in mind, this study defined a global virtual project team as having the following characteristics:

- A management appointed team of AD professionals responsible for developing and implementing a solution to a business problem.

- The team had a designated “team leader” leading the accomplishment the team’s deliverables where the team leader could have some direct or in-direct authority over the team members.
- The team had members from a third-party, off-shore company that resided in a country foreign to that of the designated team leader.
- The team’s primary mode of communication was through technological means.

The specific types of global virtual teams that this study looked at were off-shore applications development project teams. There was a mix of on-shore and off-shore members of the teams in the study. The location of the third-party organization was India. Other members of the virtual team, including the VTL, were in the US. The US members of the team in most instances were not co-located and were dispersed. Based on the physical locations of the team members, there was little or no chance for regular face-to-face interaction, so the teams were considered virtual (Townsend et al., 1998). By the fact that they had members located in separate countries, they were considered being global teams (Barczak et al., 2006).

Aside from clarifying what type of team was included in the study, there also arose a need to clearly define what would be discussed in the study. To avoid confusion, the following are definitions of terms that are used in this study.

- **Team (or Group)** – a small number of people with complementary skills who are committed to a common purpose, shared performance goals, and an organized approach for which they hold themselves mutually accountable (Katzenbach & Smith, 1993, p. 45).

- **Project** – a work effort that is a goal-oriented, coordinated undertaking of interrelated activities during finite time period where there is a beginning and end. The specific effort is often times unique (Frame, 2003, pp. 2-3).
- **Pivotal Role** – a role where differences in performance have huge impacts on business performance (Hunt, 2014, p. 67).
- **Virtual Environment** – the operating condition enabled by the use of technology that allows people to communicate (share information) and collaborate (work together) to produce a product across boundaries created by time, distance (geography) and organization (Duarte & Snyder, 2006, p. 8).
- **Communication Technology** – general term for the types of technologies used in a virtual environment that enable communication and collaboration. It includes synchronous and asynchronous types. Examples of which are e-mail, instant messaging, videoconferencing, audioconferencing, file and data sharing applications, team web sites, and workflow tools (Duarte & Snyder, 2006, p. 31 and p. 40).
- **Virtual Team (or Group)** – a group of geographically and organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task (Townsend, DeMarie, & Hendrickson, 1998, p. 18).
- **Team Learning** – the process through which a group creates knowledge for its members, for itself as a system, and for others (Kasl, Marsick, & Dechant, 1997, p. 229).

- **Off-Shoring** – locating [business] activities to a wholly owned company or independent service provider in another country (usually low cost) (Lewin & Peeters, 2006, p. 221).
- **Applications Development** – the Systems Development Life Cycle (SDLC) process is a structured, step-by-step approach for developing information systems that support a business initiative (Haag & Cummings, 2010, p. 160).

Assumptions

In conducting this study, the researcher made a number of assumptions concerning how virtual teams learn and whether team learning was possible. The major one was that virtual team learning was possible. A careful review of the literature has shown that most research on teams and team learning occurs in a face-to-face context (Edmondson, 1999; Edmondson, 2012; Gibson & Cohen 2003; Lipnack & Stamps, 2000; Nemiro, Bradley, Beyerlein & Beyerlein, 2008). Research on virtual teams and virtual team learning is still emerging (Bell & Kozlowski, 2002; Ebrahim, Ahmed & Taha, 2009). In accordance with this thinking, the researcher assumed that the Dechant, Marsick, and Kasl (1993) model could be applied to team learning in a global and virtual context. Additionally, the researcher assumed that the TLS designed by Dechant and Marsick (1993) to mirror the model can measure the extent of team learning occurring within the teams studied in the research.

Furthermore, the researcher realized that as a member of the organization he was conducting the research at that he could be subject to bias. He took precautions against these biases. They are outlined in the Methodology chapter (Chapter III). Also, as a

HRD professional, the researcher understood that he had a bias in believing that learning and development was possible for adults in the workplace.

There were other assumptions that the researcher made to conduct this study.

These assumptions were:

- A group of people coming together as a team can learn from one another in the fulfillment of its team's goals.
- Learning on a team comes about more from experiential and informal methods than from formal ones.
- Team leaders of virtual global project teams employ actions that cultivate team learning.
- Use of different technologies for communication between team members is conducive for team learning to occur.
- Learning is possible for individuals and teams regardless of physical location.

Significance of Research

The researcher believes this research is significant because virtual environments and virtual teams are only becoming more common in corporations (Pauleen, 2002). Furthermore, the use of third-parties to conduct activities for companies is only going to grow in the immediate future as companies look for ways to control costs (Jahns, Hartman, & Bals, 2006). While this research concentrated on the off-shore element with an IT subject base, the results of this research might be of some use to all types of virtual teams. Additionally, since the teams in this study were globally dispersed over space and time, there was an aspect of globalization derived from the research. The concept of

globalization involves sharing information and learning across a global organization and is an important factor in today's global economy (Marquardt, 2002). There are also competitive advantages for corporations as they attempt to exploit learning in today's knowledge economy (Edmondson, 2012). This creates extra pressure on leaders of global virtual teams to develop new skills to ensure team effectiveness and learning (Kayworth & Leidner, 2002).

The ultimate goal of this research project was to determine in what ways virtual team leaders cultivate team learning. At the end of the findings, analysis, and interpretations of the research data the researcher makes recommendations intended to help inform both the VTLs and the organizations they serve as well as the practice of leadership development and team learning. Team learning is an important element to creating a learning organization (Marsick & Watkins, 1999; Senge, 1990; Watkins & Marsick, 1993). There is also evidence of using team learning as a competitive advantage (Edmondson, 2008). Organizations that can enhance team learning are better positioned to succeed in today's hyper-competitive, global marketplace (Marquardt, 2002). This research might help to unlock some new information for HRD professionals to use in creating development programs that can further develop team learning and impact business results.

The next chapter will present a literature review of the research. Relevant literature will be discussed that can help inform the findings, analysis and interpretation of the data collected. At the close of the chapter, the researcher will present a Conceptual Framework for the study that helped to guide the research.

Chapter II

LITERATURE REVIEW

The purpose of this research study was to explore ways that team leaders of virtual teams cultivate learning within their teams. This chapter contains the results of an extensive review of the applicable literature in support of this purpose. In completing this study, the researcher hoped to provide some insights and recommendations on how virtual team leaders (VTLs) can create work environments where team learning flourishes so the team effectively and efficiently achieves its objectives. To accomplish this goal, the following research questions were addressed in this study:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

Below are the results of the review of the literature conducted by the researcher to help inform him more about the topic and the extent of prior work around the research questions.

Organization of the Chapter

In looking at the literature, this chapter is divided into five major sections. The first is defining both a team and team learning. The second is a review of team learning research which includes conceptually and empirically derived models along with other relevant research studies related to team learning variables. The third section pulls the learnings from the previous sections together in offering what the potential variables are in virtual team learning conditions, processes, and outcomes. The fourth section considers other underlying theories of learning and development that influence team learning to include group development, experiential learning, and informal learning. Finally, the researcher proposes a conceptual framework from the entire review of the literature that will be used when investigating the study data for analysis, integration, and synthesis.

Defining a Team

While the literature provides many definitions of a team (Edmondson, 2012; Forsyth, 2010; Hackman, 2002; Levi, 2011; Lipnack & Stamps, 2000), for the purposes of this research study the researcher will utilize Katzenbach & Smith's (1993) definition of a team as "a small number of people with complementary skills who are committed to a common purpose, shared performance goals, and an organized approach for which they hold themselves mutually accountable" (p. 45). This definition helps establish a focus for the investigation (Robson, 2002). As the researcher looks at collections of individuals working together, it would be best to have some standard to assess the group in its composition, purpose, and objectives common to working in a team (Levi, 2010). This

definition meets that standard. Additionally, it supplies sufficient specificity but is flexible enough to adapt to potential changes as the researcher collects data around the phenomenon in question (Bloomberg & Volpe, 2016).

Defining Team Learning

Research explicitly focused on team learning emerged as a topic in the management literature in the 1990s and expanded in volume and variety in the early 2000s and beyond (Bell et al., 2012; Decuyppers et al., 2010; Edmondson et al., 2007). In many cases, the development of team learning models and the research around these models sprang from the work around organizational learning (Crossan, Lane & White, 1999). The term “team learning” was first popularized by Senge (1990) as a component of organizational learning. Some have seen team learning as a subset of an organization learning framework (Marquardt, 2002; Nonaka & Takeuchi, 1995; Watkins & Marsick, 1993), while others have developed models of describing team learning as a stand-alone phenomenon of how a group of people interact and learn (Edmondson, 1999; Kayes, Kayes & Kolb, 2005; Kozlowski & Bell, 2008; Wilson, Goodman & Cronin, 2007). However, what actually constitutes team learning is open to debate (McCarthy & Garavan, 2008; Wilson et al., 2007).

In looking at the what constitutes team learning, the literature has shown three major themes around what team learning is and how it occurs. The first theme is that team learning involves *cognitive* activities by members of the team. As Olivera & Straus (2004) explain, teams are made up of individuals that collaborate with one another to obtain skills by thinking and transferring knowledge to one another. This area of

research concentrates on how individuals process information, how they assess and interpret situations, and how they solve problems (Tinsdale, Stawiski & Jacobs, 2008).

The second theme involves actual interaction by the members of the team in a *social* setting because it is in this setting where learning takes place (Edmondson, 2002). With the increasing interest in teamwork, understanding how these individual cognitions become integrated and coordinated at the inter-individual level becomes of value (Erhardt, 2011). Van den Bossche, Segers, and Kirschner (2006) have looked at the cognitive and social processes of learning and believe these two processes are intertwined. They posit that team learning is actually as *socio-cognitive* activity within the team.

A third theme from the literature also emerges around the idea that team learning is a *process*. When individuals come together to form teams, they inherently develop processes to govern their operations (Levi, 2011), and processes are the very nature in how a group functions and learning (Ellis & Bell, 2005). When it comes to team learning processes, researchers have identified a number of them including dialogue, feedback, sharing information, confrontation, negotiation, and reflection – to name a few (Decuyper et al., 2010). However, if one views these processes from a *systems perspective* where they act in concert with the environment where the team operates, one gains an appreciation that team learning is as a dynamic process in which the learning processes, the conditions that support them, and team behaviors, are continually evolving and changing (Sessa & London, 2008).

In looking through numerous studies occurring over the last 25+ years, the researcher has identified a number of definitions that appear relevant. Table 2.1 contains

a selection of those definitions. This list of definitions is not intended to be exhaustive, but it is meant to portray the wide-range of thinking around the phenomenon of team learning. Aside from the definition, the table also designates the applicable theme of team learning as either cognitive, social, or process.

Table 2.1 - Selected Definitions of Team Learning

Author(s)	Team Learning Definition	Cognitive	Social	Process
Argote, Gruenfeld & Naquin (2001, p. 370)	Activities by which team members seek to acquire, share, refine, or combine task-relevant knowledge through interaction with one another.	X	X	
Brooks (1994, p. 215)	The construction of collective new knowledge by a team.	X		
Decuyper, Dochy & Van den Bossche (2010, p. 128)	A compilation of team-level processes that circularly generate change or improvement for teams, team members, organizations, etc.			X
Edmondson (1999, p. 353)	An ongoing process of reflection and action characterized by asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions.		X	
Ellis, Hollenbeck, Ilgen, Porter, West & Moon (2003, p. 822)	A relatively permanent change in the team's collective level of knowledge and skill produced by the shared experience of the team members.	X	X	
Kasl, Marsick & Dechant (1997, p. 229)	A process through which a group creates knowledge for its members, for itself as a system, and for others.	X	X	X
Marquardt (2002, p. 25)	The increase in knowledge, skills, and competencies accomplished by and within groups.	X		
Wilson, Goodman & Cronin (2007, pg. 1043)	A change in the group's repertoire of potential behavior.	X	X	

When comparing the various definitions with the themes, the one offered by Kasl, Marsick, and Dechant (1997) appeared as most the applicable for use in this study. Their definition proposed a more comprehensive view around team learning. It encompassed the themes of cognition, social interaction, and processes as well as embraced a systems perspective. Plus, it supplied enough specificity to highlight what team learning was, but

it was also general enough to adapt to different situations when conducting the investigation (Bloomberg & Volpe, 2016).

Team Learning Research

In adopting the Kasl, Marsick, and Dechant (1997) definition for team learning, the researcher initially intended to use their team learning model (Dechant, Marsick & Kasl, 1993) as the basis for this study. However, as the researcher conducted a more detailed review of the literature, it became apparent that there were additional views on team learning (Bell et al., 2012; Decuyper et al, 2010; Edmondson, 1999; Edmondson et al., 2007) that should be considered. The researcher identified two major areas that divided the literature. The first area was conceptual models of team learning. This area encompassed different author(s) reviewing existing team learning research and creating a synthesized or composite view explaining team learning. The second area involved empirical studies conducted on real-world teams. This area has two sub-sections. The first sub-section involved research that resulted in a model to describe the team learning phenomenon observed. These models also spawned a series of follow up studies that looked to validate the models and their components. The other sub-section looked to test the relationships between specific team learning variables that were either conceptually or empirically created. A brief composite of the most germane literature uncovered follows.

Framework to Review Team Learning Models

The researcher desired a framework to evaluate the team learning models and other research. Gessner, Langkamer, and Klimoski (2008) and Ilgen, Hollenbeck,

Johnson, and Jundt (2005) determined that most team learning models followed the Input-Process-Output (I-P-O) model that Hackman (1987) used to describe how groups and organizations operate. The I-P-O model views learning as a linear approach where a group takes on some sort of *input* that feeds into how the group approaches a task. *Processes* then take place within the group as it works on the task. This work then generates some sort of *output* for the group (Forsyth, 2010; Hackman, 1987). The I-P-O model also encompasses a systems view where environmental factors from outside the group interact with and influence what happens in the group (Hackman, 1987; Knapp, 2010). Using this type of framework will supply the researcher with a simple, clear, and consistent method to determine and collect what the common variables are across multiple team learning models to create a conceptual framework for the study (Bloomberg & Volpe, 2016).

Conceptual Models of Team Learning

While the research around team learning is still in a nascent stage (Van den Bossche et al., 2006), the researcher was able to uncover multiple conceptual models of team learning. The conceptual models were formulated through the author(s) conducting a review of existing literature and research on team learning, and then inferring relationships between variables to create a model. The researcher selected seven models to highlight because they appear to be ones that other models were based on or were formulated through extensive reviews of the literature on team learning. Table 2.2 contains a summarized view of the seven models. The researcher has highlighted the key components of each model as they conform with Hackman's (1987) I-P-O framework.

Table 2.2 – Selected Conceptual Models of Team Learning

Author(s)	Core Principles	Input Variables	Process Variables	Output Variables
Bell, Kozlowski & Blawath (2012)	Views learning as “macrocognition” where the team learns in a cyclical and evolving cycle. With each iteration, team learns more about itself, how it learns, and how it interacts with its environment. <i>Socio-Cognitive & Process Model</i>	“Team Emergent State” <ul style="list-style-type: none"> • Goal Orientation • Psychological Safety • Team Efficacy • Cohesion/Conflict 	“Team Learning Process” <ul style="list-style-type: none"> • Macrocognition • Regulation • Information Processing 	“Team Learning Outcomes” <ul style="list-style-type: none"> • Collective Knowledge • Team Mental Models • Transactive Memory • Macrocognition • Team Performance
Cordery & Soo (2006)	Views learning in a virtual context as a process that centers on developing and exploiting transactive memory within the team where the team shares and builds on knowledge of individual team members. <i>Process Model</i>	<ul style="list-style-type: none"> • Team attributes <ul style="list-style-type: none"> ○ Geographic separation ○ Electronic dependence ○ Structural dynamism ○ National diversity • Psychological safety • Team leadership 	<ul style="list-style-type: none"> • Transactive memory • Work engagement • Collective efficacy • Task complexity • Interdependencies 	Output = Team Effectiveness <ul style="list-style-type: none"> • Productive output • Integrative group processes • Member affective well-being
Decuyper, Dochy & van den Bossche (2010)	Integrative conceptual model of team learning based on an extensive meta-analysis of over 1500 studies from multiple disciplines around team learning that organizes and categorizes 486 variables. <i>Socio-Cognitive & Process Model</i>	Inputs from inside and outside the team: <ul style="list-style-type: none"> • Sub-systems • Systems • Supra-system 	<ul style="list-style-type: none"> • Storage & retrieval of information • Constructive conflict • Sharing information • Boundary Crossing • Team Reflexivity • Team Activity 	<ul style="list-style-type: none"> • Adoption & improvement • Primary & secondary learning • Generative learning • Boundary learning • Learning by individuals, team, and organization
Edmondson, Dillon & Roloff (2007) - Model 1	Views learning as a collective cognitive action by individual members of the team. As individuals, learn the entire group’s collective skill level increases leading to improved performance. <i>Cognitive Model</i>	<ul style="list-style-type: none"> • Collocation • Team stability • Shared management 	<ul style="list-style-type: none"> • Knowledge sharing 	<ul style="list-style-type: none"> • Codified knowledge • Increased individual skills • Team performance
Edmondson, Dillon & Roloff (2007) - Model 2	Views learning as task mastery through social interaction by transactive memory systems – individuals share information they know and how to tap into knowledge of other team members to perform tasks. <i>Social Model</i>	<ul style="list-style-type: none"> • Team Characteristics • Operating context • Barriers to sharing information 	Transactive Memory Systems <ul style="list-style-type: none"> • Sharing information • Collaboration 	<ul style="list-style-type: none"> • Increased awareness of information • Increased collective knowledge • Team performance

Table 2.2 (continued) – Selected Conceptual Models of Team Learning

Author(s)	Core Principles	Input Variables	Process Variables	Output Variables
Edmondson, Dillon & Roloff (2007) - Model 3	Views learning as a “process” in accordance with I-P-O framework. Building knowledge amongst the team the goal of the effort and accomplish by establish a climate conducive to learning in order to activate learning process variables. <i>Process Model</i>	“Team Climate” • Psychological Safety • Leadership Behaviors • Operating Context • Shared Goals • Team Identification	Accessing situated knowledge inside and outside group: • Incremental (improvement) • Radical (innovation) • Local (internal members) • Distal (outside groups) • Vicarious (observe others) • Team reflexivity (group reflection on actions)	Goal – Refining the “process” of learning for the team.
Kayes, Kayes & Kolb (2005)	Views learning as a cyclical process based on Kolb’s (1984) Experiential Learning Model applied in a group setting. <i>Process Model</i>	• Team purpose • Team membership ○ Size of team ○ Diversity & compatibility ○ Cohesion ○ Trust & psychological safety ○ Inclusion • Roles & Leadership • Team context	Follow Kolb’s Experiential Learning Model with 4 learning styles: • Diverging • Assimilating • Converging • Accommodating	• Team cohesiveness • Team development • Team performance
McCarthy & Garavan (2008)	Views learning as a cyclical process based on Pawlowsky’s (2001) model of team learning as collective metacognition based on social cognitive theory. <i>Socio-Cognitive & Process Model</i>	Generation = identification of knowledge relevant for learning or creating new knowledge	• Social cognition theory = the collection, storage, and retrieval of information in a social aggregate (team) • Diffusion & exchange of knowledge • Integration & modification of knowledge	• Metacognition = understanding more about how the team learns and the forces that interact with the team in its environment.
Wilson, Goodman & Cronin (2007)	Views learning as the cyclical process of storage, retrieval and sharing of information amongst group members. <i>Socio-Cognitive & Process Model</i>	• Willingness to share information • Repository set up to store and retrieve information	• Interaction of sharing, storage, and retrieval of knowledge, routines, and behaviors amongst group.	• Change in the range of a group’s potential behavior – whether externally observable or not.

The conceptual models reviewed in Table 2.2 presented a systems view of team learning to describe the complexity of linking internal and external variables (Forsyth, 2010).

They also displayed a mix of cognitive, social, and process thinking around how teams learn. In presenting the conceptual models using Hackman's (1987) I-P-O framework, themes appeared to emerge around how teams learn. Table 2.3 contains an overview of the themes. These themes will be compared to ones generated through reviews of the empirical team learning research to develop a comprehensive conceptual framework for this study. A review of empirically derived team learning models and studies follows.

Table 2.3 – Themes from Conceptual Team Learning Model Review

Inputs	Processes	Outputs
<ul style="list-style-type: none"> • Team goals/purpose • Psychological safety • Team leadership/management • Team structure 	<ul style="list-style-type: none"> • Sharing information • Boundary crossing • Collaboration • Integration/modification of ideas 	<ul style="list-style-type: none"> • Collective understanding • Increased skills • Team performance • Team satisfaction

Empirical Studies of Team Learning

In investigating the literature around empirical studies of team learning, the researcher has divided these studies into two sub-sections. The first sub-section is research studies that have created empirically derived models of team learning. The researcher identified two models that appear to be the most noted by other researchers. They are the ones created by Edmonson (1999) and Dechant, Marsick, and Kasl (1993). There have been a number of follow up studies conducted on these two models that highlight their validity.

The second sub-section contains empirical research not necessarily tied to testing a specific team learning model in its entirety. In these studies, the authors looked to test

the relationship between various team learning variables. The authors determined these variables through an investigation of the team learning literature. In these cases, the variables may be connected to a component of a specific team learning model, but they test the variable with an unrelated variable not found in the model or part of another model. The researcher classified these types of studies as *other team learning studies*. The researcher has included these studies in the review as a method to further recognize other variables that could inform the conceptual framework for this study.

Empirical models of team learning. The two models selected for review are the ones that have been derived through extensive empirical research. These models follow a process very similar to the I-P-O view of organizational processes (Hackman, 1987). In this view, learning is seen as a linear process where the team has some inputs to learning, it conducts processes for learning, and then there is some type of learning output (Knapp, 2010).

Edmondson's model. By using both quantitative and qualitative methods, Edmondson (1999) carried on the work she initiated a few years prior (Edmondson, 1996). She studied 51 work teams in a mid-sized manufacturing company and developed a model that attempted to understand team learning. Influenced by the cumulative works of Dewey, Hackman, Senge, and Argyris & Schön, Edmondson (1999) conceptualizes learning at the group level as an ongoing process of reflection and action characterized by asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions. Edmondson (1999) postulates that it is through these types of behaviors and activities that learning is engaged at the team level.

Additionally, for teams to discover gaps in their plans and make changes accordingly, they must test assumptions and discuss differences of opinions openly rather than privately or outside the group (p. 353).

Edmondson's (1999) model follows the I-P-O framework (Knapp, 2010). As an "input" into the process, there are antecedent conditions that set the team up for success like the team structure and the context in which the team operates as provided by the team leader. These antecedent conditions create beliefs amongst the team that there is safety and efficacy for the team to operate in. The "process" portion sees team learning as seeking feedback and discussing errors as well as soliciting information and feedback from customers and others. These team learning behaviors lead to an "output" of team learning outcomes as indicated by team performance in satisfying customer needs and expectations (Edmondson, 1999).

Edmondson's (1999) core argument involves "engaging in learning behavior in a team is highly dependent on team psychological safety" (p. 376). Edmondson (1999) emphasized that team psychology safety is a powerful condition for team learning. She described team psychological safety as "a team climate characterized by interpersonal trust and mutual respect, in which people are comfortable being themselves" (p. 354). Later research by Edmondson et al. (2001) established a strong link between team leader behavior and establishing team psychological safety. Edmondson (2003) further tested the link between leader actions and building psychological safety within the team and found that coaching by team leaders to get the team members to speak up led them to follow through and participate more in team discussions. Nembhard and Edmondson (2006) found that when team leaders reduced their status within their teams, this created a

more inclusive atmosphere on the team where psychological safety flourished and engagement by the team in improvement efforts increased.

Dechant, Marsick, and Kasl's model. Dechant, Marsick, and Kasl (1993) created a developmental model for team learning. They looked at both organizational and team learning in their model (Dechant & Marsick, 1993; Watkins & Marsick, 1993). Their model of team learning was developed based on case study research in a petrochemical company and a manufacturing organization. The Team Learning Survey (TLS), a tool designed to assess team learning, was derived from the research (Dechant & Marsick, 1993). Dechant, Marsick, and Kasl (1993) based their model on the prior work of Boud and Walker, Kolb, and Jarvis. As such, it is deeply rooted in the fundamentals of adult learning concerning experiential learning and reflection in addition to group dynamics. The researcher will only describe the components of the model that refer to Team Learning: Conditions; Processes; and Outcomes.

In using the I-P-O model (Hackman, 1987) to interpret Dechant, Marsick, and Kasl's (1993) model, they referred to the "input" portion of the Team Learning Model as *Team Learning Conditions*. This is the starting point to facilitate team learning. They identified three dimensions as conditions for team learning: *Appreciation of Teamwork*, *Individual Expression*, and *Operating Principles*. These three dimensions affect the processes of learning.

In describing the "process" of *Team Learning Processes*, Kasl, Marsick, and Dechant (1997) present "team learning as an interrelated set of processes in which collective thinking and action play a central role" (p. 229). There are four major processes in their learning model: 1) *Framing/Reframing*; 2) *Experimenting*; 3) *Crossing*

Boundaries; and 4) *Integrating Perspectives*. The processes can be interdependent as they interact with each other to produce knowledge. In formulating these four processes, Dechant, Marsick, and Kasl (1993) used the fundamental learning processes of thinking and action indicative of experiential learning and reflection (Boud & Walker, 1990; Kolb, 1984; Jarvis, 1987; Schön, 1983). Initially, as part of the learning process, teams begin to “think” as they first perceive the situation (Framing), and the initial perception is transformed into a new understanding or frame (Reframing). Teams are involved in “action” through two other processes: Experimenting and Crossing Boundaries.

Experimenting is a group action used to test a hypothesis or to discover the impact of action in an environment. Crossing Boundaries is an action that happens among team members upon communicating information, views, and ideas. Finally, the team performs Integrating Perspectives, which involves dialectical thinking that group members use to synthesize their divergent views and solve conflicts.

Dechant, Marsick, and Kasl (1993) went about classifying the extent of team learning occurring within the Team Learning Process portion of the model. Kasl, Marsick, and Dechant (1997) emphasized that change is not “a one-way, stepwise progression”; therefore, the term “mode” replaced the earlier use of “stage” (p. 229) in describing the fluidity of learning that occurs within the team. The modes identified were *Fragmented*, *Pooled*, *Synergistic*, and *Continuous*.

The final stage of the model for “output” is defined as *Team Learning Outcomes*. The outcomes are the collective learning that takes place amongst the team as part of the thinking and action processes. Dechant and Marsick (1993) described that this stage

Table 2.4 – Follow Up Studies Using Dechant, Marsick, and Kasl’s (1993) Model

Study Authors	Type of Design	Sample	Purpose of Study	Findings
Oxford (1998)	Qualitative interpretive case study. Team Learning Survey Instrument and Group Development Assessment were used to gather additional data.	N = 45 3 teams with 15 team members each at a US consumer package goods company	Replication of Dechant, Marsick & Kasl (1993) Team Learning study to test and generalize about the model.	Study sought to understand and describe team learning processes and conditions that facilitated or impeded team learning. Research reconfirmed 4 team learning processes in model. Recommended that additional variables be added to the model and TLS including leadership behaviors; prior skills experience and learning by the team members; team members’ commitment to the mission/goal; and exchange mechanisms.
Sauguet (2000)	Qualitative multi-case study design utilizing Team Learning Survey instrument	N = 22 3 teams (sizes 6, 4, and 12), each one in a different Spanish firm.	Analyze how conflict is expressed and managed in teams and its impact on team learning	Study found that conflict management modes that are less confrontational appear to have a more negative impact on the team's ability to learn especially in learning processes that are more cognitive based.
Rogers (2002)	Mixed methods - qualitative case study with quantitative data derived from Team Learning Survey	N = 15 2 teams in communications company with sizes of 7 and 8 in the US	Build on work of Dechant, Marsick & Kasl (1993) to gain understanding of team learning comparing 2 teams at same company	Study added more variables to consider in the model. Found that emotions, climate, and culture are all components for team learning conditions. Also identified lack of support by the leader impeded team operations for learning.
Stull (2008)	Qualitative case study with interviews of team leaders and focus group teams	N = 19 4 teams with 3 team members each plus 7 separate individuals in the US at a US technology company <i>First virtual application of the model</i>	Used the Kasl, Marsick & Dechant (1993) model to compare the experiences of virtual teams with face-to-face ones in a global technology company. Sought to show how team learned in a virtual environment compared to face-to-face teams.	Study suggests that virtual teams learn by interacting with organizational conditions, interpersonal relationships and cognitive processes. Study identified factors of help virtual teams learn – to include regulated communication structure and clear evaluation criteria in addition to trust, conflict management and cooperative leadership. Study also demonstrated that that the model could be used in a virtual environment.

Table 2.4 (Continued) – Follow Up Studies Using Dechant, Marsick, and Kasl’s (1993) Model

Study Authors	Type of Design	Sample	Purpose of Study	Findings
Chang (2013)	Qualitative study using interviews	<p>N = 20</p> <p>Subjects worked in virtual teams in various international organizations in US</p>	Using Dechant, Marsick & Kasl’s (1993) model, study how national culture influences perceptions of teamwork and learning in teams	Study revealed that for cross-cultural teams it was important to pay attention to individuals and their abilities to understand and manage cultural differences. Also, the team leader was important in trying to construct team conditions of greater inquiry and facilitate team meetings by using skills that serve to bridge the cross-cultural gap.
Raes, Kyndt, Decuyper, Van den Bossche, & Dochy (2015)	Quantitative model-based cluster and ANOVA analysis based on questionnaire	<p>N = 168</p> <p>Working professionals distributed across 44 teams in various companies located in Belgium</p>	Test relationship between stages of group development using Wheelan’s (2005) model and the team learning modes from Dechant, Marsick & Kasl (1993). Examined the extent teams exert team-level learning within the different development phases and how the different levels of psychological safety and group potency in the development phases relate to the occurrence of team learning behavior.	The study found that there is a link between group development and team learning behavior. Another conclusion was that both team psychological safety and group potency are important in understanding how groups develop through time, and which social conditions are related to increased engagement in team learning behavior. Study showed that team learning occurs more in the later phases of group development due to higher levels of team psychological safety and group potency.

could cover such items as a revised mission statement, a collection of options for solving a pressing problem, or what the team has best learned about itself.

The researcher identified six studies that sought to test the Dechant, Marsick, and Kasl (1993) Model or some of its components. Table 2.4 contains a summary of the studies uncovered and details the various authors, study design, study sample, and findings. Kasl, Marsick, and Dechant (1997) offered that their model could be applied to many circumstances and groups. As can be seen, these studies occurred using different countries, sample groups, and settings. This demonstrates the flexibility of the model. They are presented in chronological order so the reader can get a sense of the evolution of the model over time.

Other empirically-based team learning studies. There were other studies identified by the researcher that were not tied to any particular formal model for team learning. Table 2.5 contains a summary of these studies. There are qualitative, quantitative, and mixed method studies included from multiple countries. The intention of the studies was to test the relationships between team learning variables identified in the literature. The table also highlights for each study what learning variables from specific component of Hackman's (1987) I-P-O framework were investigated or tested. Drawing this distinction adds to more credibility to the variables distilled from the literature review and included in the conceptual framework. These studies and variables can be further utilized in the analysis and interpretation chapter. Furthermore, what is also of particular value with these other empirical studies is that most were conducted in a virtual setting. The results from conducting the studies in this context offers a clearer

Table 2.5 – Other Team Learning Studies

Author(s)	Context	Type of Design	Study Sample	Purpose of Study	I-P-O Variables & Findings
Cordes (2016)	Virtual	Qualitative utilizing a 2x2 factorial method utilizing a questionnaire with the participants	N = 208 52 four-person virtual teams at a large mid-Western US university	Examined two dimensions that could impact decision making and learning. 1. <u>Technology affordance</u> : the strengths and weaknesses of technologies in terms of the usefulness they offer to teams when performing tasks 2. <u>Collaboration process structure</u> : the sequences, patterns, and routines participants use to interact and solve problems.	<ul style="list-style-type: none"> • Input: <i>Technology</i> used by team to conduct team activities • Process: How the team <i>collaborates</i> using technology • Finding: Learning was enhanced when learning processes were enabled by structured collaboration and the use of multiple technologies to conduct that collaboration
Dixon (2017)	Virtual	Qualitative inductive case study	N = 30 New department at a global research firm. Team dispersed in multiple countries.	Test the relationships between trust, agreed upon goals, and experimenting with action. The 3 variables were seen by the author as potential components to team learning in virtual setting.	<ul style="list-style-type: none"> • Input: <i>Trust</i> and <i>Goals</i> • Process: <i>Experimenting</i> • Finding: VTL was critical factor to: <ul style="list-style-type: none"> ○ Develop agreed upon team goals ○ Facilitate the interdependence between team members ○ Establish trust and psychological safety
Hardin (2005)	Virtual	Quantitative field study	N = 318 52 teams consisting of students in the US and Hong Kong	Using Social Cognitive Theory applied to virtual teams of IT students to determine factors that influence team efficacy (belief that the team can accomplish goal)	<ul style="list-style-type: none"> • Input: <i>Trust, Communication, Leadership, and Structure</i> • Output: Team efficacy (affective metric) • Finding: Strong quantitative link between team efficacy and trust and communications.
Kauppila, Rajala & Jyrämä (2011)	Virtual	Qualitative case study	N = 28 4 global cross-functional teams at a Finnish multi-national products firm.	Investigated how large multinational companies create the means and spaces necessary to achieve effective knowledge sharing and learning by highlighting a viable IT system that supports social networking.	<ul style="list-style-type: none"> • Input: <i>Trust</i> and <i>Technology</i> • Process: <i>Knowledge sharing</i> • Output: <i>Centralized data repository</i> • Finding: Learning increased over time once the team members had established a level of trust. A central data repository helped team refer to past learnings.

Table 2.5 (Continued) – Other Team Learning Studies

Author(s)	Context	Type of Design	Study Sample	Purpose of Study	I-P-O Variables & Findings
Knapp (2016)	Virtual	Quantitative correlation analysis	N = 124 North American plastic pipe trade association	Study if there was a relationship between psychological safety, team efficacy, transactive memory system (TMS), and virtual team learning behaviors.	<ul style="list-style-type: none"> • Input: <i>Psychological safety</i> • Process: <i>Transactive Memory Systems</i> • Output: Team efficacy (affective metric) • Finding: Study indicates that the team interpersonal beliefs of psychological safety and team efficacy were positively associated with team learning behaviors.
Malhotra & Majchrzak (2004)	Virtual	Mixed Methods in 2 phases: observations of one team and questionnaire to a number of teams	1. Observe 8-person team at a company N = 648 @ 54 teams in various companies across the globe	Identify best practices to overcome barriers in communication and knowledge management processes with an eye toward what types of enabling technology are used.	<ul style="list-style-type: none"> • Input: <i>Technology</i> • Process: <i>Task coordination, knowledge sharing, distributed cognition, interaction</i> • Finding: Strong technical support is required to enable team learning processes. The degree of technology needed increased as the complexity of the team's function also increased.
Ortega, Sanchez-Manzanares, Gil & Rico (2010)	Virtual	Quantitative where the participants filled out a questionnaire	N = 144 48 three-member student teams in a large Spanish university	Study analyzed interpersonal context of beliefs that may enable team learning processes leading to team effectiveness in virtual project teams.	<ul style="list-style-type: none"> • Input: <i>Psychological safety and task interdependence</i> • Output: Team effectiveness – satisfaction and viability (affective metrics) • Finding: Psychological safety and task interdependence were important in virtual team learning and resulted in team effectiveness.
Sole & Edmondson (2002)	Virtual	Qualitative field study utilizing critical incident interview protocol	N = 44 7 global cross-functional teams at a global polymer firm.	Study looked at the extent to how situations knowledge – knowledge that is specific to a certain location – is shared by the members of a globally dispersed team.	<ul style="list-style-type: none"> • Input: <i>Psychological safety and task interdependence</i> • Process: Knowledge sharing • Finding: Establishing psychological safety made dispersed teams more willing to share knowledge to promote learning.

view into what team learning variables could be particularly applicable in a virtual environment.

Summary of Team Learning Research

The preceding discussion sought to summarize the recent thinking around team learning and the various models and research that has taken place. There is essentially no one preferred model to describe the phenomenon of team learning (Bell et al., 2012; Decuyper et al., 2010; Edmondson et al., 2007). There have been a mix of conceptually derived models, empirically derived ones, and other research studies.

When evaluating the variables portrayed in these different types of research, the researcher noticed some recurring themes that crossed over from these different data sources. Table 2.6 contains the themes in the categories of I-P-O model (Hackman, 1987). These recurring themes will be useful in constructing the conceptual framework for this study.

Even though a number of team learning studies were identified that occurred in a virtual setting (as displayed in Table 2.5), this was still considered an emerging area of research (Dixon, 2017; Hardin, 2005; Stull, 2008). In fact, two significant meta-analyses of team learning literature (Bell et al., 2012; Decuyper et al., 2010) noted that they intentionally left the discussion of virtual team learning out of their reviews due to its fledgling nature. This points to the complexity of studying the uniqueness of conducting work in a virtual environment (Maznevski & Chudoba, 2000). In the next section of this review, the researcher will cover how virtual teams operate successfully in a virtual environment.

Table 2.6 – Recurring Themes from Team Learning Model and Research Study Discussion

Input	Processes	Output
<ul style="list-style-type: none"> • Appreciation of Teamwork • Individual Expression • Operating Principles • Communication • Team Goals (setting) • Psychological Safety • Team Structure/Design • Team Leader Behaviors • Technology 	<ul style="list-style-type: none"> • Framing/Reframing • Experimenting • Crossing Boundaries • Integrating Perspectives • Collaboration • Group Reflection • Information Processing • Sharing Information • Team Discussion 	<ul style="list-style-type: none"> • Satisfaction • Team Effectiveness • Team Performance • Process Improvement • Team Goals (achieved) • Collective Knowledge • Increased Skills • Knowledge Storage • Knowledge Retrieval

Next, the literature review will shift to incorporating elements of the preceding sections and the distillation of the discussion in those sections into Table 2.6 to address the research questions for this study. The research problem for this study was focused on ways that a virtual team leader cultivates team learning in a virtual environment. The three research questions were aimed at the leader actions for influencing virtual team learning conditions (input), processes (process) and outcomes (output). A discussion for each research question with the most relevant literature uncovered around that topic will be presented.

The researcher will offer a thematic view of each part of the I-P-O model (Hackman, 1987) that corresponds with the terminology used by Dechant, Marsick, and Kasl (1993) to describe the major components of their model. Each part of the I-P-O model will receive a separate section that will review the components of the Dechant, Marsick, and Kasl (1993) model that correspond to it. Additionally, other team learning variables that were uncovered in the literature review and not expressly identified by Dechant, Marsick, and Kasl (1993) but are seen as related to the Dechant, Marsick, and Kasl (1993) model or I-P-O framework part will also be included. Where applicable, the

other variables will be connected to ones in the Dechant, Marsick, and Kasl (1993) model that appear to align by definition or intent.

Input – Virtual Team Learning Conditions

Various team learning models and studies refer to the inputs to team learning using different terminology. Edmondson (1999) called it “antecedents”; Knapp (2010) and Van den Bossche et al. (2006) termed it “team beliefs”; and Cordes (2016) used “context” to describe the inputs. The researcher used Dechant, Marsick & Kasl’s (1993) model of team learning as an overall framework and the identifier “Team Learning Conditions.”

Under Team Learning Conditions, Dechant, Marsick, and Kasl (1993) pinpoint three dimensions: Appreciation of Teamwork; Individual Expression; and Operating Principles. They believe that these conditions set the environment in which the Team Learning Processes can function. While various explanations of the model (Dechant, Marsick & Kasl, 1993; Kasl, Marsick & Dechant, 1997; Watkins & Marsick, 1993) offer some examples of the dimensions of Team Learning Conditions, the Team Learning Survey (TLS) provides the primary means to identify what the conditions entail. Table 2.7 lists the definitions of each dimension.

In assessing the conceptual and empirical models of team learning in both a face-to-face and a virtual context, there appear to be items that were identified that associate well with Team Learning Conditions. Many of these items are consistent with what was in the virtual team learning literature. In addition to the dimensions identified by

Dechant, Marsick, and Kasl (1993), the researcher also believes the following should be considered in this research's conceptual framework and analysis of the research data.

Table 2.7 – Definitions of Team Learning Condition Dimensions

Dimension	Definition
Appreciation of Teamwork	Openness of team members to hearing and considering others' ideas and viewpoints. It also reflects the degree to which members value playing a team role and the extent to which they act in ways that help the team build on the synergy of its members.
Individual Expression	The extent to which team members have the opportunity to give input in forming the team's mission and goals as well as influence the team's operation on an on-going basis. It also reflects the degree to which members feel comfortable expressing their objections in team meetings. Overall, this dimension focusses on the individual's opportunity to make his position know during team discussions or actions.
Operating Principles	The extent to which the team has organized itself for effective and efficient operation. In other words, it assesses whether and how well the team has collectively established a set of commonly held beliefs, values, purpose, and structure. It indicates how effectively the team has balanced working on tasks with building relationships.

From Kasl, Marsick, and Dechant (1997, p. 230)

Communication

Communication was seen in the literature as something that was important in ensuring that team members can express themselves to share their viewpoint. Based on Dechant and Marsick's (1993) definition of Appreciation of Teamwork, communication appears to associate best with this dimension of Dechant, Marsick, and Kasl's (1993) model. In addition to what is stated in the definition, many of the items used in the TLS around this dimension refer to some form of team members communicating with each other around different ideas, thoughts, perspectives, and viewpoints. As noted, there was a constant theme around communication uncovered in the literature. The literature specifically pointed to communicating on a regular and on-going basis through meetings and information sharing forums (Berry, 2011; Dixon, 2017; Kauppila et al., 2011; Knapp, 2016; Sole & Edmondson, 2002). As part of their conceptual views of team learning,

McCarthy & Garavan (2008) found communication between team members as a facilitator of the metacognition process. Decuyper et al. (2010) saw it as part of the information sharing process. In conducting empirical research around the Dechant, Marsick, and Kasl (1993) team learning model, both Oxford (1998) and Stull (2008) found that communication amongst the team was an important condition that supported team learning. Stull's analysis was particularly informing since his study was focused specifically on virtual teams. Hardin (2005) also found communication as critical in getting teams to learn in a virtual environment as well as Van den Bossche et al. (2006). In other research specifically emphasizing virtual team learning behaviors, both Cordes (2016) and Malhotra and Majchrzak (2004) highlighted how technology was an important enabler of communication within a virtual team. Due to the dispersed nature of a virtual team, communication was also identified as something that was especially important with successful virtual teams (Bergiel, Bergiel & Balsmeier, 2008; Cohen & Gibson, 2003; Ebrahim et al., 2009).

Goal Setting

Having clear goals was seen as something vital for a dispersed team to remain focused on its mission. Based on Dechant and Marsick's (1993) definition of Individual Expression and Operating Principles, goal setting appears to associate best with these dimensions of Dechant, Marsick, and Kasl's (1993) model for Team Learning Conditions. Goal setting aligns with the TLS items of team members having the opportunity to define and develop the team's objectives; feeling free to express negative feelings about change; gaining clarity around our purpose and structure; and developing beliefs, values, and guiding principles. Having clear goals was identified in the literature

concerning successful virtual teams (Bergiel, et al., 2008; Ebrahim et al., 2009; Lipnack & Stamps, 2000). It was also something uncovered in the conceptual team learning literature (Bell et al., 2012; Edmondson et al., 2007; Kayes et al., 2005). The work of Oxford (1998) confirmed the components of the Dechant, Marsick, and Kasl (1993) team learning model which include goal setting. Additionally, Stull (2008) implied having a team goal as important for virtual team learning even though it was not a key result of his research. Dixon (2017), however, did note having an agreed upon objective by the team members as a critical take away from her case study research on a virtual team. She specifically mentions that since the team is dispersed, getting buy in from all levels and members of the team is crucial to staying focused on some sort of team learning outcome. Porter (2008) mentions having a goal orientation as important in group learning circumstances. Bell et al. (2012) discussed having a unified goal orientation as a path to team efficacy in their conceptual team learning model. Following the team efficacy theme around the team's belief that it can accomplish its goals, Hardin (2005) and Knapp (2016) found a positive relationship between psychological safety and team efficacy which showed that if a team achieved buy in to the team's goals it would create successful learning conditions.

Psychological Safety

In order for team members to feel comfortable expressing their objections, the team must feel safe in its environment with no fear of retribution. This need was represented in the literature by the work of Edmondson (1996 & 1999) and termed as psychological safety. In some research this term has been equated with establishing trust (Bergiel et al., 2008; Ebrahim, et al., 2009; Kirkman, Rosen, Gibson, Tesluk &

McPherson 2002). Dechant, Marsick, and Kasl (1993) do not directly call out either of these terms but many of the items in the TLS directly relate them. Items such as discussing thoughts and feelings; getting to know each other; balance task accomplishment and relationship building it; and team members able to express their thoughts clearly appear to align with the concepts of trust and psychological safety.

Jarvenpaa et al. (1998) were among the first to link trust and global virtual teams. Establishing trust was a factor that was continually highlighted in the literature concerning successful virtual teams (Cohen & Gibson, 2003; Lipnack & Stamps, 2000; Nemiro, Bradley, Beyerlein & Beyerlein, 2008). Edmondson later performed additional studies in other contexts that confirmed her original work on the importance of psychological safety (Edmondson et al., 2001; Nembhard & Edmondson, 2006; Sole & Edmondson, 2002). There were further studies conducted on psychological safety based on Edmondson's (1996 & 1999) work that occurred in a virtual context. They confirmed that psychological safety was a critical condition for team learning and could be applied in a virtual environment (Cordery & Soo, 2008; Dixon, 2017; Hardin, 2005; Knapp, 2010; Ortega et al., 2010; Stull, 2008). These later studies conducted in a virtual environment are especially applicable to any data analysis conducted for this study.

Team Organization (Team Structure)

Based on Dechant and Marsick's (1993) definition of Operating Principles, team organization appears to associate best with this dimension of Dechant, Marsick, and Kasl's (1993) model. The Operating Principles definition directly highlights organizing the team for effective and efficient operation. Team organization was something that appeared in the literature around what made virtual teams successful. Lipnack and

Stamps (2000) and Ebrahim et al. (2009) referred to the organizing process as “people” in their models. They were concerned with having people on the teams that had the right skills and willingness to work in a virtual environment because they believed that working on a dispersed team necessitated a different mental perspective based on the challenges of working in that setting. The model offered by Kayes et al. (2005) did include a team organization component to their conceptual view of experiential team learning. Malhotra and Majchrzak (2004) mentioned that advanced technology allowed the team to organize effectively to perform its tasks. Edmondson et al. (2007) spoke about the location of team members and stability of the team structure. Ortega et al. (2010) discussed the importance of how the group was organized so it could have interdependencies between group members in how it conducted its tasks.

Leadership Behaviors

While not specifically addressed in the Dechant, Marsick, and Kasl (1993) model, leadership of the team was identified as a key enabler of both virtual team success and team learning. It was identified as a condition for team learning – especially in a virtual environment. Among the first to see this linkage were Kayworth and Liedner (2002) who found that team leaders of global virtual teams heavily influenced all aspects of success on the team. In describing the principle attributes of virtual team success, many studies pointed directly at strong team leadership as important (Bergiel et al., 2008; Ebrahim, et al., 2009; Nemiro et al., 2008). There were also many research studies around team learning and virtual team learning that emphasized the critical influence that leadership had on learning processes (Dixon, 2016; Edmondson et al., 2007; Kayes et al., 2005; Rogers, 2002; Sauquet, 2000; Stull, 2008).

The works by Edmondson (1996; 1999; Edmondson, Bohmer & Pisano, 2001; Nembhard & Edmondson, 2006; Sole & Edmondson, 2002) all drew the strong connection between the leader being directly responsible for establishing psychological safety within the team. Follow up studies by both Hardin (2005) and Knapp (2016) specifically showed the link between team leadership behaviors and psychological safety in virtual team learning. This relationship was also confirmed in other studies by Ashauer and Macan (2013) and Berry (2011).

Zaccaro, Ely, and Schuffler (2008) recognized a lack of research specifically around what the leader should do to promote learning within the group. They advocated three areas where the leader could impact group learning processes: 1) developing, promoting and maintaining a learning environment; 2) helping group members develop and use learning tools; and 3) acting as a learning partner. The learning processes the leader could influence were: 1) members learning how to act collaboratively; 2) individual members gaining knowledge and skills and transmitting these to other members of the group; and 3) group members engaging in synergistic learning.

Technology

Technology is not something covered in the face-to-face models of team learning (Dechant, Marsick & Kasl, 1993; Edmondson, 1999). However, dispersed teams are built with the understanding that advances in communications technology can help bridge the gap of team members not being able to meet in a face-to-face manner (Bell & Kozlowski, 2002; Lipnack & Stamps, 1997). Technology is the essential ingredient that can help overcome challenges like time, location, flexibility, and structure in traditional teams (Townsend, DeMarie & Hendrickson, 1998). Effective communication through

technology permits many significant virtual team learning behaviors such as trust (Jarvenpaa & Leidner, 1999) and psychological safety (Hardin, 2005); goal setting (Dixon, 2017; Ebrahim et al., 2009); leadership (Ashauer & Macan, 2013; Bergiel et al., 2008; Kayworth & Leidner, 2002); team structure (Ebrahim et al., 2009); collaboration (Ellis & Bell, 2005; Malhotra & Majchrzak, 2004); and sharing and documenting learning (Kauppila et al., 2011) to occur. Table 2.8 lists tools for virtual teams to communicate and share information.

Process – Virtual Team Learning Processes

There was split in the literature as to what to call the process stage of team learning. Some referred to it as “behaviors” (Cordes, 2016; Dixon, 2017; Edmondson, 1999; Van den Bossche et al., 2006) and others used the term “processes” (Dechant, Marsick & Kasl, 1993; Decuyper et al., 2010). The researcher used Dechant, Marsick, and Kasl’s (1993) model of team learning as an overall framework and the identifier “Team Learning Processes.”

Dechant, Marsick, and Kasl (1993) refer to team learning processes as the heart model of their model where collective thinking and action occur. This view is based on the work of Schön (1983) where he asserted that thinking and action were the keys to learning. Dechant, Marsick, and Kasl (1993) identify the “thinking” process as Framing/Reframing. The “Action” processes are Experimenting and Crossing Boundaries. They also specify a synthesis process that is the nexus where thinking and action meet. They call this nexus Integrating Perspectives. The definitions of these processes are contained in Table 2.9.

Table 2.8 – Typical Virtual Team Technology Tools

Tool	Examples	Typical Usage	Immediacy	Sensory Mode
Instant Messaging	<ul style="list-style-type: none"> • Lotus SameTime • Facebook messaging • Twitter • Texting 	<ul style="list-style-type: none"> • Instant interaction • Less disruptive than a phone call • View who is available 	<ul style="list-style-type: none"> • Synchronous • Asynchronous 	<ul style="list-style-type: none"> • Visual text (written) • Limited graphics
Groupware	<ul style="list-style-type: none"> • Lotus Notes • MS SharePoint • Wikis & Websites 	<ul style="list-style-type: none"> • Calendars • Contact lists • Arrange meetings 	<ul style="list-style-type: none"> • Asynchronous 	<ul style="list-style-type: none"> • Visual text (written)
Remote Access	<ul style="list-style-type: none"> • WebEx • Lotus SameTime • Windows Remote PC • Chrome Remote Desktop 	<ul style="list-style-type: none"> • User controls PC without being on site 	<ul style="list-style-type: none"> • Synchronous 	<ul style="list-style-type: none"> • Visual • Audio • Tactile
Web Conferencing	<ul style="list-style-type: none"> • WebEx • Lotus SameTime • GoTo Meeting • Cisco Telepresence • Skype 	<ul style="list-style-type: none"> • Live audio • Dynamic video • Whiteboard capabilities • Applications sharing 	<ul style="list-style-type: none"> • Synchronous 	<ul style="list-style-type: none"> • Visual • Audio (optional) • Interactive graphics
File Transfer	<ul style="list-style-type: none"> • File Transfer Protocols • MS SharePoint • Internal shared drives • Websites 	<ul style="list-style-type: none"> • Ease of sharing files • Security 	<ul style="list-style-type: none"> • Asynchronous 	<ul style="list-style-type: none"> • Varies with file content
Email	<ul style="list-style-type: none"> • Numerous types – governed by organization 	<ul style="list-style-type: none"> • Sending messages & files 	<ul style="list-style-type: none"> • Asynchronous 	<ul style="list-style-type: none"> • Visual • Audio (attached files)
Telephone	<ul style="list-style-type: none"> • Regular telephone or cell • Polycom Conferencing • Voice Over Internet (VIOP) 	<ul style="list-style-type: none"> • Direct calls • Conference calls 	<ul style="list-style-type: none"> • Synchronous • Asynchronous (with voicemail) 	<ul style="list-style-type: none"> • Audio

Adopted from Ebrahim, Ahmed, and Taha (2009)

Table 2.9 – Definitions of Team Learning Processes

Process	Definition
Framing/Reframing	Framing is the group's initial perception of an issue, situation, person, or object based on past understanding and present input. Reframing is the process of transforming that perception into a new understanding or frame.
Experimenting	Group action is taken to test hypotheses or moves, or to discover and assess impact.
Crossing Boundaries	The team as a whole communicates and moves ideas, views, or information between and among other people. Boundaries can be physical, mental, or organizational.
Integrating Perspectives	Group members synthesize their divergent views, such that apparent conflicts are resolved through dialectical thinking, not compromise or majority rule.

From Dechant, Marsick, and Kasl (1993, p. 7)

When considering how the four learning processes interacted with each other, Dechant, Marsick, and Kasl (1993) further identified phases that the teams goes through as part of the learning process. These phases are not unlike the team developmental stages identified by Tuckman (1965) and Tuckman and Jensen (1977) (Chang, 2013; Oxford, 1998; Stull, 2008). In additional research, Raes, Kyndt, Decuypers, Van den Bossche, & Dochy (2015) used the phases to relate them to Wheelan's (2009) model of group development. Kasl, Marsick, and Dechant (1997) later reclassified the learning phases as "modes". Table 2.10 lists the definitions of the learning modes and the team learning processes related to each of them.

Similar to the discussion offered above around Team Learning Conditions, when assessing the conceptual and empirical models of team learning in both a face-to-face and virtual context, there appears to be items that correspond to the both the team learning processes and modes contained in the Dechant, Marsick, and Kasl (1993) model.

Table 2.10 – Definitions of Team Learning Modes

Mode	Definition	Related Processes
Fragmented	This mode marks the beginning of a group's work together. Learning has not moved much beyond the individual. It is inhibited because members hold frames or views, vary in their levels of commitment to being in the group, and are often in diverse technical backgrounds.	Framing and some Experimenting
Pooled	Clusters of individuals learn within the group. The content forms a collective group of knowledge, but there is little attempt to develop a collectively held and understood view.	Adds Reframing at the individual level and Crossing Boundaries
Synergistic	Meaning schemes are altered or discarded as a result of collective reframing among group members. People often question the values, conditions, and beliefs that support the mental framework with which they understand and actively define issues or situations. Members have evolved a language of sharing meaning including their own models or metaphors.	Adds Integrating Perspectives
Continuous	All team learning processes are used easily and regularly. Collective reframing has become the norm. Members' perspectives are easily integrated and evolved into consensual understanding. The group has developed the habit of seeking and valuing diversity, internally and externally, in order to broaden its perspective. The team experiments often – individually and as a body – with the larger organization, thus extending learning to others.	Crossing Boundaries and Experimenting into the larger organization

From Dechant, Marsick, and Kasl (1993, pp. 10-12)

Collaboration

Collaboration was a topic continually surfaced in the literature around the processes of team learning – either in a face-to-face or virtual setting. It is often used as an umbrella term for a joint intellectual effort by participants or participants and facilitators. In most collaborative environments, groups of people are collectively working together mutually searching for understanding, solutions or meanings, or creating something new (Lee, 2005). Collaboration relates to the Dechant, Marsick, and Kasl (1993) model for Team Learning Processes by looking at the definitions for learning modes and the TLS items. In the Synergistic and Continuous modes, thinking and action become a fluid process. The team is mutually sharing ideas and building knowledge in line with the definition of collaboration. TLS items such as sharing personal insights

with one another; changing perspectives viewpoints based on new information; working collaboratively results in greater learning; views often change based on team discussion; and learning from others outside the team relate to the definition of collaboration. Each of the four team learning processes are found in these TLS items.

When looking at the literature, Van den Bossche et al. (2006), in their model of team learning, based their learning processes on active mutually constructed knowledge by a group. Mutually shared cognition was a factor identified in many other studies of team learning (Edmondson, 1999; Edmondson et al., 2007; Hardin, 2005; Kayes et al., 2005). Barron (2003) made the empirical connection that mutually shared cognition is a form of collaboration in how the team's discourse practices interact with its knowledge-building processes. Collaboration is defined as multiple individuals interacting to create a shared meaning around a process, product or event (Roschelle, 1992). It is more than just sharing information and can occur using multiple communication mediums (Hinds & Weisband, 2003). The interaction among members of the group and the characteristics of their discourse/discussion practices is considered the process through which mutual understanding and shared cognition is reached. This social process of building mutually shared cognition is a team learning process. In this process, negotiation is key to determining which kind of interactions, which patterns in discourse, can be considered to be forms of team learning behavior leading to mutually shared cognition (Van den Bossche et al., 2006). Ellis and Bell (2005) arrived at similar conclusion in advocating a team learning framework built on information processing through collaborating.

Effective collaboration in a virtual environment is a challenge and needs to be accounted for by virtual team leaders (DeRosa & Lepsinger, 2010). Marlow, Lacerenza,

and Salas (2017) have offered a model of communication techniques to be used by leaders in a virtual environment that can lead to more effective collaboration. They advocate for frequency, quality and content as the key notions behind methods to communicate and collaborate. Creating an environment where the team communicates to collaborate and to learn is a key function for any virtual team leader (Zaccaro et al., 2008; Zaccaro & Klimoski, 2002).

Cordes (2016) emphasizes the factor that collaboration sessions must be structured for them to be effective. He points to the role of the leader in facilitating the collaboration meetings and using advanced facilitation techniques like a formalized agenda, ensuring open dialogue, and consensus decision making. Wilson et al. (2007) discuss the power of organized collaboration in running through their cyclical process of team learning consisting of sharing, storage and retrieval of information. Edmondson (1999) specifically mentions team learning behaviors that align to collaboration like asking questions; seeking feedback; and discussing errors for unexpected outcomes of actions in her model. Decuyper et al. (2010) refer to the interplay of knowledge construction, conflict, and co-construction in describing team learning processes like boundary crossing and team reflexivity. These types of activities in both of these models are ones that conform to what is involved in collaboration (Lee, 2005).

Group Reflection

Dechant, Marsick, and Kasl (1993) reference the work of Schön (1983) as influential in their formulation of their model – particularly when describing the inter-related processes of thinking and action. Schön (1983) refers to the cyclical nature of these two activities as either Reflection-in-Action or Reflection-on-Action. In the

Dechant, Marsick, and Kasl (1993) model one can see the inference to reflection not only in the thinking and action phases of the Team Learning Processes but also in some of the items mentioned in the TLS. Items like revising viewpoints based on input from others inside and outside the team; viewpoints change after discussing the problem; challenging basic beliefs or assumptions; listening to perspectives of every team member; and sharing learning with other people outside the team relate to reflection.

The cyclical nature of thinking and action, makes reflection a powerful tool in adult learning (Merriam & Bierema, 2014) and team learning (Kayes et al., 2005). Many of the models and studies uncovered by the researcher highlighted the use of reflection or reflexivity in their design (Cordes, 2016; Decuyper et al., 2010; Edmondson, 1999; Kayes et al., 2005; Knapp, 2016; Sole & Edmondson, 2002). The cyclical nature of reflection also harkens the experiential models of learning (Jarvis, 1987; Kolb, 1984) there were another part of the theoretical foundation used by Dechant, Marsick, and Kasl (1993) to create their model. They specifically identify Experimenting as one of the four team learning processes highlighting the need for reflection. Boud, Keogh, and Walker (1985), Boud and Walker (1993), and Raelin (2002) identified reflection as an important tool in turning experience into learning in the workplace. Later work by Boud, Cressey, and Docherty (2006) created a model to enact what they termed “productive reflection” at work in a team setting.

Much of the work in the area of Action Learning highlight the importance of reflection in that experiential learning process (Dilworth & Boshyk, 2010; Marquardt, 2002; O’Neil & Marsick, 2007; Yorks, O’Neil & Marsick, 1999). Reflection entails considering some type of experience as either an individual or a group and then analyzing

that experience as way to make meaning of it. It typically results in a new or different way of operating in the future (Merriam, Cafferella & Baumgartner, 2007). This is considered a basic level of reflection and not the type referred to as “critical reflection” in the Action Learning literature where the underlying assumptions about an experience are questioned and analyzed (Yorks, O’Neil & Marsick, 1999). While critical reflection is seen as a highly specialized and intricate form of learning on a group level (Rimanoczy & Turner, 2008), others believe that regular reflection is enough for learning to occur with a group (Perriton, 2004). Lander, English, and Quigley (2004) recognized that reflection can be done in a group setting. Looking at a co-operative inquiry-based development program in Canada, they discovered that discourse used between teammates in the program helped lead to reflection which improved overall team performance. The study showed that group reflection can be productive if initiated and used. This concept is heavily supported in the Action Learning literature (Nicolini, Sher, Childerstone & Gorli, 2004). Dickenson, Burgoyne, and Pedler (2010) showed that Action Learning can be applied in a virtual setting – along with the discourse and reflection practices. Finally, Marsick, as part of Watkins and Marsick (1993), discussed three approaches to enhance team learning that included action learning, action science, and action reflection learning. All three involve reflection as a critical element.

Group Facilitation

In looking at the variables of information processing, sharing information, and team discussion, the researcher chose to group these three together under the heading of “group facilitation”. There has been some precedence for uniting these variables under this term. Kaner (2007) believes that helping a group process information is a central

tenant of group facilitation. Schwartz (2002) has referred to sharing information as one of his ground rules for effectively facilitating team meeting sessions. Heron (2008) identifies holding discussions as a team is one of the hallmarks in setting the stage for group facilitation. From a broader perspective, group facilitation is important because it is what powers reflection (Cunliffe & Esterby-Smith, 2004) and collaboration (Lee, 2005). Since collaboration and reflection are key components of the Dechant, Marsick, and Kasl (1993) model, facilitation is seen as a necessary quality to enable those components. This is especially true of the VTL in leading the facilitation of reflection and collaboration (DeRue & Ashford, 2014).

Due to the dispersed nature of virtual teams, communicating and collaborating through meetings enabled by technology is crucial to the success of the team (Klein & Kleinhanns, 2003). Communicating and collaborating is a vital part of learning on a group level (Van den Bossche et al., 2006). A team leader that can effectively facilitate meetings where the team is collaborating is a valuable skill to have and can lead to team success (DeRosa & Lepsinger, 2010). Facilitating collaboration meetings in a virtual environment is very challenging and calls for special tools and skills (Gupta, Bradley & Yeoh, 2008). The studies around team learning in a virtual environment do refer to these tools and skills. Malhotra and Majchrzak (2004) discuss the need for leaders using appropriate technology to lead virtual meetings. Dixon (2017) points specifically at team leaders having the skills necessary to successfully facilitate a team meeting session to establish understanding of team goals and objectives and to obtain feedback and buy in. These same skills and processes can also be seen in the conceptual team learning models of Edmondson et al. (2007); Kayes et al. (2005); and McCarthy and Garavan (2008)

where they discussed the cyclical process of establishing goals and getting feedback from the team.

A leader's ability to facilitate team discussions is something that Edmondson (1996; 1999; Edmondson et al., 2001) refers to many times in her research on team learning – especially as a way to establish psychological safety. Research by Ashauer and Macan (2013), directly targeted at identifying the connection between a team leader in effectively facilitating team discussions and the development of psychological safety, showed the value of this skill. Cordes (2016) notes the need to have a structured arrangement to facilitating meeting as part of the collaboration process central to team learning processes.

Specific actions required by leaders to facilitate meetings can be found in the literature focused on group facilitation in either a virtual classroom or business meeting session. Heron (2008), Kaner (2007), Lakey (2010), Schwartz (2002), and Silberman (2006) all offer techniques for leaders to not only have the right mindset for facilitation but also use multiple techniques to facilitate decision making and group learning. Among the techniques they offer guidance on include: brainstorming; agenda setting; incorporating feedback; ensuring and encouraging complete group participation; and dealing with conflict. Conway, Jennings, Raschke, Witort, and Beyerlein (2008); Nemiro (2008); and Sivunen & Valo (2010) recommend specific techniques and technology tools for conducting these types of activities in a virtual environment.

Output – Virtual Team Learning Outcomes

The discussion presented earlier in this chapter around the results of virtual team learning offer much of the material when reviewing the literature for Team Learning Outcomes from the Dechant, Marsick, and Kasl (1993) model. However, when comparing the previous two components of the model with the third component, the extent of detail used in describing Team Learning Outcomes is not of the same richness as with Team Learning Conditions and Processes. In fact, when looking further at the various descriptions of their model in the literature (Dechant, Marsick & Kasl, 1993; Kasl, Marsick & Dechant, 1997; Watkins & Marsick, 1993), they offer little in terms of the exact items involved in this component of the model. The TLS created by Dechant and Marsick (1993) in support of the model does supply items that can be used in looking at Team Learning Outcomes. These items include: performance improvement; new or revised ways to work; new or revised norms; enhanced quality of output; and changed way of thinking (p. 3). Other models of team learning do offer some more clues as to what the results of team learning could look like. Edmondson (1999) boils it down to customer satisfaction. Bell et al. (2012) mention team performance. Edmondson et al. (2007) offer two views in terms of task mastery and outcome improvement. These views can be summarized in three schools of thought as either affective (satisfaction/subjective performance), objective (meeting established team goal) or cognitive (positive change in collective skill level) measurements. Additionally, in a virtual setting, Malhotra and Majchrzak (2004) recommend utilizing technological tools as ways to organize and share these learning outcomes.

The three schools best connect with the Dechant, Marsick, and Kasl (1993) model in two ways. The first way revolves around items in the TLS in Team Learning Outcomes that directly point to these schools. The affective measure refers new social norms and new ways of managing. Objective ones align with performance improvement and new work processes. The cognitive measures situate with the new ways of thinking and new approaches to work. The second way these schools connect is through the definitions of the learning modes. Teams that are in the Synergistic or Continuous mode will have high levels of satisfaction and engagement, cognitive advancement, and meet performance objectives (Kasl, Marsick & Dechant, 1997).

Affective Measures

Affective measures indicate the amount of satisfaction and effectiveness around how a team judges how it implemented team processes. They measure the mood, feelings, and attitudes about how the team effectively works together (Ortega et al., 2010). Surveys were the main instrument used to determine the satisfaction that team members had with the team they served on. Ortega et al. (2010) asked the teams to rate themselves on survey with the level satisfaction they had with working on the team as a measure of effectiveness. Chen, Wu, Yang, and Tsou (2008) used a survey to have members of a virtual team rate satisfaction as a measure of team effectiveness. Kirkman et al. (2002) looked at developing satisfaction within the team as a challenge for leaders of teams to make them successful. Cordery and Soo (2008) identified team member satisfaction as in how the team functioned as a final measure of team effectiveness. In another view of judging satisfaction, Edmondson (1999) believed that the output of team learning was determined by the customer judging the result by a satisfaction index.

Performance Measures

The variables of team performance, process improvements, and achieving team goals are seen as objective measures of performance. An objective measure is one that compares actual performance to clear and pre-determined criteria (Fitz-Enz, 2010). Achieving pre-determined goals is a standard by which most organizations use in evaluating performance of groups (Pfeffer & Sutton, 2000). The evaluation tends to be an objective measure of performance (Forsyth, 2010) where the measurement can supply feedback to the group around what it did well and areas for improvement (Levi, 2011). Measuring performance can also be used as a way to reward individuals and the team (Lawler, 2006). In some writings uncovered in the literature, the extent of team learning was determined by the how well the team performed (Bell et al., 2012; Decuyper et al., 2010). Dixon (2017) noted that if a team reached its goal, then the team learned successfully.

Marquardt (2002) asserts that organizations should adopt some type of method to objectively measure its progress on learning. From scanning the literature, there appears to be two dominate learning measurement models utilized in organizations – and corporate entities especially. The first is Kirkpatrick's (1998) Four Levels of training evaluation. Kirkpatrick and Kirkpatrick (2006) offer a model where any type of training event can be measured and evaluated. It has long been considered as the pre-eminent training program evaluation model (Reio, Rocco, Smith & Cheng, 2017). The other one is where Phillips (2003) builds on Kirkpatrick's (1998) model and adds the financial concept of ROI (Return on Investment) to apply to learning programs. ROI is a calculation used extensively in finance to place a value on some sort of expenditure

(Berman & Knight, 2006). When applied to a project, ROI measures the monetary value of the results against the costs for the project (Kerzner, 2010). Phillips (1997) believed this level of scrutiny was essential to for organizations to determine the ultimate impact of learning.

Cognitive Measures

Olivera and Straus (2004) explain that teams are made up of individuals that collaborate with one another to obtain skills. Tinsdale, Stawiski, and Jacobs (2008) cite the mutually shared cognition that team arrives at through group learning. Employing “thinking” processes (Dechant, Marsick & Kasl, 1993) through shared cognition is shown to increase the group’s collective skill level or new ways of operating (Edmondson et al., 2007). Van den Bossche et al. (2006) pointed to mutually shared cognition as an outcome to virtual team learning in their study.

In looking at other cognitive outcomes of team learning, Knapp (2016) studied transactive memory systems (TMS) as an indicator of the cognitive team learning. Using a survey developed by Lewis (2003) to measure TMS in the virtual teams he studied, Knapp (2016) found that utilizing the team’s collective memory acted as way to improve the team’s performance. Sole and Edmondson (2002) found that the dispersed teams they studied ended up having improvement in their work processes by learning from other regions and incorporating these ideas into their local efforts. McCarthy and Garavan (2008) identified that increasing a team’s meta-cognition was an outcome of team learning processes. They asserted that the team learned increased skills by having an awareness of its surroundings and environment.

Centralized Database

Maintaining a data repository for the knowledge created by the team was seen as a critical outcome of any team learning and project work. Malhotra and Majchrzak (2004) emphasized the importance of utilizing an appropriate technology solution in creating some sort of method for teams to share information across boundaries and monitoring team processes. Kauppila et al. (2011) noted the importance of having a central repository of information available for the team to refer to around past learnings. Gomez, Wu, and Passerini (2009) agreed with this suggestion when they discussed how in an interactive team-based learning program that the team needed to go back and review information for future use. Ebrahim et al. (2009) offered examples of the types of technology that the virtual team can use to be effective.

Other Influences on the Conceptual Framework

In addition to the components of the Team Learning Model that relate to the I-P-O framework, Dechant, Marsick, and Kasl (1993) also noted the work of others that acted as a foundation to their thinking around the model. Schön (1983) was vital for the central concept of thinking and action in the model. Tuckman's (1965) work around group development helped act as a guide for constructing the learning modes. Boud and Walker (1990), Jarvis (1987), and Kolb (1984) were referred to in their work around experiential learning which Dechant, Marsick, and Kasl (1993) believed was an important underlying basis to team learning. While not expressly called out in the writings explaining the foundations of the Dechant, Marsick, and Kasl (1993) model, Marsick has written extensively on informal and incidental learning in the workplace

(Marsick, 1987, 2003, 2009; Marsick & Volpe, 1999; Marsick & Watkins, 1990, 2001). In Marsick (2003; 2009) and Marsick and Watkins (1990; 2001) she identifies informal learning as a component of group learning. Based on this inference, the researcher considers informal learning an influence in Marsick's thinking in formulating a model of team learning. These three influences will be discussed in more detail.

Group Development

Dechant, Marsick, and Kasl (1993) point to the work around group development and group dynamics as heavily influencing the development of their team learning model. They specifically point to the work of Tuckman (1965) where he discussed four progressive stages of team development as a basis behind the four learning modes they created of Fragmented, Pooled, Continuous, and Synergistic (Kasl, Marsick & Dechant, 1997). In order to understand how a group moves through these different learning modes, it is important to understand the stages of team development in Tuckman's (1965) model. This understanding can help inform the conceptual model as well as the analysis and interpretation of the research findings.

Tuckman's (1965) four stages of group development are: 1) forming; 2) storming; 3) norming; 4) performing. In later work (Tuckman & Jensen, 1977), Tuckman identifies a fifth stage of adjourning. The first is orientation to the task under the Forming stage where the group is testing and depending on direction. The second is the emotional response to the group where some members resist the group's influence and resist under the Storming stage. The third is when there is an open exchange of relevant information including personal, opinions on task effectiveness, and solutions generation processes under the Norming stage. In the fourth stage, the norms created are implement for the

Performing stage. The fifth stage is the self-evaluation and termination of activities one where the group goes through the Adjourning stage.

While Tuckman's work is the most widely known, the group dynamics literature contains other versions for applying like-minded methods (Forsyth, 2010; Levi, 2011). Wheelan (2005) conducted an analysis of many models and classified them into five different categories. The most common were the Sequential ones (typified by Tuckman), but others included Cyclical, Life Cycle, Equilibrium, and Adaptive/Non-sequential Models. Wheelan (2005) proposed an integrated model representing a holistic view with five stages: 1) dependency and inclusion; 2) counter-dependency and fight; 3) trust and structure; 4) work; and 5) termination.

In other research around group development and the learning modes, Raes et al. (2015) conducted a quantitative cluster and ANOVA analysis based on a questionnaire with 168 working professions distributed across 44 teams in Belgium. The team wanted to test the relationship between the stages of group development using Wheelan's (2009) model and the team learning modes from Dechant, Marsick & Kasl (1993). The study showed that team learning occurs more in the later phases of group development due to higher levels of team psychological safety and group potency. It also offered a view that the learning modes of Kasl, Marsick, and Dechant (1997) can be applied to group development in a virtual environment.

Experiential Learning

Dechant, Marsick, and Kasl (1993) also point to the work around experiential learning as an important foundation to their model. They specifically highlight the work of Boud and Walker (1990), Jarvis (1987), and Kolb (1984) as key influencers. Central

to the concept of experiential learning is the interplay between action and experimentation. Dewey (1938) was the first to draw this conclusion in proposing that learning from experience occurs when the experience is composed of two major principles: continuity and interaction. Continuity involves connecting learning from current experience to future implication. Interaction describes the transactional relationship between the person and the environment. It is through the interplay of continuity and interaction where learning results from the reconstruction of experience.

Kolb (1984) expands Dewey's ideas around experiential learning by describing learning as a cyclical process revolving around thinking and doing. This cyclical process is further broken down between four distinct stages (p. 42). In the "thinking" portion, a person starts by having an actual experience of the senses ("concrete experience") that leads to reflecting internally on the experience ("reflective observation"). From this point the person proceeds to the "doing" portion whereby the person develops new ideas around the experience ("abstract conceptualization") from which he implements new types of action ("active experimentation"). However, Kolb's design relates a cycle of thinking that is very personal and process driven for each experience a person has. It does not acknowledge that a person may act instinctively or incorporate his or her surroundings into a response to a situation.

Other scholars have advanced the approaches offered by Dewey and Kolb on experiential learning. Jarvis (1987) builds on Kolb's thinking by accounting for types of non-reflection learning processes such as rote practice or memorization in addition to non-learning responses to experience like presumption, non-consideration, and rejection. Jarvis created a model that adds these aspects to the cycle of experience, reflection,

thinking and action advocated by Kolb (p. 25). Boud, Keogh, and Walker (1985) and Boud and Walker (1993) further add to the cyclical approach to experiential learning by expanding the function of the reflective process into three states: revisiting the experience (recalling learners' experience); attending to feelings (enhancing positive feelings and working through any negative feelings); and reevaluating the experience (associating previous experience and learning and integrating this with learner's values, ideas, and feelings) (1985, p. 36; 1993, p. 77).

The continuous and cyclical learning process is found in some of the research on team learning. Kayes et al. (2005) offer an update to Kolb's (1984) model applied to individuals and relates it to teams. Kayes et al. (2005) posit that learning in teams is viewed as cyclical process of knowledge creation through the transformation of the group experience. Team leader behavior, learning goals, tasks, and composition influence learning and are moderated by climate. The learning that occurs emerges as a key component to developing teamwork amongst the team. McCarthy and Garavan (2008) also viewed team learning in a cyclical and experiential manner. Using metacognition as the goal of the team, McCarthy and Garavan (2008) offered that team learning was a spiral of thinking, acting and reflecting in a continuous process. With each turn in the cycle, the team would learn more about not only itself but also about the environment surrounding the team. This environment could be other groups, support mechanisms, or the operating context. Such enhanced knowledge resulted in metacognition – knowledge about all facets and areas impacting the team.

In looking at how experiential learning translates to management development for HRD professionals, there is a growing source of literature around the concept learning

agility. Learning agility is defined as a person's ability to take previous experiences and apply them in four different factors. The factors are people, results, mental, and change (Lombardo & Eichinger, 2000). Dalziel (2011) contends how this ability in leaders shows their potential to grow. Eichinger, Lombardo, and Capretta (2010) offer a number of techniques and strategies to build learning agility in leaders. However, even with the increasing momentum of this concept (Rego, Viswanathan & Ross, 2014), there is still a need for fully understanding its theoretical grounding (DeRue, Ashford & Meyers, 2012).

Informal Learning

Informal learning is not a factor specifically addressed by Dechant, Marsick, and Kasl (1993) in the foundation of their model; however, they do mention that "team learning seldom takes place in the classroom; it is the result of interaction of people with the environment as they resolve a task" (p. 4). This notion points to informal learning as a possible area for exploration. Additionally, there is strong evidence in the literature that informal learning naturally occurs in the workplace (Cross, 2007; Matthews, 2013). This especially is applicable in dispersed team where team members are isolated individuals left alone to direct their own activities (Clemons & Kroth, 2011). Such a situation is ripe for informal learning practices (Matthews, 2013).

In looking at informal learning, there appears to be two lines of thought. One is where informal learning occurs as either a semi-structured plan like in Self-Directed Learning (Merriam & Bierema, 2014). The other is when learning occurs in a serendipitous nature (Marsick & Volpe, 1999). In the latter description, Marsick (1987) drew the distinction between formal and informal learning occurring in the workplace

and said that informal was more prevalent. Later, Marsick (with Volpe, 1999) advocated that informal learning often occurs in a haphazard manner in the workplace with often no direction intended by the learner. Marsick and Watkins (1990) believed that incidental learning was a subcategory of informal learning and was characterized as a “byproduct of some other activity, such as task accomplishment...trial-and-error experimentation... (and) almost always takes place in everyday experience although people are not always conscious of it” (p. 12). It includes learning from mistakes, learning by doing, and learning through a series of covert interpersonal experiments. Marsick and Watkins (1990; 2001) further posit that a continuum exists for the learner along conscious awareness. With incidental learning, the learner is less aware of the learning occurring than with informal learning. In their view of informal learning, Marsick and Watkins (1990; 2001) believe learning can be deliberately encouraged by the organization, but it is gained through learning from specific experiences.

The other view of informal learning follows the Self-Directed Learning (SDL) school of thought. As a type of adult learning it can be described as either a personal attribute, where the person wishes to work independently and autonomously, or as a process that dictates a method of organizing instruction (Merriam & Bierema, 2014). The best known definition for SDL was from Knowles (1975) where he felt it was a derivative of informal learning as:

a process in which individuals take initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p.18)

Previously, Knowles (1950) had first identified informal learning as a form of non-formal learning. Knowles looked at traditional learning as a highly structured event.

He discussed the need for adults to pursue education activities outside the confines of a structured environment where the learning would be non-formal. These thoughts eventually led to Knowles' developing the concept of andragogy as an opposing view to pedagogy (Knowles, 1980). Tough (1982) and Brookfield (1986) have further developed Knowles' thinking, but like Knowles, they tend to discuss informal learning more in the context of an unstructured learning event. The learner still undergoes some sort of formalized learning plan, but not under the guise of a structured classroom environment. Further work on SDL comes from Candy (1991) where he described informal learning as an unstructured, unplanned, and informal occurrence. Candy believed it had an autodidaxy quality where the learner took total control of his/her learning on a topic.

Given the flexibility advocated by Candy (1991), the possibilities for informal learning have multiplied in today's highly digital environment (Maxwell, 2013). Learning opportunities are even more easily and readily accessible through web-enabled technologies (Horton, 2000). In addition to the growth of e-learning technology and asynchronous training (Garrison & Anderson, 2003), the growth of on-line learning communities has made knowledge acquisition and knowledge sharing instantly available to anyone with access to the internet (Palloff & Pratt, 2007). Individuals and teams are more empowered now to take control of their specific learning needs (Cross, 2007). Subsequently, informal learning is something that is now actively promoted within many organizations because of advances in technology (Carliner, 2012).

The virtual environment, while liberating in some sense with easy access to knowledge, can have its challenges with regards to knowledge management. Incidental learning, or tacit knowledge, that team members acquire can be difficult to share across

the team (Maznevski & Athanassiou, 2003). Since team members are remote and do not have face-to-face contact, sharing informal or incidental learning does not readily have the opportunity to occur. This necessitates the need for frequent contact between team members utilizing technology-enabled communication tools to share knowledge (Cranton & Orvis, 2003). Additionally, teams need to be appropriately trained in the technology for it to be effective (Musico, 2009). The literature around team leader effectively facilitating meetings (Kaner, 2007; Schwartz, 2002); establishing psychological safety (Ashauer & Macan, 2013; Edmondson, 1999; Knapp, 2016); and utilizing appropriate technology to share content (Klein & Kleinhanns, 2003) will help VTLs take advantage of informal learning and capture knowledge gained by the team.

Conceptual Framework

While investigating the areas outlined above, a conceptual framework for the study began to evolve. The framework helped to act as an organizing structure for the study's findings as well as an approach to conduct the analysis, interpretation, and synthesis process of those findings. It also became a repository for the data collected and provided the basis for informing the researcher during various iterations of coding the data (Bloomberg & Volpe, 2016).

The conceptual model is based on the Dechant, Marsick, and Kasl (1993) model for team learning and Hackman's (1987) I-P-O model. The Dechant, Marsick, and Kasl (1993) model was selected for a number of reasons. It was derived through empirical research (Dechant, Marsick & Kasl, 1993). It had a number of follow up studies conducted on it that added to its validity (Chang, 2013; Oxford, 1998; Rogers, 2002;

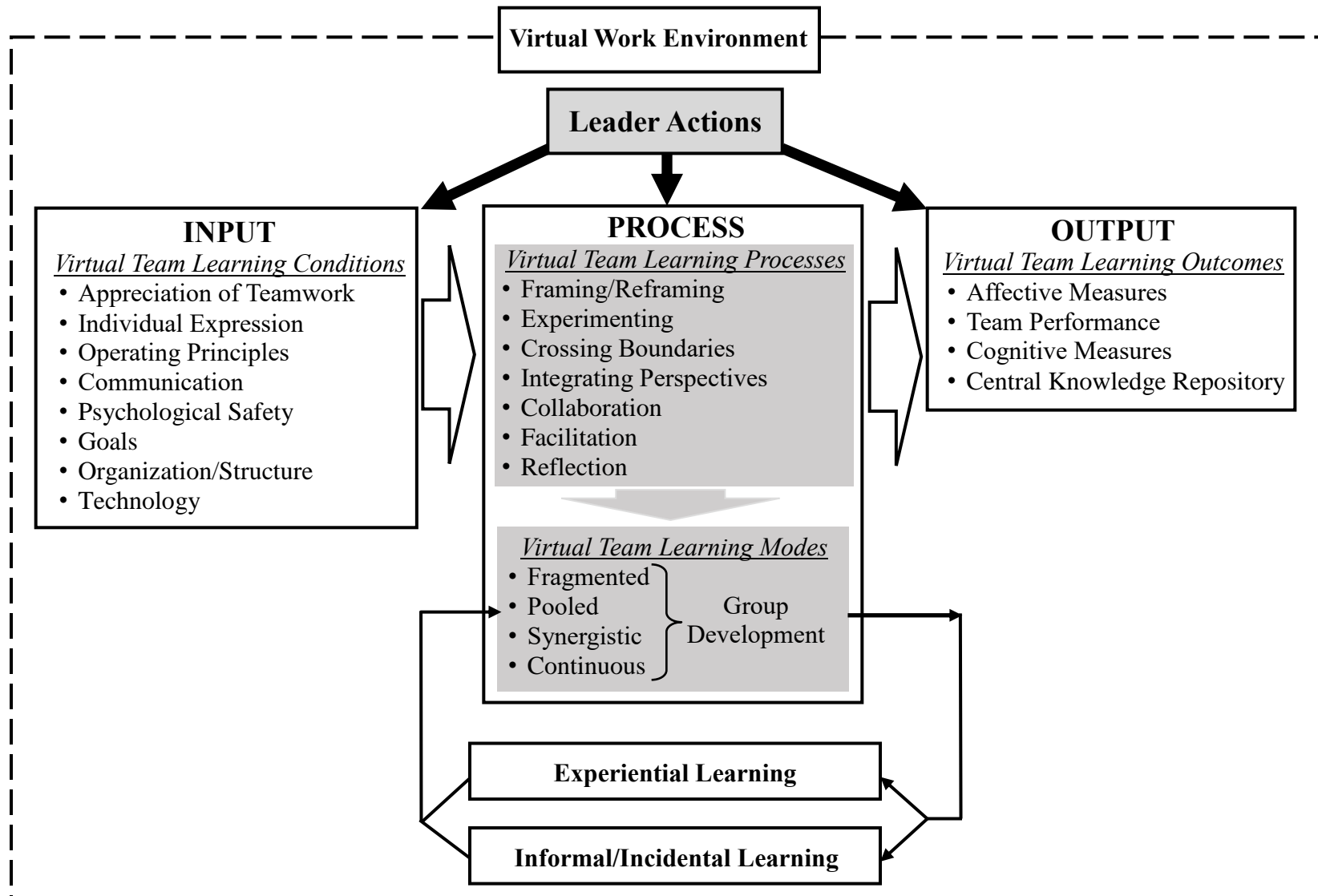
Sauquet, 2000; Stull, 2008). It had an assessment tool (TLS) specifically designed to activate it in a real-world setting (Dechant & Marsick, 1993). It had been applied in a virtual environment (Stull, 2008). These types of flexible application and activation qualities were not found in the other team learning models or research uncovered and discussed above. However, in addition to the components that Dechant, Marsick, and Kasl (1993) identified, there are items from the literature review that should be included in the conceptual framework so they can be used for the findings, analysis, interpretation, and synthesis of the data. Additionally, Hackman's (1987) I-P-O model was selected because it offers a simple and demonstrated approach to analyze organizational processes for team learning models (Dulebohn & Hoch, 2017; Ilgen et al, 2005; Knapp, 2010).

Figure 2.1 contains a graphical representation of the study conceptual framework.

Each component of the Dechant, Marsick, and Kasl (1993) team learning model has been assigned a corresponding part of the I-P-O model. Input represents Team Learning Conditions. Process represents Team Learning Processes. Output represents Team Learning Outcomes. The flow of the I-P-O model is similar to Dechant, Marsick, and Kasl's (1993) portrayal of the model.

The dashed line around the entire model represents team learning occurring in virtual environment. Since the purpose of this study was to uncover ways that virtual team leaders cultivate team learning, the focus of the study is on leader actions. The arrows emanating from the "Leader Actions" box are intended to represent the connection between leader actions and how they impact each component of the model. This division also helps highlight the three research questions for this study around VTL actions influencing team learning conditions, processes, and outcomes.

Figure 2.1 – Study Conceptual Framework



Each component of the model contains sub-components that were identified in the literature review. Some of the sub-components are directly from the Dechant, Marsick, and Kasl (1993) model. Others were gleaned through the literature review. Under the process component, the researcher retained the team learning modes identified by Kasl, Marsick, and Dechant (1997). The types of adult learning impact the extent of learning that occurs in the mode. As the group learns it develops as it progresses through the learning modes. Learning is represented as a cyclical process that represents the “thinking” and “action” foundation for the model.

The researcher sees this conceptual framework as representing how the literature and the Kasl, Marsick, and Dechant (1993) model of team learning intersect in a virtual context. The framework represents the research problem, the context and background of the study, as well as the relevant literature related to the topic. It will be used for the analysis, interpretation, and synthesis of the findings data.

Chapter III

METHODOLOGY

The purpose of this research study was to understand what ways the leader of a virtual global project team cultivates team learning. The methodology selected was intended to support the researcher's purpose behind implementing the study. In conducting the study, the researcher hoped to provide some useful insights and recommendations for adult learning practitioners, especially those interested in creating and facilitating learning programs for virtual team leaders (VTL). The aim of these programs would be to assist VTLs in successfully meeting the team's goals and organizational objectives through cultivating team learning.

The following three research questions helped to guide the researcher in this study:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

The research problem stemmed from a review of the literature discussed in Chapter II. From this review the researcher created a conceptual framework for the study. The framework drew heavily from Dechant, Marsick, and Kasl's (1993) Team Learning

Model. This chapter describes the research methodology utilized to address the research purpose and research questions, including: (a) the rationale for a qualitative research approach; (b) the information needed; (c) an overview of the research design; (d) the research sample; (e) the data collection methods used for conducting the study; (f) the methods for analyzing the data; (g) a discussion of reliability and validity; (h) the limitations surrounding the study; and (i) a chapter summary.

Rationale for a Qualitative Research Approach

A naturalist inquiry perspective (Lincoln & Guba, 1985) drove the research design for this study. Based on the research problem, the researcher desired to conduct the study in a real-world setting where the phenomenon of interest unfolded naturally and had no predetermined course established by or for the researcher (Patton, 2002). A hallmark of qualitative research is when data are gathered from subjects in their natural settings and then the researcher attempts to make sense of them (Denzin & Lincoln, 2000). Additionally, to investigate the phenomenon, the research questions were open-ended with no standard data available (Lincoln & Guba, 2000). To elicit the data, the researcher believed it was appropriate to utilize an instrument involving interviews to obtain a view around the phenomenon of how the team learned and the VTL's actions to cultivate its learning. The main source of data generated from the interviews were words describing how the global virtual teams operate. When words are generated as data, Maxwell (2005) posits that qualitative research is the applicable research method to employ.

Within this naturalist and qualitative approach, the researcher maintained an ontological view of the world where he attempted to understand the basis of reality for the team through the eyes of the VTLs and team members (Corbin & Strauss, 2008). The researcher was an observer and not a part of the actual functioning of the team. However, since the researcher was part of the organization that he wished to research, he could never truly step outside of the research and the participants. There was interaction between the researcher and the participants of the research that influenced the interpretation and judgment of the data (Lincoln, 2011). This type of interaction represented a social constructivist view for interpreting the events occurring within the team (Schwandt, 2000).

The social constructivist view entails individuals seeking to understand the world in which they live and work. Individuals then develop subjective meaning of their experiences which are often varied and multiple (Creswell, 2013). The building blocks of a team are the individuals that comprise the team (McDermott, Brawley & Waite, 1998). Subsequently, each individual on the team has his or her own view of the events occurring within the team (LaFasto & Larson, 2001). In this study, the researcher solicited the views of both the team leaders and team members. He then looked to encapsulate these views to draw general conclusions from them to create a picture of their reality.

Compared to other methods, a suitable technique to discover the multiple views of reality around a situation or event is the case study method (Creswell, 2013). Creswell defines the case study method as a “qualitative approach in which the investigator explores a bounded system (or case) or multiple bounded systems (cases) over time,

through detailed, in-depth data collection involving multiple sources of information and reports a case description and case-based themes” (p. 97). When considering the formulation of the research questions, a case study method was seen as particularly applicable when the questions are “how” and “why” based (Yin, 2009) – which they were in the research questions for this study. Yin (2009) expands Creswell’s definition by saying that a case study:

is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as a result benefits from prior development of theoretical propositions to guide data collection and analysis. (p. 18)

Both Creswell’s (2013) and Yin’s (2009) definitions point to the fact that the case study approach is an all-encompassing method. They take into account multiple points of data and call on the researcher to make interpretive judgments around what the data portray (Flyvbjerg, 2006; Robson, 2002).

Interpreting the events in the multiple case studies was of utmost importance in drawing conclusions in this study. Schwandt (2007) in his review of Lincoln and Guba (2007) discussed how interpreting events was more than just generating evidence saying, “they built an argument for the way those committed to the interpretive practice of evaluation” (p. 12). The interpretation of the data for this research study was done through the lens of the researcher as well as the participants of the research. This approach follows an axiological view where all qualitative research is value laden and includes the value system of the researcher along with the social and cultural norms of the subjects (Creswell, 2013; Guba & Lincoln, 2005).

Information Required

In accordance with the naturalist inquiry approach, the researcher wanted to gather information on the VTLs as well as the teams in their everyday settings (Lincoln & Guba, 1985; Patton, 2002). The conceptual framework developed from the Literature Review in Chapter II helped determine the type of information required. The basis of the conceptual framework was the Team Learning Model developed by Dechant, Marsick, and Kasl (1993). In that model there are three major components that the researcher was interested in gathering data around: Team Learning Conditions; Team Learning Processes; and Team Learning Outcomes. In gathering the data, the researcher obtained information from both the VTL and the teams. Using Lincoln's (2011) example as a basis, the researcher sought information from the following three categories: demographic; contextual; and perceptual.

Demographic

The researcher wanted to learn more about the background and experience of the VTLs used as research participants. Once the VTLs were selected and confirmed as research participants, data were gathered in the form of an on-line Background Questionnaire (BQ). In the BQ, the team leader was asked a series of questions designed to collect demographic information about the VTL including age, education, number of years in an IT capacity, number of years managing teams, number of years managing virtual teams, and any prior project management training. The researcher believed that this baseline information was important to understand more about the VTLs and to use in interpreting the data in the analysis phase.

Contextual

The BQ also contained questions for the VTL designed to collect data around the context under which the team operated. The information asked for in the BQ included questions about the team's purpose, how many people were on the team, how long the team had been together, and the locations of the various team members. These types of data were important to learn more about the background, composition, and role of the teams used in the research.

Perceptual

The researcher determined that he needed information around the team and how it operated within the scope of the Team Learning Model. The researcher desired information from both the VTLs and the team members. The data gathered was from critical incident (CIP) interviews conducted with the VTLs that focused around the three research questions. Additionally, an on-line Team Learning Survey (TLS) designed by Dechant and Marsick (1993) was sent to the team members to solicit their scoring of the extent of team learning occurring on the team. Finally, the researcher recorded his personal observations. Observations were in the form of notes taken during the interviews as well as maintaining a journal on business issues that could impact the teams. These three different types of data helped the researcher create a multi-layered perceptual view of how the VTL cultivated team learning on the team. Table 3.1 contains an overview of categories of collection methods utilized to obtain them. A more detailed discussion of the data collection methods is contained in a later section of this chapter.

Table 3.1 - Types of Information Required by Data Collection Method

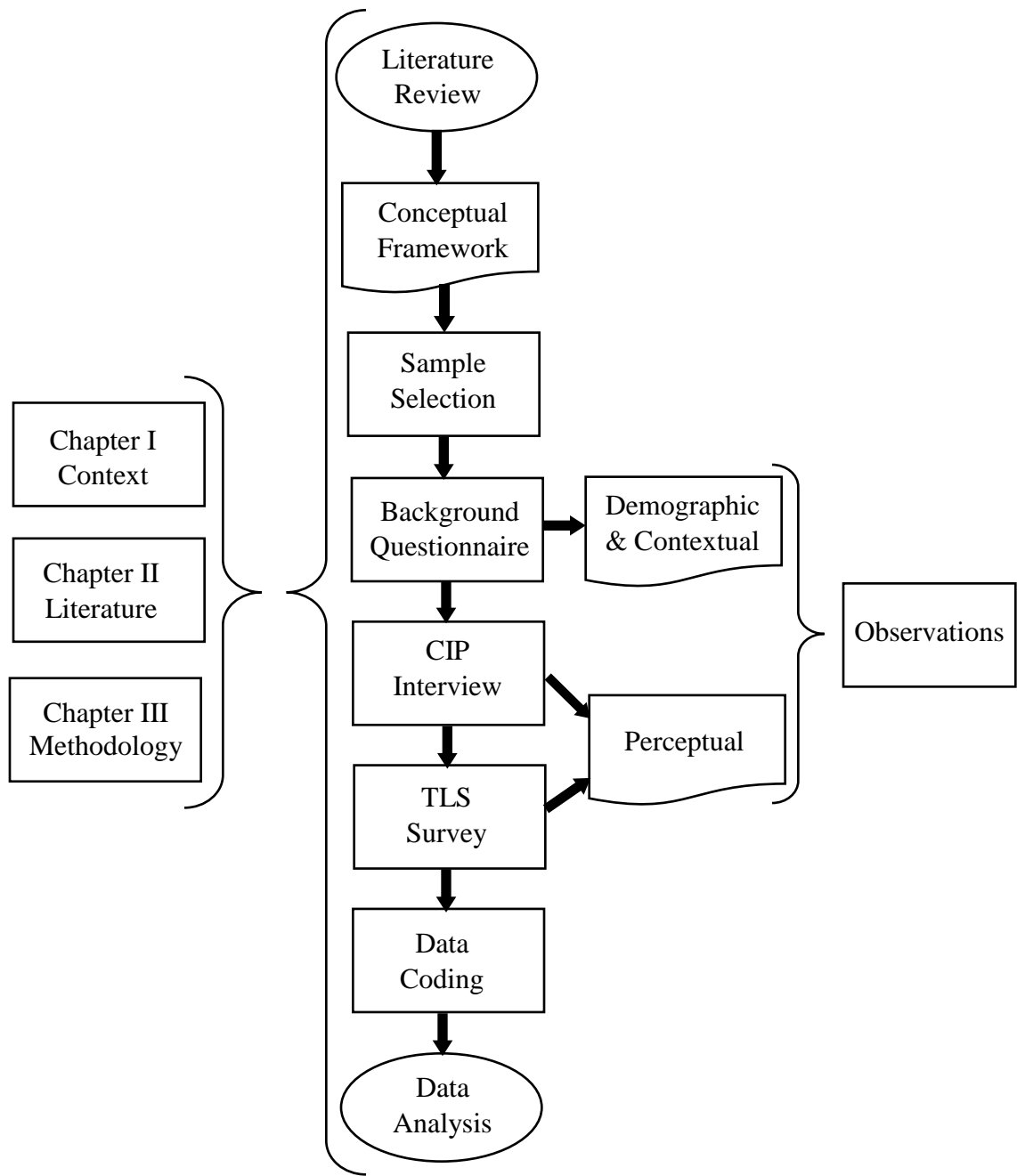
Areas of information required	Data Collection Method			
	Background Questionnaire	CIP Interview	TLS Survey	Observations
Demographic <ul style="list-style-type: none"> • Amount of time at company • Age range • Highest education level • # of years in an IT capacity • # of years managing teams • # of years managing virtual teams • Professional certifications • Prior project management training 	X X X X X X X X	X X X X X X		X X X X X
Contextual <ul style="list-style-type: none"> • Purpose of team • Objectives of team • Role of team • # of people on team • How long has team been together • Physical dispersion of team • Previous face-to-face contact • Types of virtual communication techniques used • Other comments 	X X X X X X X X	X X X X X X X	X	X X X X X X X
Perceptual Research Questions <ol style="list-style-type: none"> 1. How does the virtual team leader create team learning conditions? 2. What methods does the virtual team leader use to enable team learning processes? 3. How does the virtual team leader support team learning outcomes that achieve success? 		X X X	X X X	X X X

Adapted from Lincoln (2011)

Overview of Research Design

A graphic view of the activity flow for the research design is found in Figure 3.1 below. This graphic helps depict the process that the researcher went through to conduct the set up and data coding for the findings, analysis, and interpretation that will be presented in later chapters.

Figure 3.1 - Research Activity Flow



The first step in the research process was the literature review which yielded a conceptual framework that helped guide the study. From this framework, a sample of participants for the research were selected – both VTLs and teams. The VTLs were administered a background questionnaire in the form of an on-line survey. Critical

incident interviews were then conducted with each VTL selected around times when the team either learned well or not so well. Follow up probes for the critical incidents identified by the VTLs came from the Team Learning Survey (TLS). An on-line version of the TLS was then given to the team members of the virtual teams. During the interviews, and the entire research process, observations were conducted by the researcher. These observations included interview notes, general journal entries made about the changing operating situation at the company where the research took place, and personal reflections by researcher concerning the research. These data were then coded by the researcher using NVivo qualitative data analysis software for final analysis. A more detailed review of these steps is contained in the data collection methods section of this chapter.

Research Sample

The researcher drew participants for his research from the company at which he was employed (“AlphaCo”) and from a company that it uses to supply off-shore personnel to work on projects (“BetaCo”). Alpha is a large, leading, global financial services firm headquartered in the US. The researcher served as a human resource development (HRD) leader with the company. One of the departments the researcher worked with at AlphaCo is the information technology (IT) group. The IT group was responsible for all software programming or applications development (AD) work at AlphaCo. In utilizing the Software Development Life Cycle (SDLC) process to develop applications, AlphaCo created project teams comprised of programmers from AlphaCo

and the off-shore vendor, BetaCo. BetaCo is a leading global provider of programming personnel and is primarily located in India and the US.

Once the programming team is assembled, it is managed as a global virtual project team. The VTLs worked at AlphaCo and resided in the US. The other AlphaCo team members were located in the US but were in locations scattered around the US and not often collocated with the team leader. The BetaCo team members were typically in India, but in some instances they were located at a US AlphaCo location. The distributed structure of the team meant that the teams were not able to readily meet face-to-face. The set up of the team required that its team members communicate through virtual means to get their work assignments accomplished.

The researcher solicited research participants from the global virtual AD project teams using a number of sampling techniques. From a broad perspective, since the researcher utilized his place of work to obtain subjects, a convenience sampling technique was utilized. In *convenience sampling*, the researcher obtains subjects that are readily available to the researcher (Corbin & Strauss, 2008). The researcher then took this readily available group of potential subjects and employed a purposeful sampling approach as outlined by Patton (2002) to target the appropriate subjects. Patton (2002) explains that *purposeful sampling* is a technique typically applied in qualitative research. It is a method by which the researcher selects subjects that will best help to gather information around the research questions from which to draw conclusions. The researcher received assistance from a senior IT executive at AlphaCo that supervised the AD work for the entire company in order to identify VTLs that met the research criteria.

To help better define the research sample to select, the researcher first needed to determine the unit of analysis the research targeted. The research study attempted to identify the ways team leaders of virtual global project teams cultivate team learning. The type of data the study tried to collect were around the VTL's actions within the context of the virtual team that he led. Therefore, the unit of analysis for the study was the team leader.

To mitigate any potential risks with the sample, the researcher employed the “typical case” and “criterion” methods of purposeful sampling detailed by Patton (2002). In the *typical case method*, the researcher tries to identify research subjects that are most commonly found when one looks at a particular phenomenon (p. 245). In the *criterion method* the researcher places conditions around the type of subject the researcher wishes to gather data around (p. 245). Furthermore, not only did the VTL need to meet the criteria, but also the team the VTL led needed to meet similar criteria. This condition was enforced because the researcher wished to obtain information from both the team leader and the team members. With these factors in mind, the researcher had 13 VTLs with their respective teams that met the following criteria participate in the research:

- The teams were project-based for AD work in the IT department of AlphaCo.
- The team were geographically disbursed with team members spread amongst 3 or more sites. (*This ensured that the primary mode of communication between team members was through virtual technological means.*)

The teams were in existence for at least one year with stable membership of at least six members – including the team leader – over that time. (*This ensured*

that the team had an established leader and members that could comment of learning events on the team for an extended period.)

Table 3.2 - VTL Background Data (Note: names are pseudonyms)

VTL	Total Time in IT Capacity	Total Time Managing Teams	Total Time Managing Virtual Teams	Age Range (in yrs)	Education Degree Level	Training in Leading Virtual Teams
Alex	20	8	4	46 – 55	Bachelors	Yes
Ben	10	8	4	25 – 35	Bachelors	No
Bob	17	12	10	36 – 45	Bachelors	Yes
Chuck	40	30	20	55+	Some college	No
Donny	15	10	10	36 – 45	Bachelors	Yes
Doug	8	6	2	25 – 35	Bachelors	No
Grant	17	8	8	46 – 55	Bachelors	No
Matt	15	12	10	36 – 45	Bachelors	No
Nitesh	16	12	12	36 – 45	Masters	No
Penny	20	10	10	36 – 45	Masters	No
Pedro	17	10	10	46 – 55	Some college	No
Rob	25	15	15	46 – 55	Masters	Yes
Vinay	20	12	9	36 – 45	Bachelors	No
Total	240 yrs	153 yrs	124 yrs			
Average	18.5 yrs	11.8 yrs	9.5 yrs			

Table 3.3 - Virtual Team Description Data (Note: names are pseudonyms)

VTL	Team Role/Function	Team Distribution	Total Team Size	# A-Co	# B-Co	Duration as a Team
Alex	Team provides application development services supporting Property & Casualty financial and premium processing systems.	<ul style="list-style-type: none"> • Rhode Island • Pennsylvania • India 	12	4	8	4 yrs
Ben	Team responsible for applications development for the Automated Renewal System for group benefits packages offered by company in local markets.	<ul style="list-style-type: none"> • North Carolina • South Carolina • Georgia • New Jersey • Canada • Poland • India 	14	7	7	1 yr
Bob	Team supports a suite of new business Property & Casualty applications along with deployment of these applications into production.	<ul style="list-style-type: none"> • Pennsylvania • Rhode Island • India 	95	25	70	10 yrs
Chuck	Application development for the company's Long-Term Care and Critical Illness and Voluntary Dental insurance products	<ul style="list-style-type: none"> • South Carolina • North Carolina • India 	30	12	18	1 yr
Donny	Team handles applications development responsibilities for the company's Dental Claims and Retail Life products.	<ul style="list-style-type: none"> • South Carolina • North Carolina • India 	53	20	33	5 yrs
Doug	Team is assigned .Net application development and enhancements for the company's Retail Annuities products.	<ul style="list-style-type: none"> • Colorado • Massachusetts • India 	75	23	52	5 yrs
Grant	The team provides break/fix, development & enhancements to applications utilized by sales agents interacting with customers.	<ul style="list-style-type: none"> • Rhode Island • Pennsylvania • India 	8	4	4	1 yr

Table 3.3 (Continued) - Virtual Team Description Data (Note: names are pseudonyms)

VTL	Team Role/Function	Team Distribution	Total Team Size	# A-Co	# B-Co	Duration as a Team
Matt	Application development for e-NewBusiness platform for the company's Retail Life underwriting systems.	<ul style="list-style-type: none"> • North Carolina • Pennsylvania • New Jersey • India 	30	11	19	20 yrs
Nitesh	Assigned to applications development support for the Annuity Customer Experience Platform for the Retirement & Income Solutions business	<ul style="list-style-type: none"> • North Carolina • New Jersey • India 	30	8	23	3 yrs
Penny	Development work supporting Annuity products, operations and risk initiatives in the mainframe space.	<ul style="list-style-type: none"> • New Jersey • Colorado • India 	24	4	20	5 yrs
Pedro	Manage the applications development process for the company's intercompany billing system.	<ul style="list-style-type: none"> • North Carolina • Mexico • India 	94	7	87	2 yrs
Rob	Deliver high quality software development solutions for the company's Retirement and Income Solutions business in COBOL.	<ul style="list-style-type: none"> • North Carolina • Colorado • India 	33	10	23	10 yrs
Vinay	Application development for the company's Corporate Billing System that charges and receives payment from other companies.	<ul style="list-style-type: none"> • New Jersey • Pennsylvania • India 	19	5	15	12 yrs

- The project teams contained at least six members in total with a combination of both AlphaCo and BetaCo team members with at least 3 from each company. *(This ensured that there were enough representatives from each company to protect confidentiality in taking the TLS).*

A review of the backgrounds for the 13 VTLs included in the study is contained in Table 3.2. There were originally 25 VTLs identified as potential to participate. However, upon further investigation, 12 were determined to not be appropriate or did not agree to participate. Table 3.3 contains a review of the 13 teams involved in the study.

Methods for Data Collection

The design for this study was a multi-case qualitative study. Yin (2009) describes this method as a way to collect data encompassed in one case but repeating the activity multiple times to verify the findings across comparable circumstances. Yin believes that having multiple iterations of collecting the same types of data for different situations is a way to validate the overall data. Due to the repetitive nature of the design, it was extremely important that a clear plan for data collection was established in advance so that the same protocol could be used across the various case project teams. Creswell (2007) maintains that data collection is “a series of interrelated activities aimed at gathering good information to answer emerging research questions” (p. 119). This research study followed the direction of this statement in the collection of data. When utilizing this case study approach, the researcher wished to construct as clear a picture as possible of what was occurring in the situation. Using multiple sources of data (or cases) helped to enhance the clarity of that picture.

Participant Consent Process – VTL

The first priority to collecting the data for the research was to obtain consent from subjects to participate in the study. The researcher had a senior IT executive at AlphaCo assist in identifying virtual project teams and their subsequent team leaders. This leader was the person in charge of all application development teams for the company. Once the team leaders were identified the researcher sent them a formal Recruitment e-mail inviting them to participate. The Recruitment E-mail (Appendix A) contained an overview of the study; a list of what is involved with participation; and a list of the next steps required if the team leader agrees to participate. The e-mail emphasized that participation in the research was completely voluntary; responses given would be used for research purposes only; all responses would be completely confidential; and there would be no repercussions or retaliation for responses given.

Once a VTL agreed to participate, the researcher sent the VTL a Follow Up Recruitment e-mail with all the items required to participate. Aside from thanking the team leader for agreeing to participate, the Follow Up Recruitment e-Mail (Appendix C) contained a copy of the Informed Consent Form and a Participant's Rights Form (Appendix E); a link to the on-line Background Questionnaire (Appendix H); a copy of the Critical Incident Worksheet (Appendix J); and a copy of the questions included in the Team Learning Survey (Appendix K). The Follow Up Recruitment e-mail reemphasized the voluntary nature of participating as well as that the responses would be completely confidential. The e-mail also contained examples of team learning that the team leader could use as a reference in filling out the Critical Incident Worksheet (CIW). There were

instructions on signing and returning the Participant's Right attachment and scheduling the interview for conducting the Critical Incident Protocol (CIP).

Collecting the Informed Consent Form and Participant's Right Form were considered a critical research threshold for the researcher. The researcher followed the university's guidelines as proscribed by its Institutional Review Board (IRB) in soliciting and protecting the rights of subjects involved in any university sponsored research. The Informed Consent Form had the process for collecting data for the research as well as the required Participant Rights Form for the study. Conducting research on "live" participants necessitated the need for care in how the data are collected. Yin (2009) describes the aspects that must be accounted for in conducting research on human "subjects". Yin states that the researcher needs to do his best in controlling the atmosphere in a laboratory-type format. Therefore, the researcher needed to ensure several protections existed as part of the research design: receiving informed consent; protecting the participants from harm; protecting the participants' privacy and confidentiality; and taking special care for sensitive subjects.

Team Leader Data Materials

Background Questionnaire. Once a prospective VTL agreed to participate in the study, the participant was able to fill out the on-line Background Questionnaire (BQ). The BQ was administered through Qualtrics, an on-line software survey tool. The only person with access to the survey results was the researcher. The Qualtrics account had restricted access for only the researcher through password protection. This set up helped to ensure confidentiality of the data. Qualtrics has a functionality to download data to an Excel spreadsheet. The researcher downloaded the results to a file and applied new

pseudonym names for each VTL to identify the results as a method to further protect the confidentiality of the participants. The researcher recorded the pseudonym name for each respective VTL on a sheet of paper that was kept at the researcher's home office in a locked file. A soft copy of the individual BQs were kept on the researcher's personal laptop. Only the researcher had access to the password protected laptop.

The BQ contained 18 questions focused on the purpose, role, and size of the virtual team as well as the methods of communication employed by the team in sharing information. Appendix H contains a copy of the 18 questions asked in the BQ. The questions were seen as important to help establish a record of the background and experience of the VTL as well as the operations of the team. The intent was to draw associations between data contained in the BQ with the other sources of data to identify indicators of underlying causes that were not readily apparent when analyzing the raw data collected in the interviews or the surveys (Ary, Jacobs, & Razavieh, 1985; Howell, 2011). The questions in the BQ fell in line with the basis of qualitative research (Creswell, 2007; Maxwell, 2005; Patton, 2002).

Before administering the BQ, the researcher piloted it with two co-workers at AlphaCo. These co-workers had experience working in virtual teams and were attuned to how a potential VTL would interpret the questions. The co-workers suggested wording adjustments that would increase clarity – which the researcher utilized in making changes to the BQ.

Critical Incident Worksheet. The participant also received a copy of the Critical Incident Worksheet (CIW). The CIW was intended to assist the team leader recall two or three incidents where the VTL felt that the team s/he led either learned well or had some

challenges to learning. The Follow Up Recruitment e-Mail had examples of team learning identified by Kasl, Marsick, and Dechant (1993). The researcher wanted to help the VTL prepare for the critical incident interview so the sessions would be most productive. All 13 VTLs interviewed reported using the CIW to prepare for the interview. The CIW was not collected by the researcher. A copy of the CIW is contained in Appendix J.

Critical Incident Interviews

Once the BQ data was collected, the researcher scheduled a critical incident interview based on the Critical Incident Protocol (CIP). The interview was conducted over the telephone and scheduled for 60 minutes. The CIP template is contained in Appendix I. The CIP was constructed within the guidelines of the Critical Incident Technique (Flanagan, 1954). The researcher interviewed 13 VTLs using this method. The intent of interviewing this number of VTLs was to help achieve validity in the study and gain a better picture of what “reality” was within the teams used for data collection (Creswell, 2014).

The CIP interviews were administered over the phone, so the data could be collected in a similar manner to which the virtual teams communicated. This thinking is in line with other scholars that have noted the value of conducting research under the same conditions that the participants would normally work under (Creswell, 2007; Herr & Anderson, 2005; Maxwell, 2005; Park, 2006; Patton, 2002).

The critical incident interviews were digitally recorded. Permission was granted by the participant before recording commenced. From the recording, the researcher created transcripts of the interview through a transcription service. The transcripts

become the raw data for the researcher and were used to analyze for ways that the VTL cultivated team learning. To keep track of the individual transcripts, the researcher assigned the same pseudonym name as with the BQ results. This way the researcher could further analyze trends in the data and make associations and correlations. Soft copies of the transcripts were kept on the researcher's personal laptop. The only person with access to the password protected laptop was the researcher.

As mentioned, the researcher chose the critical incident technique as the method to format the interviews because of its usefulness in drawing out data from individuals that directly point to important incidents surrounding a certain situation (Ellinger, 1997). The critical incident technique was first publicized by Flanagan (1954). In his seminal article, Flanagan (1954) outlined the history and introduction of the critical incident technique to the behavioral sciences fields. In this groundbreaking work, he traced its original development by the US Army Air Force during World War II and how it was later adapted for academic research and corporate industrial purposes as way of gathering data on important skills, knowledge and abilities people demonstrate in certain circumstances. From the data derived from these interviews, the researcher could construct a common set of characteristics that best represented how people behaved in a specific situation.

The goal of the interview was to identify ways in which a virtual team leader cultivates team learning. The researcher asked the team leader to describe two to three incidents where the team leader felt the team either learned well or not so well. Follow up questions were constructed around components of Dechant, Marsick, and Kasl's (1993) Team Learning Model and the Team Learning Survey developed by Dechant and

Marsick (1993). The follow up probes were asked in accordance with appropriate qualitative interview techniques (Edwards & Holland, 2013; Kvale & Brinkman, 2009; Rubin & Rubin, 2012). The probes were a way to further identify actions that the VTL took to cultivate team learning within the team as well as some of the underlying thinking of the participant.

When including the probes with the initial baseline questions, the entire interview was considered more of a “semi-structured” one in that the questions followed a format provided by the CIP, but the discussion went in multiple directions depending on the follow up probes (Edwards & Holland, 2013; Rubin & Rubin, 2012). The interview questions were very open ended and allowed a conversational approach between the subject and the researcher (Yin, 2009). Asking questions on these two extremes helped to uncover richer examples from the participant’s experience with the team (Rubin & Rubin, 2012).

Prior to conducting the actual research interviews with the VTLs, the researcher piloted both the CIW and CIP with two of his co-workers. The pilots were scheduled as a way for the researcher to hone his interviewing style. Preparation in this manner is highly recommended before embarking in research activities (Bloomberg & Volpe, 2016; Kvale & Brinkmann, 2009; Rubin & Rubin, 2012). After each interview, the researcher debriefed the experience with the specific pilot participant. Any adjustments were then made as suggested by the participants.

When conducting the critical incident interview with the VTL, the researcher first reviewed the information contained in the results of the BQ. This offered the researcher the opportunity to fully understand the context and background of both the VTL and the

team. Additionally, it gave the researcher the chance to more fully vet the participant for inclusion in the study. In two circumstances it was mutually decided during the interview that the VTL was not an appropriate subject for the research. This was caused by the VTL either not having direct interaction with the team on a day-to-day basis through being more of a “senior” manager to the team or the VTL’s team having been recently disbanded.

Participant Consent Process – Team Members

At the close of the CIP interview, the researcher asked the team leader for permission to send the TLS to members of the VTL’s team. This issue was broached in the Recruitment and Follow Up e-Mails to the VTL – where a copy of the Dechant and Marsick’s (1993) TLS items were attached. All 13 VTLs agreed to have their teams participate, and they supplied a list of the team members’ names.

Once the researcher obtained the names, he sent each person a copy of the Team Member Solicitation e-Mail (Appendix B). The e-mail emphasized the following points for the team member participants: that participation in this study was completely voluntary; there was no obligation to participate; and there were no repercussions if the team member chooses not to participate. The e-mail also contained a list of the TLS questions (Appendix K).

Great effort was taken to ensure the confidentiality and anonymity of the team member participants. The virtual project teams were comprised of a combination of AlphaCo and BetaCo employees. The AlphaCo staff members were located in the sites across the US, while the BetaCo staff was located in both the US and India. The Team Member Solicitation e-Mail stated that potential participants have the right to not

participate in the study and participation was not a job requirement. The researcher also stated in the e-mail that he would be the only person that would have access to the survey results. Results were only aggregated if at least three team members participated in the survey. All 13 teams achieved this threshold.

Once a team member agreed to participate, the researcher sent the team member a Follow Up Solicitation e-Mail (Appendix D). This e-mail reiterated the voluntary nature of participating along with the anonymity and confidentiality of the responses. It contained a copy of the Informed Consent Form and Participants Rights for team members (Appendix F). As with the informed consent and participants rights for the team leaders, the researcher followed the guidelines for conducting research as prescribed by the university's IRB. Upon return of the Participants Rights form, the participant team member was allowed to take the on-line TLS.

Team Learning Survey

The researcher administered the TLS created by Dechant and Marsick (1993) to the team members. The purpose behind using this tool was to employ an objective instrument that could assess the extent of team learning occurring on the team. In utilizing a survey, the researcher sought to control and mitigate some of the subjectivity in conducting qualitative research (Creswell, 2013; Patton, 2002). It also provided a voice to the actual members of the team versus relying solely on the opinion of the team leader. The researcher had found this aspect lacking in other research studies around team learning (Chang, 2013; Ellinger, 1997; Lincoln, 2011; Stull, 2008), where they relied primarily on the team leader as the source to assess the extent of team learning occurring in the team. Following the opinion of Edmondson (1999), where she advocated including

all voices in the team to assess the extent of learning, the team members were included in the research.

The researcher decided to conduct a survey to provide a voice for the team members. Surveys provide a quantitative or numeric description of trends, attitudes or opinions of a population by studying a sample of that population (Creswell, 2014). Additionally, on-line surveys are a convenient, quick and inexpensive way to reach multiple people in a short timeframe (Sue & Ritter, 2012). It is a method that can control for confidentiality and potential face-to-face bias (Fowler, 2014). Surveys are effective if they are both valid and reliable (Creswell, 2014). The researcher chose the TLS because it is a survey that assesses the extent of team learning occurring on based on a team learning model. The TLS is a valid and reliable tool to assess team learning within a team (Dechant & Marsick, 1993). Additionally, since the researcher decided to base his research around the Dechant, Marsick, and Kasl (1993) model for team learning, and this model had a corresponding assessment tool (TLS), employing a confidential and anonymous version of the TLS appeared to be the best way to assess team learning against the model while mitigating any bias and creating more objectivity around the extent of team learning.

Dechant, Marsick, and Kasl (1993) developed their model around the concept that team learning is a process whereby the learning that occurs by members of a team is a collective act of sharing information. The shared information elicits some thinking (group reflection) by the team that results in some sort of action. This action in turn creates new or improved processes that cause some change within the team. The resulting changes should enable the team to better meet its goals. They based their work

on the foundations laid by Schön (1983) and Mezirow (1991) as well as learning from experience theories of Kolb (1984), Jarvis (1987), and Boud and Walker (1990). They studied real life examples in two companies to further develop their thinking. They gained access to two companies – a petrochemical and a manufacturing company – to determine how teams learn. Their research identified specific team learning processes, conditions, and outcomes that occur when teams work on tasks or projects. They also identified organizational learning contributions and conditions that determine the extent to which learning is accepted by the organization. From their research, Dechant and Marsick (1993) developed a survey which determined how well a team learns as a group. The survey highlights five critical factors for team learning: 1) team learning processes; 2) team learning conditions; 3) team learning conditions; 4) organization learning contributions; and 5) organizational learning conditions. They later go on to classify ways in which a team learns. They identified four methods for team learning: Fragmented; Pooled; Synergistic; and Continuous.

The researcher constructed an on-line version of the Dechant and Marsick TLS. As with the on-line Background Questionnaire, the TLS was administered through Qualtrics. The only person with access to the survey results was the researcher. Only the researcher had access to the Qualtrics account as a way to ensure confidentiality of the data. The team member participant was not asked to identify himself or herself in the survey, so the input was completely anonymous. A separate survey was set up for each specific team. This was done so the researcher could aggregate the results for each team and combine them with the other data collected around the specific team. The aggregated results were aligned with the respective VTL's pseudonym name. This was done so the

researcher could analyze and interpret the data from the VTL critical incident interviews, the background questionnaire, and the TLS results. All data was kept on the researcher's password protected personal laptop.

The TLS only contained the 39 items directly related to the team learning components of the Kasl, Marsick, and Dechant's (1993) Team Learning Model that aligned to Team Learning: Team Learning Conditions; Team Learning Processes; and Team Learning Outcomes. The entire Dechant and Marsick (1993) Team Learning Instrument contains 21 additional items related to Organizational Learning Conditions and Organizational Learning Contributions. Since the researcher only wished to assess learning within the team, the organizational learning components were not seen as necessary. The researcher discussed this possible course of action with his advisors (one of whom was Marsick – co-creator of the TLS), and they agreed that the elimination of the organizational learning components did not impact the validity of the instrument for assessing the team (V.J. Marsick & J.A. O'Neil, personal communication, February 12, 2014). The items related to Organizational Learning were subsequently removed from the survey administered to the teams in this research.

The researcher created a functionality with an Excel spreadsheet that could aggregate and score the results of the TLS for each specific team. The researcher required that he receive at least three responses from within each team. Having at least three responses is a minimum to ensure that potential bias is controlled for in a survey sample (Fowler, 2014). Once at least three responses were received, the researcher downloaded the results from the Qualtrics survey tool. The results were then uploaded into the scoring Excel spreadsheet. The algorithm for the spreadsheet was in accordance

with the scoring mechanism developed by Dechant and Marsick (1993) for the instrument. From this spreadsheet, the researcher was able to determine the scores and ratings for the team learning model components from each team as well as a composite view of all the teams. As with other data collected for this research study, the results were housed on the researcher's personal laptop. Appendix L contains the TLS results for each team as well as a composite view of the teams across each of the components and sub-components of the Team Learning Model. Across all 13 teams, 169 team members were invited to participate. A total of 72 team members (43% response rate) agreed to participate with 66 (92% follow through rate) actually completing the TLS. Appendix M contains a table that shows the frequency range of scores across each TLS item. Also included in this table is the total number of responses for each item as well as the average score, the corresponding TLS rating, and the standard deviation for the rating score. These data were provided to add extra rigor around the qualitative data generated from the critical incident interviews.

Observations

The researcher also gathered data through taking notes throughout the data gathering process. These notes were classified as "observations" as defined by Creswell (2013). The observations were in the form of the researcher taking notes during the CIP interview and maintaining a journal of what was occurring at AlphaCo during the time of the research process. The researcher recorded and transcribed the actual telephone CIP interviews. However, during the actual interview, the researcher made notes around the team leader's level of engagement during the interview through describing his/her tone of voice and readiness to offer incidents as a sign of the sincerity of the comments made and

the extent of ownership over his/her actions with the team. The researcher also maintained an on-going journal of the business environment facing AlphaCo during the time of the research. Items such as employee morale, demands on the business, and any external influences were recorded in the journal. These particular data points were derived from the researcher's view as a senior HRD professional with AlphaCo that was privy to information surrounding both the performance of company and the IT function. Additional data in this area came from public information including press releases, internal e-mails sent to employees around business issues, and employee satisfaction survey results. Observations such as these were seen as a critical way to validate data and understand more about the context of the phenomenon being studied (Robson, 2002). By using this method, the researcher hoped to gain a better appreciation of the entire dynamic surrounding the teams without having to rely solely on the data from the CIP interviews and TLS results for data analysis and interpretation.

Triangulation

Each of the different types of data collected helped in triangulating and validating all the data collected. Triangulation is an important element to ensure effective verification of the data derived during the research process (Bloomberg & Volpe, 2016; Creswell, 2013; Patton, 2002; Yin, 2009). In triangulation, researchers make use of multiple and different sources of data to provide corroborating evidence (Creswell, 2013). Typically, this process involves obtaining information from different sources via different means to help shed more light on the phenomenon being studied. When researchers locate evidence to document a theme in different sources of data, they are triangulating information and providing validity to their findings (p. 251). For this

research study, triangulation helped to control bias that could permeate some types of data such as observations (Mervis, 2006). The researcher believed that obtaining CIP interviews from the team leaders, TLS results from the team members, and observations from the researcher provided enough of the evidence scholars recommend to sufficiently triangulate and validate the case study on each team. Research that uses multiple types of data allows the researcher to have a higher degree of confidence in the findings and subsequent analysis of the data (Bloomberg & Volpe, 2016).

Timeline for Conducting Data Collection

The researcher secured official permission from both AlphaCo and BetaCo to use their employees as participants in the research during the fall of 2014. The researcher then met with the senior IT executive at AlphaCo to construct an initial list of potential VTLs. A first phase of interviews was conducted with eight VTLs in summer of 2015. Due to some unforeseen business issues impacting AlphaCo that inhibited continuing the interview process, a second phase of interviews was not started until the summer/fall of 2016. Five additional VTLs were interviewed in this phase. The researcher again met with the same IT executive to collect a list of more potential participants for this second interview phase. The TLS was administered to the resulting 13 teams in the fall of 2016 through the spring of 2017. Data analysis occurred in the summer and fall of 2017.

Methods for Analyzing Data

Creswell (2007) breaks the data analysis process into three distinct phases: (1) prepare and organize the data; (2) code the data; and (3) present the data in charts and narrative for discussion (p. 148). He then goes on to describe the “Data Analysis Spiral”.

The spiral starts with managing the data comprised of some type of file. This moves to reading and analyzing the data by reflecting and writing notes on ideas generated. Next, the researcher attempts to classify and interpret the data in terms of context and categories. Finally, the researcher visualizes the classifications in some type of matrix or some other type of visual representation of the connections within the data (pp. 150-155). The researcher used this model described by Creswell (2007) as a guide to organize and to interpret the data.

Preparation and Organization of Data

The researcher developed a database to store and organize the data. The data collected was collated in several files stored on the researcher's laptop. The data were both qualitative and quantitative in nature. The types of data collected by the researcher were managed in the following ways:

- **Background Questionnaire.** All VTLs were asked to complete an on-line questionnaire that summarized their backgrounds regarding their teams and their experience managing virtual teams. The results were downloaded from the Qualtrics survey tool to an Excel spreadsheet. Each VTL was given a pseudonym name as a way to protect confidentiality and correlate data between data sources. All data were combined in one Excel workbook.
- **Critical Incident Interviews.** Each VTL was interviewed using Flanagan's critical incident technique. The interviews were digitally recorded and transcribed into a Word document. Each VTL was given a pseudonym name as a way to protect confidentiality and correlate data between data sources.

- **Observations.** The researcher actively took notes during the 60 minute critical incident interviews. The researcher noted impressions garnered during the interview around the VTL's tone, enthusiasm, and emotions. These impressions helped the researcher determine the credibility of the VTL's remarks. Each VTL was given a pseudonym name as a way to protect confidentiality and correlate data between data sources.
- **Team Learning Survey.** Each member of the respective VTLs' teams were invited to participate in the research through completing an on-line Team Learning Survey. The survey contained 39 questions. Once at least three members of the team responded and filled out the TLS, the researcher scored the results in accordance with the scoring process provided by the TLS's developers, Dechant and Marsick (1993). The results from the TLS were downloaded from the Qualtrics survey tool into an Excel spreadsheet. The results for each VTL was then collated and scored to create a team profile for the VTL's team. All the teams' results were then aggregated and scored to create a composite profile for team learning across the teams. Each team was assigned a pseudonym that aligned with the VTL's name to protect confidentiality. It was also used as a method to associate the TLS data with the other forms of data for the findings, analysis, and interpretations portions of the research.

Data Coding

The data utilized for this research study was qualitative in nature. The main component was the critical incident interviews conducted with the VTLs. Maxwell (2005) points out the importance of beginning the process of data analysis after the very

first interview has occurred. He further describes the research process as an iterative one that can change as new data is introduced and analyzed. If researchers let the data accumulate, it can become an overwhelming task to sort through and remember the circumstances behind the interviews and other data collected (p. 95). The researcher started analyzing the data once the first critical incident interviews were conducted. Bloomberg and Volpe (2016) also call for a systematic and iterative process in analyzing and coding data. During each iteration, the researcher was looking for recurring patterns that could possibly provide different ways of viewing and thinking about the data. The researcher desired to stay in accordance with the direction given by Saldana (2013) in looking at qualitative data by first looking at the characteristics of the research questions; then identifying a coding method consistent with the data; and finally assigning codes that best represent relevant information in the data. The details of the steps employed in the coding process are outlined in Table 3.4 below.

Table 3.4 - Critical Incident Data Coding Process

Step	Action
1	Listen to the recordings of CIP interviews
2	Read transcripts of the CIP interviews
3	Review observation notes from CIP and interviews and make any relevant adjustments
4	Read through transcripts (multiple times) and take notes on themes that align with the Research and TLS questions that can be used as possible codes
5	Set up initial nodes in NVivo qualitative data analysis software package that align with themes and conduct preliminary coding
6	Reflect on results of the TLS for each team and composite view and how these scores align with the codes created
7	Adjust codes in NVivo as required in accordance with reflections on composite and team TLS results
8	Final codes created after iterative refinement and analysis of all data sources

To ensure interrater reliability for the initial codes (Patton, 2002), the researcher asked a work colleague to listen to a recording and read the transcript of one of the first interviews. He then had the colleague code the transcript using some preliminary codes that were developed during the pilot phase of the research proposal process (Locke, Spirduso & Silverman, 2007). The researcher had conducted similar reliability process during the pilot phase using another work colleague and a member of his doctoral dissertation cohort. The researcher then discussed the colleague's coding of the transcript to ensure there was common understanding of the codes (Janesick, 2000). The researcher was then satisfied that there was enough reliability to the codes to apply the scheme to the rest of the interview transcripts. These initial codes were applied as a "first cycle" of codes as part of Steps 1 – 4 depicted in Table 3.4 (Saldana, 2013).

To conduct the coding as part of Step 5 in Table 3.4, the researcher utilized NVivo coding software. He employed an open coding method (Corbin & Strauss, 2008) by setting up nodes in the coding program that aligned with themes he saw emerging in the data (Bazeley & Jackson, 2014; Edhlund & McDougall, 2016). The conceptual framework outlined in Chapter II was the basis for creating the initial coding scheme. As represented in Steps 6 – 8 in Table 3.4, additional codes were created following an iterative analysis of the data (Bloomberg & Volpe, 2016) and as part of the "second cycle" coding process (Saldana, 2013). In his attempt to offer a "voice" to the team members of the virtual teams, the researcher sought to stay within the confines of the TLS questions as a coding scheme for the CIP interviews with the VTLs. The researcher then utilized the results of the TLS for each team as well as a composite view of the scores as way to compare the codes with what the VTLs were saying in the CIP

interviews. The researcher then made any adjustments to the codes when comparing what the VTLs said with the scores on the TLS. A final version of the coding scheme was developed following much refinement and revisions of the descriptors. This final coding scheme is found in Appendix N.

Data Presentation

Data for this research study have been collected and prepared in the spirit of the qualitative style. Qualitative data typically describes a phenomenon through quotations, observations, and excerpts from documents accumulated during the research (Patton, 2002). Such types of data do not naturally render themselves for portraying in statistical methods that are commonly used for quantitative research (Creswell, 2013). However, it is possible to utilize various methods to present the data in a much more organized and visually appealing manner (Bloomberg & Volpe, 2016). To accomplish this goal, the researcher has displayed various renditions of the data by using tables, figures and graphs in both the body of this research document or the accompanying appendixes. The researcher has attempted to present the data in ways that portray the reality of team learning in a virtual environment through illustrating themes that show connections with the different parts of the data.

Validity and Reliability Testing

This study used Yin's four criteria that determine the extent of validity and reliability in empirical social research. Yin's (2003) criteria are defined as:

- **Construct validity.** Establishing correct operational measures for the concepts being studied.

- **Internal validity.** Establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships.
- **External validity.** Establishing the domain to which a study's findings can be generalized.
- **Reliability.** Demonstrating that the operations of a study – such as the data collection procedures – can be repeated, with the same results. (p. 34)

The researcher achieved *construct validity* by using multiple sources of data and a clearly established chain of evidence with the data as part of the data collection process. According to Yin (2003), *internal validity* is a concern when the case study tries to show a causal relationship between two variables. While this study did not have pre-defined actions of the VTL that caused team learning, there was a search for what those actions were. While the study did display evidence of the classic definition of a causal relationship, care was taken to account for this type of validity in case there were issues. Control was taken for internal validity by analyzing the data and trying to model it and account for rival explanations and do pattern matching.

External validity was achieved through the multiple case study design. Yin (2003) feels that when a theory is developed it needs to be tested a second or even third time to make it generalizable to other circumstances. The key concept in conducting a multiple case study is in the replication of the design protocol to all case studies. This type of validity was achieved by conducting 13 critical incident interviews that were executed in a similar fashion. There were no deviations made to the process.

Finally, *reliability* was achieved through the use of a case study protocol and case study database during the data collection phase. Each case was handled in a similar and uniform fashion. There were no deviations made to the process. Each VTL was interviewed using the CIP and transcripts were created for each in an identical manner.

The case study design for this study defined the data collection process. The procedures of this protocol contained: access to organizations/interviewees; having appropriate resources to conduct the research (ranging from laptop to recording device to paper and pen); procedures for seeking help from colleagues; preparing a schedule of data collection activities; and preparing for the unexpected.

The case study database was both hard copy and electronic. Files were created on the researcher's laptop and organized in sections according to each specific case. The files included transcripts of interviews, digital recordings of interviews, copies of Background Questionnaires, TLS results, and researcher notes/observations. The goal in maintaining the case study database was so someone else could go through the researcher's electronic and hard copy files and come to their own conclusions independent of the researcher's final report.

Limitations of the Study

The research methodology outlined in this chapter was created to account for validity reliability throughout each stage of the research process. There were limitations that existed in the design that needed to be accounted for. Many of these limitations are inherent in qualitative-type research designs (Corbin & Strauss, 2008; Creswell, 2013; Patton, 2002). There were distinct issues that needed to be accounted for that could be

considered limitations. Careful consideration was given to each to help minimize their impact. A detailed review of each one follows.

Researcher Bias

The researcher was the primary person conducting the research in this study. Since the researcher worked at the company where the research was conducted and was in a position to work closely with the IT organization where the participants were drawn, he had developed pre-dispositions and opinions. Researcher bias is an inevitable part of conducting qualitative research in an organization in which one works (Coghlan & Brannick, 2005). While there are benefits in conducting research within the researcher's company that include gaining access to the research participants and having invaluable knowledge about the culture and informal structures of the organization, the negative aspects revolve around the researcher having blind spots in interpreting, assessing and critiquing any issues that surface. Coghlan and Brannick (2005) call this bias "role duality". They also mention the issue of reflexivity where the researcher must recognize "the relationship between the researcher and the object of research" (p. 5). To mitigate this bias, the researcher followed Coghlan and Brannick's (2005) suggestion that one constantly reflects on the intention of the study, the definitions that the literature prescribed around interpreting it, and the cultural and political context in which the research was taking place. He accomplished this through referring to his research assumptions (found in Chapter I), making notes in his research journal, discussing his thoughts with his advisor as well as conversations with other colleagues that had knowledge around the research topic. These actions assisted in mitigating any potential bias the researcher may have had.

Participant Reactivity

Since the researcher worked at the company where the research took place, there existed the situation where the VTLs and team member participants needed to adjust in either a positive or a negative manner to a person that was internal to the company interviewing them or asking them to fill out a survey. Maxwell (2005) uses the term “participant reactivity” to describe this situation. Like the researcher, the participants in qualitative research are expected to have their own pre-dispositions and opinions. Since the researcher worked in a Human Resources capacity, he expected that some VTLs might wish to promote themselves with overly positive incidents where they helped cultivate learning with the teams they led. The net effect would be that their renditions of the incidents may not accurately reflect what actually occurred. The researcher tried to eliminate this type of bias by asking the VTLs to come prepared with potential negative examples. The researcher did not know or work directly with any of the VTLs. He attempted to create an atmosphere of open and honest dialogue during the critical incident interviews. Additionally, he used follow up probes to gain more details around specific actions undertaken by the VTLs as well as what the results of the actions were. For the team member participants, the researcher made sure that the TLS was both anonymous and confidential. Finally, he stated multiple times to all participants (in writing and verbally) that this research study was for doctoral research purposes only and was not part of any investigation or report back to the company’s management on the capabilities or performance of the VTLs or the teams.

Volunteer Bias

The VTL research participants were nominated to the researcher by the lead IT executive for the applications development function at AlphaCo. In all 25 VTLs were identified that could possibly fit the research study criteria. All 25 were invited, of which 15 agreed to participate. Two of the 15 were further eliminated due to a non-fit with the study's criteria. Since the list of potential subjects was developed by the organization's leader, some subjects may have felt compelled to participate since their senior leader had identified them, and they looked at the opportunity as way to promote themselves. Furthermore, when the team members for each respective VTL's team were asked to participate, the team members may have felt equally compelled to either report negative or positive answers to the TLS questions. In all 169 team members across all 13 teams were invited to participate. A total of 72 team members (43% response rate) agreed to participate with 66 (92% follow through rate) actually completing the TLS. The researcher attempted to mitigate this bias by emphasizing the voluntary nature of participating in the research. There was no requirement to participate. Additionally, he focused on the fact that the study was for doctoral research and not part of any performance discussion.

Retrospective Recall

The critical incident interview required the VTL to recall incidents from the past and describe them in detail to the researcher. The VTLs needed to search their memories for instances where the team either learned well or not so well and then describe their specific actions during the incident. The quality and extent of the comments made were dependent on the VTL's ability to accurately remember the incident. During this process,

the VTLs could choose to either embellish or disguise their actions as they saw fit. Additionally, the critical incidents discussed were volunteered solely by the VTL. The researcher had no prior knowledge of what potential incidents might exist concerning the VTL. The researcher made efforts to navigate this risk by sending each VTL a Critical Incident Worksheet (Appendix J) prior to the interview. He also included definitions and examples of team learning in the follow up solicitation e-mail (Appendix C). Having the VTL prepare for the interview using the CIW was intended to have the VTL ready to discuss the most relevant two or three incidents. The researcher believed this advanced preparation would help the VTL recall and describe the incidents and answer follow up probes in sufficient detail. The researcher saw that this advanced preparation did work and the VTLs came prepared to discuss multiple incidents.

Incomplete Exploration of Issues

Another limitation of conducting interviews as a qualitative data source is that the researcher may not be skilled in drawing out appropriate information from the research subject (Kvale & Brinkmann, 2009; Maxwell, 2005; Rubin & Rubin, 2012). In some ways this was due to the semi-structured nature of the critical incident interviews. In this research design, the VTLs were not asked a standard list of questions. The interview was reliant on what the VTL said. The researcher asked follow up probes that he felt were best suited to elicit more information. The researcher attempted to handle this limitation by creating a detailed Critical Incident Protocol (CIP) (Appendix I). The CIP contained a scripted introduction to help set the stage for the interview with the VTL. There was also a list of possible follow up probes based on the Team Learning Model and the items found in the TLS (Appendix K).

Research Instrument Alignment

The TLS was incorporated into the research design as method to give a “voice” to the team members. The critical incident interviews were designed to have the VTLs describe incidents where they cultivated learning within the teams they led. There was no direct connection between the incidents described by the VTLs and the specific responses to the TLS provided by the team members. In conducting the analysis of the data, the researcher attempted to make these connections. In some cases, the verbiage used by the VTLs aligned directly with the wording of specific questions in the TLS. In other cases, the researcher needed to use his best judgement to make the connection. The researcher utilized his practical experience, interview notes, and detailed knowledge of the literature on team learning in attempting to make these connections. This effort assisted the researcher in preparing the data for further analysis and interpretation once the findings were uncovered.

Survey Question Interpretation

The team member participants were asked to complete the Team Learning Survey (TLS) (Appendix K). The TLS contained 39 questions and was written in English. Many team members were not native English speakers. There could have been issues with team members not fully understanding the questions being asked in the survey. Additionally, when taking the survey, they may not have all been thinking about the same context for the team that the VTL was describing in the incidents relayed during the interviews. Instructions around the TLS instrument were sent to each participant in the follow up solicitation e-mail (Appendix D). The instructions also specifically called out the team and VTL that the team member should consider when answering the TLS’s

questions. Finally, while English is not the “official” language of AlphaCo and BetaCo, the personnel in their respective IT departments are judged to be proficient in English – especially those working in the US and India.

Chapter Summary

This chapter sought to provide details around the research methodology used for this study. The research problem in question for this study was to uncover ways that team leaders of global virtual teams cultivate team learning. Three research questions were formulated to investigate this problem. The three questions are: (1) how does the virtual team leader create team learning conditions?; (2) what methods does the virtual team leader use to enable team learning processes?; and (3) how does the virtual team leader support team learning outcomes that achieve success? After a review of the literature, the researcher was able to develop a conceptual framework around this problem and resulting research questions. The conceptual framework showed the connection between the team leader, the team learning conditions, the team learning processes, and team outcomes. The research was set in the context of being global corporate virtual teams which requires some attention to operating and communicating in a virtual environment. It was with the research problem, questions, and conceptual framework in mind that the research design was created.

Based on the nature of the problem, the researcher decided that a qualitative study would be the best way to conduct the research. The researcher was a HRD professional at a large global financial services company serving an IT customer group. The group employed global virtual teams to conduct its work. These teams were comprised of

employees located in the US and other team members that are employed by an off-shore vendor located in India. The researcher primarily employed a purposeful sampling approach to select VTLs and virtual teams to study. The VTLs and teams needed to meet certain criteria for inclusion in the study. The intent was to create multiple case studies that could be used to describe the actions of a VTL and the ways he cultivated team learning within the virtual team. In all, 13 VTLs and their respective teams participated in the study.

To create the case studies, the VTLs were first requested to complete a Background Questionnaire (BQ). This was an on-line survey administered through the Qualtrics survey software package. The BQ asked for background information on the team leader as well as some information around the team's role, function, and goals. The BQ helped the researcher understand the context that the team was operating in. It also acted as a further screening mechanism for inclusion in the study.

After gathering the demographic and contextual information, the researcher then moved to gather perceptual information. This perceptual information came in three forms. First, the researcher conducted critical incident interviews with the VTLs. The focus was to have the VTLs identify instances when the team leaned well and not so well. The interviews were scheduled for 60 minute sessions and were digitally recorded and transcribed. The VTLs received pre-work in the form of a Critical Incident Worksheet to spur recall of two or three relevant incidents. Second, the researcher took notes during the interview with an ear towards noting the tenor around the team leader's responses. These notes were important in following the incidents as the VTL described them as well as providing other contextual observations. Finally, the researcher sent each member of

the VTL's team a link to an on-line version of the Dechant & Marsick (1993) Team Learning Survey (TLS). Like the BQ, the TLS was administered through the Qualtrics survey software package. The intent of using the TLS was help give a "voice" to the team members – versus relying solely on the opinion of the team leaders. The scores for the TLS were aggregated for each team. At least three responses were required for each team. The researcher then created a composite score across the 13 teams surveyed. The team view and composite view offered the researcher the opportunity to assess the extent of team learning occurring within the research universe through some type of validated metric.

The researcher believed that having each of these multiple sources of data helped in triangulation. Triangulation could assist in creating valid, reliable and trustworthy results from the research. To emphasize this desire, the researcher took great pains in exploring and mitigating the limitations that this qualitative study entailed. He took steps to eliminate bias in addition to documenting all aspects of the research design in order to guide future researchers in replicating all or parts of the study in similar or different conditions.

Once the data was collected and organized, the researcher then conducted a thorough analysis, interpretation and synthesis of the data. He drew from the data sources to create a vision of what he gleaned as the "reality" of team learning occurring in the teams studied. He used his own experiences as a human resource development professional as well as the extensive literature review and conceptual framework to conduct this analysis.

To get to the analysis, interpretation and synthesis stages of the research, the researcher first needed to present the findings following the collection and organization of the data. The findings are discussed in the next three chapters. The researcher will dedicate a specific chapter to each of the three research questions for this study. The research questions align with the three major components of the Team Learning Model: Team Learning Conditions; Team Learning Processes; and Team Learning Outcomes. The next chapter is dedicated to Team Learning Conditions.

Chapter IV

FINDINGS – TEAM LEARNING CONDITIONS

The purpose of this interpretive case study was to explore ways that team leaders of virtual global teams cultivated learning within their teams. Virtual teams are those groups of individuals that are dispersed over both spatial and temporal boundaries. The research took place within a leading global financial services firm. Critical incident interviews were conducted through a Critical Incident Protocol (CIP) with 13 virtual team leaders (VTL) that worked in the firm's global information technology (IT) department managing a global team of on-shore and off-shore application development (AD) professionals. Additionally, an on-line assessment, the Team Learning Survey (TLS), was administered to members of the each of the 13 respective VTL's teams. In total, 66 team members across the 13 teams completed the TLS. The following three research questions helped to guide the researcher in this study:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

The researcher will report the findings around each question with a specific chapter in this research report. Chapter IV will focus on the first research question.

Subsequent chapters (V and VI) will focus on each of the remaining research questions. In these three chapters, through the lens of the TLS items, the researcher will provide key findings on how the VTLs tried to cultivate team learning within their teams.

Organization of the Chapter

This chapter will discuss the key findings that emerged from the research participants' descriptions of critical incidents around team learning and Team Learning Conditions. As a reporting framework for this chapter, the researcher will first present the participant descriptions of critical incidents that describe Team Learning Conditions and its dimensions of Appreciation of Teamwork, Individual Expression, and Operating Principles. These will be presented using the respective TLS items for each dimension. Next, the researcher will report the average aggregate scores for the related items of the TLS across the 13 teams. Due to the volume of items contained in each Team Learning Conditions dimension, in some instances the researcher has grouped certain items together into categories in order to focus the findings for further analysis and interpretation in later chapters.

Appreciation of Teamwork

Appreciation of Teamwork is the dimension that assesses how open team members are to hearing and considering others' ideas and viewpoints. It also reflects the degree to which members value playing a team role and the extent to which they act in ways that help the team build on the synergy of its members. The items from the TLS that relate to Appreciation of Teamwork are:

1. We build upon one another's ideas.
2. We try to understand one another's viewpoints.
3. We look at issues from multiple perspectives.
4. Members feel valued and appreciated by one another.
5. We try to capitalize on each other's strengths and compensate for one another's weaknesses.
6. Team effort is valued over individual achievement.
7. Most members are able to express their thoughts clearly.
8. Most members are open to new ideas or ways of thinking.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Ideas, Viewpoints and Perspectives: VTL Critical Incidents

For this discussion, the first three items listed above have been combined into one category. These questions appear to represent the team working together to share information between the group members and build further understanding from one another. In looking at the incidents aligning to these questions, it appeared that the VTLs were concerned with creating an atmosphere where the team members felt free to express themselves and have other team members listen to their opinions. The VTLs were shown to employ a number of methods to get the team to open up to them and the others. In some cases, it was simply asking a question or following up on a remark that a team member made during a team meeting. Doug mentioned a time when his off-shore vendor partners stated that they had significant experience in an area. He then asked them to follow through on their statement and assist:

They always say that they've got all this experience. So we flipped it back the other way and said hey, if you're going to sell us as you guys having all this experience, then prove it.

Ben mentioned that the questions during a team meeting could help foster discussion. It was something akin to creating two-way dialogue with the team. He

elaborated around the follow up actions to the daily stand up meeting he conducted when asking simple questions like “What did you do yesterday? How did that go, and what do you plan on doing today?” Creating this type of dialogue amongst the team was critical for the team to learn. Ben did it by actively asking questions, listening, and using follow up questions. He further stated that it was almost liberating to not know all the answers. “So we kind of relish that no one knows any more than anyone else there. So everybody’s ideas are valid, and if everybody’s honest, and everybody’s on the same page that your guess is no better than mine.”

Chuck believed that dialogue occurred organically within the team. In his example, there was a set agenda for team meetings that included a time period to discuss unresolved issues for the team. He believed that the discussion during this time period naturally moved to areas of mutual interest for the team. Chuck felt it was the relationships developed between the team members that caused open dialogue to occur. When describing an incident where a controversial issue was surfaced by the team, Chuck said about the surfacing that:

it just naturally came up in this way. Well how do I say this? It just naturally occurred, in my opinion, because of the relationship. It made it much easier to me. I want to say it just naturally came up because that was the appropriate action I think both people felt that should happen.

Chuck concluded his description by remarking on the learning opportunity from this dialogue:

I try to make sure we use that team meeting in this sort of way. It’s not just providing status and talking about projects that we’re working on, but as a learning opportunity to get things out there that not everybody on the team may know about.

Doug admitted that sometimes the direct approach of soliciting opinions from the

team did not always work to the extent that he might have wished. He described mixed results when using pressure on the off-shore team to deliver on a statement they made about their capabilities:

Was it always successful? Probably not. I thought it started getting more successful towards the end when we started actually getting more feedback from them and more improvement ideas from them.

However, Doug later commented that having an opportunity where the team could voice concerns was intentional and must be embraced by the team. Doug felt he was:

creating that time where we're expecting people to bring these things up was kind of the intent. If you don't voice your mind, if you don't voice your concerns now, don't say later that we didn't give you the opportunity to do it.

Doug believed that the team members must be willing to take advantage of times when they could voice their opinions and not complain later that they did not have the opportunity.

Ideas, Viewpoints and Perspectives: Summary and TLS Scores

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. The first three items for Appreciation of Teamwork were rated as Moderately Agree by the teams. Table 4.1 contains the average score across the total of the 13 virtual teams for each item. Teams with a favorable score in this range tend to display an openness to differing views and ideas from inside and outside the group. Furthermore, diversity of opinion and contribution is valued within the team. In the comments made by the VTLs, they showed they took specific actions to enable the openness. Among the actions discussed was the fact that during team meetings they would ask questions with

follow ups to encourage dialogue. Sometimes there were mixed results in that the team members needed to take advantage of the opportunity to voice their opinions.

Table 4.1 – TLS Scores for the 1st Three Items Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork) In our team...	Average Total Score	TLS Rating
We build upon one another's ideas.	6.05	Moderately Agree
We try to understand one another's viewpoints.	6.02	Moderately Agree
We look at issues from multiple perspectives.	5.95	Moderately Agree

Team Members Feel Valued and Appreciated by One Another: VTL Critical Incidents

The VTL was critical to creating an atmosphere where the team was free to talk.

Doug mentioned retrospective meetings where his team conducted a deep dive into what went well or poorly with a recent team activity. This was a process that the team put in place to debrief on team activities in an open and candid way:

I think it had to do a lot with the process we had in place. I think that them seeing it week in and week out. Making the retrospective meeting something that is a safe place to talk and share ideas. Not necessarily a place where there is no conflict...not to just be blatantly mean to others, but it's a safe place.

Doug wanted his team to feel safe during their team meeting so team members could voice their opinions and not face mean-spirited conflict. The team was in a situation where they could value each other and not be exposed to intentionally malicious or inappropriate conduct.

Rob had a similar perspective when stating that he thought the atmosphere he created in his team bred an environment where they were free to voice their opinions. To Rob it was just a natural way to work:

It's a good way to work. It's just the way we always work... People are free to come up with any kind of ideas they think are the best. I think it's just the

atmosphere that we've been in for years...I don't think anybody's afraid to say something for fear of being told that it's a bad idea...we're very open to anybody's ideas.

Rob summed up his feelings by saying the team was characterized by a sense of openness and safety. "I think it's just openness. I don't think if something does go wrong, I don't think they have the fear of repercussions."

Chuck described an incident where technology was important in getting the team to get together so a new person on the team felt that she was valued. He had held a phone call with this new team member where she brought up an issue around an operating procedure, "she was one of my newer developers on the team and the discussion in our one-on-one where she raised an issue around a release we were in the process of running." Chuck immediately notified a technical lead on his team via e-mail, and the tech lead held a larger team conference call to address the problem. Chuck was happy because during the call:

we all felt good about it because I felt like the tech lead was stepping in and definitely had our teammate's back and was actually making sure things got out so that we didn't run into this issue again. So to me that's sort of one of those situations where everybody on the ground benefitted from what was going on.

The team was able to come together and address the issue where everyone on the team valued the input of the new team member. The call allowed the issue to be resolved at a benefit of all involved and the tech lead was able to openly show support for the new developer.

Team Members Feel Valued and Appreciated by One Another: Summary and TLS Score

This item for Appreciation of Teamwork was rated as Moderately Agree by the teams. This was a fairly high rating across the range of possibilities for this item. Table

4.2 contains the average score across the total of the 13 virtual teams for this item.

Teams with a favorable score in this range acknowledge the contribution that teamwork can make to addressing and solving problems. In the comments made by the VTLs, they showed they took specific actions to show team members they were valued and appreciated. Among the actions undertaken were trying to create an atmosphere where the team members were free to talk. Creating a safe space for the team was important for them to voice opinions to each other to show they were valued. Additionally, the VTL could utilize technology as a way to bring the team together or directly connect with an individual to address issues in a supportive way.

Table 4.2 – TLS Scores for the 4th Item Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork) In our team...	Average Total Score	TLS Rating
Members feel valued and appreciated by one another.	5.79	Moderately Agree

Team Members Try to Capitalize on Strengths and Compensate for Weaknesses: VTL Critical Incidents

The VTLs tried to shape their teams in a way that maximized the knowledge, skills and abilities across the team members. Sometimes this was done in how the VTL molded the team using a project management framework. Bob mentioned forming an Agile project management team as a way to get multiple people on the team that had different skills sets:

We talked about forming the Agile team and said we want someone from the business. We wanted a tester, and we wanted a BSA (Business System Analyst), somebody that knows systems that is used to writing requirements. And we said we want developers.

Bob later described the role of the Agile team as “a model built for easily interacting with people and learning”. Using the Agile framework was a way to get team members with different skills on the team so they could more easily communicate and accomplish the mission of the team.

On some occasions, the VTLs did not know how to handle a situation and needed to use the knowledge and skills of the team to make up for them lacking in some areas. Ben typified this issue when he was explicit with his team in describing his ignorance of how to deal with a problem. He told the team that he had no idea on how address the problem and actively sought the team’s assistance in trying to figure it out:

I was flat out and honest with them in the beginning. I said, you know, I’ve been with AlphaCo ten years, and I’ve been a developer for nine of those. This is literally the first time I’m getting up to lead a project... (it’s) just as new to me as it is to everybody else, and I needed their help.

On other occasions there were VTLs that described pairing more experienced team members with newer members of the team. Chuck commented that he partnered his “experts” with new people so they could understand the background of an application or process and contribute more quickly. This action helped to develop bench strength within the team:

I may reach out to them (the experts on the team) because I know the knowledge they have and say, this person is coming in and...they’re not very knowledgeable yet on what everything’s doing. I ask the experts to spend some time sitting down with them and talking through what that area of the system does...those people do play critical roles in the development of that bench strength.

Utilizing technology was a ready tool that the VTLs employed to get the team to counter-balance their strengths and weaknesses. Donny discussed how he had a new group of developers join his team. He needed to train his new people on the older processes that his more experienced team members managed. These more tenured

developers wanted to leave the applications in a good state when they retired, “the SME (expert) associates that have been here 30 plus years are looking at it and realizing that they need to give back that knowledge to the team so that they don’t leave the system in a bad way.” The team ended up using various forms of technology to train the newer team members:

We landed on the WebEx model of that training and putting the video in front of them because we tried to put the picture in it...the SME really saw the value of it...they didn’t want to leave the system unattended when they leave the company...they want to leave the rest of the team in good shape.

Using technology training tools for training was a way that Donny found he could transfer knowledge within the team to compensate for any deficiencies.

Team Members Try to Capitalize on Strengths and Compensate for Weaknesses: Summary and TLS Score

This item for Appreciation of Teamwork was rated as Moderately Agree by the teams. This was a fairly high rating across the range of possibilities for this item. Table 4.3 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range recognize the value of teamwork and understand that they must be willing to exploit the knowledge of some team members to assist with others. In the comments made by the VTLs, they showed where they took specific actions to help capitalize on strengths and compensate for weaknesses within the team. The VTLs constructed their teams with team members that had a variety of skills sets. They also directly asked the team for assistance when there was a need for help. Pairing more experienced members of the team with newer members was a way to overcome the lack of knowledge and help train the new people. Finally, some VTLs

employed technology training tools as a method to train newer team members and transfer knowledge.

Table 4.3 – TLS Scores for the 5th Item Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork) In our team...	Average Total Score	TLS Rating
Team members try to capitalize on each other's strengths and compensate for one another's weaknesses	5.77	Moderately Agree

Team Effort Valued Over Individual Achievement: VTL Critical Incidents

There were cases where the VTL expressed times when the team collaborated heavily to perform a task. The VTL would help unite the team by fostering the spirit of teamwork and why working as a team was important. Bob mentioned that, "I feel my job is to provide a framework to bring people together and emphasize teamwork and interaction". Doug discussed how he had the team meet on a regular basis for various purposes. These meetings helped to develop a team atmosphere amongst the team members where camaraderie developed and the team was willing to work together as one unit:

The process of having the retrospectives every three weeks, and having demos every three weeks, and meeting every day for 15 or 20 minutes, the team really built what I view as an amazing camaraderie and was willing to go to bat for other people on the team.

Alex discussed how he utilized his relationship with the team over time to foster the belief that the team was valued over the individual. He had worked in his team leader role for many years, and his team and customer group believed he had their best interests at heart:

I've been...supporting the P&C (property & casualty) company for 28 years. So, I think I've developed maybe a reputation that I'm somebody the business and team can work with and I'll support them.

With this longevity, Alex had been able to developed a shared sense of ownership through their on-going interactions:

it's just the daily interactions with the team. We do know each other, we trust each other and we try to stay out and in front of our objectives and make sure that we're meeting the mark.

It was the level of trust that Alex had built up through the years that allowed the team to realize that he wanted the team to succeed versus individual accomplishment. His intent then permeated the group.

Team Effort Valued Over Individual Achievement: Summary and TLS Score

This item for Appreciation of Teamwork was rated as Moderately Agree by the teams. This was a fairly high rating across the range of possibilities for this item. Table 4.4 contains the average score across the total of the 13 virtual teams for this item.

Teams with a favorable score in this range realize that their roles as team members are important. They also understand that individual contributions do not outweigh the strength of the team and each team member plays a part with the success of the team. In the comments made by the VTLs, they showed where they took specific actions in providing a forum where the team could come together. This way they could foster a sense of team spirit and comradery. It was also shown that building relationships and comradery occurred over time where trust was established between the VTL and the team.

Table 4.4 – TLS Scores for the 6th Item Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork) In our team...	Average Total Score	TLS Rating
Team effort is valued over individual achievement.	5.67	Moderately Agree

Team Members Able to Express Thoughts Clearly: VTL Critical Incidents

In meeting regularly with their team members, the expressed intent offered by the VTLs was to promote dialogue amongst the team members. However, part of the issue that VTLs dealt with was that if they asked for the team to make comments, then they needed to listen to these suggestions and act on them. Doug mentioned an idea that the team had about adopting a new operating framework known as Kanban:

we weren't getting enough work done to meet our July deliverables...and one of the team members actually proposed a process called Kanban...we did some research on it and then we brought it back to the team...we did some research and it looks like it's fairly promising.

The result was that Doug needed to follow through and act on the suggestion. In this case, Doug did adopt the new project management framework and used it with the team.

Sometimes the VTLs said that they needed to shut down discussion during meetings if it could be handled through other means. Matt made the point that he sometimes stops discussion on an item when he felt it should be handled by another discussion outside of the team. He believed he might be wasting the time of other team members that were not engaged in the problem:

during a team meeting, having a discussion between three people while seven, eight people listen is not productive. So I think we talked about it for probably another ten minutes or so ... (then) I said to take it off-line and discuss it later.

What Matt does not mention about cutting off the discussion is that could have interfered with the ability of other team members to express their thoughts clearly because they knew he would stop the conversation.

Technology also played into the ability of the team members to express their thoughts. Ben mentioned how he had a daily call with his global team to share information and get updates as a way to check in with the team as a whole:

it's a meeting and a call. It's literally just a standup meeting where everybody kind of gets together in a room with a phone and we sit down and talk...It's pretty much an open forum.

However, Ben went further and mentioned that the call was sometimes a problem. The team was rather large, and it was difficult to get everyone to participate when they were not in a face-to-face environment. He ended up dividing the call up into segments amongst the team to make it work:

the team was actually very large - around 60 something people. Pretty much the first four or five hours of the day we were having all the development leads on the same call and then we would take turns to hash out issues. We would carve out something like 30 minute blocks for each of the sub-team...It wasn't the most efficient, but it was the only way we could get people to consistently participate.

Technology enabled the team to communicate but using it needed to be organized. In Ben's example, having everyone participate at once was not always the most efficient way to run the team. Not all members of the team could participate together.

Team Members Able to Express Thoughts Clearly: Summary and TLS Score

This item for Appreciation of Teamwork was rated as Slightly Agree by the teams. Compared with the other scores, this was not as high a rating across the range of possibilities for ratings. Table 4.5 contains the average score across the total of the 13 virtual teams for this item. Teams with a less favorable score in this range sometimes are

not able to capitalize on the thoughts and ideas of individual team members. This means that individual opinions could be ignored. In the comments made by the VTLs, there were actions where they showed that could restrict the ability of a team member to express her thoughts clearly. The dangers demonstrated by the VTLs included not appropriately following up on an idea or suggestion from a team member; stopping discussion of an issue during a team meeting; and not acknowledging the constraints of technology in running team discussions.

Table 4.5 – TLS Scores for the 7th Item Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork)	Average Total Score	TLS Rating
In our team... Most members are able to express their thoughts clearly.	5.44	Slightly Agree

Team Members Open to New Ideas or Ways of Thinking: VTL Critical Incidents

The VTLs described that the people they managed were sometimes frustrated by the lack of new thinking in their areas of responsibility. Bob made a comment that best capsulizes the mentality of technology-oriented people. In most cases the technologist person wants to be on the cutting-edge of technology developments. Learning and adapting to new and changing technology is a way of life. He described this mentality for his team in the following way:

the people are very much interested in learning. I think technologists are like that. Basically, when you become a programmer you are involved with technology...you have to be educated and bred to adapt to those things, and if you don't then technology is not for you.

However, Matt mentioned a challenge with his team based on the length of time the team members had been involved with their specific application. He found that they were used

to fixing a process problem in a certain way. However, this way violated the company's release guidelines. Matt discussed his concern with the team in terms of violating the company's rules. The team felt that he was making them do unnecessary work. Matt stood his ground to explain the audit risk of not going in the direction that he advocated. Matt received resistance from the team for his new way of thinking because the team sensed it would take more effort:

I would say there was some definite resistance...I don't think it was angry resistance where people were just like, "You're doing it the wrong way." It was more sort of dumbfounded resistance... I don't think they understood or were interested in the differences in risks as opposed to differences in effort that was involved in doing it.

Length of time working on the applications was a recurring theme with many of the VTLs. Some members of their teams had worked on their respective applications for many years. Furthermore, the technology that was used on these programs was not considered current. The ones that stood out were: Alex, "I've been in the P&C (property & casualty) IT space and supporting the P&C company for 28 years."; Chuck, "we support mainly the UIS application which is an application that's been around for quite a while – 35 plus years. It's kind of old technology in a sense that its mainframe."; Rob, "we support what are called 'Legacy Systems' (programs that have been in existence for more than 15 years). So they're mainframe COBOL programs."; and Matt, "we have a lot of the existing knowledge subject matter experts that have been with the company for, you know, 15, 20 years working on this program."

Team Members Open to New Ideas or Ways of Thinking: Summary and TLS Score

This item for Appreciation of Teamwork was rated as Moderately Disagree by the teams. Compared with the other scores, this was the lowest scored item and rating

achieved for the entire TLS. Table 4.6 contains the average score across the total of the 13 virtual teams for this item. Teams with a less favorable score in this range appear to be closed to new ways of thinking that are proposed by others. There were certain conditions that appeared to exist specifically around this item. It was stated that technology-oriented people have a desire to learn and adopt new technology. The pace of change they experienced may have been too slow. Also, many of the teams and VTLs had been employed at the company and worked on a specific and older technology for many years. They were, in some cases, reluctant to try out new thinking or deviate from what they had done in the past. There appeared to be a disconnect between the expectations of the team members and the VTL.

Table 4.6 – TLS Scores for the 8th Item Relating to Appreciation of Teamwork

TLS Item (Appreciation of Teamwork)	Average Total Score	TLS Rating
In our team... Most members are open to new ideas or ways of thinking.	2.07	Moderately Disagree

Overall TLS Rating for Appreciation of Teamwork

Aside from each TLS item within the Appreciation of Teamwork sub-component achieving a score and rating, an aggregate score and rating is also given across the 8 items. The applicable ratings are Favorable, Neutral, and Unfavorable. When aggregating the items scores for the 13 teams with a total of 66 team members that completed the TLS a rating of Favorable was achieved (score of 42.77 in a range of 56 – 40 points). Teams with scores in the Favorable zone display an openness to differing views and ideas from inside and outside the group. Diversity of opinion and contribution is valued. Members consider their roles as team members to be important. They

acknowledge the contribution that teamwork can make to addressing and solving problems. Relevant examples of actions conducted by the VTLs to achieve this rating were detailed in the discussion above.

Operating Principles

Operating Principles reflect the extent to which the team has organized itself for effective and efficient operation. It assesses whether and how well the team collectively establishes commonly held beliefs, values, purpose, and structure. It indicates how efficiently the team has balanced working on tasks with building relationships within the group. The items from the TLS that relate to Operating Principles are:

1. We find that we need to balance getting the task accomplished with building relationships among members.
2. We are developing beliefs, values, and guiding principles.
3. We discuss our feelings as well as our thoughts.
4. We spend much time gaining clarity around our purpose and structure.
5. Members take sufficient time to get to know each other before working on the task.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Balancing Getting the Task Accomplished with Building Relationships: VTL Critical Incidents

Since the team members were distributed in a virtual environment, getting the team members together on a periodic basis was important for the VTLs. One main method described by the VTLs for bringing people together was the team meeting. As Chuck noted, the meeting was a place to share information and build relationships amongst the team:

the team meeting is a place where all of these folks are together, and I like to think if we do a lot of things that help build on each other and develop those relationships between the team members. You might be able to improve how things operate and each one of us gets better.

Chuck concluded his remarks around this issue by saying, “I don’t see how we could get our work done if there weren’t strong relationships.” Ben echoed Chuck’s point, saying that his meetings were a forum for collaboration and sharing information, “it’s primarily around sharing information and planning out the work that we’re going to be doing.”

Various VTLs discussed how they set up meetings with a specific cadence. Ben mentioned that his team would meet periodically to discuss an issue to decide on how to meet the day’s objectives. He then went on to describe how the meeting let the team share information across the team so it could decide and learn how to handle issues facing the team:

every morning we sit down on a call and talk for an hour on the issues that people are having - the outstanding defects that we have to fix and we’ll kind of pick and choose there who the best person is to work on it.

Like the other VTLs, Doug mentioned how he utilized technology to try to connect the team members with each other. He would have a call with his on-shore and off-shore teams to talk about what projects each person was working on. The intent was to build relationships and create more a personal connection between team members – especially between his US and India-based personnel:

a lot of times we’d go around the table virtually, in India too, and have them talk about what projects they were on. What problems they were facing. What kind of improvement things they were looking to do. And try to get some of that personal element in there so that the teams started building more of a connection between the onshore and offshore teams.

Balancing Getting the Task Accomplished with Building Relationships: Summary and TLS Score

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. This item for Operating Principles was rated as Slightly Agree by the teams. While this score is in the favorable range, it is on the lower end. Table 4.7 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range are able to balance relationship building with task accomplishment. The VTLs expressed a number of ways in which they try to achieve this balance. They hold meetings on regular basis so all team members can collaborate and get to know each other. This regular interaction was a factor in building relationships across the team. The VTLs also have their teams participate in dividing up work assignments amongst the group. Finally, they utilize technology as a way to connect the group members so they can get to know each other across time zones and geographical distances.

Table 4.7 – TLS Scores for the 1st Item Relating to Operating Principles

TLS Item (Operating Principles) In our team...	Average Total Score	TLS Rating
We find that we need to balance getting the task accomplished with building relationships among members.	5.28	Slightly Agree

Developing Beliefs, Values, and Guiding Principles: VTL Critical Incidents

At its very core, a “virtual team” is one where its members are not physically collocated. The geographic dispersion of the team creates a variety of challenges. This point was best introduced by Ben when he stated “I think the reality of it is that anytime

you involve people out of your geographic location, then it is going to be a challenge.” He then went on to explain that the amount of challenges can escalate with items like team members being in different time zones, communicating using technological means, and trying to integrate various components of the team. He summarized his thoughts by saying that, “every variable you add to the virtual experience could be an influence.” Chuck echoed Ben’s thoughts. He described his challenges in leading virtual teams in the past and trying to integrate them to work together by saying, “it (the virtual environment) does present its challenges I think. You have to work very hard to make that work with all the different types of people in the group.”

Team meetings/calls were important in bringing the team together on a regular basis, and having an agenda was a focal point in managing the call. Penny, set up an entire process for managing interaction within her group. She called it the “7 Checkpoints” and believed it was an important factor in maintaining control over her team and their projects:

there are “7 checkpoints” along the way to create an application. It puts rigor around our deliverables...we go through the dashboard, and we talk about how did they do within various checkpoints. The checkpoints align with the SDLC process and show how the project is going overall.

Pedro explained a similar process for managing his team. Instead of checkpoints, he used the term “gates” as way to check with his team on their progress toward completing projects. He developed these gates as milestones for specific deliverables in managing a project. The team needed to be disciplined in meeting these deliverables:

the “gate” is supposed to be points that you double check if you always finishing off different milestones in the methodology and they are really being done...it outlines which deliverables are required for each gate...you need to make sure that the process this or that team is following the process and all of the deliverables are really in sync with the process.

Developing Beliefs, Values, and Guiding Principles: Summary and TLS Score

This item for Operating Principles was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 4.8 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range try to maintain a structure for its operations that meet a shared set of guidelines, principles, and norms. They will focus on how the team will operate. The VTLs did focus on guidelines but less on values and beliefs. In the examples offered, the VTLs readily acknowledged the challenge of operating in a virtual environment. To compensate for not having the team members geographically accessible, the VTLs created a number of methods to control the team and standardize operations. Having regular team meetings with some way of guiding the meeting – like a project management control processes – assisted in managing the group.

Table 4.8 – TLS Scores for the 2nd Item Relating to Operating Principles

TLS Item (Operating Principles) In our team...	Average Total Score	TLS Rating
We are developing beliefs, values, and guiding principles.	5.21	Slightly Agree

Discussing Feelings as well as Thoughts: VTL Critical Incidents

The VTLs mentioned many incidents where their teams would discuss their thoughts. The VTLs actively solicited the opinions of members of their teams. Chuck mentioned an incident where the entire team was available and on a call. The team members started discussing an issue that impacted the entire the team. The team members felt free to speak up and attempt to resolve the issue:

we were able because the whole team was there. There was everyone there to speak to their parts to the process...I think the conversation was very positive in the sense that the folks that were providing their input into it, it was an opportunity for them to talk about things they're doing that they might have not had the opportunity before...we were taking appropriate actions to try and help them resolve that issue.

Doug discussed how he needed to try to create a safe space for his team during team meetings so the team members could express themselves. He held retrospective meetings around completed projects focusing on what went well and what needed to be improve:

initially the meeting was open to anybody who wanted to attend. After that we would ask anybody who wasn't part of the core team to leave. And then we'd have the retrospective with the core team to talk about what went well, what didn't go well, and what kind of things that we can change going forward.

Doug also mentioned that the meetings could get volatile as emotions came to the forefront. However, the key ingredient was that everyone approached the meeting as way to openly discuss issues without having residual bad feelings:

(we) wanted to keep these meetings as a safe place where people were willing to talk and potentially get into heated debates every once in a while, that are healthy in nature, but not in the sense of wanting someone beating up on somebody else, but if people aren't comfortable to speak their minds, then those things go unsaid and kind of foster bad feelings within the team.

Some VTLs expressed the challenge of creating an atmosphere in the team where the team members could openly express their thoughts in a virtual environment. Regardless of the challenges, the VTLs felt the teams did need to communicate so it could perform its duties. Ben mentioned how important communicating was in the virtual environment and having the right technology was a key to collaborating effectively:

speaking to someone in India over a phone line can be a challenge too...so technology plays into it. You know like the ability to get clear communications

whether it is through conference calls, whether it is through Jabber, video teleconferencing or whatever.

Technology helped improve the communication process and its impact on the ability to share thoughts, particularly with off-shore teams. When commenting on having a regular VTC session with this team to get them express their thoughts, Nitesh stated that, “the learning which I got out of this was the team structure of the offshore-onshore relationship was that the more they communicate the better it is” for them to show their feelings.

Discussing Feelings as well as Thoughts: Summary and TLS Score

This item for Operating Principles was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 4.9 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range will create an atmosphere within the team where team members will equally share their feelings as well as thoughts as way to solve problems and handle conflicts within the group. Teams that score in the less favorable range will have team members that are not willing to openly express their underlying thoughts and motivations to their leaders and the rest of the team. The VTLs in this study did offer examples of their teams offering their thoughts. However, there were scant examples of offering their feelings. In order for the team members to be willing to share thoughts, the VTLs mentioned having all team members available to participate in team meetings – whether in person or through technology. They then needed to create a safe space for the team members to express themselves. This could be difficult in a virtual environment where the team members did not have visual contact with one-another.

Table 4.9 – TLS Scores for the 3rd Item Relating to Operating Principles

TLS Item (Operating Principles)	Average Total Score	TLS Rating
In our team...		
We discuss our feelings as well as our thoughts.	4.79	Slightly Agree

Spending Time Gaining Clarity Around Team Purpose and Structure: VTL Critical Incidents

One of the main items that the VTLs mentioned when they discussed their incidents with the researcher was getting the team together to acknowledge what the purpose of the team was and how they would address problems. There were cases where this would be handled with one-on-one conversations with members of the VTL's team. Alex noted a few occasions where he was speaking to a remote member of his team and the person brought up a situation that needed to be looked at:

well again my (vendor) lead in Rhode Island was observing some of the problems that they were encountering with the test process. So, we had some meetings to talk about it and essentially the dug into it and they were able to discover where the gaps were.

He also discussed a second incident in the same manner of discovery:

once again, I relied on my Lead in Rhode Island, my vendor person there and we started to openly converse about who were all of our customers on the business side that used FARO. What are their needs going forward? How can we help them through this issue?

Vinay described a case where he asked for an update on a project that was ready for deployment. He asked for status tickets regarding the implementation process. These status tickets gave an indication of the degree of functionality for the application before and after deployment. The question spurred a conversation that helped to identify a problem:

I wanted to see the status tickets of a week before the implementation and the week after the implementation...we thought that this was not possible and the level of detail we need to get is not available...we started thinking as a team to define and solve the problem.

Once the issue was surfaced, the VTL engaged the team in a discussion as to how to further refine the issue and address it. Matt demonstrated a more systematic way of looking at the problem at hand. He asked the group to help him walk through the extent of the situation so both he and the team understood it. It was important for him to do this because he wanted to articulate the problem in a way that everyone understood it. In this way he could gain buy in from the team that there was in fact an issue that needed to be addressed:

so we walked through what they did. They showed me how it worked so that I could get a full understanding of what they were doing... so I could articulate to them the differences between what they were looking to do and what I was looking to do.

Rob had a similar approach in running through the problem to make sure he had all the information as well as ensuring that the team understood the problem. Rob employed the whiteboarding feature in WebEx so the entire virtual team could follow the conversation and see all the relevant data surrounding the problem:

we wrote a list on the board, on the whiteboard and we shared that on WebEx and everybody saw the same thing. We went through everything and asked everyone what they think.

Spending Time Gaining Clarity Around Team Purpose and Structure: Summary and TLS Score

This item for Operating Principles was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 4.10 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this

range generally spend time gaining clarity around their purpose and goals. They do not dive headlong into trying to accomplish a task without first understanding the issue and then organizing around how to address it. They establish how assignments should be handled and shared. The VTLs were found to supply a number of examples in how they helped facilitate this process. They held one-on-one and group conversations to solicit information from team members about what was occurring in the group. They then made sure that they gathered all relevant information from the team.

Table 4.10 – TLS Scores for the 4th Item Relating to Operating Principles

TLS Item (Operating Principles)	Average Total Score	TLS Rating
In our team...		
We spend much time gaining clarity around our purpose and structure.	4.77	Slightly Agree

Members Take Sufficient Time to Get to Know Each Other Before Working on the Task: VTL Critical Incidents

In this area, the VTLs tended to concentrate on the process for managing their teams rather than methods of focusing on interpersonal interaction. However, there were instances where the VTLs tried to get to know the team members – especially the ones working off-shore for BetaCo. Vinay offered how he handled this situation. He hosted a video conference call for new team members to introduce themselves to the rest of the team:

it's a VTC meeting monthly. I just wanted to make sure that we meet like that so it's a little more personal. So I meet with them on a weekly basis. I just talk to them. If there are any new people and I don't know them, they're welcome to join the meeting to get introduced.

The VTLs discussed how they thought about inviting people to the team meetings. This could be a way to help develop relationships. Sometimes there was a

logistical struggle based on the sheer number of people that the VTL managed. The VTLs wanted to create the right forum for all team members to collaborate. Matt talked about how he was challenged to find the correct balance when inviting various components of his team because of the size. He said that “it’s a little bit more difficult (with the off-shore people) because there are 25 people offshore and I can’t do 25 and the 12 FTE together.” He still wanted to have the teams meet, but he divided them up:

we actually have two sets of these meetings. One of them is with the - just the 12 people which is all of my FTE staff...and I do one with all of the offshore team, the offshore leads, all of the offshore

Even though Matt divided his teams between on-shore and off-shore, he still “considers them all on the team” and tried to treat them all as one team regardless of the formal reporting relationships.

Chuck invited outside people to come to his meetings to discuss topics relevant to his team. When discussing the patterns of his team conducting new software releases, he said:

we have our release coordinator come in and talk about the releases themselves...we have to make sure we’re all in the loop on these things and that everything’s going smoothly with them.

Chuck went on to mention the importance of establishing relationships by the team members getting to know each other and those in other groups through these interactions. He utilized technology and his VTC calls as a way for the them to become more familiar one another. This way, when they were assigned to projects, there was already some affinity established:

like I say it makes it easier for them to talk to each other they know each other better. They may be working on a project for the first time when the tech lead assigned knows them better because they’ve already worked with them. They

hash things out with them in the team meeting and so that relationship is already there and doesn't have to be built.

Members Take Sufficient Time to Get to Know Each Other Before Working on the Task: Summary and TLS Score

This item for Operating Principles was rated as Neutral by the teams. This score is considered neither favorable or unfavorable since it falls in the middle of the range. Table 4.11 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score are able to balance building relationships with engaging directly in the task at hand. The VTLs did not expressly mention instance where they spent time for team members to get to know each other after assigning tasks. However, they did exercise actions that would create more familiarity between team members. These actions included holding VTC calls where the entire team – both on-shore and off-shore components – could see each other and interact. If the team was too large where getting to know team members was challenging, the VTLs would simply divide the team up for meetings to create more intimacy between themselves and the team members. Finally, the VTLs would look to invite other functional partners to meetings as a way to foster those relationships.

Table 4.11 – TLS Scores for the 5th Item Relating to Operating Principles

TLS Item (Operating Principles)	Average Total Score	TLS Rating
In our team... Members take sufficient time to get to know each other before working on the task.	4.12	Neutral

Overall TLS Rating for Operating Principles

Aside from each TLS item within the Operating Principles sub-component achieving a score and rating, an aggregate score and rating is also given across the 5 items. The applicable ratings are Favorable, Neutral, and Unfavorable. When aggregating the items scores for the 13 teams with a total of 66 team members that completed the TLS a rating of Favorable was achieved (score of 24.07 in a range of 35 – 20 points). Teams with scores in the Favorable zone are able to balance relationship building with task accomplishment. Structurally, the group operates according to a shared set of guidelines, principles, and norms. Relevant examples of actions conducted by the VTLs to achieve this rating were detailed in the discussion above.

Individual Expression

Individual Expression reflects the extent to which team members have the opportunity to give input in forming the team's mission and goals as well as influence the team's operation on an on-going basis. It also reflects the degree to which team members feel comfortable expressing their objections in team meetings. Overall, this dimension focuses on the opportunities that an individual has to make his position known during team discussions or actions. The items from the TLS that relate to Individual Expression are:

1. People do not feel free to express their negative feelings about changes.
2. Speaking one's mind is not valued.
3. Members do not have the opportunity to define and develop the team's objectives.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

People do not Feel Free to Express Their Negative Feelings about Changes: VTL Critical Incidents

The VTLs were shown to employ a number of methods to get the team to open up to them and the others on the team about changes. Most VTLs expressed that they had a formal agenda item during team meetings as an opportunity for team members to express their opinions on issues or concerns. Donny offered an example of how he handled this activity by putting “walk ons” on his agenda. This was where anyone on the team could bring up an item to discuss. Donny used the term when describing an incident around a recent release management issue. “It was the ‘walk on’ area we typically try to leave on our agenda. So if we do an hour call once a month, we try to leave 20 minutes on the agenda to ‘walk on’ the session. We try to invite topics on the table that’ll stir the conversation.” He further states that:

you try to leave a window of area in the agenda because some people call it “question and answers” at the back end. In the past, the walk ons were items that management has been driving out... (now) all the topics on the agenda are non-management topics. We’re letting the developers deliver the topics.

Many of the VTLs utilized an open discussion item in their agendas for questions & answers (Q&As). Sometimes the discussion that came up during the meetings were spontaneous. Matt described an incident where he and the team completed the designated agenda topics. When the call was about to conclude, someone on the team surfaced an issue which led to a further discussion where the team was able to share more information:

it’s (the call) scheduled for an hour, but I want to say it usually takes about 25 to 30 minutes to go through the status. And just when you think that we’ve made it through the status, and we’re going to hang up the call, that’s when people will start to do follow ups and we get into more discussional points...someone will say, can we talk a little bit more about this particular item?

Chuck mentioned how the team members of his team were free to add topics to his meeting's agenda. They can bring up whatever is concerning them and have an open discussion about it with the team:

the team members themselves ask for topics to be added to the agenda. The things that we want to discuss as a team especially if it's around process procedures expectations or anything that would be of a benefit of the team or to be shared in an environment where the whole team's present so their part is explained.

Chuck was looking to have the team share information as well as look to solve problems that the team faced as a whole.

In many ways Donny summed up the sentiment for these open discussion/Q&A items by focusing on empowerment. When members of the team feel they were actively engaged in the team, it promoted their desire to stay engaged and try to solve problems and learn from each other:

I think it just opens up the team to feel more empowered. It's just a more open feeling... I can't tell you of how many examples where people have really brought topics that they normally wouldn't have.

People do not Feel Free to Express Their Negative Feelings about Changes: Summary and TLS Score

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. The items for this sub-component are scored differently than the other items in the TLS. Due to the phrasing of the questions, the scoring is conducted in a reverse ranking order. To avoid confusion, the researcher has made the scoring value used for the results consistent with the other questions. For this item in Individual Expression, the TLS rating was Moderately Disagree by the teams. This score is on the lower end of the favorable range. Table 4.12 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range have team members that

feel free to express themselves and offer both positive and critical comments. The VTLs mentioned examples where they felt that team members were free to express their feelings about change. Some VTLs included an open item discussion topic on the team’s meeting agenda. This way there was time set aside for the team to ask questions on a topic of interest. In some teams, while there was not an explicit agenda item to ask questions, the team members would ask questions after all the formal agenda items were addressed. The VTLs felt the teams were empowered to ask questions on any issues concerning them.

Table 4.12 – TLS Scores for the 1st Item Relating to Individual Expression

TLS Item (Individual Expression) In our team...	Average Total Score	TLS Rating
People do not feel free to express their negative feelings about changes.	5.67	Moderately Disagree

Speaking One's Mind is not Valued: VTL Critical Incidents

The VTLs were shown to take positive steps to encourage dialogue within the team. Matt offered an example by saying that he wanted the team members to explain their line of thinking when voicing an opinion. “I foster that sort of attitude by giving them a little bit of time to explain their case, why they think it’s important that we do follow up, give them a minute or two to get into it, let people sort of announce their interest in helping our understanding.”

The VTL was critical to creating an atmosphere where the team was free to talk. As mentioned already by Doug, he held retrospective meetings where his team conducted a deep dive into what went well or poorly with a recent team activity. This was a process that the team put in place to debrief on team activities in an open and candid way:

I think it had to do a lot with the process we had in place. I think that them seeing it week in and week out. Making the retrospective meeting something that is a safe place to talk and share ideas. Not necessarily a place where there is no conflict. I think people are smart enough not to just be blatantly mean to others, but it's a safe place.

Doug further explained the purpose of these meetings and why it was a safe place:

they wanted to keep these meetings as a safe place where people were willing to talk and potentially get into heated debates every once in a while, that are healthy in nature, but not in the sense of wanting someone beating up on somebody else.

Rob had a similar perspective when stating that he thought the atmosphere he created in his team bred an environment where people were free to voice their opinions.

Rob felt that:

it's a good way to work. It's just the way we always work. So there's no right or wrong answers or anything. People are free to come up with any kind of ideas they think are the best. I think it's just the atmosphere that we've been in for years. People aren't afraid to voice their ideas...nobody's going to say that's a dumb idea.

Rob summed up his feelings by saying the team was characterized by a sense of openness and safety. "I think it's just openness. I don't think if something does go wrong, I don't think they have the fear of repercussions."

Speaking One's Mind is not Valued: Summary and TLS Score

This item for Individual Expression was rated as Slightly Disagree by the teams. This score is on the lower end of the favorable range. Table 4.13 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score ensure that everyone on the team is heard and all comments and contributions are taken seriously. The VTLs zeroed in on the aspect of them creating an atmosphere where the team feels they can openly express themselves. Some VTLs explicitly stated that they strove to create a safe environment where the team members felt they could speak to whatever was on their minds.

Table 4.13 – TLS Scores for the 2nd Item Relating to Individual Expression

TLS Item (Individual Expression)	Average Total Score	TLS Rating
In our team... Speaking one's mind is not valued.	5.33	Slightly Disagree

Members do not have the Opportunity to Define and Develop the Team's Objectives: VTL Critical Incidents

The VTLs mentioned that they regularly brought their teams together for meetings with the idea of defining and developing the team's objectives. In some cases the meetings could be eye-opening for teams that had not met previously and were learning about what the different components of the team did on a day-to-day basis. The discussions that came up during the meetings were a way to share information and break down silos. Matt discovered this when he referred to his experience when he took over his virtual team. He had them meet to share what projects they were working on. "When I took over the team I started doing a full team meeting where everybody would get together and talk about what projects they're working on."

He soon learned that many on the team had no idea what others on the team had been working on. The team was extremely siloed with each member isolated. Having each team member give an update was a way that the team shared information and learned from each other:

in that process they started hearing what other people on the team were working on, and they realized even though they'd been with the team for 15 years they had never heard of some of the applications or some of the processes that we - that other people are working on. They had no idea what other people on the team were doing and how it related to the work that they were doing.

While he acknowledged that the virtual nature of the team and not being co-located was a factor behind this, he firmly believed that the main culprit was the existing mentality on the team to only focus on each individual's work and nothing outside of that:

I'm sure part of that is distance in the case that you're not sitting near these people...but I think more importantly it was just that those silos were artificially created to say, this is your area. This is what you do. Don't do anything else.

Vinay saw the meeting as a way for not only the team but also him to get an understanding of what the team was doing and stay on track with its purpose. When the IT organization at AlphaCo restructured, Vinay believed he was losing track of the work the team did in that he "didn't get too involved with who is working on the team and how are they doing. I think those things are not really visible after we switched over to PBO." He then instituted a standing VTC call with the team so he could learn about what the entire was doing:

I haven't been getting a chance to talk to offshore...it may be a good idea to have a VTC meeting with the offshore on a monthly basis, so they can see us and talk to us and we can talk to them and understand what's going on and hear if they have any concerns that we can address statically with them.

Using VTC technology was important to Vinay so the team could see each other and interact in a more personal manner.

The VTLs ran their meetings differently when deciding on how to review the team's objectives. Some used a formal agenda and others kept the meeting more of a topical discussion to help drive a conversation amongst the group around the team's objectives. Ben wanted his meetings to be comprised of team members giving quick updates during a "stand up" discussion – one that is intended to be short and to the point. This way the team could share information and stay on track with its objectives.

It's literally just a standup meeting where everybody kind of gets together in a room with a phone and we sit down and talk. There's no real agenda other than we go through everybody one by one and ask who has something that is a concern or a problem where they have a question. It's pretty much an open forum.

While he ran a very informal meeting that included no formal agenda, all the participants understood their roles and responsibilities. Bob had a more descriptive version of what the stand up-type meetings was and its agenda:

so there is a scrum meeting where every person talks about their projects...They call them standups sometimes because they don't want to get too comfortable in a long meeting. It is meant to be quick – this is what I am working on now, and this is what I worked on yesterday

He had each team member answer three basic questions as part of their updates:

these are the three questions you have got to answer: yesterday; today; and am I blocked by anything? They don't want people going off on tangents or long-winded discussions.

Some meetings had a more formal agenda attached to them. Donny describes how he and the other managers on his team constructed the agenda for their meetings, but also asked the team for potential topics. He said that he helped “along with one of my other managers, help pull it together. But we reach out to the developers and ask if they have topics they want to contribute some.”

Chuck also had a formal agenda, and he included a follow up portion to it. This was a place where the team would provide updates on past team discussions as way to ensure that objectives were being met:

we assign action items from the discussion and document what person is assigned to handle something. We follow that up usually at the next team meeting or whatever the timeframe is for those action items to be resolved. Whoever owns it brings it back to the team meeting and we finalize there.

Rob talked about an agenda consisting of a project tracker for his team meetings.

There was a step-by-step discussion amongst the team to share details and updates.

Questions were encouraged:

there's an agenda. So we have what we call a "project tracker weekly status report". It's actually a list of everything... We'll have a list of all the items that are going into production and they'll actually walk through each item individually... If there's any questions, people stop and we talk about the questions.

Even though his team meeting appeared to be tightly structured, Rob said the meetings were pretty interactive and the subject matter could result in extensive dialogue. "No, they are pretty lively. I mean, if somebody has a question, they'll bring it up on that call, but they're pretty much straight forward. It really depends on the phase of the project."

Members do not have the Opportunity to Define and Develop the Team's Objectives: Summary and TLS Score

This item for Individual Expression was rated as Slightly Disagree by the teams. This score is on the lower end of the favorable range. Table 4.14 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score reflect the existence of an opportunity by the team members that they can provide their individual contribution to the team's overall purpose and strategy. Additionally, it shows that the direction that direction the team is heading in was determined through consensus. The VTLs mentioned holding meetings with the team as a way to bring the team together. These meetings were held through utilizing technology to connect all the team members. They constructed either formal or informal agendas to the meeting so they could have the team members update each other. The discussion that followed created a forum where team members could ask questions and make adjustments to the team's objectives. It was through this discussion where team members had the opportunity to define and develop the team's objectives.

Table 4.14 – TLS Scores for the 3rd Item Relating to Individual Expression

TLS Item (Individual Expression)	Average Total Score	TLS Rating
In our team... Members do not have the opportunity to define and develop the team's objectives.	4.60	Slightly Disagree

Overall TLS Rating for Individual Expression

Aside from each TLS item within the Individual Expression sub-component achieving a score and rating, an aggregate score and rating is also given across the 3 items. The applicable ratings are Favorable, Neutral, and Unfavorable. When aggregating the items scores for the 13 teams with a total of 66 team members that completed the TLS a rating of Favorable was achieved (score of 15.61 in a range of 21 – 15 points). Teams with scores in the Favorable zone are able to balance relationship building with task accomplishment. Structurally, the group operates according to a shared set of guidelines, principles, and norms. Relevant examples of actions conducted by the VTLs to achieve this rating were detailed in the discussion above.

Chapter Summary for Team Learning Conditions Findings

This chapter presented findings uncovered by the researcher in this study around Team Learning Conditions. When looking at the data from the critical incident interviews, the researcher noticed certain patterns emerging. Once these patterns were coded, the researcher was able to attribute certain comments made by the VTLs in their critical incident interviews with specific items in the TLS for Team Learning Conditions. The researcher also presented the average total results for each item in Team Learning Conditions TLS across the 13 virtual teams surveyed. The intent was to give a voice to

the team members and show methods that the VTLs used to create Team Learning Conditions for team learning in a virtual environment. In accordance with a typical qualitative research study, extensive use of quotations by the research participants were used in presenting the research findings. Through utilizing direct quotes the researcher wanted to present to the reader an accurate and unbiased view of what the VTLs' actions were in cultivating learning within their teams.

Team Learning Conditions is made up of three dimensions: Appreciation of Teamwork; Operating Principles; and Individual Expression. According to the scoring protocol for the TLS, each of these dimensions received a rating based on the aggregate scores for the TLS items contained in a dimension. Each of the three dimensions achieved a "Favorable" rating. This is the highest score possible for the TLS.

When looking at the comments made by the VTLs the researcher was able to identify specific themes that emerged from the data. These themes are important in answering the first research question for this research study, "How does the virtual team leader create team learning conditions?" These themes will be further developed in the Analysis, Interpretations and Synthesis of Findings chapter (Chapter VII).

The next chapter in this research study addresses the second research question, "What methods does the virtual team leader use to enable team learning processes?" The researcher will take the same approach as with the current chapter. Quotes from the critical incident interviews will be used to augment the results of the TLS items aligning to Team Learning Processes.

Chapter V

FINDINGS – TEAM LEARNING PROCESSES

The purpose of this interpretive case study was to explore ways that team leaders of virtual global teams cultivated learning within their teams. Virtual teams are those groups of individuals that are dispersed over both spatial and temporal boundaries. The research took place within a leading global financial services firm. Critical incident interviews were conducted through a Critical Incident Protocol (CIP) with 13 virtual team leaders (VTL) that worked in the firm's global information technology (IT) department managing a global team of on-shore and off-shore application development (AD) professionals. Additionally, an on-line assessment, the Team Learning Survey (TLS), was administered to members of the each of the 13 respective VTL's teams. In total, 66 team members across the 13 teams completed the TLS. The following three research questions helped to guide the researcher in this study:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

The researcher will report the findings around each question with a specific chapter in this research report. Chapter IV focused on the first research question.

Chapter V will focus on the second question. Chapter VI will focus on the third and remaining research question. In these three chapters, through the lens of the TLS items, the researcher will provide key findings on how the VTLs tried to cultivate team learning within their teams.

Organization of the Chapter

This chapter will discuss the key findings that emerged from the research participants' descriptions of critical incidents around team learning and Team Learning Processes. As a reporting framework for this chapter, the researcher will present the participant descriptions of critical incidents that describe actions occurring during each of the Team Learning Processes of Framing & Reframing, Experimenting, Crossing Boundaries, and Integrating Perspectives. These will first be presented using the respective TLS items for each process. Next, the researcher will report the average aggregate scores for the related items of the TLS across the 13 teams. Finally, he will present an aggregate TLS score for combining all the Team Learning Processes. Due to the volume of items contained in each Team Learning Process, in some instances the researcher has grouped certain items together into categories in order to focus the findings for further analysis and interpretation in later chapters.

Framing and Reframing

Framing and Reframing is the process that represents how people “think” in the Team Learning Model. Framing is the initial perception of an issue, situation, person or object based on past understanding and present input. Reframing involves challenging

the team's initial mandate or hammering out consensus among members as to the nature of the mandate. Teams advance their development through the process of Reframing.

The items from the TLS that relate to Framing and Reframing are:

1. We often revise our viewpoints based on input or new information from others outside the team.
2. We often find that our views of the problem change as a result of our team discussions.
3. We challenge our basic beliefs or assumptions about the issues under discussion.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Revising Viewpoints Based on Input or New Information from Outsiders: VTL Critical Incidents

Many VTLs discussed that they created formally designated meetings with groups outside of their teams where they could share information. It was through the effective facilitation of the discussions during these meetings where the group could talk about updates on progress and obstacles to project completion. From these discussions it was seen that viewpoints could change and then be readjusted. Penny offered an example of this occurring within her "7 Checkpoints" project management process that she developed. She would have all interested parties in the project come together at a specific milestone of the project. The meeting was formed around reviewing a "dashboard". The dashboard was a tool that had all the requirements for the project listed. She described it as a tool that "just takes each gate in the SDLC (Software Delivery Life Cycle), so "Requirements" is just one gate that we have...and all those requirements are within the tool. We can see them all." From there, her team would

review the dashboard both with her own team and with other groups. Penny believed it was a powerful tool because it could:

really expose, for lack of a better word, where problems are and to ensure that things like ambiguities are taken care upfront in the requirements...so finding these things upfront really adds value to the project and it also drives down the number of problems found...because we were able to correct them.

Grant gave an incident where he had a regular meeting with his business customers. The intent of this meeting was to get feedback on how to prioritize his team's work. Initially, Grant would set up the project workflow "as part of the project plan for launching the application into production." Invariably, there would be production issues that his team would need to deal with. In order to ensure his team was working on the right priorities, he and his team would:

meet with the business regularly on production problems and change requests and prioritize them. So we work on these based on priority...and that's what we're working off of. But that can change based on the circumstances.

Similar to Penny, he developed a dashboard that he housed on a data sharing SharePoint site. The dashboard was used as a tool that could help facilitate the discussion. This way the information on prioritization was shared not only with his team but also with the business customer so:

the team knows that if they're ready to take on a new task, that they go out and they check with the intake SharePoint, which the business helps manage...that site has all the open production problem or just a list of open problems and CRs (Customer Resolutions) and what their priority rankings from the business are.

Grant used this dashboard to help manage the group and keep it focused on its deliverables. Work was adjusted based on input from an outside customer group.

Sometimes the VTL needed to make adjustments based on a lack of information from people outside the group. Alex provided an incident where the company made the

decision to retire a platform (FARO) that it used to manage a department's financial and budget records. He stated that after the decision, "the project kind of got orphaned a little bit in terms of all the people who were out there using this platform." There was no guidance around a replacement platform to perform the same function, "nobody really grabbed hold of this project and said I own this and I'm going to help you get to the next state." As the timing of the FARO retirement neared, Alex realized that he "had a bunch of exposures with our business partners in terms of where are we going to store all of these reports." He decided to change the work schedule of his team and assist his customer groups with the transition, even though he was given no formal direction or guidance by other groups on how to conduct it. "We were able to identify a solution for all of our exposures with our business customers." Alex used his own intuition and experience to make a decision.

Revising Viewpoints Based on Input or New Information from Outsiders: Summary and TLS Scores

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. The first item for Framing and Reframing was rated as Slightly Agree by the teams. Table 5.1 contains the average score across the total of the 13 virtual teams for each item. Teams with a favorable score in this range tend to create an initial perception about an issue; however, they are then flexible enough to transform that initial perception into a new frame. In the case of this item, the transition to a new frame came from interacting with people outside of the group in a facilitated meeting. In the comments made by the VTLs, they showed they took specific actions to enable this transition.

Among the actions discussed was setting up a formal process to meet with constituents outside the group for input on project progress. This input was tracked in formal ways through tools like a dashboard that could help dictate adjustments or prioritization of work. In some cases, the VTLs acted on their own without input from outsiders when they knew a change was imminent and they received no guidance. In others they received input from other groups.

Table 5.1 – TLS Scores for the 1st Item Relating to Framing and Reframing

TLS Item (Framing and Reframing) In our team...	Average Total Score	TLS Rating
We often revise our viewpoints based on input or new information from others outside the team.	5.49	Slightly Agree

Views Change as a Result of Team Discussions: VTL Critical Incidents

The VTLs were seen to employ number of methods to check their understanding of an issue with the team and make revisions to the team’s direction if required. Alex talked about utilizing brainstorming as a device to get the team to think differently about a problem. He described an incident where his team received the functional requirements for a project in the form of “a BRD (Business Requirements Document) that comes from the business. It includes functional requirements.” Based on the BRD, Alex “had a lot of outbound activity changing software on the mainframe that impact my portfolio.” He needed to figure out how he could manage this increased activity where:

it got fixed by us, me and the team, engaging on the topic and brainstorming on how we want to solve the problem. Once we arrived on the “how”, we realized that it’s going to require some additional testing and some additional due diligence on the business side.

The brainstorming exercise by the team allowed the team to reflect on the situation and reframe the problem which resulted in a new course of action by the team to address reaching its objectives.

Grant mentioned an incident where he set up a Knowledge Transfer (KT) routine with a vendor that he was using on a project. The vendor was rolling off a project, and he needed to have his team learn how to continue the work the vendor had started:

we would hit that 30-day warranty period, and we have to do the KTs before that...we would schedule KTs with...really talking about the delta in knowledge...so the KTs are more around what we don't know and figuring out what to change

As noted by Grant, his team would also work with the vendor to figure out what might need to change. He felt that “it’s actually working out well. There's some good back and forth and we’ve gotten into a good cadence with these now...and making changes where necessary.” Grant was getting his team to apply the learnings from the vendor and transfer it to his team.

Holding an open discussion on an issue was another way the team could reframe its prior thinking. Ben described a time where he decided to have the team reinvent how it worked on a project. The project he had been working on had been having some issues. He had asked a number of people to join the discussion, including some external consultants. He declared to the team and the consultants that “it’s not going to do anyone any good if you’re pretending you know something when you don’t because we’re going to have to figure this out.” He thought that taking this perspective “makes people comfortable” and creates a supportive atmosphere. The team seemed to immediately respond and start offering opinions and potential solutions. Having the diverse group available for the discussion set a different tone. Ben thought the members of the group:

kind of relished that no one knows any more than anyone else there. So everybody's ideas are valid, and if everybody's honest, and everybody's on the same page that your guess is no better than mine.

As alluded to be Ben, making sure that the VTLs included their entire teams with any other relevant constituents was an important factor to ensuring all perspectives were accounted for. Inviting the entire team to meetings was a method to ensure that multiple viewpoints could be heard.

Views Change as a Result of Team Discussions: Summary and TLS Scores

This item for Framing and Reframing was rated as Slightly Agree by the teams. This was a on the lower end of the favorable scale. Table 5.2 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range tend to create an initial perception about an issue; however, they are then flexible enough to transform that initial perception into a new frame. In the case of this item, the transition to a new frame came from discussing the problem form both within and outside the group. In the comments made by the VTLs, they showed they took specific actions to elicit discussion from the team around the problem and make requisite adjustments. Among the actions undertaken were brainstorming with the team to find new solutions, holding open discussion forums that reimaged the problem, conducting knowledge transfer sessions as way to train and revise processes, and making sure that all relevant people were included in the discussion.

Table 5.2 – TLS Scores for the 2nd Item Relating to Framing and Reframing

TLS Item (Framing and Reframing) In our team...	Average Total Score	TLS Rating
We often find that our views of the problem change as a result of our team discussions.	5.35	Slightly Agree

Challenging Basic Beliefs and Assumptions: VTL Critical Incidents

One way that was identified by the VTLs for challenging beliefs and assumptions was simply for the VTL to be available on a call to ask questions. Most the VTLs in the study explained that they were very busy on a day-to-day basis. They could not always participate in calls that their sub-teams would have. Penny was a prime example of this sentiment when she said that:

I'm not into the extreme details with all the projects going on, obviously. I'm not in the nuts and bolts of every project. That would be difficult given the size of the team and the number of project going on.

Deciding to participate in certain calls and asserting control were actions that the VTLs did that could drive challenging assumptions and beliefs.

Matt described an incident where a sub-set of his team was having a call. He decided to join it. The team was discussing an issue that they wanted to create a short-term fix. Matt immediately noticed that there was a potential audit issue with how the team discussed working around it. The type of workaround discussed was one that had become commonplace with the team prior to Matt joining it. As they were talking about it, Matt realized that he didn't "think they understood or were interested in the differences in risks as opposed to differences in effort that was involved in doing it the right way versus the way they had always done it." He then discussed it with the team, and they arrived at a more compliant solution. Matt believed that:

if I hadn't have been on the call, if I had hung up the call...they would've continued the old way...there are more senior people on the team that wanted to go the old way so I think if I hadn't have been there they would've done the old way without me.

Matt hoped that the team would learn from this experience. He wanted the team to undertake the compliant method in the future and resist the urge to follow the more tenured people on the team that would advocate for the non-compliant version:

my hope is that now that we've done this together as a team that the next time I won't have to press it that the senior people understand it's not that bad and the junior people understand that this is the way we should be doing it going forward.

Chuck discussed how VTLs needed to embrace the “social environment” that is in existence now in the workplace. This environment is one where it is acceptable to challenge assumptions and beliefs. He used the “social environment” term to explain how “things have evolved...it's just the changes in generations with millennials versus the others. I think the newer generations come along that are more socially tuned in.” Chuck believes that “as generations change people's thoughts, values, all of those kind of things change along with them.” Chuck further amplified his point by saying that nowadays, leaders need to “figure out how do I give these folks what they want to make them want to work here and do the best job they can do.” Chuck felt that leaders must explain where individuals on the VTLs' teams fit into the overall context of the work they are doing. It is no longer enough to simply tell someone to do something. A leader now needed to explain the impact of the work and allow the individual to question the work:

people are interested in...what is the value they're adding. So it's more than just give me an assignment and lock me up in a room and I'll code it for you. I don't think there's much of that anymore... People are interested in what it is that they're doing and how that's a benefit to the company they're working for as a whole.

In Chuck's analysis of the situation, the social environment is one that allows team members to challenge assumptions and beliefs in an open and accepted manner. VTLs

must enable this by explaining to the team what their role is in the function of the organization and how the individual fits into it.

Challenging Basic Beliefs and Assumptions: Summary and TLS Scores

This item for Framing & Reframing was rated as Moderately Agree by the teams. This was a fairly high rating across the range of possibilities for this item. Table 5.3 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range tend to create an initial perception about an issue; however, they are then flexible enough to transform that initial perception into a new frame. In the case of this item, the team is able to challenge its basic beliefs and assumptions about the issues under discussion. The VTLs offered various examples of actions that promoted challenging assumptions and beliefs. These included being present and active during meetings. Also, they should be willing to exert control if the team was headed in a wrong direction. The VTLs could further explain to the team the team members' roles in the overall strategy for the organization and embrace an environment where challenging the *status quo* is acceptable. This could help stress the individual's role on the team and how everyone on the team shares collective responsibility for the team achieving its objectives.

Table 5.3 – TLS Scores for the 3rd Item Relating to Framing and Reframing

TLS Item (Framing and Reframing) In our team...	Average Total Score	TLS Rating
We challenge our basic beliefs or assumptions about the issues under discussion.	5.53	Moderately Agree

Experimenting

Experimenting is one of the “action” processes in the Team Learning Model. It reflects the process of trial and error that team will go through the solve a problem. It is considered as either a systematic and scientific way of solving the problem or a serendipitous way of testing new ideas in an active analytic framework. It is actions that are undertaken to test a hypothesis or a move to discover something new. The items from the TLS that relate to Experimenting are:

1. We often learn through trying out new behaviors.
2. Members try out new approaches to their jobs as a result of the team's work.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Learning Through Trying Out New Behaviors: VTL Critical Incidents

Many of the VTLs directly assigned members of their teams to specific roles or responsibilities that were not in the person’s typical job function. These actions included taking ownership of a team meeting, mentoring less experienced team members, and having a person conduct training on new knowledge for the team. The rationale behind this was best expressed by Alex when he said that “I look for chances to take them out of their comfort zone.” The implication is that the team members will learn from these experiences and further their individual development.

Having members of the team take on different responsibilities was a common action used by the VTLs. Chuck discussed how he rotated facilitation of the team meeting as well as other duties to various team members. He had his team members sign up in advance for the roles:

it's a rotating thing and we have a sign-up sheet that we try to sign up for the whole year and if something happens and a person can't be there, then they will work with another team member to swap out. It's the same thing for the reporter.

One of the roles was as the facilitator of the meeting – responsible for putting the meeting agenda together and then running the meeting:

for my team meeting we have a facilitator. We have the folks on the team rotate in the various roles. We have a facilitator every week. We have someone that's recording the minutes of the meeting...(he) reaches out prior to the team meeting on Thursday to gather agenda items for the meeting...he then runs the meeting for us.

When asked why he ran his meetings this way, Chuck responded that it was something he started when he took over the team.

it's something we put together when we became a team and I took over responsibility for the team a few years back. I had been very used to having team meetings and I think the team itself had too...we wanted to start sharing responsibilities...this is what we came up with and it seems to work very well.

Penny took a similar stance when she described how she ran her process reviews using the “7 Checkpoints” project management framework. She designated one of her sub-team leaders to run the meeting in going through the project dashboard. Penny liked to “have one of my managers act as the facilitator and she coordinates the meeting. She facilitates the meeting. We go through the dashboard.” Penny's rationale behind having someone else run the meeting was because “I don't have time to organize it.” However, “it is also a learning opportunity” for the person designated in that they get to lead the interaction with all the parties at the meeting.

Donny mentioned another tactic he used in partnering more experienced team members with less experienced ones. He called it “job shadowing.” Initially, Donny said that “I try to set up interesting contacts and situations where they're working together.” He then asks the “senior associates to start imparting some of their knowledge and

information and share how you do things.” From there he then commences with the “job shadowing” part of the exercise where the senior team member will conduct a peer review of the work of the junior person. Donny said he would “pull tasks from the senior members that are maybe more simplified tasks, and I’ll ask the newer developers to actually code those tasks with senior people, and then let them do peer reviews with your senior peers and the team.” Donny thought the training that occurred was a way “to glue the team together” by “really looking at the team skill sets and make up when they come in the organization in addition to what we currently have” to make the team stronger.

Chuck also utilized a similar tactic with developing his team members. He asked more experienced members of the team to work with the people just joining it. Chuck would:

reach out to them because I know the knowledge they have and say, this person is coming in and needs to work on a project that’s going to be enhancing this area within the system. They’re not very knowledgeable yet on what everything’s doing. I ask the experts to spend some time sitting down with them and talking through what that area of the system does.

Chuck employed this technique because he wanted “utilize their knowledge quite a lot to help grow the knowledge of the others on the team as we’re building out this time....so those people do play critical roles in the development of that bench strength.” Sharing knowledge and ensuring that all members of the team were able to contribute quickly was important for Chuck.

Learning Through Trying Out New Behaviors: Summary and TLS Scores

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or

Disagree. This item for Experimenting was rated as Moderately Agree by the teams. This score is in the favorable range. Table 5.4 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range are able to test a hypothesis or a move or to discover something new. In the case of the examples given by the VTLs, they took actions where the team members were experiencing something new. The examples they offered revolved around the VTLs assigning varied and increased responsibilities to their team members and asking team members to assist others on the team through mentoring, job shadowing, or training. VTLs intent in these actions was to further develop their people through learning.

Table 5.4 – TLS Scores for the 1st Item Relating to Experimenting

TLS Item (Experimenting)	Average Total Score	TLS Rating
In our team...		
We often learn through trying out new behaviors.	5.86	Moderately Agree

Trying New Approaches as a Result of the Team’s Work: VTL Critical Incidents

A large majority of the VTLs mentioned how they experimented with potential solutions. Some discussed how they would actively engage with other constituents to work through solutions in real time. Pedro voiced a situation where he needed to gather multiple resources from various areas to assist in troubleshooting a problem. It included people from the various IT and cross-functional partners that interfaced with the application. Pedro ended up hosting a virtual session where he facilitated a painstaking review of each interface in detail to try to isolate the problem. Along the way, the team attempted different fixes to the problem and tested them in real time. Eventually they were able to identify the problem:

We then started a troubleshooting session with around ten people, 10 – 12 people including people on my virtual team in India and trying to figure out what the problem was...(through) this troubleshooting effort we realized that the application was working in the AlphaCo.net domain but the application was not working at CharlieCo.com domain.

Pedro actively managed the troubleshooting process. He and the team learned as they experimented with different options. He stated that he was actively engaged in the process as he “was very close of this incident at that time.” Pedro then proceeded to put together a far more extensive team to troubleshoot the problem. He utilized virtual technology to enable the session and share information so the team could learn in real time as it went through each interface:

we put together a team of, I think, ten people...we all got together and we started a troubleshooting session. We did this through a WebEx...to take a look at where's the main reason of this problem.

Pedro then went through a series of checks with each team member over the WebEx to determine the extent of the non-performing interface. He would show the team what was happening to his application in real time through the WebEx screen sharing function. Each member of the team would then test their interface in an effort to isolate and identify the problem. First, Pedro spoke with the database analysts (DBA) for the application:

we should talk to the DBAs. We tell them that we are having this problem, and they can see the problem that someone is having by showing them the problem on the screen...they see it and say, no, no, it looks like that's okay.

Next he spoke to Windows team in the same manner through the WebEx:

now they check the parameters inside of Windows and check what is really the message and trying to dig if there's some problem...they check and tell us that it's not a problem with Windows.

Pedro explained that “basically this is how it works in this process. You're going team by team on the call and asking questions and trying to understand if anyone has any issues, from their perspective, is everything going well or is everything wrong?”

Pedro concluded his rendition of this incident by saying that the problem was resolved due to the team coming together to work through the issue. The team was able to solve the problem and create a more lasting and stable solution for its customers:

because you're talking with each other, it's easier to fix the problem...you need to make sure that after logging into the system again that you keep it stable...this way you completely resolve the issue.

Alex offered a similar detailed account of how he and his team worked with a business customer around experimenting with various solutions. His team was looking to assist all of its business customers with rolling out a replacement tool for an internal system called FARO. This older system was a finance and budgeting one where managers could track expenses across an assigned cost center. Alex and his team decided to adopt a file sharing program called SharePoint used by the company to replace FARO. Alex approached this problem by creating a customized solution depending on his customers' needs:

we started to openly converse about who were all of our customers on the business side that used FARO. What are their needs going forward? How can we help them through this issue? And we came up with a very diverse solution - different solutions for different areas.

Alex then went through a series of meetings with each customer group he supported and tried different solutions with the groups. The groups were given access to the SharePoint tool, and then Alex and his team worked with the customers on their requirements while they utilized the replacement tool. Alex had a series of activities that he asked the person in the business to execute. Alex and his team were not sure what

they were doing at first, but they diligently worked with each customer to ensure that all problems were worked out. Alex said that:

we had to basically meet with each group...we had to explain to them how to find things, what's the best way to go get the reports now because they have a new process...we started just picking them off one by one.

They actively experimented with the customer to co-create a workable solution. Alex mentioned that “at first we didn’t know what we were going to do but we figured it out by working the problem.” Alex then closed his description of this incident by saying that things got easier as the work progressed. The team learned new tactics on how to streamline the process. They also learned what solutions would work for different customers given the customer’s requirements and how it used the FARO product:

It absolutely gets easier after a while and we’ve tried a few things out...as we were working through each area we learned. When we started, we started small and we started creating some structures within SharePoint and getting people versed in accessing it and going there for the information and it just kind of went from there.

Trying New Approaches as a Result of the Team’s Work: Summary and TLS Scores

This item for Experimenting was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.5 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range can be systematic and scientific in how they approach work. Experimenting can take place in a technical setting, where the team is looking at a software tool or piece of equipment. It can also take place in a social setting where the team is working with others to test out new roles and responsibilities. In the examples offered by the VTLs, there was evidence supplied in both cases. The actions the VTLs undertook were

working with constituents to actively test the functionality of a tool; actively seeking feedback from customers; and utilizing technology as method to conduct experiments.

Table 5.5 – TLS Scores for the 2nd Item Relating to Experimenting

TLS Item (Experimenting) In our team...	Average Total Score	TLS Rating
Members try out new approaches to their jobs as a result of the team's work.	5.23	Slightly Agree

Crossing Boundaries

Crossing Boundaries is the second of the “action” dimensions in the Team Learning Model. Boundaries are the intangible lines that separates person from person, team from team, and team from organization. In Crossing Boundaries, team members can cross those lines to ask for help, collaborate, or seek fresh opinions. It also involves bringing into the team ideas, insights, information or data from outside the team. The items from the TLS that relate to Crossing Boundaries are:

1. The act of working collaboratively results in greater learning for each of us than if we had worked alone.
2. Members change their behavior as a result of seeing other team members change.
3. We share what we learn from our team with others outside the team.
4. We invite people from outside the team to present information or have discussions with us.
5. We increase our knowledge base by going outside of our team for information.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Working Collaboratively Results in Greater Learning Than Working Alone: VTL Critical Incidents

Since the team members are distributed in a virtual environment, getting the team members together on a periodic basis was important for the VTLs. The central point described by the VTLs for collaboration was the team meeting. As Chuck noted, the meeting was a place to share information and build relationships amongst the team:

the team meeting is a place where all of these folks are together, and I like to think if we do a lot of things that help build on each other and develop those relationships between the team members.

In creating this supportive atmosphere, Chuck also commented about the meetings that the team “might be able to improve how things operate and each one us gets better.” Ben concurred with this point of meetings as a form of collaboration in saying, “it’s primarily around sharing information and planning out the work that we’re going to be doing.”

The team meeting was the building block for collaboration. Alex spoke of the frequency for the meetings and their importance – especially in a virtual environment. His team met at multiple times during the day so they could include the off-shore contingent in India. He said that his team:

will have a meeting in the morning, then a meeting in the afternoon or whatever when the offshore team is available. We collaborate in the early morning hours when I have to meet with the team...So, we make it work.

Alex believed that working in this collaborative fashion “really helped us to be successful with meeting our objectives and breaking down these obstacles. Sometimes you run into these projects that present unusual challenges and we’re able to do it.”

There were many ways that the virtual team could meet. In the case of meeting with the off-shore component of the team, Doug said that his team tried to meet on a frequent basis and utilized video technology:

even with the rest of our offshore development team, we do a monthly video conference with them and we try to do a bi-weekly (team) meeting, but we don't always – that one sometimes gets cancelled. But we try to stick to doing a monthly video conference with the core team in India.

Vinay had a similar approach. He employed video technology so the team meeting could be more intimate. “It’s a VTC meeting monthly. I just wanted to make sure that we meet like that so it’s a little more personal.” He used the meeting as a way to “touch base with them on how the projects are going.” The team would then work collaboratively “if they want to see change from any issues are burning that they have or any process improvements that they have come across recently and want to share.” The dialogue during the meetings helped to foster cross-team learning.

Working Collaboratively Results in Greater Learning Than Working Alone: Summary and TLS Scores

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. For this item in Crossing Boundaries, the TLS rating was Moderately Agree by the teams. This score is on the higher end of the favorable range. Table 5.6 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range believe that they can cross the intangible lines that separate person from person, team from team, and team from organization. The particular situation involved with this specific item is crossing the lines between each person on the team. The VTLs mentioned examples where they got the group to collaborate inside the team so their collective effort was more than what an individual could achieve. The central way that the VTLs ensured collaboration was holding a regular team meeting. Establishing a regular cadence to these meetings was important in a virtual environment

as a method to link the team together. In many cases the VTLs utilized technology as a way to create a more personal interaction between team members as a way to break down interpersonal barriers.

Table 5.6 – TLS Scores for the 1st Item Relating to Crossing Boundaries

TLS Item (Crossing Boundaries) In our team...	Average Total Score	TLS Rating
The act of working collaboratively results in greater learning for each of us than if we had worked alone.	6.23	Moderately Agree

Behavior Change Based on Seeing Other Team Members Change: VTL Critical Incidents

On many occasions the VTLs sought to promote change within their groups. This was sometimes difficult with people that were long-tenured and not used to change. However, there were a few examples that the VTLs offered where change came from seeing other members of the team change. Matt discussed a common situation for the teams that the VTLs led. He had multiple team members that had worked on the application for “15, 20 years.” He mentioned that when he “took over the team I started doing a full team meeting where everybody would get together and talk about what projects they’re working on.” This was a change from the previous leader where there had been no team meetings to share information. Matt remarked that he had “had a one-on-one with an individual on the team that had actually indicated that this is not only how they worked but that this is how they worked best.” This person felt that each person was “an asset to the team that they had experts within their silos, and that by not distributing that work that it allowed someone to focus on a particular area.” Matt continued to hold the meetings and:

in that process they started hearing what other people on the team were working on, and they realized even though they'd been with the team for 15 years they had never heard of some of the applications or some of the processes that other people are working on.

What Matt found next was exciting to him. During the conversations during the team meetings he “noticed that people would say something and someone else would speak up about that particular thing.” This self-directed conversation “allows them to self-coordinate without me...I hope that they say something that rings a bell with somebody else and that they make that communication happen.” This communication facilitates learning and meeting the team’s objectives. Matt had introduced the change and the team adopted it after they saw the usefulness of it.

Pedro had a similar experience. He required his team to maintain a “Run Book” so “that all application documentation is prepared and all of the details are described in the documentation.” He explained that “usually as general rule, people that are technical like more to work on developing code than creating really big documents or redoing documents.” Subsequently, there was initial resistance to maintaining this type of documentation, “that's the flack I get. The programmers always want to go directly to the work instead of starting the documentation first.” He mentioned that he had one team member that stated during a meeting that we “need to do it (the Run Book) so we’re up-to-date.” The rest of the team quickly fell in line after that. “The folks here quickly became really open to creating the documentation.” Because the team had bought into the process, he felt that “we have controls built in. We have a process to make sure that the documents are there.” The team ended up creating a condition whereby “the people are really expecting (to see) the documentation.”

Donny gave an example where the team took ownership of training its new members and those outside the team. He had a number of retirement eligible people on his team. He embarked on a journey to get the more experienced members of the team to record videos of themselves explaining their technical area. It was an effort that they “talked a lot of about it in the past...obviously management was pushing it,” but it never gained much traction. Eventually, the team realized that it was an effort they should get behind and “the associates are directly doing it because they realize the value.” It quickly became what he termed a “grass roots” effort, “I think they’re pulling themselves to get it done knowing that they’re going to be the ones left owning the system. So I think it’s being driven at an associate level.” It was the new team members that originally pushed recording the videos, but then the retirement eligible team members decided to follow through and take more ownership. Donny explained it the following way:

I also think the new associates pushed in an interesting way, but I think the existing or the SME (subject matter expert) associates that have been here 30 plus years are looking at it and realizing that they need to give back that knowledge to the team so that they don’t leave the system in a bad way.

Behavior Change Based on Seeing Other Team Members Change: Summary and TLS Scores

This item for Crossing Boundaries was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.7 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score have individuals that seek or give information, views and ideas through interactions with other individuals. The boundaries can be either physical, mental or organizational. The VTLs focused on a number of tactics to encourage the adoption of change through having an individual influence the group. A prime tactic was to demonstrate to the group the power

of the change. Individual team members can then decide to adopt it because it either makes sense or helps the person do his job more effectively.

Table 5.7 – TLS Scores for the 2nd Item Relating to Crossing Boundaries

TLS Item (Crossing Boundaries) In our team...	Average Total Score	TLS Rating
Members change their behavior as a result of seeing other team members change.	4.72	Slightly Agree

Sharing What is Learned from our Team with Others Outside the Team: VTL Critical Incidents

The VTLs also mentioned reaching out to other groups to share knowledge and operating techniques that they had developed. Penny was highlighted in the TLS instrument by comments made by her team as being especially good at promoting the work that her team conducted. “Penny strives to communicate the value of our team with others in the organization and highlight the aspects that make us stand out.” Furthermore, she was on the forefront of reaching out to other teams to share the project management process she created (7 Checkpoints). The process had received enough notoriety within her company’s IT organization that other groups were looking to adopt her process. Penny mentioned that she “talked with the PPM (Program & Project Management) and they’re interested in rolling it out enterprise wide, so we might do that next after we get through the Manufacturing team.” She also remarked that she had “been asked to talk to someone in Japan about it. So I think they will go international.”

Bob showed concern for sharing information to people outside of the group. He would get his team together with other application teams to help foster collaboration between the teams. The intent was to set up dialogue between teams to learn across

borders. They “would get together and talk about issues and we would share the requirements and process improvements.” He set up a regular rhythm to these meetings so they “would meet every other week to talk about what you are doing.” He felt this type of regularity worked best – especially in a virtual environment. Bob “wanted to embrace the challenge in that way because the reality...is we are a global company. So you can’t always have people in the same location.” He believed that the knowledge sharing that occurred helped the teams improve their performance and succeed in the long-run because “it actually did pretty good, I think. It did pretty good and it still works today.”

Rob mentioned how he had his team formally record how the team repaired problems it encountered. When the team had a problem with an application and then fixed the problem, he would have them:

write up a “what went wrong” report on what was the root cause. It addressed issues like what, how, what's the short-term fix, how do we get it back, how do we get that resolved really quickly in production, and how do we prevent it from happening again.

Rob remarked that his team had “a format that we use...a template that we make them fill out that says exactly” what needed to be done to repair the problem. The intent of the report was to create “preventive measures to stop it from happening in the future.” He would then share the report with others both inside and outside the group as a way to promote group reflection. We would have to “have the business involved or my manager” to show them what was done, “and then we'll meet with the onshore or offshore lead with the developers and go through the issue and make sure everybody understands” what was done. Rob believed that it was helpful to share the learning with others because “you never know when somebody might be changing that same particular

portion of that functionality in the future, so now they kind of know this stuff so they don't make the same mistake.”

Sharing What is Learned from our Team with Others Outside the Team: Summary and TLS Scores

This item for Individual Expression was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.8 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score reflect tendency to want to share their learnings with others which leads to better thinking and action. Increased organizational learning could be an outcome of this activity. The VTLs mentioned a number of ways where they shared the learnings of their teams with others outside the group. First, they actively sought to share their knowledge because others outside the group had learned of the team's success. The VTL then responded to the request to share the knowledge. Another method was setting up meetings to actively coordinate with other groups. A third action was creating formal documentation around a process improvement and then sharing it with other constituent groups so they could enact the changes and prevent future problems.

Table 5.8 – TLS Scores for the 3rd Item Relating to Crossing Boundaries

TLS Item (Crossing Boundaries)	Average Total Score	TLS Rating
In our team...		
We share what we learn from our team with others outside the team.	4.81	Slightly Agree

Going Outside Team to Gather Information or Knowledge: VTL Critical Incidents

For this discussion, the last two items for Crossing Boundaries have been combined into one category. These questions appear to be related in that they represent

the team working with outside parties to increase knowledge within the team. In looking at the incidents aligning to these questions, it appeared that the VTLs were concerned with getting the team together with people outside the group with the interest of gathering information or knowledge. As with other incidents recorded by the VTLs, holding meetings was an important method that VTLs used to collaborate with groups outside of the team. Crossing boundaries to other groups created another dimension for collaboration. As Grant stated, he would have weekly meetings with his business customers as well as other parts of the IT organization as a way to offer updates and share information. He said, “we also had planning meetings weekly where we got together with the business, with Solutions Delivery which is the planning leg of the PBO (Plan Build Operate) model and also some senior management each week to get an understanding of where we stood and where they stood with their work.”

Ben looked at these opportunities to collaborate with outside groups as a way to calibrate and validate progress and expectations. “We then went back to the business and got them to validate everything that we had written down on how your process worked. We had captured it over the course of weeks and months of calls and emails. Is this accurate? And once we had that and it was all signed off and everybody was comfortable with it, we went ahead.”

In addition to the outside groups, VTLs also liked to meet with their senior leaders to review progress and learn of any new information. Penny mentioned a preparation meeting she ran to get ready for a meeting with her senior leaders. The intent of the meeting was “just basically going through that and preparing for our VP’s review...so that we have a very smooth discussion with him and he can focus on what

needs to be done about solving problems.” These prep meetings were an open forum where all interested parties could attend. She described the knowledge sharing process in the follow way:

anyone who is a point person on a project and sometimes even developers that are involved attend. Anyone is welcome to the prep meeting. Anyone that runs a project and can speak to a project is in there. This includes BetaCo tech lead or an FTE tech lead or a senior developer who’s on the project.

Almost all of the VTLs mentioned reaching out to other groups. There were various groups within AlphaCo that needed to be involved with rolling out applications. The VTLs needed to actively coordinate with them. Grant described how he formed an “operating committee” his area of responsibility. It was comprised of senior leaders, managers of other teams, and the technical off-shore vendor. The function of this group was to take a more high-level strategic view of all projects in the area and ensure effective coordination:

in the operating committee meetings, we have VPs (vice presidents) and AVPs (assistant vice presidents) from the business, from Solutions Delivery and from software engineering. We have the technical vendor represented. We have myself and other VLTs and our counterparts from Solutions, and this is where we give a status on where the project stands and can offer comments on future activities.

Rob created a standardized procedure with inviting external group members to his meetings. However, he would mix it up depending on the topic of discussion. While he would invite his external Solutions Delivery partners, he would sometimes not include his business partners. When dealing with technical issues, there were some instances when external partners were not required as they would not understand the technical content of the discussion. In those cases, “we don't usually get the business involved in the technical design because they don't need to be. I mean, not that they don't need to know it, but...these meetings are a little bit too technical for them, so they don't come.”

Going Outside Team to Gather Information or Knowledge: Summary and TLS Scores

The final two items for Crossing Boundaries were both rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.9 contains the average score across the total of the 13 virtual teams for these items. Teams with a favorable score are ones that involve bringing into the team ideas, insights, information or data from outside the team. Team members may choose to cross boundaries on purpose or may gain input more of less by osmosis. The VTLs described a number of ways where they promoted this type of knowledge and information sharing with people outside the team and how they enabled learning. Many VTLs stated that they held regular meetings with external groups. These external groups could be from other IT areas, senior leadership, or business customers. In most cases there were standardized invitation lists to these meeting so that representation from all critical constituents was engaged in the discussions – both internal and external team members. However, the standardized invitation lists could be flexible depending on the subject matter.

Table 5.9 – TLS Scores for the 4th and 5th Items Relating to Crossing Boundaries

TLS Item (Crossing Boundaries)	Average Total Score	TLS Rating
In our team...		
We invite people from outside the team to present information or have discussions with us.	4.62	Slightly Agree
We increase our knowledge base by going outside of our team for information.	5.43	Slightly Agree

Integrating Perspectives

Integrating Perspectives is the final process of the Team Learning Model under Team Learning Processes. It is the one that links thinking and action. It is a synthesis

process in which divergent views and new input gleaned from Crossing Boundaries and Experimenting are reflected upon by means of conducting a team discussion, resolving any conflicts, and obtaining consensus around an issue, perception or perspective.

Reframing generally occurs as a result of Integrating Perspectives. The items from the TLS that relate to Integrating Perspectives are:

1. Members share the results of their personal insights or learning with one another.
2. We learned to drop our departmental perspectives and think from an organization-wide perspective.
3. We generally revise our viewpoints based on input or new information from others outside our team.
4. We change our perspectives about ourselves and others.
5. We generally incorporate the perspectives of most members in analyzing problems and making decisions.
6. We listen to the perspectives of every member of the team.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Sharing Personal Insights or Learning with One Another: VTL Critical Incidents

Each of the VTLs that the researcher spoke to had a significant amount of experience both in the IT profession and in leading virtual teams that had an off-shore team component. When they reviewed their critical incidents with the researcher, many drew on their prior experience to apply in the context of the incident they were describing. The researcher realized that the VTL, as a member of the team, had personal insights and learnings that he shared with the team. Penny was one such VTL. She mentioned that she had “been here 15 years (with the company), so I have a long history with the systems and a deep knowledge of them – so I also will tend to function as an SME on most days on larger initiatives.” Consequently, Penny saw herself as both the

team leader and a team member. She offered an example of fulfilling both those roles. She was in charge of “building out a brand-new application to handle a new function that we didn’t have before on the system.” She helped out when she realized that, “I have the expertise too that I wanted to share with the group...so I was somewhat heavily involved in as...the project gets rolling.”

Donny told the researcher that he had many years of experience in management. Subsequently, he preferred to get into the details when managing his team where he could interact with the people responsible for doing the work. He found that this method helped him stay abreast of potential problems and offer assistance where needed:

I’ve been in management for about 20 years, and I like go to the root level of the work, you know, the work that’s actually being done. I like to fully vet the report outs because that gives you your truest answer...at my level in the current organization, I’m at the ground level, we’re the one doing the work.

In getting team members to share their personal experience with the group, Nitesh explained that he has “dealt with offshore teams all my life” and found that the one he encountered at AlphaCo “was a very mature offshore team...they had actually the most knowledge on the application. They had much more knowledge than our onshore folks.” He decided he could use this team in different ways than in the capacity he had previously employed off-shore teams. Therefore, he “quickly asked them to start sharing that knowledge with the team.” They given assignments to start upskilling his on-shore team on the application’s functionality.

Aside from getting directly involved with the team and sharing personal learnings, another method the VTLs mentioned was letting the team itself take ownership of themselves. Many times the team directed itself in accomplishing a task. In these instances, the VTL did not directly insert himself into the learning process to produce a

learning outcome. In many instances, the VTLs remarked how they essentially got out of the way and let the team determine its methods for driving an outcome. A prime example of adopting this technique was offered by Doug. A member of his team had suggested using the Kanban model of running a project with his team. Doug described Kanban as “actually an older process that was developed by Toyota in the ‘50s, but it’s a process for, kind of, continuous flow and continuous improvement.” The team had been given a project with some aggressive deadlines, but they “weren’t getting enough work done to meet our July deliverables.” In looking for other ways to get the project back on track, the idea to adopt the Kanban technique “came from one of the team members. He mentioned it to myself and the project lead. He had used it before at another place and it had been successful.” Following the suggestion, Doug did some initial research on the method and then introduced it to the team. The team adopted the Kanban process of continuous improvement and from there took charge of implementing the new process:

the team...came together and defined this process...the team themselves had skin in the game to make it work. And they essentially did it, you know, with a strong offshore presence and it was a very smooth transition.

Doug freely admitted that not all team members were initially bought into the new Kanban process. “There were two or three people on the team that were, like, this is stupid. Why are we doing this?...this will never work.” However, “after sitting through all the discussions and then being a part of it and about three weeks later they came back and said this was the best idea that we’ve had.”

Sharing Personal Insights or Learning with One Another: Summary and TLS Scores

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or

Disagree. For this item in Integrating Perspectives, the TLS rating was Moderately Agree by the teams. This score is on the higher end of the favorable range. Table 5.10 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range tend to truly listen for new perspectives when they work with others. They seek out, listen to, and incorporate the perspectives of all team members and feel a sense of freedom to offer their own opinions. The VTLs mentioned a series of actions they undertook where team members could share their personal insights and learnings with the team. Some VTLs considered themselves as a member of the team with their own personal experiences to offer. They freely shared them with the team. Another method was allowing the team to take ownership over its own learning by sharing information and encouraging the adoption of new techniques.

Table 5.10 – TLS Scores for the 1st Item Relating to Integrating Perspectives

TLS Item (Integrating Perspectives) In our team...	Average Total Score	TLS Rating
Members share the results of their personal insights or learning with one another.	6.07	Moderately Agree

Dropping Departmental Perspectives and Thinking from an Organization-Wide Perspective: VTL Critical Incidents

The researcher found that the VTLs were very interested in taking an organizations-wide perspective in the form of focusing on reaching their organizational goals. Obtaining these goals was important for the team to be successful. The first item where the researcher found a recurring action was VTLs mentioning that they took on broader ownership role of the team's responsibilities. It was not enough to simply fulfill

the requirements of administratively managing their immediate direct reports. They needed to actively manage the interaction with their group and other groups.

Alex mentioned that he was the first point of contact with anyone interacting with his team. “Because I own the applications, I’m the first point of contact for many, many stakeholders across the enterprise.” Donny stated that he not only managed the team, but he also saw his role as managing the relationships with other external groups. “I’m the Director of the team so obviously I manage the team, and I manage the relationships too between our plan team, the business, and our operate team to hand off for ongoing support after delivery.”

The VTLs also displayed an ability to articulate how the team fit into the larger business strategy. They felt that delivering for the customer was a key requirement to support the company’s goals. Pedro stated that he continually spoke to his team about taking the customer’s perspective in everything they do. “That’s one point I keep reinforcing all of the time here and it’s, man, you need to think from a customer perspective, you know, you need to put on your customer hat. So that’s one thing that I say all of the time to the team.” He reinforced his thinking with an example:

I’ll tell them, so imagine a person who calls AT&T to solve a problem. That person doesn’t care if the people at AT&T that he talks to knows or doesn’t know how to directly answer the question. That person only wants his problem solved as soon as possible.

He said that he constantly reinforced this message to his team. Pedro wanted his team to have the perspective that the team considered “all these guys around us are really customers, and we’re trying to do the best that we can for them.”

In some cases the team received feedback from various sources that would influence how it achieved its organizational objectives. The VTLs used this feedback as

a way to either motivate the team or recast how it operated. The customer's feedback was a primary method used by some VTLs to help orient the team in the accomplishment of its objectives. Bob summed his thoughts up in the following way around how he received his objectives from the business, but in the end, it was up to him on how he delivered. "I would say at the beginning it was set out by the business. This is what we want to accomplish. They were totally open to how we would accomplish it, so we would focus on working out the how."

Dropping Departmental Perspectives and Thinking from an Organization-Wide Perspective: Summary and TLS Scores

This item for Integrating Perspectives was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.11 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score are able to view where their team fits in with the organization's goals and objectives. The VTLs modeled behavior that represented working across functional lines and reaching outcomes. The VTLs displayed a number of methods to make sure the group stayed focused on meeting the organization's needs. The VTLs took a wider view of their responsibilities. They acknowledged these responsibilities and the trade offs they incurred. They had to balance between the needs of the team and the needs of the organizations they served. The VTLs would also take a holistic view of where their teams' functions fit into the structure of the organization and what it took to meet all constituent needs. Finally, the VTLs took a strong view what the customer wanted and rallied the team around meeting those needs.

Table 5.11 – TLS Scores for the 2nd Item Relating to Integrating Perspectives

TLS Item (Integrating Perspectives)	Average Total Score	TLS Rating
In our team...		
We learned to drop our departmental perspectives and think from an organization-wide perspective.	4.86	Slightly Agree

Revising Viewpoint Based on Outside Data: VTL Critical Incidents

Resolving conflict was an important action the VTLs referred to when discussing how they cultivated learning. Conflicts arose over competing priorities or resources. The resolution of these conflicts sometimes caused the team to revise their viewpoints based on new information or input from parties external to the team. The conflicts could cause roadblocks where the VTLs needed to get involved in clearing. Chuck mentioned the importance of clearing roadblock as way to move the team toward its objectives and creating a supportive atmosphere. Team members needed to know that the VTLs supported them. Chuck would have team meetings where the team would discuss the status of their work on projects. When there were issues with other teams, Chuck saw his role as the one that would take the lead in overcoming these obstacles so the team had a freer path to accomplish its objectives. “And if there’s things that are causing issues or roadblocks in the way or bottlenecks then certainly I would work with the team and get involved in those to clear those out of their way so they can continue to be successful.”

Grant mentioned that it was sometimes important to formally document priorities and work expectations with external groups. This documentation could help to resolve conflicts before they even arose. All parties understood what their requirements were and expectations were set. Grant relayed a situation where an external partner did not follow through on their commitments. This created conflict, but his team had the formal work

expectations document completed that they were able to refer to. While it caused some consternation between the parties, it set up a situation where they could resolve the issue and make sure that all parties were more informed in order to avoid a repeat of the situation:

we had the agreement that we had updated...that caused some conflict there as well. We had it documented that that's what they were supposed to do and we had to go back to them and do some clean-up on what to do on some particular items.

Grant and his team then “worked with them to figure how do we clean this mess up. And going forward figuring out how we have to do it.” He was able to use the document as a tool for reflection because he felt “it was holding them accountable for something that they agreed to do.”

Penny spoke of meetings that she set up with her senior leaders to discuss project completion status as part of her “7 Checkpoints” process. She summarized the process as a way to update senior leaders and receive feedback on the progression toward goals. All parties involved in the status updates were able to ensure that they were aligned. The senior leaders spoke during the meeting and offered whatever feedback was required to help her team stay on track or change direction. The feedback was rendered as a suggestion to how to operate and were not mandatory actions:

ultimately, it’s about our VP (vice president), right, and knowing what’s going on in a very fast, efficient way, doing what’s going on with his group and be able to focus in on things like where we’re not aligned.

Revising Viewpoint Based on Outside Data: Summary and TLS Scores

This item for Integrating Perspectives was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.12 contains the average

score across the total of the 13 virtual teams for this item. Teams with a favorable score will take input or new information from outside groups and examine them. They can reject the information or input, substitute them for existing perspectives, integrate them in some way with current meaning schemes, or use to create a whole new understanding of reality. The actions the VTLs mentioned including resolving conflicts between the team and outside parties to overcome roadblocks; using feedback from the customer to check the team's orientation in achieving its objectives; and both seeking and incorporating feedback from senior leaders for revising team goals and operating processes.

Table 5.12 – TLS Scores for the 3rd Item Relating to Integrating Perspectives

TLS Item (Integrating Perspectives) In our team...	Average Total Score	TLS Rating
We generally revise our viewpoints based on input or new information from others outside our team.	4.98	Slightly Agree

Changing Perspectives about Ourselves and Others: VTL Critical Incidents

Bob mentioned his experience with training his people in the new Agile project management methodology. He employed a very active training technique when he “got them on the team and what we did is we sent them to a class together to learn the Agile methodology.” The team would then assemble in the morning session of the class where he “set out the project problem. We gave them some dummy data and then they practiced.” After gaining the concepts in the morning, “we then had them work on an actual problem in the afternoon.” It was an active training approach that he employed to change the perspectives of the team. Bob believed that the team “didn’t learn like in a textbook problem alone. We solved it together and then moved on outside of the class to

solve our problem.” They were able to immediately apply their learnings and adopt a new perspective to their work.

The VTLs also discussed their roles in helping the teams make meaning of what was occurring around them and codifying that knowledge in the form of documentation. Chuck discussed how he worked with his team during a team discussion to get them to realize the new information and learning they were uncovering. He thought this action “helps define what’s occurring in different situations, depending on what that deliverable was that you were monitoring, to make sure it ran successfully.” During the discussion, he asked the team questions like “What you needed to do? Did it become clear then?” He then wanted them to document what they had discovered so they could apply it in the future for other work efforts. He told the team that “here’s the kind of things we want to make sure we add to our documentation because even though you do this all the time and you’re the expert in it, you can still tell us how it’s done.” The documentation was important to Chuck because it helped to codify the new perspective gained by the team because “each of the team members that are in that role were able to kind of stick to what they did and put definition around it and help each other out.”

Some VTLs felt that the network of people that their team members acquired could help them gain and change perspectives. This network can help people navigate the complexities of a large, global organization like AlphaCo. Donny believed his main role as a VTL was to promote the spread of knowledge through introducing people to multiple areas. The person would learn about that area and also gain more knowledge about the functions within the company. He believed his role was to:

coach, from a management perspective, to build that network within the team and then once they get comfortable with the box that they’re in...then I start talking

about reaching out to our partner areas...and then I start helping them bridge those gaps. So I'll start introducing them to people outside.

Donny went further and noted, “through these introductions and exposure to the team, we’re making sure we’re connecting team members to different areas.” This network created a supportive atmosphere for the team. He also believed making these introductions exponentially increased the potential of learning and changing perspectives “because with 25 people, it’s like you have 25 combinations right - 25 to the 25th power or something like that. So it’s matching that combination so that one associate is well rounded.”

Donny then described what the end game of helping each team member build their network. He called it “tribal knowledge.” He explains that tribal knowledge was understanding how to get things done at AlphaCo. It could be knowing the right contact or having an important piece of information at a critical juncture to get work accomplished. Having this knowledge could change someone’s perspective on how to get things done. Essentially, it was about developing relationships and knowledge about the informal ways the company operated:

It’s just how to reach out and share information. It’s knowledge of how the company works – not so much the system because the system is an entity and it can be documented – but tribal knowledge is how the company works. It’s not so much documented anywhere. It probably never could be documented anywhere because it’s the relationships that make the company operate. It’s who are the right people to go to in certain situations. Sometimes its knowing who the right contact in a department is to get something done.

Changing Perspectives about Ourselves and Others: Summary and TLS Scores

This item for Integrating Perspectives was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 5.13 contains the average

score across the total of the 13 virtual teams for these items. Teams with a favorable score will change their perspectives about themselves or others generally through reframing. These team are able to incorporate new information, input or learning and then create a new reality for themselves and others. In the incidents offered by the VTLs, they explained some of the actions they used to get their teams to change perspectives. They would encourage learning transfer by using knowledge gained in previous circumstances and then apply it to a new situation. This could be done by an open discussion or simply challenging the group to improve something they worked on. They would also use active training where the team learn new skills and then were able to immediately apply them to everyday situations. Documenting discussions for changes was another method utilized. The VTLs did this as a way to codify and reinforce agreed upon changes. Finally, the VTL could assist team members to build a network of people within the organization to act as a learning reference for support going forward.

Table 5.13 – TLS Scores for the 4th Item Relating to Integrating Perspectives

TLS Item (Integrating Perspectives) In our team...	Average Total Score	TLS Rating
We change our perspectives about ourselves and others.	5.02	Slightly Agree

Listening to and Incorporating All Perspectives: VTL Critical Incidents

The researcher decided to merge the final two items for Integrating Perspectives. These two items primarily dealt with getting all perspectives from the team in managing the work. Many of the incidents described by the VTLs handled these items in the same way. The first method encompassed encouraging team members to offer opinion during meetings. This was an important point highlighted by the VTLs. Being able to

effectively facilitate group discussions was a critical skill to enable learning to occur in an interactive, beneficial and continuous way. The researcher has identified incidents where effective group facilitation techniques were practiced by the VTLs.

Penny mentioned that sharing data and being transparent with the information was a method she used to facilitate discussion amongst her team. She had a process that she developed to manage her projects called the “7 Checkpoints”. Her checkpoints were designated steps in a project where the team would meet and report on progress status to offer updates. There were always questions that came up during this review when the team members addressed their progress or status of checkpoint completion. However, Penny noted that the dialogue was much more than simply reporting the status, “we also talk about specific things within a gate – not only just the status. If I see something like some bad practices, then we correct those.” The correction process came from an interactive discussion involving the team. She would ask questions like, “Okay, well, what happened here? You’ve got an issue, why didn’t you get the sign-up? Or why was that late? Why was there so much back and forth with you and architecture?” This discussion would involve the entire team so it was a “kind of learning going through these issues. It’s not just reporting the status of each project.... And everyone moves on...it’s more than that.” In Penny’s case, the format of discussing the project milestones initiated the discussion, but it was her follow up questions in facilitating the discussion drove the learning.

Matt spoke about having a supportive atmosphere where the team members knew that they could speak up. He set the ground rules that everyone was expected to participate in the team discussions. This condition would allow the team to engage in

two-way dialogue. He attempted to quantify how the actual dialogue on the call was broken up between him and team. Based on the numbers he offered, the team members spoke more than he did. “Anyone can and does speak up. I would say it’s probably...like 60/40. Sixty percent of the time they’ll do it and forty percent of the time I will say something.”

Mutual supportiveness amongst the team was also an important point made by the VTLs. In some cases the VTL needed to allow the conversation to go in the direction that the team was taking it and not intervene. The VTL needed to be supportive of the team and the points that individuals on the team were making as part of the dialogue. In describing an incident involving a discussion during a team meeting between himself, a tech lead and a few members of the team, he thought “the conversation was very positive in the sense that the folks that were providing their input into it. It was an opportunity for them to talk about things they’re doing that they might have not had the opportunity before.” To Chuck, the conversation was positive because none of the “people would have thought of it as confrontational because we were clearly hearing what someone was saying and we were taking appropriate actions to try and help them resolve that issue.” He concluded his description of the incident remarking on the supportive atmosphere during the call by saying “I almost feel like the tech lead has the person’s back and that was a good thing.”

When gathering and discussing the perspectives of others, some VTLs sought to lead the group through the process of trying to make meaning of it. In some cases the VTLs attempted to take a retrospective look at an event and determine what went well and what could be improved. Bob mentioned these types of retrospective meetings as a

normal part of his process for managing the team. As part of an Agile project management methodology “there was a third type of meeting which was retrospective, where you got together and said, all right over the last two weeks what did we accomplish?” The aim was to figure out what went well and what needed to improve – a type of after action review. They would ask questions like “what are some of the problems that we encountered accomplishing it? What are some things that are holding us back?” The team would listen to each other in a constructive dialogue aimed at process improvement.

Alex described the process of retrospective analysis as “reverse engineering”. His team had implemented a solution to a programming problem, but they wanted to look at the solution and see where there were still areas that needed attention. The process ended up generating data that need further analysis. “We looked at the end of the process and basically did some reverse engineering with what had occurred. And we traced it back to project inception and some requirements that were not highlighted in terms of the statistical areas that needed the attention.”

As the VTLs further described, this type of group reflection could be an iterative process where the team looked at a solution and then went back-and-forth amongst the team to decide if the solution executed was the best course of action. The result could be a whole new way of approaching a problem or constructing a new tool. Ben described how he had conducted this process with his team. They required data to run some tests for an application. The team discussed how it had been done in the past and what perspective solutions could be used. They landed on creating a data generator that could automatically produce data that the team could use to conduct its testing:

so we kind of discussed things back and forth, and where we landed was we actually created a data generator that was actually expanded upon several times to cover just about the entire application that no one team was going to be dependent on another team to actually generate the data that they need...Generating this data really helped keep the process on track.

During this process, Ben actively solicited input from his team. He was looking for their perspective on how things were done in the past and how they could be improved upon.

Doug voiced his own example of an iterative review with his team and how it reflected on its actions in creating a new process. Initially, he was looking for the team to document how it conducted work. In documenting the results of the review:

it ended up being a fairly complicated Viseo document that showed the process flow from requirements through the project being done, and what all the different actors or actions could be along the way.

Doug thought the Viseo document “was very reflective from the team. The team was reflecting on themselves when they had to make changes to it.” They were looking for a to streamline the process and make it more efficient.

Listening to and Incorporating All Perspectives: Summary and TLS Scores

The final two items for Integrating Perspectives were both rated as Moderately Agree by the teams. This score is on the higher end of the favorable range. Table 5.14 contains the average score across the total of the 13 virtual teams for these items. Teams with a favorable score attempt to acknowledge all views around an issue and reflect upon them through discussion. VTLs took an active role in facilitating group discussions as a way of incorporating all views. They used probing and open-ended questions to elicit productive responses from team members. They also created a mutually supportive atmosphere where team members were encouraged to offer their views. Conducting retrospective sessions with the team was a method that the VTLs used for the team to

reflect on its actions during a situation. The VTLs employed an iterative, back-and-forth process between team members to generate ideas for future process improvement.

Table 5.14 – TLS Scores for the 5th and 6th Items Relating to Integrating Perspectives

TLS Item (Integrating Perspectives) In our team...	Average Total Score	TLS Rating
We generally incorporate the perspectives of most members in analyzing problems and making decisions.	5.67	Moderately Agree
We listen to the perspectives of every member of the team.	5.79	Moderately Agree

Overall TLS Results for Team Learning Processes

While each process of Team Learning Processes does not achieve a rating in the TLS scoring paradigm, there is one scored for the entire component. This rating represents how the team moves through the four processes. The measure is in the form of three different learning “modes” – Fragmented, Pooled, and Synergistic. In Fragmented, typically this means that individuals maybe learning, but as a whole, the group is not learning. In Pooled, it is likely that some group learning is taking place along with considerable individual learning. In Synergistic, the team is doing a good job using the thinking and action learning processes. When aggregating the items’ scores for the 13 teams from the total of 66 team members that completed the TLS a rating of *Synergistic* was achieved (score of 85.68 in a range of 112 – 81 points). The Synergistic mode suggests that the team is seamlessly moving through the various team learning processes. They actively experiment with new idea ideas and new behaviors, adding to both member and group capability. Members are committed to their roles as team players, pulling together their ideas, skills, and resources to create, innovate and challenge. The team

actively constructs new knowledge, often altering or discarding individual members' long-standing assumptions and beliefs in order to accomplish the team's mission. In the literature, the metaphor of a "mosaic" is used to describe this mode since the learning processes are intertwined in an overall clear picture of what the team is doing, learning and accomplishing – versus being unclear, hazy, and siloed. Relevant examples of actions conducted by the VTLs to achieve this rating were detailed in the discussion above.

Chapter Summary of Team Learning Processes Findings

This chapter presented findings uncovered by the researcher in this study around Team Learning Processes. When looking at the data from the critical incident interviews, the researcher noticed certain patterns emerging. Once these patterns were coded, the researcher was able to attribute certain comments made by the VTLs in their critical incident interviews with specific items in the TLS for Team Learning Processes. The researcher also presented the average total results for each item in the TLS for the four Team Learning Processes based on the 13 virtual teams surveyed. The intent was to give a voice to the team members and show methods that the VTLs used to create Team Learning Processes for team learning in a virtual environment. In accordance with a typical qualitative research study, extensive use of quotations by the research participants were used in presenting the research findings. Through utilizing direct quotes the researcher wanted to present to the reader an accurate and unbiased view of what the VTLs' actions were in cultivating learning within their teams.

Team Learning Processes is made up of four different processes: Framing & Reframing, Experimenting, Crossing Boundaries, Integrating Perspectives. According to the scoring protocol for the TLS, each of these processes does not receive a rating. However, there is a rating given that is based on the aggregate scores for all the process items combined. The combined rating for Team Learning Processes can range from Fragmented to Pooled to Synergistic. The combined score for the 13 teams in this study reached the Synergistic mode, which is the highest learning mode possible for the TLS.

When looking at the comments made by the VTLs the researcher was able to identify specific themes that emerged from the data. These themes are important in answering the second research question for this research study, “What methods does the virtual team leader use to enable team learning processes?” These themes will be further developed in the Analysis, Interpretations, and Synthesis of Findings chapter (Chapter VII).

The next chapter in this research study addresses the third research question, “How does the virtual team leader support team learning outcomes that achieve success?” The researcher will take the same approach as with the current chapter. Quotes from the critical incident interviews will be used to augment the results of the TLS items aligning to Team Learning Outcomes.

Chapter VI

FINDINGS – TEAM LEARNING OUTCOMES

The purpose of this interpretive case study was to explore ways that team leaders of virtual global teams cultivated learning within their teams. Virtual teams are those groups of individuals that are dispersed over both spatial and temporal boundaries. The research took place within a leading global financial services firm. Critical incident interviews were conducted through a Critical Incident Protocol (CIP) with 13 virtual team leaders (VTL) that worked in the firm's global information technology (IT) department managing a global team of on-shore and off-shore application development (AD) professionals. Additionally, an on-line assessment, the Team Learning Survey (TLS), was administered to members of the each of the 13 respective VTL's teams. In total, 66 team members across the 13 teams completed the TLS. The following three research questions helped to guide the researcher in this study:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

The researcher will report the findings around each question with a specific chapter in this research report. Chapter IV and Chapter V focused on the first and second

research questions, respectively. Chapter VI will focus on the third research question. In these three chapters, through the lens of the TLS items, the researcher will provide key findings on how the VTLs tried to cultivate team learning within their teams.

Organization of the Chapter

This chapter will discuss the key findings that emerged from the research participants' descriptions of critical incidents around team learning and Team Learning Outcomes. As a reporting framework for this chapter, the researcher will present the participant descriptions of critical incidents that describe actions resulting in Team Learning Outcomes. Team Learning Outcomes can be performance improvement; new or revised ways to work; new or revised norms; enhanced quality of output; or changed ways of thinking. These will first be presented using the respective TLS items for Team Learning Outcomes. Next, the researcher will report the average aggregate scores for the related items of the TLS across the 13 teams. Finally, he will present an aggregate TLS score combining all the items for Team Learning Outcomes. Due to the volume of items contained in the TLS for Team Learning Outcomes, in some instances the researcher has grouped certain items together into categories in order to focus the findings for further analysis and interpretation in later chapters.

Team Learning Outcomes

As soon as a team begins to work together, learning takes place. Initially, this learning is more on the individual level. However, as soon as the team members begin to exchange information and accumulate a pool of team-held information, team learning

begins. The products of the team's shared discussions are known as Team Learning Outcomes. The items from the TLS that relate to Team Learning Outcomes are:

1. The end products of our work include performance improvements.
2. The end products of our work are of a much higher quality than any one of us could have produced alone.
3. The end products of our work include new approaches to work.
4. The end products of our work include new ways of thinking.
5. The end products of our work include new work processes or procedures.
6. The end products of our work include new ways of managing.
7. The end products of our work include new social norms.

A discussion of the critical incidents around each item and the aggregate TLS scores follows.

Performance Improvements: VTL Critical Incidents

The VTLs were constantly looking for ways to improve the performance of their teams. Most VTLs identified automation as an operating method to improve performance in achieving objectives. Ben discussed a time where he had a system that "was essentially a very manual process and it was very prone to human error." He kicked off a project where the team would "re-engineer" the system by "eliminating a lot of those manual processes and automating a lot of the data flow because you're talking about data for about 50,000 customers that's coming from a dozen different source systems...you want to automate that." The goal in automation was to simplify how the process operated in delivering for the customer. Ben stated further that one of the overall thrusts for the team was they "looked at automating wherever possible."

In looking for operating methods to automate and simplify, the VTLs would look to adopt new technology as a vehicle to enable these efforts. Vinay offered an incident where his team adopted a new technology to improve its performance. His team had just

introduced a new application that would handle a product for the company. Just before the launch, he “wanted to see the status tickets of a week before the implementation and the week after the implementation.” He thought this was important so he could see the “effectiveness of the new application.” He soon learned that getting the reports was “not possible and so the level of detail we need to get is not available in any of the portal in any way.” Furthermore, Vinay was told that getting the information was “going to be a tedious process.” He discussed the issue with the team, and a “developer jumped in and he...let us know about the tool they had...a Rexx tool that can do the similar type of things.” The developer then looked into using the new Rexx technology. Vinay reported that “later in the day of the next morning, I received an e-mail from the developer with the spreadsheet saying that this is what he got for it that worked.” He summed up the incident saying that the new tool had improved the performance of the system because “I saw that batch status information in there that I was looking for and it did work fine.”

The VTLs were also interested in documenting any performance improvement. Many called this documentation artifacts. Alex mentioned this when discussing the accomplishments of his team. He believed that “with the maturity of the software engineering environment...we have different artifacts that we have to produce as a team to demonstrate that we are performing our project activities.” He explained that the artifacts “are organized and quality mannered, delivering quality products and capturing all these metrics.” He felt managing these artifacts was an important responsibility for him because he “routinely” sought to:

engage my lead over the phone or by WebEx to demonstrate all the different processes and procedures that needs to be done for project activities...with the team performing coding, and testing...that lead up to our production deployment.

In Alex's eyes, successful deployment of the application was the mark of accomplishing the team's goal. He also wanted the knowledge spread to others and publicized.

In addition to Alex, other VTLs actively directed their teams to create documentation as artifacts on improved processes or new ways of thinking. To underscore this point, the VTLs found it extremely necessary to codify the new or improved information because the learning that was achieved to gain it would soon be lost. The ensuing effort to regain this knowledge could be significant if it was not appropriately recorded. Ben voiced this conundrum the best. He explained that his group had had a number of substantive conversations about an issue and worked out a resolution. The downfall of that extensive effort was that no one documented the improved process and new line of thinking. Ben considered this a big miss:

you still didn't have anything that you could go back to and refer to. This is what they should have done and created the documentation. A lot of it was on calls ... essentially verbally conveying requirements and conveying functionality. And that never got captured anywhere, and that was probably our single biggest mistake on the project.

This point helps amplify the need for VTLs to direct that any new knowledge should be immediately documented.

Performance Improvements: Summary and TLS Score

The range of ratings for the TLS are Firmly Agree, Moderately Agree, Slightly Agree, Slightly Disagree, Moderately Disagree, Firmly Disagree, and Neither Agree or Disagree. The first item for Team Learning Outcomes was rated as Moderately Agree by the teams. Table 6.1 contains the average score across the total of the 13 virtual teams for each item. This rating is on the high end of the favorable range. Teams with a favorable score will look for ways to accomplish its objectives with a performance improvement

mindset. In the comments made by the VTLs, they showed they took specific actions to enable performance improvement. Among the actions discussed were seeking to simplify operating processes through automation as well as adopting new technology. They would then produce artifacts that helped demonstrate what the improvements were and how the team could further utilize them. Once the artifacts were produced, they would ensure that these documents were publicized to appropriate constituents.

Table 6.1 – TLS Scores for the 1st Item Relating to Team Learning Outcomes

TLS Item (Team Learning Outcomes) In our team...	Average Total Score	TLS Rating
The end products of our work include performance improvements.	5.81	Moderately Agree

Much Higher Quality Than Could Have Produced Alone: VTL Critical Incidents

The VTLs emphasized the value of teamwork and how they tried to build relationships within the team. They would readily utilize these relationships in getting the members of the team to work with each other to achieve project deliverables. There were a number of incidents that stood out which showed where the quality of the end product developed by the team was much higher than if it had been done by an individual. Alex described an incident where this was demonstrated to full effect.

He and his team had completed a project by creating a new application for a business customer. They had been doing some data analysis during “this past year or so, (and) we’ve observed some results with our projects...where we’re encountering statistical errors on the back end with our systems.” Once these errors were identified, Alex needed to start “working with the team on how to minimize those scenarios because it can cause challenges with the production deployment in terms of quality and how we

do our reporting.” This was a critical issue for the business and the team needed to address it. The team then commenced in “digging into what are the driving factors behind this.” During the analysis, they “stumbled across is a gap in the process with our business partners in how the product is initiated and how the engagement takes place. And we identified an area where we have to perform more testing.” This result came about because the team worked together to identify the root cause and propose a solution. Alex felt “this measure came out of our own collaboration and due diligence in observing our results from executing our projects.” He believed the team worked together on a collective solution by being “able to implement some new procedures...so we could have more quality results with our typical rate revision projects to support the company.”

Bob discussed how adopting the Agile project management methodology helped to instill the value of relationships and interaction amongst the team. He said that the Agile method “is very much focused on interaction and relationships. You had business people, testers, developers, BSAs with different backgrounds that came together were focused on an issue as a team and delivered a solution as a team.” He added “that everybody brought to the table what their skill sets were, what their backgrounds were, what their education was, what apps they knew.” There was no requirement in Agile for the individual to take precedence over the team. The group worked together to produce the result. Bob summed up the experience by saying that “what you deliver is team oriented versus handing it off to specific individuals and leaving it.” The traditional way that the company handled its projects entailed writing “the requirements and then I hand it off to the architect and the design and the BSA requirements and developer kind of codes.” Bob explained that “that kind of handoff model can cause silos where people are

oriented on their specific job or task versus oriented towards delivering for the customer as a team.” This was not the case with Agile project management methodology.

Training the team in new ways to operate was a way that VTLs could create a baseline of information that existed across the team. This ensured that all team members could be active contributors to the solutions – versus relying on a few subject matter experts. For this reason, active knowledge sharing was an important action that the VTLs embarked upon. Grant discussed an incident where he needed to train the team on a new technology so the entire team could use it. The company had hired a vendor to create a new application. Grant’s team needed to learn the technology in the application’s platform so it could continue the work of the vendor. They were under a time crunch with the vendor in that they “would hit that 30-day warranty period, so we have to do the KTs (knowledge transfer) before that.” They decided to do a series of WebEx training sessions. “We’ll have the SME for that particular topic on the call and one of our developers. We use either their WebEx account or mine” to run the sessions. The intent of the sessions was to arm each person on the team with the right type of knowledge so they can contribute. “It’s very targeted KT...(and) it’s actually working out well. There's some good back and forth and we’ve gotten into a good cadence with these now as far as an understanding of what” the system does and how to use it. Ensuring that all team members have the training and tools necessary to do their jobs and contribute equally was seen to be a key action that the VTLs voiced.

Much Higher Quality Than Could Have Produced Alone: Summary and TLS Score

This item for Team Learning Outcomes was rated as Moderately Agree by the teams. This was on the higher end of the favorable scale. Table 6.2 contains the average

score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range will have results in a much higher quality than if an individual performed the action. They accomplish this through accumulating data for use in developing a set of recommendations or a shared set of meanings for the language used by the team in its work processes. In the comments made by the VTLs, they showed they took specific actions to gather and analyze data as well as making sure that the team members had appropriate knowledge of the work they were expected to perform. Among the actions undertaken in gathering data and analyzing data was assess the effectiveness of their past work and making improvements where warranted. The VTLs would also set the team up for success by having cross-functional representation on the team so the team members could share information and participate in the work. Finally, they would ensure that all team members were trained on an application and process and made sure appropriate documentation was available to support future actions.

Table 6.2 – TLS Scores for the 2nd Item Relating to Team Learning Outcomes

TLS Item (Team Learning Outcomes) In our team...	Average Total Score	TLS Rating
The end products of our work are of a much higher quality than any one of us could have produced alone.	5.77	Moderately Agree

New Ways of Conducting Work: VTL Critical Incidents

The researcher chose to combine the TLS items concerning new approaches to work; new ways of thinking; and new work processes or procedures into one category for Team Learning Outcomes. They all appeared to revolve around the central concept of new ways for the team to conduct its work. This was an important consideration for the

VTLs in the study. Bob best summed up the environment at AlphaCo by saying the company “has gotten stuck for the past ten years or so. They’ve kept things fairly stagnant in terms of the technologies that they’re using to build applications.”

Consequently, the company’s senior leadership was looking for their team leaders to discover new ways to work, think, and act. Bob believed the leaders “were coming in right on the verge of this rebirth and being aggressive. We’re trying new things, bringing in new technologies and capabilities in the door, so that was in the forefront of our minds when they were” conducting their work.

Sometimes developing new ways of thinking was in response to an inquiry from a customer. In another situation, Bob spoke about a time where his customer came to him with an issue about how information was presented in a system that they used. On the screen used by a customer service representative, Bob received feedback that the representatives thought “the screen should look like this. We think you should flood these questions in.” Bob said that type of feedback created a situation where he and his team “would jump in” to assist. He felt the representatives “were totally open for it” because “we were the technologists. We would say something like, hey, by the way, did you know that such-and-such technology allows you to do that same functionality?” Bob stated that “it would be really cool to do this with them and have this back-and-forth.” This type of exploration of ideas and “conversations really helped to add value to the project.” It created a situation where “the team delivered the results” that the customer was looking for.

Donny described a situation where he used technology to approach a problem in a new and innovative way. He had a number of team members that were in “a retirement

eligible situation.” He was afraid that “there’s a lot of knowledge on the team that’s about to go away...so we had to get some (of that) knowledge in their mind.” To combat the problem, Donny instituted a new method to transfer the knowledge to other team members as well as each other. The team “started doing video recording of some of our SMEs (subject matter experts)... that have been here for 35, 30 plus years...trying to spread all the knowledge.” Even though video recording the SMEs was a new idea, Donny admitted that “the technology has been around for a while, and then we’ve been experimenting with it.” He believed “it’s just a matter of getting engaged in it, so we tried a couple of techniques.” It became a success because:

the SMEs really saw the value of it because to be honest they didn’t want to leave the system unattended when they leave the company. They want to leave the system solid. They want to leave the rest of the team in good shape.

Donny relayed to the researcher that the team was “just starting really to build our...video training library to handle that.” He thought the whole video recording effort was “fairly positive and it will probably live a lot longer than the resource once they retire.”

The VTL could also look at new operating methodologies as a way to organize the team to meet its goals and objectives. A number of project management techniques were mentioned by the VTLs outside of the normal Waterfall SDLC process. Adopting an Agile project management methodology was an approach that Ben, Bob, Grant, Nitesh mentioned. However, some used ones different than these. Doug mentioned that he adopted the Kanban process. Doug described Kanban as “actually an older process that was developed by Toyota in the ‘50s, but it’s a process for, kind of, continuous flow and continuous improvement.” The team needed to look at a new approach because “we

weren't getting enough work done to meet our July deliverables.” After some further investigation on this method, he decided to utilize it. He received some initial skepticism from his team members, but after a while “they came back and said this was the best idea that we've had.” The project got on track and “ended in a good place” by delivering the required results.

If these established methods were not appropriate, the VTLs would create their own. Penny discussed how she created a formal approach to managing the projects by developing new processes and procedures to stay abreast of programming deliverables. She set up a series of seven milestones or “checkpoints” where the team and their external partners would get together and monitor progress. The goal of the “7 Checkpoints” was to ensure that each step of the process was delivering a quality product. “They have the tangible things that the customer sees. So what this 7 Checkpoints process does is it gives us a better idea of quality throughout the phases.”

But Penny did not stop there. She created further enhancements of the 7 Checkpoints. She looked for ways to improve the process and created two more “bonus” checkpoints when she and the team realized that they needed additional controls built into the process. They learned they required status updates around the project initiation phased and due diligence beyond the implementation phase of the project. Essentially, they were the pre- and post-checkpoints for the 7 Checkpoints. Eventually, these two new checkpoints were codified in the process too:

we've created these bonus checkpoints. So the checkpoints we have now are seven...so we introduced a “minus one” and a “plus one” concept to keep it at seven. One is for project initiation and the other one is what I told you about where due diligence goes beyond the implementation window.

New Ways of Conducting Work: Summary and TLS Score

The researcher combined three Team Learning Outcomes items for this category including new approaches to work; new ways of thinking; and new processes or procedures. Each item in this category for Team Learning Outcomes was rated as Slightly Agree by the teams. This was on the lower edge of the favorable range. Table 6.3 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score in this range will have shared discussions as a way to collect options for solving a pressing problem. They will also look at changing the way the group operates to meet its objectives. There were a number of examples described by the VTLs that helped to illustrate their actions in finding new ways to conduct work. They would engage with others like the team and customer to gather and assess options. They would utilize new technology as way to enable the new approach. Finally, the VTLs were shown to introduce and adopt non-standard methods to manage the operations of the group through different project management methodologies. These could all result in positive changes.

Table 6.3 – TLS scores for the 3rd, 4th, and 5th Items Relating to Team Learning Outcomes

TLS Item (Team Learning Outcomes) In our team...	Average Total Score	TLS Rating
The end products of our work include new approaches to work.	5.23	Slightly Agree
The end products of our work include new ways of thinking.	4.91	Slightly Agree
The end products of our work include new work processes or procedures.	5.19	Slightly Agree

New Ways of Managing: VTL Critical Incidents

Managing the virtual team was a major focus for all the VTLs that participated in this study. There were many examples rendered as to how the teams were managed – especially in a virtual environment. As Bob noted earlier, the leaders at AlphaCo were “trying new things, bringing in new technologies and capabilities in the door, so that was in the forefront of our minds when they were” conducting their work. This also applied to the new people the company was bringing in to implement these new technologies and capabilities. Donny thought about the changing situation in the workplace. He felt that a “social network” had evolved. It was one that enabled people on the team to communicate with one another and share information. He talked about a team meeting where the team members “started doing those connections” and bringing up different options. This type of atmosphere was not typical because “some parts of AlphaCo are still hierarchal.” However, he encouraged the free flow of information. He thought this attitude “just opens up the team to feel more. It’s just more open feeling.”

Donny went further to explain his central challenge in managing his virtual team. “Basically, I’ve got three groups within my team. I’ve got this new group of people that have just joined the company. I’ve got some legacy group that is getting ready to retire. And then you’ve got the offshore people.” He felt his main roles was to bring these three factions together. Donny thought a VTL needed to have an approach in:

how you integrate virtual teams. You have to look at a lot of things. It’s a balance of age group. It’s a balance of history with the company. It’s a balance of how they are tied to the system they are in with most of the projects with the role.

To accomplish this goal, Donny recommended trying:

to set up interesting contacts and situations where they’re working together. So an example is a brand new associate. I try to pair them with a very senior associate.

And my ask of senior associates is to start imparting some of their knowledge and information and share how you do things.

Typically, the on-shore component of an AD team has more experience than the off-shore component. This had changed at AlphaCo and required a new way of managing the teams. Doug encountered a situation like this with his team by describing that the “offshore team actually has more experience than the on-shore team by years of experience with the application. With that, we still don't find that they are the ones driving a lot of the projects and a lot of the technologies and the enhancements.” Doug decided to address this imbalance in experience and get the off-shore to help out more.

The off-shore group always touted:

that they've got all this experience. So we flipped it back the other way and said if you're going to sell us as you guys having all this experience, then prove it. Show us that that experience isn't just numbers and show us that you actually do have that system understanding and that you guys are able to run with projects and make these kinds of decisions on your own, without relying on one of our people that only has one year of system experience to tell you what to do.

Doug asked them to take on additional responsibilities. In looking at whether this tactic was successful, Doug reported:

that they've tried to do that in the last few months. We actually have some initiatives going on that we call our “continuous improvement initiatives”, where they...come back with recommendations on how to improve it. Things like that.

Because the team was distributed in a virtual environment, the VTLs needed to create a centralized data repository to help manage the team. Alex added that the centralized location was a great place to house all the relevant documents that the team needed to conduct its work. For his group he had a variety of items that he required.

we have to have functional requirements and review BRDs (Business Requirements Documents). We have to have a back-out plan, testing results, deployment plans, like old artifacts that are required to deploy software within that lifecycle. These are in a central repository in a particular format, and it's

expected that all those things will be delivered when we deliver a new or updated type of software to production.

When documents were stored in a central repository, they become artifacts that the team could look at and learn from. They become a method to share information and collaborate. When the documentation was posted to the central repository, the team had information it would need to accomplish its goals and be successful. Ben commented on this when he described how he used his team's shared data repository for the team as a reference and management tool. The team had developed a shared expertise on a topic and wanted to avoid having to constantly update one-another:

we said, here's all the information that they're going to need to be successful and they're probably going to have these questions at some point and they're not going to think of it to ask it at the time, but they have a set of documentations that they could go to as the first stop before they would actually go and try to engage some of the other developers in the project.

Ben then explained how "it was a matter of us taking all of that that we learned piece meal and then centralizing it because just sending someone a bunch of emails or WebEx reporting really wasn't going to get the job done."

New Ways of Managing: Summary and TLS Score

This item for Team Learning Outcomes was rated as Slightly Agree by the teams. This score is on the lower end of the favorable range. Table 6.4 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score for this item are ones where the nature of the leadership role is to facilitate the team's work by considering the work environment. In the examples offered by the VTLs, there was evidence supplied for their being new ways of managing. The work environment at the company was changing, so new ways of managing were required. There was a change in the demographics with a new "social" atmosphere taking hold. VTLs had to

account for social interaction and be more inclusive and less hierarchical in managing the team. They also needed to accept that the skills and experience level of the team was changing and called on them to have the more experienced off-shore team members take on more. Finally, they needed to use a centralized data repository to house artifacts to help manage a dispersed team so it had ready access to information.

Table 6.4 – TLS Scores for the 6th Item Relating to Team Learning Outcomes

TLS Item (Team learning Outcomes) In our team...	Average Total Score	TLS Rating
The end products of our work include new ways of managing.	4.72	Slightly Agree

New Social Norms: VTL Critical Incidents

Chuck discussed how VTLs needed to understand the changing generational demographics of the workforce and its impact on group norms. This change was one where it was now acceptable to challenge assumptions and beliefs. He used the term “social environment” to explain how “things have evolved...it’s just the changes in generations with millennials versus the others. I think the newer generations come along that are more socially tuned in.” Chuck felt that “as generations change people’s thoughts, values, all of those kind of things change along with them.” He said that leaders now have a new challenge and need to “figure out how do I give these folks what they want to make them want to work here and do the best job they can do.” Chuck felt that leaders must explain where individuals on the VTLs’ teams fit into the overall context of the work they are doing. It was no longer enough to simply tell someone to do something. A leader now needed to explain the impact of the work and allow the individual to question the work:

people are interested in...what is the value they're adding. So it's more than just give me an assignment and lock me up in a room and I'll code it for you. I don't think there's much of that anymore... People are interested in what it is that they're doing and how that's a benefit to the company they're working for as a whole.

In Chuck's analysis of the situation, the social environment was one that encouraged team members to challenge leaders to explain to the team what their role was in the function of the organization and how the individual fit into it. This was a change from the previous norm at the company.

To promote a type of norm that emphasized relationship building and teamwork, team composition was important. Even though Bob didn't want to make a "sweeping generalization" he believed that creating "really good chemistry" in constructing the team was important. He would "try and reproduce the chemistry in other sites" when asked to form his teams. When he built his teams he "seeded it with the right folks. We seeded it with people that were open for that type on interaction, that had strong skills, interpersonal skills." Among other qualities he was looking for where:

they would have to be team oriented. We didn't want the 'not my job' people...that kind of attitude... that were good problem solvers. And ultimately, they had a vision of delivering for the customer. They had a broader vision of what they are actually doing...they needed to think that they were in charge of delivering for the customer and the ultimate measure of their success is customer satisfaction.

Traditionally, AD team leaders valued people with good technical skills around programming. This view was changing, and it impacted the norms for the group. In Bob's mind, bringing people together on a team that had a relationship-based perspective was a sure sign that the team would be successful.

Fostering relationships could be done by protecting people on the team. Nitesh offered an instance where he needed to directly interject into an issue that arose within

the team to ensure that the relationships between team members remained strong. While Nitesh referred to the relationship between his on-shore and off-shore team members as “there are no personality conflicts. There are no egos involved. I think everybody respects each other and that’s the main thing.” However, he did mention an incident where there was a direct conflict between individuals on these teams. There was an e-mail that was sent from one of the on-shore people to the entire team critical of one of the off-shore vendor leads. Due to the contents of the e-mail, the targeted off-shore vendor lead “was really devastated and she was not feeling well. She ultimately went home early after the e-mail was sent.” Nitesh immediately sprang into action to address the situation. “I spoke with her one-on-one. I assured her that it was a mistake on our part. It should have been handled differently...I let her know that it was not her fault...it was inappropriate what he did and I apologized for it.” Nitesh then “spoke with the onshore counterpart also” to discuss the offending e-mail. Nitesh informed the researcher that he:

had spoken with the onshore person who had sent the e-mail, and I said that we have to show more patience, and if there’s something which we cannot work with, then we will have to work out a different strategy for...how to go about doing it.

When pressed for what the outcome of the conflict was, Nitesh responded that “it did work well after that. I hadn’t heard any more complaints.” His goal was to maintain the norm of treating everyone similarly, fairly and with respect. Nitesh elaborated by saying:

from my perspective I’ve never been biased from an onshore versus offshore perspective. I’ve never even been biased from a vendor versus an FTE perspective. There might be some inherent bias...but from a team perspective I hold like the vendors just as much accountable as the FTEs and *vice versa*.

Another norm that the team needed to be able to instill was creating documentation on processes and procedures. Pedro explained that getting the team to document its processes was not always easy. He explained that:

the team is generally technical and usually there is some receptivity to doing the documentation, but usually as general rule, people that are technical like more to work on developing code than creating really big documents or redoing documents.

People in the IT profession want to do programming and not create documents. Pedro amplified his point by saying, “that's problem we face with getting documentation. The reaction from the technical team is always, oh, but it will consume two or more days to prepare this documentation and this will take me away from my primary job of coding.” He reported that he would respond to this point by saying, “yes, you're going to consume these days, but I need to do that so we're up-to-date.” In the end “the programmers always want to go directly to the work instead of starting the documentation first. It's always this way.” However, they do understand that creating documentation is necessary, so they do change their inherent behavior and create it.

New Social Norms: Summary and TLS Score

This item for Team Learning Conditions was rated as Neutral by the teams. This score is in the middle of the range between favorable and unfavorable. Table 6.5 contains the average score across the total of the 13 virtual teams for this item. Teams with a favorable score are ones that understand what the team has learned about itself and how it works most effectively. While the rating was only in the middle of the scoring range, the VTLs offered methods that they took to reinforce new social norms that had evolved in the group. One method was to understand the changing workforce demographics and the new demands placed on leaders by a growing Millennial workforce. They require more information and are not content to simply work in an isolated environment. Relationships were also seen as important. Previously, technical

skills were something that were valued. Now, VTLs are just as concerned with well people could work together and with their customers. Another action that VTLs needed to do was protect team members and ensure fair and equal treatment between them. Finally, VTLs had to be willing to challenge conventional attitudes and hold team members accountable for following established procedures.

Table 6.5 – TLS Scores for the 7th Item Relating to Team Learning Conditions

TLS Item (Crossing Boundaries) In our team...	Average Total Score	TLS Rating
The end products of our work include new social norms.	4.33	Neutral

Overall TLS Results for Team Learning Outcomes

Aside from each TLS item within Team Learning Outcomes achieving a score and rating, an aggregate score and rating is also given for this component of the Team Learning Model. The applicable TLS ratings for Team Learning Outcomes are Favorable, Neutral, and Unfavorable. When aggregating the items scores for the 13 teams with a total of 66 team members that completed the TLS, a rating of Favorable was achieved (score of 35.95 in a range of 49 – 32 points). Teams with scores in the Favorable zone have learning outcomes that may include a revised mission statement, a collection of options for solving a pressing problem, an accumulation of data for use in developing a set of recommendations, or a shared set of meanings for the language used by the team during its work processes. Outcomes could also include what the team has learned about itself as a group and how it feels about itself. In general, all changes in the way the team operates occur as a result of collective learning of the team. Relevant

examples of actions conducted by the VTLs to achieve this rating were detailed in the discussion above.

Chapter Summary for Team Learning Outcomes Findings

This chapter presented findings uncovered by the researcher in this study around Team Learning Outcomes. When looking at the data from the critical incident interviews, the researcher noticed certain patterns emerging. Once these patterns were coded, the researcher was able to attribute certain comments made by the VTLs in their critical incident interviews with specific items in the TLS for Team Learning Outcomes. The researcher also presented the average aggregate score for each item in the TLS for Team Learning Outcomes across the 13 virtual teams surveyed. The intent was to give a voice to the team members and show methods that the VTLs used to create Team Learning Outcomes for team learning in a virtual environment. In accordance with a typical qualitative research study extensive use of quotations by the research participants were used in presenting the research findings. Through utilizing direct quotes the researcher wanted to present to the reader an accurate and unbiased view of what the VTLs' actions were in cultivating learning within their teams. There is a TLS rating given that is based on the aggregate scores for all the items. The rating for Team Learning Outcomes for the teams in this study was Favorable. This is the highest score possible in the TLS for Team Learning Outcomes.

When looking at the comments made by the VTLs the researcher was able to identify specific themes that emerged from the data. These themes are important in answering the third research question for this research study, "How does the virtual team

leader support team learning outcomes that achieve success?” These themes will be further explored in the next Chapter (Chapter VII), Analysis, Interpretations, and Synthesis of Findings.

In Chapter VII, the researcher will take the major themes derived from Chapters IV, V, and VI and compare them with the conceptual framework developed in Chapter II. The conceptual framework will be a guide to determine how the themes match what the literature showed about how team leaders cultivate team learning in a virtual environment. The goal will be to determine what actions that VTLs take to cultivate team learning in each component of the Dechant, Marsick and Kasl (1993) team learning model which address the three research questions for this study.

Chapter VII

ANALYSIS, INTERPRETATION, AND SYNTHESIS OF FINDINGS

The purpose of this research study was to explore ways that team leaders of virtual teams cultivate learning within their teams. In completing this study, the researcher hoped to provide some insights and recommendations on what actions virtual team leaders (VTLs) can implement to create a work atmosphere where team learning flourishes so the team can achieve its objectives in a virtual environment. The growing use of virtual teams in corporations makes this type of research compelling for VTLs and the organizations they serve. To accomplish this aim, the researcher constructed the following research questions:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

These research questions were largely addressed in the findings contained in Chapters IV, V, and VI through the use of Dechant & Marsick's (1993) Team Learning Survey (TLS) items as a method to structure the data. The researcher will now present an analysis and interpretation of the findings with an attempt to synthesize them with the relevant literature.

Organization of the Chapter

Through conducting a cross-case review of the research findings, the researcher seeks to provide analytical and interpretive insights. The researcher realizes that the data collected through interviews and surveys are only a snapshot look at what the study participants thought and said during the research time period. In looking at the conceptual framework for the study, along with all the data and the findings themes that emerged, the researcher has created analytic categories that could be tested and examined for possible further use and theory building (Bloomberg & Volpe, 2016). Each analytic category is an attempt by the researcher to answer each one of the research questions based on the data collected and to seek higher level meaning from the findings. The analytic categories will be presented with the evidence collected that created the category. The researcher will then interpret the analysis utilizing the conceptual framework with references to any relevant literature as a synthesis of the data. The three analytic categories that correspond to the research questions are as follows:

1. Virtual Team Learning Conditions: Establishing a regular rhythm of technology-enabled communication forums
2. Virtual Team Learning Processes: Implementing consistent dialogue and engagement practices for the team to collaborate
3. Virtual Team Learning Outcomes: Capturing learning using social and cognitive technological means

In addition to the analytic categories, the researcher has examined the leadership styles practiced by the VTLs. Since leadership actions in cultivating virtual team learning was the key driver of this study, a discussion of leadership styles and

motivations by the VTLs could be of use in the analysis and interpretation of what those actions were.

Analytic Category 1 **Establishing a Regular Rhythm of Technology-Enabled Communication Forums**

The first research question sought to identify what the VTL does to create team learning conditions. Using the Dechant, Marsick, and Kasl (1993) team learning model as part of the overall conceptual framework for the study, the findings were related to each component of the model using Dechant and Marsick's (1993) Team Learning Survey (TLS) items. For Team Learning Conditions, the model identifies the following three dimensions: Appreciation of Teamwork; Individual Expression; and Operating Principles. According to the scoring protocol for the TLS, each of these dimensions received a "Favorable" rating based on the aggregate scores for the items related to that specific dimension. Table 7.1 contains how Dechant and Marsick (1993) identify the characteristics that exemplify a Favorable rating for each dimension.

Table 7.1 – Favorable Rating Characters – Team Learning Conditions Dimensions

Team Learning Conditions Dimension	Favorable Rating Characteristics
Appreciation of Teamwork	<ul style="list-style-type: none"> • Team is relatively open to differing views and ideas • Team is valued over the individual • Team builds on the synergy of members
Individual Expression	<ul style="list-style-type: none"> • Opportunities provided for input into mission, goals, and operating procedures • Climate exists for expressing objections • Easy opportunities for members to express themselves during team activities
Operating Principles	<ul style="list-style-type: none"> • Team operates according to shared set of guidelines, principles and norms • Team effectively balances working on tasks with building relationships

What emerged from the findings data was that VLT actions appeared to be helpful in creating these conditions. Their role in establishing these conditions was especially important in a virtual environment where the team was dispersed over space and time. This dispersion caused a lack of connection between individuals and the team; ambiguity in roles or responsibilities; and a loss of focus on team objectives. The VTLs in this research study displayed a strong impetus to bring their teams together to address these challenges. The primary method they appeared to use was establishing a regular rhythm of technology-enabled communication forums. The VTLs felt it was critical to meet on a regular basis. This was especially important in a virtual environment. They needed to use technology in order to meet. When they did meet, the VTLs practiced techniques that helped to both build relationships between team members and to solicit input from the team. This rationale for action was borne out by the themes that emerged from looking across the three Team Learning Conditions dimensions.

Table 7.2 contains a review of the actions practiced by the VTLs in accordance with the applicable TLS item. These actions fell into four themes that spanned the three dimensions.

1. **Holding meetings** was an important foundation for all team activities. Meetings were held to determine the team's purpose, monitor progress against goals, share information, and creating a forum for collaboration. The VTLs managed these meetings through creating an agenda where goals were discussed and questions could be asked. The meeting was a central way the VTLs used to ensure collaboration in a dispersed team design.

Table 7.2 – Key VTL Actions Relative to Themes and TLS Items for Analytic Category 1

		Team Learning Conditions Themes & VTL Actions			
TLS item/category		Holding Meetings	Utilizing Technology	Building Relationships	Soliciting Input
Appreciation of Teamwork	Ideas, viewpoints and perspectives	Bring team together to discuss issues	Using phone calls for direct communication		Asking direct questions to team members
	Team members feel valued and appreciated by one another	Create group forum to say thank you	Using VTC for more personal interaction	Enabling a free-to-talk atmosphere	
	Team members try to capitalize on strengths and compensate for weaknesses		Training lesser skilled team members		Asking experienced people to help out
	Team effort valued over individual achievement	Framework to bring people together		Building feeling of trust over time with team	
	Team members able to express thoughts clearly	Forum to meet and share ideas	Creating a medium for team to communicate		Following through on suggestions by team
	Team members open to new ideas or ways of thinking		Overcoming challenge of virtual environment	Longevity on team could deter openness	
Operating Principles	Balancing getting the task accomplished with building relationships	Bringing team together on regularly basis		Knowing capabilities of team members	
	Developing beliefs, values, and guiding principles		Enabling team to share ideas		Asking for thoughts and opinions
	Discussing feelings as well as thoughts	Agenda item for open discussion items		Creating a “safe place” for team to talk	Staying cognizant of time zone issues
	Spending time gaining clarity around team purpose and structure	Process for reviewing progress on goals	Using Whiteboarding feature in WebEx	Employing one-on-one conversations	
	Members take sufficient time to get to know each other before working on the task	Setting up structure for more intimate dialogue		Getting to know members of team	Including all team members in dialogue
Individual Expression	People do not feel free to express their negative feelings about changes	Agenda item to speak about open issues		Empowering team to ask questions	Allowing spontaneous discussion on issues
	Speaking one's mind is not valued			Creating a “safe place” for team to talk	Asking for thoughts and opinions
	Members do not have the opportunity to define and develop the team's objectives	Discuss progress toward achieving goals	Using VTC for clearer communication		Encouraging questions from team on updates

2. **Utilizing technology** helped enable collaboration and build relationships. The VTLs mentioned the difficulty of communicating in a virtual environment. They employed multiple technology tools to make sure that the team could collaborate. These tools included using WebEx, e-mail, teleconferencing, and video-telephone conferences. The data showed that the VTLs focuses on the “process” of leading the team versus managing for the “feelings” and emotions for the teams. This fact was shown through the focus on utilizing technology.

3. **Building relationships** was a critical component to learning. The VTLs ensured they took time to build relationships with their team members. This included meeting with the team through meetings and allowing the team to get to know one another. The VTLs also paid attention to the team structure and roles and responsibilities. Time spent managing the teams and getting to know the members of the teams was also identified as a way to build relationships on an informal basis.

4. **Soliciting input** from team members around issues assisted in learning. They utilized both active and passive methods to accomplish this. The VTLs wanted to make sure that they tapped into the experience of the team when addressing problems. In some cases the team members or off-shore vendors were more experienced than the VTLs. The VTLs wanted the team to be critical of methods as a way to improve processes. During meetings, the VTLs encouraged team members to comment of issues. Some used agenda items during the meetings to discuss issues while others allowed a freer flow of information as way to increase the dialogue between them and the team and amongst the team members.

TLS Results for Team Learning Conditions

Before a more in-depth analysis and interpretation of each theme takes place, a further review of the TLS results for each dimension can help shed more light on the themes. The themes were generated from the VTL critical incident interviews. Using the TLS results as a lens, which came from the team members themselves, can be a way to help validate and question the VTLs comments for further analysis and interpretation.

Appreciation of teamwork. Table 7.3 contains a review of the TLS items scores and ratings for Appreciation of Teamwork. Items 1 – 6 all fell in the “Moderately Agree” scoring range which is very high in the scoring range. This is evidence that the teams felt they could express themselves freely and build on one another’s ideas. Additionally, they felt appreciated by one another and valued being a member of the team. This was caused by the VTLs creating an open and collaborative environment. The actions portrayed by the VTLs in holding meetings, building relationships, and soliciting opinions point to reasons why these teams may have scored on the higher end of the range. The VTLs sought to engage their teams during meetings. They wanted to build relationships where team members got to know each other and could discuss their thoughts and viewpoints.

What was surprising to the researcher were the scores for items 7 and 8. With item #7, which had a lower score than the other items, the team members could have been inhibited in expressing their thoughts clearly because of the virtual environment. General communication in a virtual environment is challenging (Duarte & Snyder, 2006; Lipnack & Stamps, 2000). The team members could have been reacting to this factor when responding to the TLS item. When considering item #8, which had the lowest score for

Table 7.3 – TLS Items and Scores for Appreciation of Teamwork

Item #	TLS Item (Appreciation of Teamwork) In our team...	Average Total Score	TLS Rating
1	We build upon one another's ideas.	6.05	Moderately Agree
2	We try to understand one another's viewpoints.	6.02	Moderately Agree
3	We look at issues from multiple perspectives.	5.95	Moderately Agree
4	Members feel valued and appreciated by one another.	5.79	Moderately Agree
5	Team members try to capitalize on each other's strengths and compensate for one another's weaknesses.	5.77	Moderately Agree
6	Team effort is valued over individual achievement.	5.67	Moderately Agree
7	Most members are able to express their thoughts clearly.	5.44	Slightly Agree
8	Most members are open to new ideas or ways of thinking.	2.07	Moderately Disagree

any of the items across the entire TLS, the team members could also have been reacting to the technology and operating processes used by the team. As Bob described, technologists in general want to use advanced technology as often as possible. Additionally, as VTLs like Matt, Chuck, Andy, Grant, and Donny explained, many of their team members of their teams had been working on the same technology for numerous years. The TLS results on this item could have been a reflection of the frustration that team members felt in trying to adopt new ideas with more tenured colleagues and a slow pace of adopting new technology.

Operating principles. Table 7.4 contains a review of the TLS items scores and ratings for Operating Principles. Items 1 – 4 received a somewhat high score of “Slightly Agree”. While the aggregate score of this dimension was in the Favorable range, the scores were on the lower end of the range. This would indicate that the team members

believed that the teams did not spend enough time on such affective qualities as building relationships and discussing feelings with the team. This was reflected in the VTL comments in focusing on technology versus affective qualities. This point was further amplified by the rating on item #5 where the team members did not feel they spent sufficient time getting to know one another. Overcoming the affective hurdles in the virtual environment are challenging when team members are unable to meet face-to-face (Bell et al., 2012; Bergiel et al., 2008). However, the VTLs did express a tremendous amount of effort in trying to overcome these hurdles in building relationships and soliciting opinions. Their efforts could be the cause of the Favorable rating versus an Unfavorable one.

Table 7.4 – TLS Items and Scores for Operating Principles

Item #	TLS Item (Operating Principles) In our team...	Average Total Score	TLS Rating
1	We find that we need to balance getting the task accomplished with building relationships among members.	5.28	Slightly Agree
2	We are developing beliefs, values, and guiding principles.	5.21	Slightly Agree
3	We discuss our feelings as well as our thoughts.	4.79	Slightly Agree
4	We spend much time gaining clarity around our purpose and structure.	4.77	Slightly Agree
5	Members take sufficient time to get to know each other before working on the task.	4.12	Neutral

Individual expression. Table 7.5 contains a review of the TLS items scores and ratings for Individual Expression. Item #1 received a very high score for the Favorable range of “Moderately Disagree”. This would show that the team members believed that they were able to express themselves and would support what the VTLs said about their

actions in soliciting opinions from the team as well as building relationships. The scores of “Slightly Disagree” for items #2 and #3 are on the lower end of the Favorable spectrum. However, they do indicate in a positive way the efforts that VTLs did employ to ensure that the team members could speak their mind as well as engaging the team in defining objectives. Holding meetings was important for the team to get together to share their thoughts and opinions. Furthermore, soliciting opinions helped spur the team to offer their thoughts and show that they were valued. These actions were further reinforced by the relationships that the VTLs had built.

Table 7.5 – TLS Items and Scores for Individual Expression

Item #	TLS Item (Individual Expression) In our team...	Average Total Score	TLS Rating
1	People do not feel free to express their negative feelings about changes.	5.67	Moderately Disagree
2	Speaking one's mind is not valued.	5.33	Slightly Disagree
3	Members do not have the opportunity to define and develop the team's objectives.	4.60	Slightly Disagree

Analytic Category 1 Themes Interpretation

From the comparison of the TLS results with the themes generated from the VTL critical incident interviews, it is possible to balance the analysis with the relevant literature. Each of the four themes will be discussed and synthesized with the literature.

Holding meetings. Communicating amongst virtual teams was something overwhelming identified in the literature for team learning (Dechant & Marsick, 1993; Edmondson, 2003; Sauguet, 2000; Wilson, Goodman & Cronin, 2007) and especially with virtual team learning (Dixon, 2017; Hardin, 2005; Malhotra & Majchrzak, 2004;

Stull, 2008). As with the definition of a virtual team (Duarte & Snyder, 2006), the VTLs recognized that their teams were dispersed over geographic and temporal boundaries. They could not interact with each other in a face-to-face manner. There needed to be some means to connect the group together and ensure there was an effective flow of information and to monitor task accomplishment. While holding meetings is not something specifically mentioned as a technique for team learning, it is something that is implied in bringing a group of people together to learn (Arrow & Cook, 2008; Dool, 2010). Holding a regularly scheduled meeting was the primary means employed to conduct this flow of communication between team members (Lipnack & Stamps, 2000). The VTLs also realized that a meeting was an effective and efficient way to bring the group together so they could share information and learn – especially when the team was dispersed. They believed it would be inefficient, untimely, and counter-productive to try to meet with each person on the team in a one-on-one fashion. Holding a team meeting was the best way to quickly and efficiently accomplish multiple tasks in an organized and effective manner. The meetings could be in either a structured or unstructured format. Cordes (2016) found that a structured format to meeting and collaborating worked best especially when multiple technologies were employed by the VTL.

Utilizing technology. Utilizing technology was another theme that was uniformly supported in the literature around virtual teams and virtual team learning. As discussed in the previous section regarding communication and meetings, a dispersed team needs to meet on a regular basis because they are not afforded the same opportunities to meet as a co-located team (Duarte & Snyder, 2006; Lipnack & Stamps, 2000). Technology is the means for a virtual team to meet and communicate (Kayworth

& Leidner, 2002; Maznevski & Chudoba, 2000). To be effective, a virtual team leader needs to take advantage of any technology means available to accomplish to make sure the virtual team can interact (Malhotra & Majchrzak, 2004). The VTLs in this study completely recognized this need and utilized the communications technology at their disposal to accomplish it. These means of technology-enabled communication included direct through phone or e-mail; indirect through use of data sharing sites like SharePoint; and group interaction through teleconferencing, VTC, and WebEx. Some VTLs even utilized additional forms of technology. Each of these forms were fully represented in the literature as viable methods for virtual teams to communicate and meet (Ebrahim et al., 2009) as well as in the literature around virtual team learning (Clark & Kwinn, 2007; Grosse, 2010; Tai, 2010).

Building relationships. Building relationships can best be interpreted through the extensive writing and research centered around trust and psychological safety. The VTLs all discussed some aspect of building relationships between the team and with other groups. This was an important part for how many VTLs saw their teams operate. Trust is an aspect that relationships are built on – especially in a virtual team (Levi, 2011). It is on a foundation of trust that the virtual team functions most effectively (Bergiel et al., 2008; Cohen & Gibson, 2003; Duarte & Snyder, 2006; Kirkman et al., 2002; Lipnack & Stamps, 2000; Nemiro et al., 2008). The VTLs recognized that in a virtual environment, face-to-face contact is difficult – if not impossible – so building trust is a challenge. This realization is wholeheartedly supported in the literature around virtual teams (Jarvenpaa, Knoll & Leidner, 1998; Jarvenpaa & Leidner, 1999). Alex and

Chuck specifically mentioned building trust as one of their key roles as a VTL in building relationships.

In the minds of many scholars, trust and building relationships are related to psychological safety in virtual team learning (Cordery & Soo 2006; Dixon, 2017; Hardin, 2005; Knapp, 2016). Psychological safety has been widely recognized by many as one of the primary conditions for successful team learning (Bell et al., 2012; Decuyper et al., 2010; Edmondson, 1999). While not specifically calling it “psychological safety,” Rob and Doug mention the importance of creating a “safe space” for the team to operate where there was no fear of reprisals or repercussions – which is essentially the definition of the term (Edmondson, 1999).

Soliciting input. Soliciting input was not something directly referred to in the team learning literature. There is an implied connection with “Developing Goals” found in some of the literature. In addition to Dechant, Marsick, and Kasl (1993), who speak extensively about developing goals in their TLS (Dechant & Marsick, 1993), Bell et al. (2012) and Edmondson et al. (2007) point to the formulation of goals process in their team learning models. Soliciting input from the team is part of their recommended approach in determining team goals. Bergiel et al. (2008) refer to creating goals with input and buy in of the team as important. Dixon (2017) found that the team leader getting alignment and support from the team around goals as a critical role for the team leader for enabling virtual team learning.

There appeared to be two ways in which the VTLs solicited the opinions of their team members. These can be broken down between *active* and *passive* methods. Active methods were shown through the VTL actively engaging with the team to either ask for

assistance or share information. Passive methods were occasions when assistance was offered by the team or information was shared due to some unanticipated or random discussion. There were cases where VTLs employed both techniques.

When looking at the active methods, the VTLs would ask questions of the team with the intention of getting some sort input into a situation or problem. Ben and Matt mentioned how they expressed ignorance around an issue and needed the group's help in solving it. Chuck commented on how he would question his team members during team meetings when holding a discussion around a specific agenda item. He wanted more information but also wanted the team's help in solving it. Penny and Pedro spoke about how they had lists of pre-formulated questions that they used to obtain information for the team as part of their project management process meetings. Donny said that he would ask pointed questions of specific people during meetings so he could either get them to engage in the discussion or for that person to share a piece of knowledge that that person had with the team. In each of these instances, the VTLs were acting with the direct intention to solicit opinions from the team. They were looking to gather or share information that would help further the team's knowledge in how to address a situation or problem.

The other way to solicit opinions was through passive methods. While some VTLs reported that they had a time period allotted during their team meetings for open items, they did not have the specific intent of soliciting opinions. The solicitation was more a by-product of the discussion. Chuck, Penny and Donny mentioned that this happened continually during their meetings and was a great way for them to gather or share information. Bob ran his project through the Agile project methodology. This

called for an open discussion of issues, so soliciting opinions came up through the natural dialogue that this form of project management encompassed. Doug pointed out that he would only mention problems during his meetings simply as a way to share updates with the team on what he was working on. However, the team would then freely offer their opinions and possible solutions without him really having asked for their assistance. This would cause him to follow up and discuss further. During his one-on-one conversations with team members, Alex found that the person would offer his/her opinion as a course of the discussion. In each of these ways, the VTL was not actively looking for opinions, but the opinions of the team arose from some other source which lead to further discussions and problem solving.

Summary of Analytic Category 1 Discussion

For the most part, the themes generated for Analytic Category 1 were found in the literature regarding the inputs to virtual team learning. They revolved around the VTLs establishing a regular rhythm of technology-enabled communication forums. The three dimensions of Dechant, Marsick & Kasl's (1993) Team Learning Conditions were visible.

Holding meetings as an important foundation for all team activities appeared in the literature around ways that virtual teams communicated for learning. While the action of "holding meetings" was not something specifically mentioned in the team learning literature, it can be implied as a way to bring the team together to learn as a group. Utilizing technology was something that the literature showed as important for operating in a virtual environment, and the VTLs actively used it to help enable collaboration and build relationships. It was also seen in the team learning literature for

learning in both synchronous and asynchronous formats. The VTLs also focused on building relationships as a critical component to learning. The literature around psychological safety encompassed this aim for the VLT. While not specially identified in the literature on inputs to team learning, the data showed that the VTLs solicited input from team members around issues to assist in learning. This theme could be partially covered by the literature identified by goal setting. However, the evidence also showed that VTLs engaged in active and passive methods to solicit input from the team.

An area that was not seen from the research data on how VTLs created team learning conditions was around team organization and structure. This was an area identified in the team learning literature. Very few comments were made by the VTLs on how the team was organized and structured. A possible explanation could be found in the group development literature. The TLS results from the teams in this research study showed them to be operating at the Synergistic mode for learning. This mode is typified by the team learning in a fluid and more mature operating style, where team members are “committed to their roles as team players” (Dechant & Marsick, 1993, p. 8). The description for this mode would be indicative of Tuckman’s (1965) “Performing” stage of development. In this stage the structure and support for team operations have been developed. The lack of comments from the VTLs during the critical incident interviews may further manifest that the Synergistic mode and Performing stage existed. Since the team structure was set up and functioning, there was no need for the VTLs to comment on it.

Analytic Category 2

Implementing Consistent Dialogue and Engagement Practices for the Team to Collaborate

The second research question sought to identify what methods the VTL used to enable team learning processes. Using the Dechant, Marsick, and Kasl (1993) team learning model as part of the overall conceptual framework for the study, the findings were related to each component of the model using Dechant and Marsick's (1993) Team Learning Survey (TLS) items. For Team Learning Processes, the model names the following four processes for team learning: Framing/Reframing; Experimenting; Crossing Boundaries; and Integrating Perspectives. Kasl, Marsick, and Dechant (1997) also define a learning mode that characterizes how the team incorporates these processes. The four learning modes are Fragmented, Pooled, Synergistic, and Continuous. The TLS only rates teams on the first three modes and excludes Continuous. Watkins and Marsick (1993) reported that reaching this mode was extremely rare for most teams.

The combined score in the TLS for all 13 teams surveyed in this study reached the Synergistic mode. Because the teams were in the Synergistic mode, the researcher saw evidence that the teams moved back-and-forth between the four team learning processes in a fluid style. As expected when operating in this mode, the researcher found it difficult to pin-point specific actions for each respective process because many actions appeared to cross between the processes. A more detailed analysis of the Synergistic mode will take place at the end of this chapter. However, in looking at the actions of the VTLs that enabled these processes, the researcher noticed four themes that emerged from the findings that showed leader actions to enable team learning processes. Table 7.6 contains

an overview of the leader actions and the four themes that emerged from the TLS items. A more detailed discussion follows.

1. **Creating a supportive atmosphere** for the team was actively desired by the VTLs. Bringing the team together to collaborate between its members and with other groups appeared as an important practice for the VTLs. They felt that the key to making this dialogue effective was creating a supportive atmosphere for all parties that participated. The VTLs used a number of methods to create a supportive mood for the team. They empowered the team members to take ownership over their work by encouraging participation and taking individual responsibility. The VTLs would then support their efforts through resolving conflicts and regular information sharing updates. When they did hold meetings, the VTLs would ensure that all pertinent people were invited. This could be through standard invitation lists. Additionally, they employed mentoring and job shadowing as well as network building as methods for the team members to learn more and feel more support from both inside and outside the group.

2. **Conducting group reflection** was employed by the VTLs to foster learning for the team. Reflection is seen as an important process for learning (Boud & Walker, 1993). It allows the team to look at what it is currently doing or has accomplished with a critical eye toward learning and improvement (Rimanoczy & Turner, 2008). The VTLs utilized a number of techniques to promote this activity. While they did not expressly call it “reflection” they instinctively realized that this was something that should be done so the group could reach its objectives. Some of the methods employed were having the group engage in brainstorming; performing a detailed review of team activities to assess what worked and what did not; formally documenting actions and then sharing them with

Table 7.6 – Key VTL Actions Relative to Themes and TLS Items for Analytic Category 2

TLS item/category		Team Learning Processes Themes & VTL Actions			
		Creating a Supportive Atmosphere	Conducting Group Reflection	Facilitating Discussions	Applying Learnings & Experience
Framing & Reframing	We often revise our viewpoints based on input or new information from others outside the team.			Using a dashboard to monitor project progress	Utilizing own intuition and experience to make a decision
	We often find that our views of the problem change as a result of our team discussions.	Telling team to be honest and not try to be experts in everything	Utilizing brainstorming as a method to determine root of issues	Inviting all relevant parties to meetings	Using Knowledge Transfer (KT) to train new people on team
	We challenge our basic beliefs or assumptions about the issues under discussion	Embracing current ‘social environment’ in the workplace	Ask direct questions to get the group to think about what it is doing	VTL makes oneself available to participate on calls	Asserting own perspective and ideas to the team
Experimenting	We often learn through trying out new behaviors.	Job shadowing and mentoring for more junior team members	Asking individual to train other team members on new skill	Rotating facilitation duties for team meetings	Assigning different roles and responsibilities
	Members try out new approaches to their jobs as a result of the team's work.	Inviting the customer to offer feedback	Actively experiment with different solutions to problems	Lead troubleshooting sessions where all can offer opinions	
Crossing Boundaries	The act of working collaboratively results in greater learning for each of us than if we had worked alone.	Team meetings help build relationships to improve collaboration		Utilize technology so team can communicate effectively	Act as a coach to the team so it can learn from their experience
	Members change their behavior as a result of seeing other team members change.	Individuals taking ownership of assisting other team members	Documenting learnings through Run Books for future discussions		Target specific people on team to help reinforce changes
	We share what we learn from our team with others outside the team.	Inviting constituents to meetings with expressed intent to solve problems	Document learnings and share with outside groups	Hold open discussions during meetings aimed at solving problems	Using KT to transfer existing learning on team to newer members
	We invite people from outside the team to present information or have discussions with us.	Weekly meetings with all constituents helps build relationships	Actively seek to resolve conflicts and make process improvement where necessary	During open forum discussions, allow all parties to speak and share information	Obtaining resources where required and get buy/feedback from senior leaders
	We increase our knowledge base by going outside of our team for information.	Inviting all parties ensures equal representation			

Table 7.6 (Continued) – Key VTL Actions Relative to Themes and TLS Items for Analytic Category 2

TLS item/category		Team Learning Processes Themes & VTL Actions			
		Creating a Supportive Atmosphere	Conducting Group Reflection	Facilitating Discussions	Applying Learnings & Experience
Integrating Perspectives	Members share the results of their personal insights or learning with one another.	Empower to team and allow self-direction and ownership over issues	Team actively reviews feedback from constituents		Actively draw on prior experience as a co-creator of knowledge
	We learned to drop our departmental perspectives and think from an organization-wide perspective.	Transparency of information by sharing outside feedback	Take a holistic view and revisit problem on regular basis	Enact process to manage group meetings and discussions	Take a broader ownership over team’s responsibilities
	We generally revise our viewpoints based on input or new information from others outside our team.	Resolving conflicts to remove obstacles for team members	Documenting customer and constituent expectations		Incorporating senior leader feedback
	We change our perspectives about ourselves and others.	Introduce and help build a network to support work efforts	Work with team to make meaning of what group is working on		Employ active training to directly apply learning to current work
	We generally incorporate the perspectives of most members in analyzing problems and making decisions.	Allow team to take ownership over itself	Hold retrospective meetings Use an iterative process Document learnings	Encourage team to offer opinions Ask open-ended questions	State that all team members are expected to participate Designating other meeting facilitators.

others; and continually looking at the problem they were engaged in from a holistic perspective. Some of the sources of information they utilized to conduct reflection included feedback from customers, senior leaders and the team itself. The VTLs were diligent about getting this feedback so they could determine ways to improve and meet goals.

3. **Facilitating discussions** was an important skill for the VTLs to possess. Given all the meetings that the VTLs held to enable collaboration across their multiple constituents, the VTLs were in a position to facilitate these meetings. Their goal was to promote effective dialogue during the ensuing discussions. The VTLs used many methods to facilitate discussions. They used dashboards to track deliverables and drive discussion items during project updates. They also asked open-ended questions to solicit detailed responses from meeting participants. Making themselves available for the meetings was also important so they could participate. The VTLs effective use of technology also improved the team's ability to communicate with one-another.

4. **Applying learnings and experience** gained by the team was used to solidify changes. The VTLs wanted to make sure that they utilized the experience and learnings of the team when addressing problems. This also included themselves when dealing with issues. The VTLs engaged in a series of activities that helped the team apply what it had learned to the situations it engaged it. In some cases the VTLs would utilize their own basis of experience to make decisions. They would assert her opinion on the group to ensure that her opinion was considered as an option. In other times, the VTL would assign other group members responsibilities outside of the individual's normal role. Knowledge transfer (KT) was another technique promoted as way to both develop skills

and share knowledge for application to other venues. The VTL could also act as a coach for the team in helping them to apply the knowledge shared. Finally, the VTL could take a broader view of his responsibilities when looking at a situation and determine what was right in the eyes of the organization versus a more parochial team view.

TLS Results for Team Learning Processes

Prior to a more detailed analysis and interpretation of each theme, a further review of the TLS results for each process will occur to help highlight other potential points to consider. The themes were generated from the VTL critical incident interviews. Using the TLS results as a lens, which came from the team members themselves, can be a way to help validate and question the VTLs comments for further analysis and interpretation. Watkins and Marsick's (1993) definitions for each team learning process are contained in Table 7.7. A discussion of the TLS results for each of the four Team Learning Processes follows.

Table 7.7 – Team Learning Process Definitions

Team Learning Process	Definition
Framing/Reframing	The initial perception of an issue, situation, person or object based on past understanding and present input. This initial view can be transformed into a new understanding or frame.
Experimenting	Action undertaken to test a hypothesis or a move to discover something new.
Crossing Boundaries	When two or more individuals and/or teams communicate.
Integrating Perspectives	Divergent views are synthesized and apparent conflicts are resolved, but not through compromise or majority rule.

Framing/Reframing. Table 7.8 contains a review of the TLS items scores and ratings for Framing/Reframing. Item 1 received a very high score for the Favorable

range of “Moderately Agree”, while items 2 and 3 received fairly high “Slightly Agree” score. These scores would indicate that the teams did feel that they could express themselves and share information around a problem. They were engaged in this thinking process of learning. The VTLs were able to achieve this open dialogue through creating a supportive atmosphere on their teams. They welcomed input and discussion.

Additionally, the VTLs facilitated discussions utilizing tools and techniques that could gather and elicit the comments. Furthermore, they would get the team to refer to past experience in the situation as a way to develop a revised way to attack a problem.

Table 7.8 – TLS Items and Scores for Framing/Reframing

Item #	TLS Item (Framing/Reframing) In our team...	Average Total Score	TLS Rating
1	We challenge our basic beliefs or assumptions about the issues under discussion.	5.53	Moderately Agree
2	We often revise our viewpoints based on input or new information from others outside the team.	5.49	Slightly Agree
3	We often find that our views of the problem change as a result of our team discussions.	5.35	Slightly Agree

Experimenting. Table 7.9 contains a review of the TLS items scores and ratings for Experimenting. Item #1 received a very high score for the Favorable range of “Moderately Agree”, while item #2 was “Slightly Agree”. The results show that the team members felt they practiced this action-oriented learning process. Utilizing methods like job shadowing and mentoring helped to create a supportive atmosphere. By facilitating discussions, the VTLs were able to actively troubleshoot issue. In having others act in different roles, the team members were able to try new behaviors and reflect on the activity as well as apply their past experience to a new situation.

Table 7.9 – TLS Items and Scores for Experimenting

Item #	TLS Item (Experimenting) In our team...	Average Total Score	TLS Rating
1	We often learn through trying out new behaviors.	5.86	Moderately Agree
2	Members try out new approaches to their jobs as a result of the team's work.	5.23	Slightly Agree

Crossing boundaries. Table 7.10 contains a review of the TLS items scores and ratings for Crossing Boundaries. Item #1 received a very high score for the Favorable range of “Moderately Agree”. The other items each received a “Slightly Agree” rating. The findings showed that the VTLs overwhelmingly held meeting to bring people together. The discussion in Analytic Category #1 around Team Learning Conditions helped to set the stage for engaging other individuals and groups on issues. The VTLs tried to take advantage of the meeting as best as possible by inviting others. Perhaps the items with the lower score attest that the teams felt bringing others into the conversation was not done enough. However, it was in the supportive atmosphere that the VTLs established that allowed the team to trying collaborate and learn from one another. Additionally, when the different constituencies were gathered, the VTL would lead reflection sessions on what went well and what needed to be improved. Deft facilitation of those meetings by the VTLs enabled them to be productive. The VTLs were also able to seamlessly utilize the experience of the other individuals and/or groups in addressing situations when these outside parties were included in trying to solve the problem. Each of these actions helped to demonstrate the power of this action-orient process when applied in a virtual environment.

Table 7.10 – TLS Items and Scores for Crossing Boundaries

Item #	TLS Item (Crossing Boundaries) In our team...	Average Total Score	TLS Rating
1	The act of working collaboratively results in greater learning for each of us than if we had worked alone.	6.23	Moderately Agree
2	Members change their behavior as a result of seeing other team members change.	4.72	Slightly Agree
3	We share what we learn from our team with others outside the team.	4.81	Slightly Agree
4	We invite people from outside the team to present information or have discussions with us.	4.62	Slightly Agree
5	We increase our knowledge base by going outside of our team for information.	5.43	Slightly Agree

Integrating perspectives. Table 7.11 contains a review of the TLS items scores and ratings for Integrating Perspectives. Items 1 – 3 received a very high score for the Favorable range of “Moderately Agree.” Items 4 – 6 received a slightly lower “Slightly Agree” rating. This process is the one that truly shows the cyclical nature of the thinking and action processes of learning. The scores indicate that the team members believed that they could listen to and incorporate divergent opinions from both inside and outside the group. This was caused by the active dialogue the VTLs encouraged through a supportive atmosphere and engaging facilitation of the interactions between team members and others. They were also able to help integrate various perspectives through reflection on the group level using retrospective meetings; documenting and sharing the results of learning for comment; and constantly seeking feedback around how issues were handled. Through these methods, the VLTs were able to get team members to share their personal learnings for use by others.

Table 7.11 – TLS Items and Scores for Integrating Perspectives

Item #	TLS Item (Integrating Perspectives) In our team...	Average Total Score	TLS Rating
1	Members share the results of their personal insights or learning with one another.	6.07	Moderately Agree
2	We generally incorporate the perspectives of most members in analyzing problems and making decisions.	5.67	Moderately Agree
3	We listen to the perspectives of every member of the team.	5.79	Moderately Agree
4	We learned to drop our departmental perspectives and think from an organization-wide perspective.	4.86	Slightly Agree
5	We generally revise our viewpoints based on input or new information from others outside our team.	4.98	Slightly Agree
6	We change our perspectives about ourselves and others.	5.02	Slightly Agree

Analytic Category 2 Themes Interpretation

From the comparison of the TLS results with the themes generated from the VTL critical incident interviews, it is possible to balance the analysis with the relevant literature. Each of the four themes will be discussed and synthesized with the literature.

Supportive atmosphere. There were a number of actions identified in the analysis of the findings around a supportive atmosphere that have firm foundations in the literature. Overall, this specific theme is supported by the extensive work around psychological safety (Bell et al., 2012; Dixon, 2017; Edmondson, 1999; Edmondson et al., 2001; Knapp, 2016; Van den Bossche et al., 2006) in showing how leaders should create an atmosphere on the team that is free from retaliation as being critical to team learning. The issue of psychological safety was covered in Analytic Category 1.

However, there were actions that VTLs performed in the team learning processes that showed how they reinforced creating a supportive atmosphere. This is seen as especially important in a virtual environment (Palloff & Pratt, 2007). The VTLs seemed to realize that they needed to encourage the team so they could get them to participate more in the team's activities when learning was involved. Encouraging them seemed to break down barriers that could get the team members to open up and share their individual opinions and learnings with the team.

Empowering their team members to take ownership over their tasks and learning was something emphasized by the VTLs in their Knowledge Transfer (KT) efforts. The VTLs provided the learning resources, but the team members needed to take advantage of them on their own by empowering them. Empowerment has its foundations in the literature around self-directed learning (SDL) as described by Brookfield (1986) and Knowles (1980). In SDL the individual takes charge of one's own path to learn. The VTLs enabled their team members by giving them the freedom to learn on their own. They also supported the decisions that team members made in getting their work accomplished. This action reinforced the use of empowerment. Being transparent with information and sharing it with the team was something also seen in the literature around empowerment in a virtual team learning setting (Palloff & Pratt, 2007) as well as communication (Kirkman et al., 2002) and building trust (Lee, Gillespie, Mann & Wearing, 2010).

Having the team members build a network of people to refer to was something that Levi (2011) felt was a necessary part of how any organization functioned. Heron (1996) discussed it as part of co-operative inquiry where the team members need to know

who to reach out to for assistance. It is also something referred to in the literature around action learning (Dilworth & Boshyk, 2010) and informal learning (Marsick & Watkins, 1990). Matthews (2013) emphasizes that networks are even more important in a virtual setting. The networks were built through introductions or through the VTL intentionally partnering more experienced people with less experienced team members. This could be considered coaching in that the more experienced person was a guide for the less experienced person (McCall, Lombardo & Morrison, 1988). The VTLs used terms like job shadowing and mentoring to describe these types of coaching actions. The intent was to build up a team member's base of knowledge so the person quickly learned the tools and processes for the role and became productive as soon as possible.

Group reflection. While not specifically calling it reflection, the VTLs instinctively saw the power that it brought to learning. Reflection is generally recognized as the engine that helps drive learning on both an individual (Schön, 1983; Boud, Keogh & Walker, 1985) and a group (Heron, 1985; O'Neil & Marsick, 2007; Revans, 1998) level. Raelin (2008) especially pinpoints the value of public reflection in the workplace as a way to increase learning for a group of people. Similar to the definition presented in the literature, the goal that the VTLs had for reflection was to assist the team in reviewing current or past actions so they could learn what went well and what went wrong (Cressey, 2006).

In many cases the reflection sessions were performed similar to an AAR (After-Action Review) process (Yorks, O'Neil & Marsick, 1999). The teams would meet with either the team alone or with other constituents to review activities. The VTLs were actively looking for feedback to improve how the team performed and meet its

objectives. Seeking feedback on performance is something found in both the personal development (Effron & Ort, 2010; Stone & Heen, 2014; Ulrich & Smallwood, 2003) and team development (Hackman, 2002; LaFasto & Larson, 2001; Levi, 2011) literature. The VTLs were hungry for this type of feedback.

They sought to generate ideas during these reflection sessions. A typical method found in the literature around generating ideas is brainstorming (Bailey & Black, 2014). The VTLs did not follow the classic methods of brainstorming described in the literature (Paulus, Larey & Dzindolet, 2001; Schwartz, 2002), most likely because they were not trained in it or found it too difficult in a virtual environment. There was no evidence of using other group idea generation methods like mind-mapping, role playing, story boarding or nominal group technique explained in the literature as other ways to generate ideas (Bailey & Black, 2014). They were generally looking to conduct a free-flowing discussion where team members could openly offer their ideas.

The reflection sessions were typically around specific actions used by the team or individuals in performing a function. They tended to stay on a more surface level of depth in their analysis. They did not cross into the deeper level of “critical reflection.” The VTLs and team members did not question their underlying beliefs and motivations in acting in a specific manner which leads to transformative learning (Mezirow, 1991). While reflecting in this manner could have led to deeper learning by the team (O’Neil & Marsick, 2007; Rimanoczy & Turner, 2008), the VTLs did not wish to pursue it. In the workplace, leaders most times tend to stay on a more superficial level with the people they work with in terms of offering feedback and interpreting underlying actions (Landsberg, 2003; Stone & Heen, 2014). This is often caused by a leader’s unwillingness

to be frank with their subordinates and have subordinates be honest with them (Lencioni, 2002).

The type of reflection most readily identified by the researcher as reflected in the evidence was “productive reflection” (Boud et al, 2006). The VTLs looked at opportunities to reflect with the team in a work-related setting and took advantage of them. Cressey (2006) explained three phases of reflection that could take place in this circumstance: formal; functional; and embedded collective. The VTLs used formal reflection in organizing specific meetings designed to get feedback and determine how an event went in a holistic fashion. In the functional format, the team zeroed in with its reflection around a specific process and discussed feedback around a function like programming, troubleshooting, or specifications development. The third phase is when the team uses reflection in all aspects of its work and tries to proactively diagnose and resolve issues. The researcher saw evidence of each of these phases of reflection. The VTLs utilized productive reflection as a way to meet their team goals and improve their teams’ chances to learn.

Facilitating discussions. The VTLs looked at facilitating discussions in two ways. The first was through the tools that they used. Tools were seen to be the cognitive and functional aspects of how to facilitate the discussion. The other way was through the techniques they employed. The techniques focused on the affective methods they used during the discussions.

The tools commonly used to facilitate discussions included dashboards, checklists, and technology. These areas were reflected in the literature around team learning and facilitation. Dashboards are a common item used by team leaders to

management projects. They are heavily used in project management (Kerzner, 2010), quality control monitoring (Bounds, Yorks, Adams & Ranney, 1994), and overall business metrics management (George, 2003). The VTLs used this tool because it was readily available, and it was a common practice in the IT functional community (Haag & Cummings, 2010). Additionally, standardized checklists and questions are often advocated by project management scholars to help reduce conflict, create a consistent set of measures, and quicken the pace of meetings (Kerzner & Salidas, 2009). The researcher saw evidence of each of these in how the VTLs used dashboards to help facilitate their discussions.

While technology was covered in Analytic Category 1, this item again came up continually as part of the team learning processes. The rationale was supported in the literature around virtual teams in that technology-enabled communication was the centerpiece of how a virtual team functioned (Duarte & Synder, 2006; Jarvenpaa & Leidner, 1999; Lipnack & Stamps, 2000). Bradley (2008) and Malhotra and Majchrzak (2004) greatly emphasized the use of appropriate technology for a virtual team to conduct its work. Bergiel et al. (2008) advocated that the VTL needed to be adept at its use so virtual discussion would run smoothly. The VTLs did mention this need when reviewing their critical incidents. Being in the IT function as a profession, the VTLs were all technologically savvy. They tended to embrace the use of technology as a tool to enable team learning. The literature showed that VTLs that were not skilled or comfortable with using technology caused problems with how the team functioned (Ebrahim et al., 2009). This problem was not seen for the VTLs in this study.

When looking at the affective-based techniques for facilitating discussions, much of what was seen in the findings was also reflected in the literature around group facilitation. Items like using open-ended questions (Lahey, 2010), reinforcing and praising a group member's contributions to the discussion (Heron, 1996), and checking for understanding (Rouwette & Vennix, 2008) were all uncovered in the critical incidents. Effectively facilitating discussions was seen as an important skill that the VTLs appeared to take seriously. They realized that it was critical to enable learning amongst the team, and it was their responsibility to see that the discussions were facilitated properly (Zaccaro, Ely & Schuffler, 2008).

Applying learnings and experience. The VTLs were seen to apply learnings through two approaches to adult learning: experiential learning and informal learning. Learning from experience is one of the fundamental tenets of the Dechant, Marsick, and Kasl (1993) team learning model. From the examples given by the VTLs, they showed that they and the teams learned through experience. They learned using the traditional “hands on” view seen in the experiential learning models of Kolb (1984) and Jarvis (1987). In their examples, the VTLs spoke about troubleshooting an issue where they would have members of the team available as well as other cross-functional partners – like with Crossing Boundaries (Dechant, Marsick & Kasl, 1993). The VTLs would then run through the problem with the team assembled to test possible solutions. This was very similar to the Experimenting and Integrating Perspective processes that Dechant, Marsick, and Kasl (1993) describe in their model.

The VTLs and the teams also applied what they knew from prior experience to a current problem. The literature identifies this type of experiential learning as “learning

agility” (Lombardo & Eichinger 2000). The VTLs spoke about how they and some members of their respective team were highly experienced. In many situations they took that knowledge from prior roles and applied it to a situation they were facing. They did it in an almost natural way, but the literature says that this activity is not always done naturally (DeRue, Ashford & Myers, 2012). The VTLs and teams may have practiced learning agility in this study because they felt comfortable with the teams they were on.

The degree of psychological safety they had established may have freed their minds up to think more clearly and draw on past experiences. Schön (1983) would refer to this as Reflection in Action, whereby the person is actively reflecting on what is going on around one’s self and able to think more holistically about what is occurring. Edmondson (1999) asserts that this condition is caused by psychological safety existing within the team. Given that the teams in the research study appeared to have a high degree of psychological safety there is the possibility that learning agility resulted from it. Informal learning was demonstrated through the spread of KT to members of the team. The VTLs embraced offering learning in a virtual format. They supported the rationale given in the literature found around individual e-learning (Gayol, 2010). They realized it was a quick and effective method of passing on knowledge and skills to team members. They used digital recordings, teleconferencing, VTCs, and shared data repositories to share learning content. These are typical resources identified in the literature to deliver content in a virtual setting (Garrison & Anderson, 2003). Some even assessed their current technology capabilities and sought to tailor their e-learning solutions to accommodate the team and the capabilities available (Banner, Brown-Hoekstra, Huettner & James-Tanny, 2010).

In most cases the VTLs allowed the team members to dictate their own learning schedule. The team members were free to take advantage of whatever types of learning resources were available. The VTLs just made sure that the e-learning resources were available and the team had access. This type of philosophy toward learning fully conforms to the self-directed learning (SDL) style advocated by Brookfield (1986) and Knowles (1980). SDL is often associated with informal learning (Merriam & Bierema, 2014). Additionally, setting up opportunities for building networks amongst the organization is shown as an important part of informal learning (Marsick, 2003, 2009; Marsick & Watkins, 1990). The goal the VTLs had for offering these types of learning opportunities to their teams was to get them trained so they could become productive team members and assist the team in accomplishing its team objectives.

Summary of Analytic Category 2 Discussion

Many of the themes generated for Analytic Category 2 were found in the literature regarding the processes of virtual team learning. They centered around the VTLs implementing consistent dialogue and engagement practices for the team to collaborate. The four learning processes of Dechant, Marsick, and Kasl's (1993) Team Learning Processes were noticeable.

The VTLs actively desired to create a supportive atmosphere for the team. While the supportive atmosphere was indicative in the literature around psychological safety covered in Analytic Category 1, the VTLs also utilized empowerment and network building as a way to exemplify their support. These concepts were not identified in the team learning literature, but they are considered evidence of SDL (Brookfield, 1986) and informal learning (Marsick & Watkins, 1990). Conducting group reflection to foster

learning for the team was something uncovered in the literature that was important for team learning. The VTLs were seen to utilize brainstorming as a tool for reflection, but not others generally used in generate ideas and receive feedback in groups (Paulus, Larey & Dzindolet, 2001; Schwartz, 2002). However, the VTLs did not supply evidence that the teams engaged in critical reflection (O'Neil & Marsick, 2007). Most likely this occurred because teams in a corporate setting do not readily want to show the level of vulnerability required (Landsberg, 2003; Lencioni, 2002). They showed more evidence of displaying productive reflection found in the workplace (Boud et al., 2006).

Additionally, the theme of facilitating discussions was shown in both the research data and the literature through the VTLs utilizing both tools and techniques. They accomplished this through affective, process, and technological means. The VTLs were also able to apply learnings and experience gained by the team as a way to solidify changes. The literature around informal learning showed how knowledge transfer efforts were formulated for a sustained level of impact. The team were able to apply learning in an experiential, "hands on" way through troubleshooting and practicing learning agility.

An area that was indirectly shown in the research data but is expressly referred to in the literature is the area of collaboration. The themes of creating a supportive atmosphere, conducting group reflection, and facilitating discussion are each referred to in the literature around collaboration (Lee, 2005) as well its practical application in a learning setting known as collaborative inquiry (Bray, Lee, Smith & Yorks, 2000). Other applications of collaboration that were shown in the data included conducting AARs (Yorks et al., 1999) and facilitation techniques like brainstorming (Bailey & Black, 2014). The rationale behind not expressly mentioning collaboration by the VTLs could

again be contained in the group development literature. Since the teams in this study were operating in the Synergistic mode, they were continually moving through each of the four learning processes in a back-and-forth and cyclical nature (Dechant & Marsick, 1993). Such active movement could show evidence to the high degree of collaboration that was occurring and may have appeared as obvious to the VTLs. Therefore, it was not necessary to note by the VTLs because it was already in use.

Analytic Category 3 Capturing Learning Using Social and Cognitive Technological Means

The third research question sought to identify how the VTL supported team learning outcomes that achieve success. Using the Dechant, Marsick, and Kasl (1993) team learning model as part of the overall conceptual framework for the study, the findings were related to each component of the model using Dechant and Marsick's (1993) Team Learning Survey (TLS) items. According to the scoring protocol for the TLS, the aggregate of the items for Team learning Conditions arrived at a "Favorable" rating. While the model does not name specific sub-functions like the other two components in the model, it does offer examples on what a Favorable rating would entail. These examples include: performance improvement; new or revised ways of working; new or revised norms; enhanced quality of output; and changed ways of thinking. What unfolded from the findings were three themes that appeared across the TLS items. These themes showed that VTLs supported team learning outcomes through capturing learning using social and cognitive technological means. Table 7.12 contains a review of the actions practiced by the VTLs in accordance with the applicable TLS items.

1. **Maintaining relationships** was important for the team to meet its goals. VTLs expended much effort to ensure that team collaborated effectively. The central focus of this effort was trying to build and maintain relationships amongst the team members. Most VTLs believed that if the team members got along with one another, then they would work more effectively together. This would lead them to meet the goals of the team. They strove to maintain these relationships given a number of challenges that surrounded the team. These challenges included team members as well as the overall composition of the team concerning experience levels, locations, vendor relationships. The VTLs were seen to employ a number of methods to address these challenges. Among the actions employed were to explain how the team fit into the organization's overall objectives; gathering customer input; encouraging dialogue during meetings; building connections between team members; and maintaining an unbiased view of individual team members.

2. **Creating artifacts** documented processes and procedures. In a virtual environment creating a centralized data repository was seen as a critical tool for the team to record its learning, share knowledge and information, and communicate changes to work priorities. This data repository was housed with documents and artifacts that the team could use to perform its work. The VTLs imposed a great level of importance on documentation. It was a place where the team could codify what it had learned, changes it had made, and report its progress against achieving its deliverables. The VTLs undertook a number of actions to ensure that documentation took place. Aside from simply writing down the process, the VTL could have the team record its learning with videos and create a video library of knowledge. They could also create dashboards that

Table 7.12 – Key VTL Actions Relative to Themes and TLS Items for Analytic Category 3

Team Learning Outcomes Themes & VTL Actions			
TLS items	Maintaining Relationships	Creating Artifacts	Incorporating Different Operating Methods
The end products of our work include performance improvements.	<ul style="list-style-type: none"> Publicizing artifacts across appropriate constituents 	<ul style="list-style-type: none"> Documenting improved processes and procedures (e.g. Run Books) 	<ul style="list-style-type: none"> Simplify operating methods through automation and technology
The end products of our work are of a much higher quality than any one of us could have produced alone.	<ul style="list-style-type: none"> Collaborating on the problem at hand as a team 	<ul style="list-style-type: none"> Data tables to analyze Training documentation 	<ul style="list-style-type: none"> Implementing Agile project management methodology
The end products of our work include new approaches to work.	<ul style="list-style-type: none"> Group discussions during team meetings Customer feedback and interaction 	<ul style="list-style-type: none"> Video recording of SME training sessions Maintaining library of video recordings for training Dashboard to monitor project deliverables Documentation of process (i.e. 7 Checkpoints and Bonus Checkpoints) 	<ul style="list-style-type: none"> Automation of processes Video recording of training Non-standard project management methodologies (e.g. Agile, Kanban, and 7 Checkpoints)
The end products of our work include new ways of thinking.			
The end products of our work include new work processes or procedures.			
The end products of our work include new ways of managing.	<ul style="list-style-type: none"> Explaining how team fits into the organization’s activities Building a support system for new hires Incorporating a variety of team member types 	<ul style="list-style-type: none"> Creating and maintaining a centralized data repository of necessary information 	<ul style="list-style-type: none"> Challenging more experienced team members to assist Using technology so team can meet
The end products of our work include new social norms.	<ul style="list-style-type: none"> Empowerment and voicing opinions Building connections Maintaining an unbiased view 	<ul style="list-style-type: none"> Overcome team resistance to creating documentation 	<ul style="list-style-type: none"> Team composition and structure

tracked progress toward goal completion. People engaged in technology had a natural resistance to creating the documentation. They were more interested in coding.

However, it was seen that the VTLs needed to be vigilant in demanding that the teams created the appropriate artifacts needed for the team to reach its objectives.

3. **Incorporating different operating methods** helped to achieve team objectives. The company where the research took place had many “standard” ways to operate. The VTLs that participated in this study were seen as successful in the eyes of the organization. The researcher saw that most of these successful VTLs were willing to attempt non-standard operating methods in managing their teams. The company was trying to change the paradigm on how it ran its business. It encouraged the team leaders to try new ways. The VTLs in this study appeared to embrace this challenge. They engaged in a number of different operating methods to achieve their goals. Automation and simplification through adopting new technology was a technique used. They also sought to challenge their team members to improve processes and become more efficient. In conducting this work, some felt they needed a team composed of individuals that had an innovative mindset and reveled in working as a team to meet customer needs. They were also willing to implement different project management methodologies like Agile and Kanban. When the standard operating methods of the company did not fit their needs, some would go off and create a new and totally different technique.

TLS Results for Team Learning Outcomes

Before a more in-depth analysis and interpretation of each theme takes place, a further review of the TLS results for each process can help shed more light on the themes. Using the TLS results as a lens, which came from the team members themselves,

can be a way to help validate and question the VTLs comments for further analysis and interpretation. Table 7.13 contains a list of the TLS items for Team Learning Outcomes along with the scores and ratings.

Table 7.13 – TLS Items and Scores for Team Learning Outcomes

Item #	TLS Item (Team Learning Outcomes) In our team...	Average Total Score	TLS Rating
1	The end products of our work include performance improvements.	5.81	Moderately Agree
2	The end products of our work are of a much higher quality than any one of us could have produced alone.	5.77	Moderately Agree
3	The end products of our work include new approaches to work.	5.23	Slightly Agree
4	The end products of our work include new ways of thinking.	4.91	Slightly Agree
5	The end products of our work include new work processes or procedures.	5.19	Slightly Agree
6	The end products of our work include new ways of managing.	4.72	Slightly Agree
7	The end products of our work include new social norms.	4.33	Neutral

The overall rating for Team Learning Outcomes was in the Favorable range. This shows that the teams believed that they had achieved a high degree of collective learning as a result of its work together (Dechant & Marsick, 1993). They tended to share information readily to develop new ways of working, thinking, and managing. The team members felt that their teams produced results relative to their teams' assigned tasks, mission, goals, or objectives. The individual scores for items 1 – 6 attests to this feeling. The VTLs were seen to have went to great lengths to ensure that relationships were maintained, artifacts were created, and different operating methods were incorporated. They practiced techniques like publicizing information, showing were the team fit into

the overall organization strategy, emphasizing the production of documentation, and looking for new and innovative methods to manage their operations.

An area where there did not appear to be as strong of an effort was in creating new norms for the groups they led. This was also reflected in the TLS results. They tried to lead by example in building relationships and creating a supportive atmosphere. These focuses were covered in Analytic Categories 1 and 2. However, while the VTLs said they were trying to account of the growing number of Millennial generation members of their teams, they may not have been adapting to leading this group as quickly as the team members may have wanted. Additionally, when operating in a virtual environment, it may be difficult to develop new norms for the team since there is not face-to-face interaction where team members can witness each other in actions.

Analytic Category 3 Themes Interpretation

From the comparison of the TLS results with the themes generated from the VTL critical incident interviews, it is possible to balance the analysis with the relevant literature. Each of the three themes will be discussed and synthesized with the literature.

Maintaining relationships. Maintaining relationships was seen as part of the affective measures of team learning outcomes identified in the literature. Kraiger, Ford, and Salas (1993) and Stagl, Salas, and Day (2008) refer to affective elements of team learning outcomes as one of the viable ways to determine how effective team learning occurs in a group. They define these affective elements as motivational, attitudinal and behavioral. Edmondson et al. (2007) made the conceptual connection between team relationships and affective qualities of a team and team learning effectiveness. In their

research, Ortega et al. (2010) and Cordery and Soo (2008) found that affective measures such as team satisfaction and motivation to conduct tasks impacted the virtual team's ability to learn and meet its objectives. In focusing on the relationships within the team, the VTLs were trying to develop this affective nature of learning and team effectiveness.

Many VTLs readily acknowledged that they actively sought to build the affective side of the team in describing the "social environment" and "social network" that existed in the team. Social learning is something that has been developed in the literature. Olivera and Straus (2004), Edmondson (2002) and Van den Bossche et al. (2006) support this social side of team learning as the constructive interaction and collaboration of individuals in a group. In looking to exploit the social side of individuals in a group interacting with each other in its normal course of events (Levi, 2011), the VTLs were looking to successfully support their teams' learning outcomes in a social context (Ardichvill, 2003). The social nature of work also points to the changing generations in the workplace (Meister & Willyerd, 2010).

The actions that the VTLs employed were supported in the literature around affective measures for team learning outcomes. The VTLs actively praised team members that recommended or made changes to existing routines. Heron (1999) and Hackman (2002) suggest that leaders that encourage and reinforce participation amongst team members who offer ideas on the ways the team operates will garner future successful efforts by their subordinates. The VTLs tried to treat all suggestions by the team equally and not impose their will on the team because of their superior status. Edmondson (2003) and Nembhard and Edmondson (2006) showed that if a leader reduces hierarchical levels within the team, that the team develops a higher level of

psychological safety and meets its team objectives. The VTLs made many attempts to share information and post new knowledge and processes in some sort of public forum. They wanted to conduct this action so that all team members and other interested parties understood what was occurring around them. Tinsdale et al. (2008) refer to the importance of the entire group having access to information as way to incorporate changes in how it learns and operates.

Creating artifacts. Developing documentation around processes and procedures was the main type of artifact uncovered in the findings. This documentation encompassed many different forms. The most common identified by the VTLs were digital recordings, dashboards, and standard operating procedures (SOP). These were typically posted on some type of shared data repository site for the team and other concerned partners to view. Creating documentation is very prevalent in the literature surrounding the IT function (Haag & Cummings, 2010) and project management (George, 2003; Kerzner, 2010). The type of artifacts mentioned are seen in the literature around virtual learning (Bradley, 2008; Garrison & Anderson, 2003; Gayol, 2010), quality control (Bounds et al., 1994), and business analytics (Fitz-Enz, 2010). While documenting processes and procedures is highly recommended in the IT function, one VTL, Pedro, recognized that people engaged in technology had a natural resistance to creating the documentation. They were more interested in coding. However, it was seen that the VTLs needed to be vigilant in demanding that the teams created the appropriate artifacts needed for the team to reach its objectives. The artifacts were a method to capture the cognitive elements that resulted from team learning.

Artifacts were important for passing on knowledge to other team members and groups. However, not much was done by the VTLs to measure the effectiveness of this knowledge transfer. Measuring the cognitive change in skill level by the team and its members is seen by some scholars as important to assessing the impact of any team learning activity (Ellis, Bell, Ployhart, Hollenbeck & Ilgen, 2005). A change in the team's overall cognitive ability is seen as a positive indication of the team's ability to reach its goals (Edmondson et al., 2007). However, there was no attempt made by any VTLs to try to measure their efforts objectively.

Objective measurements are a hallmark of evaluating training programs on multiple levels to assess their effectiveness (Kirkpatrick & Kirkpatrick, 2006; Philips, 2007). The VTLs seemed to rely on subjective measures like how they felt the team was incorporating the new knowledge into their activities. One VTL, Grant, mentioned that this was how he assessed the KT efforts. This may have been caused by the VTLs not having the active involvement of the company's learning & development team to advise them on how to evaluate their KT efforts. It also could have been caused by them not having the time, tools or inclination to really assess their training actions. In a metrics driven culture, once something is measured, performance assessments are made from the objective measurements (Fritz-Enz, 2010). These objective measures can impact someone's standing in an organization (Effron & Ort, 2010). The VTLs may have been looking to avoid this extra scrutiny of their job performance in not measuring their KT efforts' effectiveness. It was easier to have the team members responsible for their own learning through informal means (Cross, 2007; Matthews, 2013).

Incorporating different operating methods. Dechant and Marsick (1993) identify multiple outcomes from team learning. These outcomes include new or improved ways to work; new or revised norms; or a changed way of thinking. These results represent another cognitive means. In a recent article in CIO magazine describing the top qualities needed for successful IT project managers, the author identified the ability to innovate and influence in a fast-paced and demanding environment as a leading one desired by most companies (Florentine, 2016). Schein and Van Maanen (2013) referred to these qualities as career “anchors” that lead someone to a specific profession. These qualities were seen in most of the VTLs in this study.

Because the VTLs were all experienced IT professionals, they most likely had a natural inclination to try new technologies to solve business-related problems. They also had experienced members of their teams with extensive knowledge of different types of technologies. The VTLs either offered the technology solution on their own or they listened to the suggestions of their team members and used what the team recommended. Additionally, they also looked for a way to conduct project management for the team that would fit the type of work assigned to the team. Some continued to use the approved SDLC process practiced by the company, Waterfall. They did this because either the systems and processes for managing projects by their leaders were built around the Waterfall methodology or they wanted to run the project in a way that they felt could achieve the desired project outcomes. In some cases, the VTL decided to use a different methodology. The ones that decided to use Agile reached this conclusion because they were either told by their leaders to institute it or they had had some prior experience with it and they felt that this type of management process could work best given the project

they were managing. In the situation with the ‘7 Checkpoints’ process developed by Penny, she was told by her manager to develop a project management process that would closely monitor her projects. With Doug and the Kanban process, he asked his team for suggestions and a team member recommended this type of process. He looked into it and decided that it could work for the project at hand. With each of the 13 VTLs they employed some aspect of learning agility in making their decision on the methodology to employ. They ended up using their best judgement based on prior experience.

Summary of Analytic Category 3 Discussion

Generally, the themes distilled for Analytic Category 3 were found in the literature regarding the outputs of virtual team learning. Pinpointing what exactly team learning outcomes consists of is oftentimes inconsistent (Stagl et al., 2008). In this study, the outcomes centered around the VTLs capturing learning using social and cognitive technological means. There was evidence of Dechant, Marsick, and Kasl’s (1993) Team Learning Outcomes.

Maintaining relationships was important for the VTLs in having the team meet its goals. The literature around affective measures showed this theme especially in the VTLs efforts around stimulating team satisfaction (Cordery & Soo, 2008; Ortega et al., 2010), encouraging participation (Hackman, 2002; Heron, 1999), and being transparent and open about sharing information (Tinsdale et al., 2008) in the emerging social environment existing in today’s workplace (Meister & Willyerd, 2010). Creating artifacts to document processes and procedures was something seen in the literature around creating a central data repository (Malhotra & Majchrzak, 2004). Incorporating different operating methods helped to achieve team objectives appeared in the literature

in research around affective measures, team performance, and centralized data repository. Utilizing operating methods like Agile and Kanban helped to maintain relationship amongst team members as an affective means. Documenting the new operating methods was important to codify changes in operating methods. Team performance was oftentimes measured by the extent of new operating processes adopted or changed.

Where the VTLs commented little on was around the cognitive changes that their teams went through. They did discuss their efforts around training new team members through knowledge transfer and job shadowing efforts. However, they did not discuss how they would measure the increase in either individual and or team skills. Learning on these two levels was something discussed extensively in the team learning literature (Decuyper et al., 2010; Edmondson et al., 2007; Wilson et al., 2007). In corporate environments, measurements around process efficiency and cost are routinely maintained (Fitz-Enz, 2010). It was surprising to the researcher that the VTLs did not maintain any sort of metric that could track their learning programs' effectiveness like those developed by Kirkpatrick (1998) or Phillips (2003).

Discussion of the Synergistic Learning Mode

As mentioned earlier, the results of the TLS indicated that the teams operated at the Synergistic mode for learning. The teams moved fluidly between the learning processes of thinking and action in a repetitive and cyclical nature. The researcher saw evidence in the critical incidents of where the VTLs would lead their respective teams through the sequence of team learning processes and then start again or move back and revisit a process. As explained in Dechant and Marsick's (1993) definition of the

Synergistic mode, the team does a good job of using thinking and action when it moves in this fluid style. The following is a typical description of how many VTLs described moving through these processes while addressing an issue.

Examples of the Synergistic Mode

The researcher saw that many VTLs would initiate a discussion with their teams around goals or a project deliverable the team was working on. The VTLs were trying to work with their teams on defining expectations or what a course of action should be to solve problem (Thinking/Framing). Then, because they had invited cross-functional partners to attend the meeting, they would receive instant input and advice from the partners (Action/Crossing Boundaries). This conversation with the partners would get the core team led by the VTL to work through different scenarios of how the advice from the partners could work (Action/Experimenting). The team and VTL would then receive immediate feedback from the partners and make changes right there on the spot (Thinking & Action/Integrating Perspectives). This entire activity could take place in a 10 – 15 time frame (or over an extended time period of multiple days, weeks or months – depending on the circumstances) during a meeting as either an agenda item or an *ad hoc* discussion. The resulting conversation could result a new way of operating (Thinking/Reframing). Once this new way of operating was implemented, the team could meet again and in the same method as just described initiate this cycle of action again.

Table 7.14 offers some actual examples from the critical incidents that represent what was just described. These examples help shed light what other VTLs stated during their critical incident interviews. In Scenario #1, Ben is looking for a technology training

solution for new team members. Scenario #2 has Penny explaining how she problem solves during a project update meeting. Scenario #3 explains how Chuck handled an *ad hoc* discussion around a problem during a team meeting.

Table 7.14 – Synergistic Team Learning Process Examples

Scenario #1 – Overview	
• VTL	Ben
• Issue	Designing a training program on technology used by the team for new team members.
• Context:	A continual process of creating and refining the training.
• Participants:	VTL, team members, new team members, technology subject matter experts, customers
• Timeframe:	Over the course of 4 months
Team Learning Process	VTL & Team Actions
Framing	VTL met with team to determine the initial training that needed to occur around the technology. The team brainstorms possible solutions to the problem. The VTL admitted that he did not know how to solve the problem and asked for help.
Crossing Boundaries	Subject matter experts on the technology were invited to the meeting (but are not part of the team). The SMEs comment on the proposed solutions.
Integrating Perspectives	The team develops possible solutions. It then runs the solution by the SMEs as well as new people that have joined the team.
Experimenting	Training is launched and tried with the new team members.
Crossing Boundaries	The VTLs and team meet with the recent participants, SMEs and some customers to review the training for what went well and what needed to be improved.
Integrating Perspectives	The feedback on what was said is recorded and new possible training plans are considered.
Reframing	Based on the feedback and review by others, a revised training program is reviewed with the group.

Scenario #2 – Overview	
• VTL	Penny
• Issue	Reviewing status for project deliverables
• Context:	Weekly meeting with team as part of ‘7 Checkpoints’ project management process
• Participants:	VTL, team members, cross-functional partners, senior leaders, technology subject matter experts, customers
• Timeframe	Discussion during a meeting – 10 mins
Team Learning Process	VTL & Team Actions
Framing	As part of the review of a project, an issue is uncovered where the project may not be able to meet a timing deadline. Time is taken to define what the actual issue is at stake.
Crossing Boundaries	Other participants (SME and senior leaders) are brought into the conversation to offer potential solutions. The meeting facilitator records the possible solutions.
Experimenting	The possible solutions are worked through with the customer in real time along with a conversation of “whats” and “ifs”.
Integrating Perspectives	After running through the scenarios, the team decides what the best possible course of action is. Some minor refinements are made based on the continued input of the SMEs, senior leaders, cross-functional partners.
Reframing	A memo (e-mail) is sent out to all participants outlining the problem and what the solution is. Memo is from the senior leader, which shows his endorsement of the solution.

Scenario #3 – Overview #3	
• VTL	Chuck
• Issue	Question on a project brought up during team meeting
• Context:	Weekly meeting with team and question wa asked by a team member during the ‘open items’ section of team agenda
• Participants:	VTL, team members, cross-functional partners
• Timeframe	1 week
Team Learning Process	VTL & Team Actions
Framing	A team member asks a question during a team meeting concerning a resource availability problem from a cross-functional partner. The team spent time clarifying what the actual issue was and what the possible impacts were with the entire team. The admitted that he did not know that the resource was an issue, but he needed the team’s help in solving it.

Crossing Boundaries	The cross-functional member is at the meeting. The representative explains the rationale for the resource issue but says that she will try to get further guidance.
Experimenting	The VTL meets with the cross-functional team member to look at different ways to resolve the issue. They try them out with select members of the team to see if the possible solution works.
Integrating Perspectives	At the next team meeting, the VTLs and cross-functional partner report back to the team that they have determined a possible solution. Those select other team members that assisted with the solution are invited to comment. Input from the entire team was then solicited and recorded.
Reframing	A new way to deal with the resource problem was agreed up by the team. The VTL had the solution recorded and posted on the team's data sharing site so all (customers, SMEs, other cross-functional partners) could see and comment as appropriate.

From looking at these scenarios, the reader can see how the VTLs moved their team through the team learning processes in either a sequential or a back-and-forth style. Many techniques were employed to move the team through each process. Some of the same actions were used in multiple processes. These actions could occur over a few minutes during a team meeting or over a few months as the team actively worked through a solution. In reviewing the findings with some actual scenarios, the reader can see evidence of the four themes uncovered from the findings illustrated. The researcher will now review the four themes with practical examples on how VLTs enabled team learning processes.

Synergistic Learning Mode Interpretation

In operating in a Synergistic learning mode, the teams engaged in the learning processes similar to a “mosaic” art piece where the actions were distinct, but they blended together to form a flowing picture of how learning occurred in the team (Watkins & Marsick, 1993). They moved through the thinking and action parts of learning that

Dechant, Marsick, and Kasl (1993) use as an example of what Schön (1983) reported as the centerpiece of learning. It also occurring in a cyclical process that Kolb (1984) describes for experiential learning. In applying experiential learning to a team, Kayes et al. (2005) use this same cyclical description to explain how learning occurs most effectively. The evidence from the TLS and the critical incidents point to the team learning in synergistic fashion. The examples in this research study can also be explained by the theoretical foundations of the Dechant, Masick, and Kasl (1993) team learning model. Since all types of leaders in this study were seen to operate in the Synergistic mode, there was no overwhelming style that enabled team learning processes to reach this mode.

Summary of the Chapter

This chapter presented a cross-case analysis, interpretation and synthesis of the research findings centered around the research goal of identifying ways that team leaders of virtual teams cultivate learning within their teams. The researcher conducted an analysis of the findings seeking to identify answers to the three research questions that guided this study. He created three analytic categories that corresponded to each research question. Each analytic category had themes that were uncovered from the findings. Additionally, the researcher presented the results of the TLS that aligned with each analytic category. From there the researcher conducted a comparison of the TLS and themes with the Conceptual Framework developed in Chapter II. The comparison yielded the following results:

• **Analytic Category 1.** The three dimensions of Team Learning Conditions offered in Dechant, Marsick, and Kasl's (1993) model of team learning appeared in the findings. There were four general themes uncovered: holding meetings; utilizing technology; building relationships; and soliciting input. Holding meetings was not something directly referenced in the team learning literature. However, it was implied as a way to bring people together to promote communication so the team could learn. The team learning literature does not directly explain how teams come together to learn. Holding meetings was a VTL action uncovered that adds to the literature to show how teams come together to learn. Utilizing different types of technology like e-mail, teleconferences, video conferencing, and information sharing software were all types of technology that the team learning literature referred to as methods to foster virtual learning. The study's results confirmed these points. Building relationships was something that was seen in the literature around psychological safety. Establishing trust, creating a "safe space", and communicating openly were ways that the VTLs in this study used to build relationships. These actions align with the team learning literature. The fourth theme of soliciting input was not seen directly in the literature, but parts of it were covered in the goal setting literature. Soliciting input adds to the literature in a new way. Team organization and structure were identified in the literature but were not something discussed by the VTLs in the critical incident interviews. This could be explained by the teams in this study operating in the Synergistic mode that aligns with Tuckman's (1965) Performing stage of group development denoting established roles, structure, responsibilities, and operating processes. However, the study's results do question the viability of the literature in the area of team structure and organization.

• **Analytic Category 2.** The TLS results for the teams in this study reported that they operated in the Synergistic learning mode which means that they moved seamlessly through the four team learning processes offered by Dechant, Marsick, and Kasl (1993). There was evidence of the four learning processes in the findings. Four themes emerged that included a supportive atmosphere; group reflection; facilitating discussions; and applying learnings and experience. Creating a supportive atmosphere was found in the psychological safety literature from Analytic Category 1; however, the literature around SDL and informal learning also pointed to this area. The VTLs practiced empowerment and networking as techniques to create a supportive atmosphere. The technique of brainstorming was the primary method used by the VTLs to conduct group reflection and facilitate discussions. They also asked open-ended questions and communicated openly with the team. Each of these actions were supported in the team learning literature. The theme of applying learning and experience was found in the literature on informal and experiential learning. The literature review surfaced collaboration as a process for team learning; however, this concept was not expressly identified by the VTLs. Collaboration is something referred to in the supportive atmosphere, facilitation, and reflection literature. Since the teams were in a Synergistic learning mode, collaboration could have been an assumed practiced by the team and not mentioned by the VTLs.

• **Analytic Category 3.** The teams were seen to meet Dechant, Marsick, and Kasl (1993) indicators of Team Learning Outcomes. The literature on team learning outcomes is not always clear and consistent on what are the results of team learning. This study found three areas: maintaining relationships; creating artifacts; and incorporating different operating methods. Maintaining relationships was evidenced by actions like

publicizing team accomplishments, conducting reviews on activities, building connections with other team members, and involving multiple constituents in issues. These items add to the literature. Creating artifacts showed the importance of having a centralized data repository. A centralized repository of data was something referred to in the literature and supported by the finding of this study. Incorporating different operating methods had elements of the affective measures, team performance, and centralized data repository literature. Where there was a difference between the data results and the literature was around cognitive measures. There was little evidence of the VTLs employing any overt metrics to measure the impact of the learning efforts they implemented. There is literature that refer to cognitive measurement as showing the ultimate impact of team learning.

Following the discussion of the analytic categories, the researcher presented examples meant to show how the Synergistic learning mode manifested itself amongst the teams. The researcher wanted to demonstrate how this mode played out in real-world scenarios. This way the reader could see the back-and-forth, cyclical style that exemplify the thinking and action processes central to learning in this mode. Additionally, the central qualities of the Synergistic learning mode were demonstrated by various examples in the details of the discussions around the analytic categories.

In the next and final chapter (VIII), the researcher will discuss the conclusions of the research with possible contributions to the literature and recommendations that include additional suggestions for future research. The conclusions will focus around the areas of relationships, technology, measurement, reflection, and leadership. Subsequent recommendations will be proposed to three different groups: VTLs and the organizations

that employ them; HRD professionals looking to enhance learning and development opportunities for VTLs; and researchers seeking to further investigate the growing field of virtual team learning.

Chapter VIII

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research study was to explore ways that team leaders of virtual teams cultivate learning within their teams. In completing this study, the researcher hoped to provide some insights and recommendations on what actions virtual team leaders (VTLs) can implement to create a work atmosphere where team learning flourishes so the team can achieve its objectives in a virtual environment. The growing use of virtual teams in corporations makes this type of research compelling for VTLs and the organizations they serve. The researcher could then use these insights and recommendations for possible development programs focused on VTLs. To accomplish this aim, the researcher constructed the following research questions:

1. How does the virtual team leader create team learning conditions?
2. What methods does the virtual team leader use to enable team learning processes?
3. How does the virtual team leader support team learning outcomes that achieve success?

These research questions were largely addressed in the findings contained in Chapters IV, V, and VI. The researcher then presented his analysis and interpretations of the findings in Chapter VII. An attempt was also made to synthesize the data with the relevant literature and the conceptual framework developed in Chapter II. A discussion

of the conclusions of the research with possible contributions to the literature and recommendations that include additional suggestions for future research follows.

Organization of the Chapter

Through conducting a cross-case review of the research findings, the researcher sought to provide analytical and interpretive insights. During this process, the researcher uncovered actions that VTLs use to cultivate team learning within their virtual teams. From these analytical and interpretive insights, the researcher derived five main conclusions for how VTLs cultivate team learning for the virtual teams they lead. These five conclusions will be presented along with how they might contribute to the applicable research concerning the area covered. The researcher will also revisit the Conceptual Framework offered in Chapter II and propose adjustments to it given the learnings gathered from this research study. Additionally, this study yielded insights into how to enhance learning opportunities for VTLs that lead virtual project teams. Since one of the intentions of this study was to further the professional and leadership development of a pivotal role within the corporate world of VTLs that lead projects, the researcher will offer recommendations on how to enhance the skill sets around this increasingly important role (Kerzner, 2010). The researcher will propose actions for training and developing these skills to both VTLs (and the organizations that employ them) and HRD practitioners. As part of this discussion, the researcher will also suggest other areas for continued research into virtual team learning and recommendations for the Dechant, Marsick, and Kasl (1993) Team Learning Model.

Conclusions

The conclusions for this study were drawn from the analysis and interpretations of the findings. The researcher looked at each Analytic Category and the subsequent themes uncovered for each one. As the researcher reviewed these data and attempted to make higher meaning of them (Bloomberg & Volpe, 2016), he noticed that many common messages resonated across the Analytic Categories and the findings from the research questions. These messages were especially important when looking at team learning in a virtual environment. Since the role of the VTL was seen as a pivotal role for the organization in question, the conclusions and recommendations can be used in furthering the skills sets for VTLs. The following five main conclusions emerged from the data that integrated many of the common messages contained in the analysis and interpretation of the findings.

Conclusion #1 – Relationships Matter

The data from this study strongly indicate that VTLs place a tremendous amount of importance around building relationships between themselves and the team. Some type of relationship building activity was seen in each of the three team learning components of conditions, processes, and outcomes. These activities included creating a sense of trust, showing mutual respect, and open communication. In a virtual environment, fostering these relationships was especially important so the team can feel connected to one-another. The VTLs tried to regularly meet with their teams both formally and informally to build those connections. During interactions they were supportive of the team's efforts and encouraged participation when facilitating

conversations. The regular interaction helped to establish a level trust and psychological safety between all parties. Furthermore, the VTLs tried to facilitate connections between team members both inside and outside the group. This way trust could extend on multiple level levels. The conduct of the interactions using an open communication style showed how the VTL respected the opinions of all parties and valued their input. Creating these connections helped to develop an emotional bond where a state of psychological safety flourished. Once this state was established, the team was positioned to learn in each stage of its undertaking. VTLs must invest the time and effort necessary to build these relationships. They must have the interpersonal skills develop those emotional connections and the inclination to make building relationships a priority.

Conclusion #2 – Technology Enables Learning

Because virtual teams are dispersed and face-to-face interaction is next to impossible, technology was the means in which the team could meet and communicate. Aside from simply using technology as the means to communicate in a transactional way, VTLs must embrace the use of technology in multiple mediums so the team can take advantage of the cognitive, affective and psychomotor means to learning. Documenting, recording, and storing information in shared data repositories helps to create space for the team to codify and access knowledge. Using teleconferencing and VTC capabilities to meet and interact creates the emotional connection for learning so the team members can more fully develop their skills. Finally, as they utilize technology such as WebEx Whiteboarding or more hands on troubleshooting, they get the opportunity to apply what they learn in a real-time nature that helps to reinforce the learning exercise. The VTLs must be skilled in utilizing technology so they can provide for these three valuable

components to learn. They must understand the importance of using technology as a means for learning as well as a method to communicate in a virtual environment.

Conclusion #3 – The Value of Learning was not Measured

The VTLs in this study invested a significant amount of effort in transferring knowledge to their dispersed team members. They readily adopted an informal and an experiential approach to learning. However, they did not incorporate any means to measure what the team members had learned. There was no way for them to determine any type of return on investment for their efforts. Meeting objectives and team performance cannot be the ultimate measure of team learning. If team learning can enable team performance and accomplishing goals and objectives, then VTLs require some method to monitor the effectiveness of their learning activities. As part of leading the team, VTLs should look at methods to measure learning in the same approach that they measure and monitor the processes that they manage. The VTLs in this study measured project management attributes like financial expenditures, coding quality, timeline deliverables, and process adherence. VTLs must consider and adopt methods that measure the extent of learning occurring on the team with the same alacrity.

Conclusion #4 – Reflection Drives Learning

Reflection is a centerpiece to learning. This was reaffirmed in the findings for this study. The VTLs utilized some form of reflection to enable learning for the team. The VTLs willingly used reflection during all phases of an event and in multiple formats. It could take place in both formally scheduled sessions or *ad hoc*-type instantaneous opportunities. There was no right or wrong time for reflection. They took advantage of

the level of psychological safety that they developed on the team and with other parties to gather open and honest feedback around an event. They helped to gather that feedback through effectively facilitating the discussions during reflection sessions using techniques like brainstorming. The VTLs in this study appeared to instinctively realize the power and value of reflection as a tool to learn. They used it throughout the team learning processes and demonstrated that reflection can be effectively practiced in a virtual environment.

Conclusion #5 – Leadership is Critical

Leadership was the engine that drove learning on the teams investigated in this study. The VTLs looked at their accepted roles as the leaders of their respective teams and conducted themselves accordingly. While they did not always focus specifically on learning, they did exhibit actions that cultivated team learning within the team. They cared about the team's performance and invested in their role as a motivator of that performance. They developed trust and psychological safety within the team and looked for ways to empower the team members for success. The VTLs also looked at their past experiences in leading teams and attempted to apply the experience in their current circumstance.

Revisions to Conceptual Framework

When looking at the conclusions derived for this research study, there appears to be some revisions that could be made to the Conceptual Framework offered in Chapter II. Figure 8.1 contains a visual representation of where those revisions of the framework

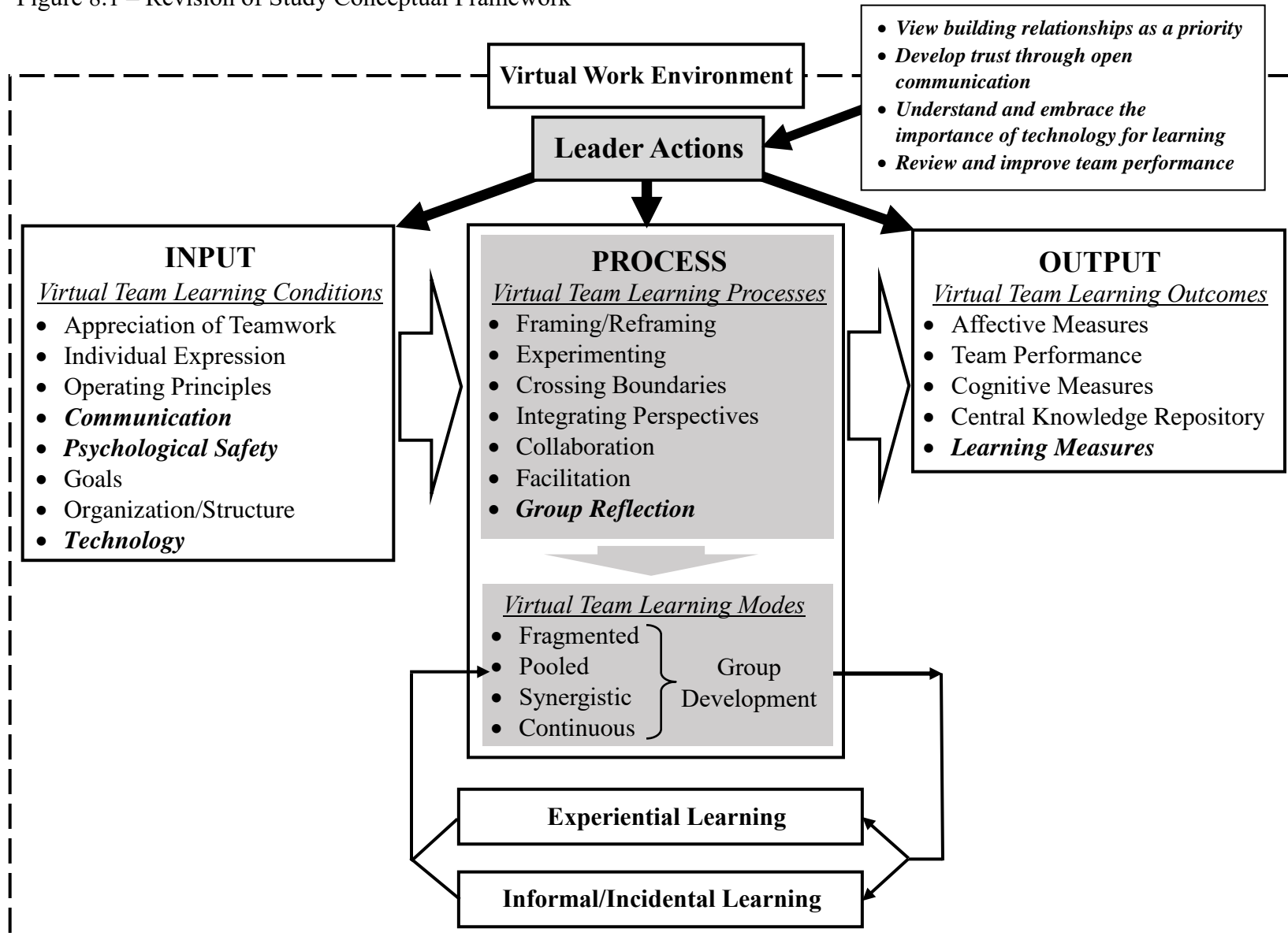
were applied. The changes are highlighted in bolded italics. An explanation of the revisions follows.

The first set of revisions revolves around the leader actions found to cultivate team learning in virtual project teams. These actions were demonstrated across the VTLs in this study as derived from the study's conclusions. The actions are depicted in the figure as the box with the arrow directed at the leader actions. These actions include:

- **View building relationships as a priority.** The VTLs willingly focused a significant amount of effort on building relationships both inside and outside the team.
- **Develop trust through open communication.** The VTLs sought to develop trust with the team by utilizing techniques that created open communication and dialogue.
- **Understand and embrace the importance of technology for learning.** The VTLs actively utilized communication technology to ensure that learning took place with the team.
- **Review and improve team performance.** The VTLs looked to continually review the team's actions both internally and externally on where and how to improve.

The second set of revisions are contained within the three components of the framework relating to Hackman's (1987) I-P-O model. While some of the items highlighted were in the original Conceptual Framework, the researcher wished to call attention to them because of the strong evidence from the conclusions that these items were especially critical for team learning to occur in a virtual environment. Under the Input component, the results showed that *communication*, *psychological safety* and *technology* were items vital in setting virtual team learning conditions. These items are also reflected in the Leader Actions with VTLs developing trust, communicating openly,

Figure 8.1 – Revision of Study Conceptual Framework



and embracing technology. Under the Process component, reflection was a key activity used by the VTLs. The researcher adjusted the item to *group reflection* to show how the team used reflection as a learning process. Utilizing group reflection allowed VTLs to review team actions and seek improvement. Under the Output component, the researcher added *learning measures* to the conceptual framework. While the VTLs did not appear to measure learning with their teams, this item was seen in the study as something that could have been done to gauge the effectiveness of their learning efforts.

Contributions to the Literature

The researcher believes that the current study makes the following contributions to the literature. The first is that team learning can occur in a virtual setting. This is still an emerging focus in the study of team learning in the literature (Bell et al., 2012; Decuyper et al., 2010). The current study adds to the growing empirical research conducted in this area (Cordes, 2016; Dixon, 2017; Hardin, 2005; Knapp, 2016; Ortega et al., 2010). It also helps to widen the gateway established by Stull (2008) for applying the Dechant, Marsick, and Kasl (1993) team learning model in a virtual setting.

The second contribution reinforces the previous literature showing the importance of psychological safety for team learning. Edmondson (1999) and others (Edmondson et al., 2001; Knapp, 2016; Van den Bossche et al., 2006) have shown this value and the important role that team leaders play in establishing it (Nembhard & Edmondson, 2006). While trust is something heavily referenced in the literature around how virtual teams work effectively (Bergiel et al., 2008; Cohen & Gibson, 2003; Duarte & Snyder, 2006; Jarvenpaa et al., 1998; Lipnack & Stamps, 2000), it is still an emerging area to show the

value of psychological safety and trust in a virtual learning environment (Cordes, 2016; Dixon, 2017; Hardin, 2005; Kauppila et al., 2011; Knapp, 2016; Ortega et al., 2010).

This present study can add to this area.

The third contribution is that reflection can occur in a virtual setting. The VTLs in this study emphasized the use of reflection as a learning tool. Productive reflection has been seen to occur in the workplace in more of a face-to-face environment (Boud et al., 2006). This study helps show that it can occur in a virtual group setting. Additionally, Action Learning relies heavily on reflection as a tool for learning (Revans, 1998); however, the reflection in this group learning technique tends to take place in a face-to-face manner (Dilworth & Boshyk, 2010; O'Neil & Marsick, 2007). This study can add to the emerging literature around Action Learning in a virtual context (Dickenson et al., 2010).

Recommendations

The role of the VTL is considered a pivotal one for the company where the research took place. Given the growing use of virtual teams in other organizations, it may also be seen as a pivotal one in those organizations. The researcher offers two sets of recommendations based on the results of this study. The first set is for VTLs and the corporate organizations that employ them. The second set is for human resources development (HRD) professionals that are concerned with developing the virtual team learning skills set for VTLs in their organizations. This section concludes with a set of recommendations for future research.

Recommendations for VTLs

There are four recommendations that were derived from the findings, analysis, interpretations and conclusions from this study that are specifically aimed at the VTLs. They attempt to span many of the prior points made and put forth actionable practices that VTLs should consider in cultivating learning within the virtual teams they lead.

Continue valuing relationships. VTLs need to recognize that building relationships are important for the virtual team to learn. In a virtual environment where the team is dispersed, the VTLs should realize that extra effort needs to be made by them to build relationships. Many times this action is something that is neglected by team leaders (Hackman, 2002; Levi, 2011), especially those that lead virtual teams (Lafasto & Larson, 2001; Lipnack & Stamps, 2000; Tryan et al., 2003). It is an important part of developing trust and psychological safety within the team (Carmeli, Brueller & Dutton, 2009; Dixon, 2017; Ortega et al., 2010). VTLs need to embrace their roles as leaders of people and not simply act as impersonal managers of “resources” that happen to be people. They should continue to meet regularly with their team members on both a formal and an informal basis to foster open and honest dialogue with their team members. VTLs should adopt behaviors that value individuals, diversity, communication, and transparency (Schein, 2010). To do this, VTLs should become aware of their own strengths and development areas around their personal beliefs about leading teams and cultivating team learning. A method to help gain this insight could be through utilizing a practice like the Johari Window (Luft & Ingram, 1955) where the person looks to identify what is known and unknown about oneself and others to identify blind spots. VTLs can partner with HRD practitioners to administer various personality or learning-type

assessments to assist VTLs in uncovering blind spots that can inhibit effectively building relationships like developing trust, establishing mutual respect, and communicating openly. Obtaining a clearer understanding of their capabilities in these areas can help them to either continue with valuing the power of relationships or working on creating stronger ones between themselves and their team members.

Measure learning efforts. Just as the VTLs in this study measured their performance in terms of project management attributes like budget expenditures, timeliness of deliverables, task assignment, and project defects, the VTLs should also undertake measuring how well their learning efforts are conducted. These will help determine the effectiveness of their team learning conditions and processes with the final team learning outcomes. They could adopt affective measures around the emotional aspects of team leading as well as cognitive and behavioral changes the team develops through learning. Developing measurements along the lines of Kirkpatrick's (1998) four levels of training evaluation or Phillips' (2003) measure of learning Return on Investment (ROI) could be two ways to develop and implement these metrics. The VTLs in this study dedicated significant time and effort to knowledge transfer for their teams. Due to the pace of change currently experienced in most organizations, all evidence points to knowledge transfer efforts not slowing down in the near future (Finger, 2016; Hong & Vai, 2008; Soule, 2003). For teams – particularly ones that operate in a corporate setting – where performance measurement is practiced, monitoring and measuring learning efforts at the team level could be a valuable way to indicate VTL and team effectiveness. The VTLs can work with their organization's HRD or learning & development

professionals to determine how to implement the most appropriate measurements of their knowledge transfer efforts.

Provide effective learning technology. VTLs and the organizations they serve should provide effective technologies that enable communication on multiple levels. The technology should encompass the components of Bloom's Taxonomy (Bloom, Englehart, Furst, Hill & Krathwohl, 1956) for learning consisting of affective, cognitive, and psychomotor qualities to ensure that all learning can take place to its fullest. The types of technology capable to accommodate these qualities should be invested in by the organizations the VTLs support. There are many types of technology that the literature has noted (Bradley, 2008; Garrison & Anderson, 2003) that VTLs can take advantage of. Some are low cost solutions (Ebrahim et al., 2009). Furthermore, VTLs should be trained and comfortable in working with these types of technology tools in order to enhance their effectiveness in a learning environment. The VTLs should also ensure that their team members are trained and comfortable in using the various types of communication technology so they can take full advantage of the learning opportunity. In today's corporate world, tools such as e-mail and teleconferencing are taken for granted in communicating across time and space; however, advances in data sharing and video conferencing technology allow greater promise for not only sharing information but also active hands-on learning when conducting knowledge transfer exercises (Laughridge, 2012). VTLs should take advantage of whatever means are at their disposal and push their organizations for as much support as possible.

Recognize prior learning. As adult professionals, VTLs come to their role with a whole host of prior experiences. This is a similar condition as any adult learner entering a new learning situation (Jarvis, 1987; Merriam & Bierema, 2014). VTLs should embrace their current circumstance and look to apply what they have learned from their past experiences. Not all people are fully able to apply this concept of Learning Agility (DeRue, Ashford & Myers, 2012; Eichinger & Lombardo, 2004; Ungemah, 2014). VTLs that are not able to fully realize their prior experiences and where to apply them should look to establish coaching relationships with either peers or leaders in their organizations (Boyatzis, Smith & Van Oosten, 2011). Coaching can help unlock hidden experiences or unknown potential that an individual does not realize (Goldsmith, Lyons & McArthur, 2012; Landsberg, 2003; Thompson, 2006). The VTLs should also recognize that the members of their teams have some equally significant prior learning. VTLs should not be afraid to tap into that learning for the benefit of the team. Conducting some sort of skills assessment with their teams to determine a baseline level of knowledge, skills and abilities could be a worthwhile exercise.

Recommendations for HRD Professionals

There are two recommendations that were derived from the findings, analysis, interpretations and conclusions from this study that are specifically aimed at the HRD professionals. They center around assisting the VTLs in the recommendations offered above.

Act as a resource. Many of the recommendations offered above involve a component where the VTLs should reach out to subject matter experts knowledgeable in

a specific area. Many of these areas involve the HRD function. HRD professionals have knowledge and experience in the areas of personality assessments, learning measurement, coaching, and training technology. These are often areas where project managers in corporate organizations do not have the time or expertise to engage in. Members of the HRD function can either be receptive to inquiries from VTLs for assistance or proactive in reaching out VTLs around their team learning efforts. In this way they can position themselves to not only assist the VTLs but also make a direct connection to helping the company achieve its business objectives.

Create development programs. Another area where HRD professionals can assist is through creating programs that develop team learning skills and train VTL in the actions found in this research study around cultivating team learning. Such programs could be valuable for project leaders of virtual teams like the ones found in this study. These could also apply to other types of VTLs. Possible subject areas to cover could include:

- Virtual meeting facilitation techniques
- Leading virtual reflection sessions
- Relationship building in a virtual environment
- Conducting personality assessments using instruments like 360, DiSC, Myers-Briggs Type Indicator (MBTI), Hogan, or Social Styles (to name a few of the most popular)
- Learning program development – technology types and measurement
- Project management techniques in a virtual setting

Recommendations for Future Research

This study only looked at 13 VTLs and their teams in one large global financial services firm in the IT function. The VTLs were all located in the US but managed a globally dispersed team. The foremost recommendation for future research would be to expand the study to other corporations, other functions, and other VTLs located outside the US. What may work for the participants in this study may not work for others involved in a different circumstance. The research around virtual team learning is nascent at this point. More data from these other contexts will only add to the richness of the existing research. The use of virtual teams will only continue to expand and will be applied to multiple contexts outside the corporate realm. There is an opportunity to investigate these other realms as well as virtual team learning in general.

Additionally, this research study included teams that were primarily performing in the Synergistic learning mode. Perhaps different conclusions would have been derived from the study if the participating teams operated in the Pooled or Fragmented learning modes according to Dechant and Marsick's (1993) TLS. Future research could be aimed at comparing and contrasting the data between teams that performed in different learning modes to determine other types of actions used by VTLs to cultivate team learning. In addition to opening the research up to other contexts, the researcher has other ideas based on gaps in the literature and this study's findings that could be fruitful ventures for future research considerations. The literature shows that there is gap in conducting reflection in a virtual setting. Reflection is recognized as a powerful method of learning. It is critical to the fundamentals of Productive Reflection, Action Learning, and AARs (After Action Review) (Boud et al., 2006; O'Neil & Marsick, 1997; Revans, 1998; Yorks

et al., 1999). This study has shown that group reflection is possible in a virtual setting and does occur. More research is required to determine processes and techniques for effective reflection in this context.

There was also another gap in measuring team learning outcomes. Much of the research around team learning has focused around team learning conditions (inputs to team learning) and team learning processes (the process of learning). Scant attention has been paid to team learning outcomes (the output of learning). Many opinions have been offered on what team learning results look like. These include measures like team performance, affective-based satisfaction surveys, behavioral changes, and cognitive improvements. However, there is no agreed upon method to measure and assess what extent the team actually learned following a learning effort. Some of this is due to the way a team learns through both experiential and informal means. Regardless of the challenge, more research should occur in this area.

The research study did not seek to identify the leadership style used by the VTLs. Since leadership was seen a critical element to cultivating virtual team learning, some future research effort could be made to discern the leadership style practiced by a VTL. The specific style could then be correlated with the extent of team learning occurring and the actions practiced by the VTLs. Assessing learning styles for the learner is something already explored in the literature (Honey & Mumford, 2000; Kolb, 1984); however, there is little work done around learning styles in teams and the leadership style that a leader should employ to foster team learning (Schein, 2010). Perhaps utilizing a lens like House's (1971, 1996; House & Mitchell, 1974) Path-Goal Theory of leadership styles to interpret the VTLs actions in cultivating team learning could be of value. There could be

an opportunity to conduct research around leadership style and team learning. The VTLs could then make the most of the leadership style that they actively practice to have a positive impact on learning.

The VTLs in this study were each seen to embrace the use of technology as a method of communication and collaboration. They utilized multiple virtual communication tools to help enable learning. Future research could be directed towards how those types of technology tools are better utilized by VTLs to enable learning. The effective use of technology as a communication and collaboration tool is something that all VTLs should master (Bradley, 2008). However, leveraging the available technology effectively to promote learning is something that VTLs should strive for (Clark & Kwinn, 2007).

The scope of this study included global virtual teams. The VTLs and team members were comprised of people from different nationalities. While national culture was not something that was looked at in this study, the role of culture in global teams is not something that can be entirely ignored (Chang, 2013; Lincoln, 2011). Both Hofstede (2001) and Trompenaars and Hampden-Turner (1998) have studied the interplay between national cultures and organizational cultures. Future research could look to advance their work in studying the influence of the national culture in global teams and its impact on virtual team learning. Perhaps utilizing an instrument like Hofstede's (1994) Value Survey Module to evaluate the influence of national culture and compare it to the results of Dechant and Marsick's (1993) TLS could be a possible method to investigate the nexus of culture and team learning in a method originally conducted by Ndletyana (2005).

Recommendations for the Dechant, Marsick, and Kasl (1993) Team Learning Model

Overall, the researcher found the Dechant, Marsick, and Kasl (1993) team learning model sufficiently robust and flexible to use in this study. However, after the model was developed, there have been further research studies clarifying some of the learning variables that the model mentions in a broader sense as well as a new environment that teams have started to operate in (virtual versus face-to-face). Many of these items were reflected in the research data. Accordingly, the researcher offers some recommendations to consider for the model.

- **Leadership.** Call out the role of the leader in team learning more directly. The model refers to the leader in parts (particularly in the TLS), but it appears to be more concerned with how the individual team members interact with one-another. The present study showed the impact of the leader on learning throughout the model. Perhaps a stronger emphasis on what the team leader does to influence learning could be incorporated in each component of the model.

- **Technology.** Add technology as a variable when investigating Team Learning Conditions. The present study showed the value of utilizing communication technology so the team members could communicate with each other as well as store, access, and retrieve information. When looking at virtual teams, technology could be something to consider.

- **Psychological Safety.** Some of the concepts behind psychological safety are referred to in the model. However, this appears to occur in a broad sense. The present study reemphasized the significance of psychological safety in team learning. The model

could possibly describe this activity more explicitly in the Team Learning Conditions dimensions.

- **Outcomes.** The model could incorporate more variables that measure the outcome of team learning in a specific versus general way. This study identified affective, cognitive, and team performance measures as possible categories to measure learning. Adding more specific variables would supply the same level of robustness to the Team Learning Outcomes component as is contained in the Team Learning Conditions and Processes ones.

- **Informal Learning.** Informal learning was not explicitly mentioned as a foundation of the model by Dechant, Marsick, and Kasl (1993). However, there was strong evidence that informal learning was something actively practiced by the participants in this study. It was something that was supported in other research studies and prior writings by Marsick (Marsick, 1987, 2003; Marsick & Watkins, 1990, 2001). Informal learning could be added as another adult learning principle in how the model functions.

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Appendix A
Recruitment E-mail
Team Leader

To: Potential Subject (Team Leader)

From: Edward Pasquina

Date: TBD

Subject: Request for Participation in a Virtual Team Study

I am currently a doctoral student at Teachers College at Columbia University in New York City. I wish to invite you to participate in my dissertation research. My study looks to identify actions that team leaders of virtual teams take to cultivate team learning within the team. You were identified as a potential participant because of your current role in the organization. I am looking specifically at the challenges faced in leading a global, off-shore team that is involved in the applications development process. To be eligible, you must be someone that currently leads a dispersed team which was formed for this purpose. Additionally, the primary method the team meets and communicates must be through some type of virtual means (phone, e-mail, instant messaging, teleconference, or videoconference).

Your participation in this study is completely voluntary. There is no obligation to participate, and there will be no repercussions if you chose not to. Participation involves the following:

1. You complete a brief, on-line background questionnaire around the type of team you lead as well as information about your prior experience working on virtual teams.
2. You have an interview with me about 2 or 3 specific incidents in the last 6 – 12 months where you believe team learning occurred.
3. You allow me to send your team members an on-line survey to complete on team learning. As with your participation in this study, participation by your team members will be completely voluntary too.

As the researcher, I will be the only person that will have access to these pieces of information. Once I receive a signed copy of the attached consent form you will receive an e-mail with instructions for filling out the background questionnaire, a copy of the actual interview questions with an interview preparation worksheet to help you prepare for the interview, and a list of the team learning survey questions. Completing the background questionnaire and filling out the interview preparation worksheet should take 5 – 10 minutes.

The interview is designed to last no longer than 60 minutes. We will conduct it over the phone at a mutually agreeable time. Before we start the interview, I will ask your permission to record the conversation so I can create a transcript to use in analyzing your responses for the research. Your comments will be completely confidential; they will be

shared with no one at the company; and they will be used exclusively for research purposes.

If you elect to participate in the study, you have rights in accordance with Columbia University's research guidelines. The company has agreed to abide by them. These rights are namely that you can withdraw from the study at any time, any information you offer during the research process will be completely confidential, there will be no repercussions to you for participating in the research study, and you can contact the university at any time to discuss the research process.

Please let me know whether if you desire to participate in the study. If you are willing, I will send you a follow up e-mail with further instructions. Feel free to contact me if you have any other questions or need further clarification around any parts of the study.

Thank you,

Ed Pasquina

Appendix B

Solicitation E-mail
Team Members

To: Potential Subject (Team Member)

From: Edward Pasquina

Date: TBD

Subject: Request for Participation in a Virtual Team Study

I am currently a doctoral student at Teachers College at Columbia University in New York City. I wish to invite you to participate in my dissertation research. My study looks to identify actions that team leaders of virtual teams take to cultivate team learning within the team. I define “virtual” as the primary method where the team meets and communicates must be through some type of virtual means (phone, e-mail, instant messaging, teleconference, or videoconference). I am looking specifically at the challenges faced in leading a global, off-shore team that is involved in the applications development process.

You were identified as a potential participant because I have interviewed your team leader, XXXXX, and he/she noted that you are a member of his/her team. The team is specifically involved in XXXXXXXX. Participation involves taking an anonymous on-line survey about team learning (Team Learning Survey). Your participation in this study is completely voluntary. There is no obligation to participate, and there will be no repercussions if you chose not to. Below is a link to the actual survey questions:

[Link to TLS Questions](#)

The Team Learning Survey is an on-line survey that should take you 15 mins to complete. The survey helps to diagnose the type and conditions of team learning currently occurring within a team. It is seen as an important part of the study as a way to gain input from the team in a systematic and anonymous way.

As the researcher, I will be the only person that will have access to the results of the survey. The results will be combined with others on the team to create a view of how your team learns. If your team leader wishes to receive a copy of the results, I will show him/her how your team does. I will also make the results available to you if you request them.

Before I can send you a link to the survey, I must receive a signed copy of a research consent form. If you agree to participate, I will send you an e-mail with the form and instructions for filling out the survey. Again, your comments will be completely confidential; they will be shared with no one at the company; and they will be used exclusively for research purposes.

If you elect to participate in the study, you have rights in accordance with Columbia University’s research guidelines. The company has agreed to abide by them. These

rights are namely that you can withdraw from the study at any time, any information you offer during the research process will be completely confidential, there will be no repercussions to you for participating in the research study, and you can contact the university at any time to discuss the research process.

Please let me know whether you desire to participate in the study. If you are willing, I will send you a follow up e-mail with further instructions. Feel free to contact me if you have any other questions or need further clarification around any parts of the study.

Thank you,

Ed Pasquina

Appendix C

Follow Up Recruitment E-mail
Team Leader

To: Potential Subject (Team Leader)

From: Edward Pasquina

Date: TBD

Subject: Instructions for Participation in the Virtual Team Study

Thank you once again for agreeing to participate in my doctoral research study. As stated in the invitation e-mail, this study seeks to identify the actions that leaders of virtual teams take to cultivate team learning within the team. I specifically would like to look at the learning issues involved in leading global off-shore teams. Based on your current role and experience, I think that this study could be of interest to you and its results could be of some benefit.

Before we get started, I will need you to read and sign the attached informed consent form. This has information about the study as well as a detailed description of your rights as a participant in this research. Please print out a copy, sign it and send it to me via inter-office mail. Once you sign and send it, we can commence with the three components of the study: 1) the background questionnaire; 2) the critical incident interview; and 3) obtaining your permission to have the members of your team complete the on-line Team Learning Survey.

Link to Informed Consent

Below is a link to the on-line background questionnaire. It should only take you 5 – 10 minutes to complete. The questionnaire covers some basic information about your personal background, your experience with working with virtual teams, and some information around the virtual team that you lead. Your answers will be completely confidential and will only be used for research purposes.

Link to background questionnaire

We will need to schedule a mutually agreeable time between us for the interview. The interview should take 75 – 90 minutes. We will conduct it via telephone. Before the interview proceeds, I will ask your permission to record the conversation. This is only so I can create a transcript of our conversation that I can reference when analyzing the data. As with the answers to the pre-interview questionnaire, your comments will be completely confidential and will be used exclusively for research purposes.

In order to help prepare you for our interview, I'd like to provide you with some of the concepts I'm interested in discussing. One of the main ideas is team learning. There are a number of ways of describing the way teams might learn including the following 3 descriptions:

1. Learning is more on an individual basis where each person gains knowledge on his/her own. The person then uses this knowledge to complete his/her specific tasks related to the team project. The team generally has different skills and team members tend to stay in their specific area of expertise. Information is shared between team members, but it is typically to give updates on team project-related items.
2. Members of the team share information and perspectives in the interest of group efficiency and effectiveness. Small clusters of individuals learn together but there is not a communal sense of learning between the entire team where the team develops knowledge together and makes it its own
3. Members of the group create knowledge together and readily share information between each group member. The group actively experiments with new ways of doing things. Team members are willing to conduct duties outside of their areas of expertise.

Keeping these descriptions in mind, prior to our interview, I'd like to ask you to think back on your team's interactions over the past 6 – 12 months. I am interested in hearing 2 - 3 specific incidents that stand out in your mind where the team exhibited some of the characteristics described above. These could be examples of when you felt the team learned or when it might have missed an opportunity to learn. Think about when and where the interaction took place, who was involved (you can use roles and job designations rather than specific identities), and why this interaction fit the above descriptions.

Some examples of interactions might be:

- A situation where the group either stayed on its original course with solving an issue or ended up changing its definition of an issue.
- A situation where the group members shared their knowledge or insights with one another and this helped to create a new way solving a problem or may have missed an opportunity to do so.
- A situation where the group decided to test a new way of doing something or group members adopted different roles on the team or may have missed an opportunity to do so.
- A situation where the group invited someone from another area to help out in solving an issue or looked to other resources to obtain other information or may have missed an opportunity to do so.
- A situation where the group decided to split into smaller sub-groups to investigate a problem and then came back together to discuss the findings of the small groups.
- A situation where the group determined or sought out a best a best practice and then made that best practice a standard method of operating for the group.

When we meet, I will ask you to describe the interaction for me. I will then ask you some follow up questions around these situations to gain more detail around the actions taken. For your benefit I've created a worksheet that you can use to write your comments

down on 2 – 3 examples. I strongly encourage you to take advantage of this worksheet. This way we can maximize the time we'll have available.

Critical Incident Worksheet for CIQ Part I

Finally, I would like to receive your permission to have the members of your team take the Team Learning Survey. This is an on-line survey that should take the team member 10 – 15 mins to complete. The survey helps to diagnose the type and conditions of team learning currently occurring within a team. It is seen as an important part of the study as a way to gain input from the team in systematic and anonymous way. Similar to your participation in this study, participation for the team members will be completely voluntary. They will need to sign a consent form too. Their individual responses will be confidential and viewable only to me. The use will be strictly for research purposes. However, I am willing to share the aggregate team results of the survey with you and/or the rest of the team if you desire. Below is a link to the list of survey questions.

Team Learning Survey Questions

I appreciate that you are willing to participate in this study. I think it is a worthwhile topic and very appropriate to the situation many of us feel as a leader of a virtual team. As a reminder, your participation is completely voluntary. There will be no repercussions for you in either participating or withdrawing from the study.

If you have any further questions or concerns, please feel free to either call or send me an e-mail. I will immediately address any questions you may have. Please send me the consent form to my office location through intercompany mail as soon as possible. We will also need to coordinate a time and date for the interview.

Thanks, Ed

Appendix D
Follow Up Solicitation E-mail
Team Members

To: Potential Subject (Team Member)

From: Edward Pasquina

Date: TBD

Subject: Instructions for Participation in the Virtual Team Study

Thank you once again for agreeing to participate in my doctoral research study. As stated in the invitation e-mail, this study seeks to identify the actions that leaders of virtual teams take to cultivate team learning within the team. I specifically would like to look at the learning issues involved in leading global off-shore teams. Your participation involves taking an anonymous on-line survey. Based on your current role on a virtual team, I think that this study could be of interest to you and its results could be of some benefit.

Before taking the survey, I will need you to read and sign the attached informed consent form. This has information about the study as well as a detailed description of your rights as a participant in this research. Please print out a copy, sign it and send it to me via inter-office mail. Once you sign and send it you can take the survey. Below is a link to the Informed Consent form.

Link to Informed Consent

The Team Learning Survey helps to diagnose the type and conditions of team learning currently occurring within a team. When you take the survey, please respond from the perspective of being a team member of a virtual team led by XXXXXX that is tasked with performing XXXXXX. Your answers will be completely anonymous and confidential. They will only be used for research purposes. Below is a link to the survey. It should only take you 15 minutes to complete.

Link to TLS Survey

I appreciate that you are willing to participate in this study. I think it is a worthwhile topic and very appropriate to the situation many of us feel as a member of a virtual team. As a reminder, your participation is completely voluntary. There will be no repercussions for you in either participating or withdrawing from the study.

If you have any further questions or concerns, please feel free to either call or send me an e-mail. I will immediately address any questions you may have. Please send me the consent form to my office location through intercompany mail as soon as possible.

Thanks, Ed

Appendix E

Informed Consent and Participants Rights – Team Leader

TEACHERS COLLEGE

COLUMBIA UNIVERSITY

525 West 120th Street
 New York NY 10027
 (212) 678-3000
www.tc.edu

Informed Consent to Participate in Research Study

Principle Investigator: Edward Pasquina

Research Title: *Ways team leaders of virtual project teams cultivate team learning*

Research Description:

You are invited to participate in a study that seeks to understand the actions that team leaders of virtual teams take to cultivate team learning within the team. The study will focus on the experience of virtual teams working in an information technology (IT) project work capacity. Participants were selected based on their role in leading a virtual team. Teams were drawn from the applications development function in IT. The primary mode of communication for the team must be through virtual means (phone, e-mail, instant messaging, or teleconference).

The study contains three major components: a background questionnaire; an interview with the researcher; and having the team fill out an on-line survey on team learning in the team. Only the researcher will have access to the information. Once the researcher receives a signed copy of this consent form you will receive an e-mail with instructions for filling out the background questionnaire. The questionnaire will ask questions on the type of team you are on as well as information about your prior experience working on virtual teams. You will also receive a copy of the interview questions as well as a list of the team learning survey questions. This should take you 5 – 10 minutes to complete.

The interview will be scheduled at a mutually agreeable time between you and the researcher. It will last for 60 minutes and will be over the phone. The researcher will ask your permission to record the conversation so he can obtain a transcript for use in analyzing your responses for the research. Your comments will be completely confidential and be used exclusively for research purposes. There are no repercussions for you in either participating or electing not to participate in this research study.

To prepare for the interview you should think 2 or 3 specific incidents in the last 6 – 12 months where you believe team learning occurred. Instances of team learning could be, but are not limited to, times where the team shared important information, developed a new process, sought help from sources outside of the team, discussed the rationale behind an important decision impacting the team, implemented a best practice, or split into sub-groups to investigate a specific critical issue. The researcher will be looking for you to describe the instance and what the actions of the team leader were during these incidents. During the interview you will have further chances to ask questions and gain further clarification on team learning.

Risks and Benefits:

The risks of this study to you as a team leader would be similar to the risks involved if the organization chose to evaluate the work of your team in a similar way (i.e., concern about participation in the evaluation, concern about use of the data; concern with the results of the evaluation). The researcher has taken several

steps to minimize the potential risks. Since participation and responses to questions are completely voluntary, you do not have to disclose issues of concern and if you don't want certain responses taped, the recording will be stopped. All data collected will be confidential. Your direct responses will not be shared with anyone in your organization and will only be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University. The issues of team learning in a virtual environment are ones that could be of interest to you and your colleagues. I hope that the data generated from this study will help expand thinking in this area. Your participation could also further your own learning in this subject area.

Data Storage and Confidentiality:

All data generated will be stored on a laptop accessible only by the researcher. This laptop will remain under constant supervision of the researcher. All data collected will be completely confidential. The data will be coded in such a way as to disguise individual participation. Your direct responses will not be shared with anyone in your organization and will only be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University.

Time Involvement:

- Completion of background questionnaire: 5 – 10 minutes
- Participation in the interview: 60 minutes

How will the Results be Used:

Participation in this study is part of a dissertation to be submitted in partial fulfillment of requirements for the degree of Doctor of Education at Teachers College, Columbia University, New York, New York, USA. Your opinions may be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University, but under no circumstances will the participant be identified by name in any final product.

TEACHERS COLLEGE

COLUMBIA UNIVERSITY

525 West 120th Street
 New York NY 10027
 (212) 678-3000
www.tc.edu

Participant's Rights

Principle Investigator: Edward Pasquina

Research Title: *Ways team leaders of virtual project teams cultivate team learning*

- I have read and discussed the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study.
- My participation in research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to future employment or other entitlements.
- The researcher may withdraw me from the research at his professional discretion.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue to participate, the researcher will provide this information to me.
- Any information derived from the research project that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law.
- If at any time I have any questions regarding the research or my participation, I can contact the researcher, who will answer my questions. The researcher's phone number is (XXX) XXX-XXXX.
- If at any time I have comments, or concerns regarding the conduct of the research or questions about my rights as a research subject, I should contact the Teachers College, Columbia University Institutional Review Board /IRB. The phone number for the IRB is (212) 678-4105. Or, I can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY, 10027, Box 151.
- I should receive a copy of the Research Description and this Participant's Rights document.
- If video and/or audio recording is part of this research, I () consent to be audio recorded. I () do NOT consent to being audio recorded. The written and/or audio recorded materials will be viewed only by the principal investigator and members of the research team.
- Written and/or audio taped materials () may be viewed in an educational setting outside the research/ () may NOT be viewed in an educational setting outside the research.
- My signature means that I agree to participate in this study.

Participant's signature: _____ Date: ____/____/____

Name: _____

Appendix F

Informed Consent and Participants Rights – Team Members

TEACHERS COLLEGE

COLUMBIA UNIVERSITY

525 West 120th Street
New York NY 10027
(212) 678-3000
www.tc.edu

Informed Consent to Participate in Research Study

Principle Investigator: Edward Pasquina

Research Title: *Ways team leaders of virtual project teams cultivate team learning*

Research Description:

You are invited to participate in a study that seeks to understand the actions that team leaders of virtual teams take to cultivate team learning within the team. The study will focus on the experience of virtual teams working in an information technology (IT) project work capacity. Participants were selected based on their role in being part of a virtual team. Teams were drawn from the applications development function in IT. The primary mode of communication for the team must be through virtual means (phone, e-mail, instant messaging, or teleconference).

Participants of this study will be required to complete an anonymous on-line survey regarding team learning. The Team Learning Survey helps to diagnose the type and conditions of team learning currently occurring within a team. Only the researcher will have access to the information. Once the researcher receives a signed copy of this consent form you will receive an e-mail with instructions for completing the survey. The survey should take 15 minutes to complete. You should take the survey from the perspective of being a member of an off-shore applications development team.

Risks and Benefits:

The risks of this study to you as a team member would be similar to the risks involved if the organization chose to evaluate the work of your team in a similar way (i.e., concern about participation in the evaluation, concern about use of the data; concern with the results of the evaluation). The researcher has taken several steps to minimize the potential risks. Since participation and responses to questions are completely voluntary, you do not have to disclose issues of concern and if you don't want certain responses taped, the recording will be stopped. All data collected will be confidential. Your direct responses will not be shared with anyone in your organization and will only be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University. The issues of team learning in a virtual environment are ones that could be of

interest to you and your colleagues. I hope that the data generated from this study will help expand thinking in this area. Your participation could also further your own learning in this subject area.

Data Storage and Confidentiality:

All data generated will be stored on a laptop accessible only by the researcher. This laptop will remain under constant supervision of the researcher. All data collected will be completely confidential. The data will be coded in such a way as to disguise individual participation. Your direct responses will not be shared with anyone in your organization and will only be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University.

Time Involvement:

- Completion of Team Learning Survey: 15 minutes

How will the Results be Used:

Participation in this study is part of a dissertation to be submitted in partial fulfillment of requirements for the degree of Doctor of Education at Teachers College, Columbia University, New York, New York, USA. Your opinions may be utilized for this research study or other research-related usage authorized by Teachers College, Columbia University, but under no circumstances will the participant be identified by name in any final product.

TEACHERS COLLEGE

COLUMBIA UNIVERSITY

525 West 120th Street
 New York NY 10027
 (212) 678-3000
www.tc.edu

Participant's Rights

Principle Investigator: Edward Pasquina

Research Title: *Ways team leaders of virtual project teams cultivate team learning*

- I have read and discussed the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study.
- My participation in research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to future employment or other entitlements.
- The researcher may withdraw me from the research at his professional discretion.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue to participate, the researcher will provide this information to me.
- Any information derived from the research project that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law.
- If at any time I have any questions regarding the research or my participation, I can contact the researcher, who will answer my questions. The researcher's phone number is (XXX) XXX-XXXX.
- If at any time I have comments, or concerns regarding the conduct of the research or questions about my rights as a research subject, I should contact the Teachers College, Columbia University Institutional Review Board /IRB. The phone number for the IRB is (212) 678-4105. Or, I can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY, 10027, Box 151.
- I should receive a copy of the Research Description and this Participant's Rights document.
- If video and/or audio recording is part of this research, I () consent to be audio recorded. I () do NOT consent to being audio recorded. The written and/or audio recorded materials will be viewed only by the principal investigator and members of the research team.
- Written and/or audio taped materials () may be viewed in an educational setting outside the research/ () may NOT be viewed in an educational setting outside the research.
- My signature means that I agree to participate in this study.

Participant's signature: _____ Date: ____/____/____

Name: _____

Appendix G

Thank You Note – Team Leaders

To: Team Leader Interview Participant
From: Edward Pasquina
Date: TBD
Subject: Request for Participation in a Virtual Team Study

Thank you very much for participating in the research study around how leaders of virtual teams cultivate team learning with those teams. I really appreciate your time and effort.

I look forward to providing you with the a summary of the results and will be happy to talk through them once the research is completed. Please accept my sincere thanks for contributing to this research.

Please let me know if you have any further questions or concerns.

Regards,

Ed Pasquina

Appendix H

Background Questionnaire

Background Questionnaire – to be distributed prior to critical incident interview via automated survey tool (Qualtrics)

PERSONAL BACKGROUND

1. Name
(for initial identification purposes only – alpha-numeric identifier to be applied once data are compiled)
2. Amount of time working at the company? # years
3. Age? *Circle: 25 – 35; 36 – 45; 46 – 55; 55+*
4. Highest Degree Achieved? *Circle: HS; Some college; BS/BA; Some Masters; Masters; Masters +*
5. Other Professional Certifications? Please list
6. Approximate number of years working with virtual teams? # years
7. Approximate number of years leading virtual teams? # years
8. Have you received any training on leading virtual teams?
9. If so, please explain what type it was?

TEAM BACKGROUND

10. Please describe the function of team
11. Please describe the objective of the team
12. What is your role on team?
13. How many people are on the team?
14. How long has team been together? years &/or months
15. Please describe the physical dispersion of the team?
16. Please explain the extent and method of communication your team utilizes
17. Has the team ever met in a face-to-face manner? Y/N
18. If so, how many times and how often?

Appendix I
Critical Incident Protocol

PART I

Introductory Remarks (~5 mins)

Thanks for agreeing to speak with me. I am conducting research for my doctoral dissertation on virtual team learning. I am specifically interested in looking at in what ways leaders of virtual teams cultivate team learning in a virtual context. I will start by asking you about the team you currently lead – what it does, what is its purpose, and how it is composed? From there I will ask you to describe specific incidents that stand out in your mind with respect to team learning. This was part of the pre-work I sent you earlier. We will then discuss those incidents and what your actions were that supported leaning in the team.

I want to reiterate at the outset that your responses and comments made during this interview are for research purposes only. They will be completely confidential, so I would like you to be as open as possible. There will be no repercussions to you for your participation, and I am neither obligated nor plan to report back my individual findings to the organization's leaders. You should understand that this is not about your performance as the leader of the team. I am looking for ways that team leaders cultivate learning for the team and how they are influenced by operating in a virtual environment. I plan to take 60 minutes for this interview. Hopefully this is not a problem. Do you have any questions so far?

I will take notes as we speak, but I would like to record this interview so I have something to refer back to for my research. Before I do this I would first like your agreement to do so. I will create a transcript of the interview that will be used strictly for research purposes. If you want, I will share with you a copy of the transcript. The soft copy of the transcript will be stored on my personal computer and any hard copies will be kept in a locked drawer at my home office. Following the transcription of the recording it will be deleted.

I see this interview as a conversation and not a formal question and answer session. If you have not already done so I would ask you to sign the release form for this interview. This is part of the formal research process required by the university. Just to reiterate, it states that the information from this interview will be kept confidential, your participation is voluntary, and you may stop at any time. Do you have any questions?

Hopefully you had some time to review and complete the pre-interview materials I sent you. This included filling out the background questionnaire on the team and writing down 2 or 3 incidents of where you saw team learning occurring in the team over the past 6 to 12 months. Before we start I want to review with you on how I am defining some of the terms I will use for this research study. By “virtual context” I mean interaction between team members that occurs in a non-face-to-face manner. This covers e-mail,

IMing, conference calls, video conferencing, etc. By “team learning” I mean actions you and the team took to elicit some type of change in the way it operates to meet its performance objectives. This could include, but is not limited to, sharing important information between team members, developing a best practice, reaching out to another department for assistance, establishing ways that the team operates, or changing a previously held concept. Again, these are just some examples of team learning. Do you have any questions?

The first couple of questions cover who you are, what your team does, and what your role is on the team. They are a review of some of the questions included in the background questionnaire. I then will ask you about the 2 or 3 incidents you’ve identified for your team in the last 6 to 12 months. As you describe these incidents, I will ask you follow up questions on what your actions were during these incidents and how they may have been influenced by operating in a virtual environment.

Review of Selected Background Questionnaire Questions (~5 mins):

Questions	Potential Probes
1. Can you tell me a little bit about the function of your team?	<ul style="list-style-type: none"> • How long has the team been in existence? • Who is the main customer of the team? • How large is the team?
2. What is your role on the team?	<ul style="list-style-type: none"> • What are the other functions on the team? • Who are the other members of the team? • How do the different roles on the team get assigned?
3. How long have you been the leader of this team?	<ul style="list-style-type: none"> • What has been your level of interaction with the rest of the team? • What do you see as your major role on the team?
4. To what extent does your team operate as a virtual one?	<ul style="list-style-type: none"> • Have you ever met face-to-face? • What sort of mechanisms do you use to conduct team business? • How often do you get together as a team?

Critical Incident Questions (~45 mins)

Determining Specific Critical Incidents and Learning Process: (~5 mins):

Question
5. Now I want you to think back on your team’s interaction over the past 6 – 12 months. I am interested in hearing 2 - 3 specific incidents that stand out in your mind where the team exhibited some of the characteristics I described. These could be examples of when you felt the team learned well or when it might have missed an opportunity to learn. Think about when and where the interaction took place, who was involved (you can use roles and job descriptions rather than specific identities), and why this interaction fit the above descriptions.

6. Probes for clarity on the results: Can you tell me little about the incident and what the end result was or what might have been the missed opportunity? Did it include:

- Performance improvements?
- New approaches to work?
- New ways of thinking?
- New ways of managing?
- New work processes or procedures?
- Higher quality than what could have been produced alone?
- New ways that the group members related better between each other when working?

(Note if positive or negative incident)

Probes for clarity on leader actions:

I will now ask you about your actions during these incidents. When I am asking you these questions, I will also be looking for how the virtual environment may have either helped or hindered your or the team's actions during the incident.

PART II

Potential follow up probes/questions for each incident (~15 mins for each incident):

Potential Questions	Follow Up Probes
7. How were you able to make the team more open to new ways of thinking?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
8. How were you able to create an environment where the team could express its thoughts?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
9. How were you able to recognize team members for their accomplishments?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
10. How were you able to have the team help in defining the team's objective?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?

11. How were you able to create an environment where the team members were able to speak up?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
12. How were you able to balance getting tasks accomplished and building relationships amongst the team members?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
13. How did the group spend time gaining clarity around the team's purpose and structure?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
14. How has the team developed its beliefs, values and guiding principles?	<ul style="list-style-type: none"> • What was helping you or impeding you to do this? • How did the virtual environment impact your performance?
15. Is there anything I may have left out that you think is important around this incident?	Follow up probes around anything not covered in the questions above.

Soliciting Team Members for completing Team Learning Survey (3 mins)

Now that I have had a chance to speak with you, I would like the opportunity to get the input of the members of the team for the incidents that you described. I would like your permission to send the members of your team and anonymous on-line survey. I mentioned this to you in the follow up e-mail I sent after you agreed to be in the study. The survey is intended to give a voice to the members of the team and determine the extent of team learning they see occurring on the team. If you agree, I would need a list of names for the team members so I can send the survey link to. They would have the same right as you did to decline to participate and there should be no repercussions with participating. I plan to aggregate all the results for the team and incorporate them into my findings. I am willing to share your team's aggregate results with you if you so desire. I am unable to share individual responses. Do you have any questions? Are you willing to have your team participate? If yes, what are their names?

Interview Close Remarks (2 mins):

Thank you very much for your participation in this research. Once again your answers are strictly confidential. Once I review the recording and the transcripts, I may need to contact you if I have any questions or need clarification on any of your comments. Is this OK? If you think of anything else or have any questions, please feel free to contact me. Thank you.

Appendix J

Critical Incident Worksheet

In order to prepare for the interview on team learning, I have created this worksheet to help you organize your thoughts around 2 – 3 team learning incidents. Please remember that for purposes of this interview learning can be considered in one of the following three categories:

1. Learning is more on an individual basis where each person gains knowledge on his/her own. The person then uses this knowledge to complete his/her specific tasks related to the team project. The team generally has different skills and team members tend to stay in their specific area of expertise. Information is shared between team members, but it is typically to give updates on team project-related items.
2. Members of the team share information and perspectives in the interest of group efficiency and effectiveness. Small clusters of individuals learn together but there is not a communal sense of learning between the entire team where the team develops knowledge together and makes it its own
3. Members of the group create knowledge together and readily share information between each group member. The group actively experiments with new ways of doing things. Team members are willing to conduct duties outside of their areas of expertise.

With these in mind, think back on your team's interaction over the past 6 – 12 months. Please write down your thoughts on 2 - 3 specific incidents that stand out in your mind where the team exhibited some of the characteristics described above. These could be examples of when you felt the team learned well or when it might have missed an opportunity to learn. Think about when and where the interaction took place, who was involved (you can use roles and job descriptions rather than specific identities), and why this interaction fit the above descriptions.

You can select 2 – 3 of the examples below or something that is not on the list where you feel the team experienced some type of learning. Please fill in each example in the space provided and answer the questions associated with it listed in the worksheet.

- Performance improvements?
- New approaches to work?
- New ways of thinking?
- New ways of managing?
- New work processes or procedures?
- Higher quality than what could have been produced alone?

- New ways that the group members related better between each other when working?

INCIDENT 1:

Example (positive or negative):	
What was this interaction about?	
Where did the interaction take place?	
Who was involved?	
Why does this incident stand out for you?	

INCIDENT 2:

Example (positive or negative):	
What was this interaction about?	
Where did the interaction take place?	
Who was involved?	
Why does this incident stand out for you?	

INCIDENT 3:

Example (positive or negative):	
What was this interaction about?	
Where did the interaction take place?	
Who was involved?	
Why does this incident stand out for you?	

Appendix K

Team Learning Survey

Directions: Using the scale below, determine the extent to which you agree with each statement. Think about each statement in terms of your present experience with your team. Record all your responses on the Response Form.

Rating Scale

FA = Firmly Agree

MA = Moderately Agree

SA = Slightly Agree

N = Neither Agree nor Disagree

SD = Slightly Disagree

MD = Moderately Disagree

FD = Firmly Disagree

In our work team...

1. the end products of our work include performance improvements
2. members share the results of their personal insights or learning with one another
3. we often learn through trying out new behaviors
4. we build upon one another's ideas
5. members do *not* have the opportunity to define and develop the team's objectives
6. we find that we need to balance getting the task accomplished with building relationships among members
7. the end products of our work include new approaches to work
8. we learned to drop our departmental perspectives and think from an organization-wide perspective
9. we change our perspectives about ourselves and others
10. we try to understand one another's viewpoints
11. speaking one's mind is *not* valued
12. members take sufficient time to get to know each other before working on the task

13. the end products of our work include new ways of thinking
14. we often revise our viewpoints based on input or new information from others outside the team
15. members try out new approaches to their jobs as a result of the team's work
16. most members are open to new ideas or ways of thinking
17. people do *not* feel free to express their negative feelings about changes
18. we are developing beliefs, values, and guiding principles
19. the end products of our work include new social norms
20. the act of working collaboratively results in greater learning for each of us than if we had worked alone
21. we generally incorporate the perspectives of most members in analyzing problems and making decisions
22. we look at issues from multiple perspectives
23. we spend much time gaining clarity around our purpose and structure
24. the end products of our work include new ways of managing
25. we often find that our views of the problem change as a result of our team discussions
26. we invite people from outside the team to present information or have discussions with us
27. team effort is valued over individual achievement
28. we discuss our feelings as well as our thoughts
29. the end products of our work are of a much higher quality than any one of us could have produced alone
30. we listen to the perspectives of every member of the team
31. we generally revise our viewpoints based on input or new information from others outside our team
32. most members are able to express their thoughts clearly
33. the end products of our work include new work processes or procedures

34. members change their behavior as a result of seeing other team members change
35. we share what we learn from our team with others outside the team
36. we try to capitalize on each other's strengths and compensate for one another's weaknesses
37. we challenge our basic beliefs or assumptions about the issues under discussion
38. we increase our knowledge base by going outside of our team for information
39. members feel valued and appreciated by one another

Appendix L

Team Learning Survey Results

Team Learning Component	Composite Average Score	Composite Learning Level	Alex	Ben	Bob	Chuck	Donny	Doug	Grant	Matt	Nitesh	Pedro	Penny	Rob	Vinay
Team Learning Conditions															
Appreciation of Teamwork	42.77	F	+(F)	+(F)	-(F)	-(F)	-(F)	+(F)	-(F)	+(F)	+(F)	-(U)	+(F)	+(F)	+(F)
Individual Expression	15.61	F	+(F)	-(F)	+(F)	+(F)	-(N)	-(F)	+(F)	+(F)	-(F)	-(U)	+(F)	+(F)	+(F)
Operating Principles	24.07	F	+(F)	+(F)	-(F)	-(F)	-(F)	+(F)	-(F)	+(F)	+(F)	-(N)	+(F)	-(F)	+(F)
Team Learning Processes	85.68	S	+(S)	+(S)	+(S)	-(P)	-(S)	+(S)	+(S)	-(S)	+(S)	-(P)	+(S)	-(S)	+(S)
Framing/ Reframing	16.37		+	+	-	-	-	+	+	-	-	-	+	-	+
Crossing Boundaries	25.82		+	+	+	-	+	-	+	-	+	-	+	-	-
Experimenting	11.09		+	+	-	-	-	+	+	+	+	-	+	-	+
Integrating Perspectives	32.40		+	+	+	-	-	+	+	-	+	-	-	+	+
Team Learning Outcomes	35.95	F	+(F)	+(F)	-(F)	-(F)	-(F)	+(F)	-(F)	-(F)	-(F)	-(F)	-(F)	+(F)	-(F)

TLS Scoring Key

+	Specific team aggregate score is <i>above</i> the composite average score across all 13 teams
-	Specific team aggregate score is <i>below</i> the composite average score across all 13 teams

NOTE: Actual scores not reported in order to maintain confidentiality

TLS Ratings Terminology Key

Component	Code Key
Team Learning Conditions	F = Favorable N = Neutral U = Unfavorable
Team Learning Processes	S = Synergistic P = Pooled F = Fragmented
Team Learning Outcomes	F = Favorable N = Neutral U = Unfavorable

TLS Ratings Scoring KeyTeam Learning Processes

Synergistic	Pooled	Fragmented
112 - 81	80 - 69	68 - 16

Team Learning Conditions

	Favorable	Neutral	Unfavorable
Appreciation of Teamwork	56 - 40	40 - 34	34 - 8
Individual Expression	21 - 15	15 - 11	11 - 3
Operating Principles	35 - 20	20 - 14	14 - 5

Team Learning Outcomes

Favorable	Neutral	Unfavorable
49 - 32	32 - 24	24 - 7

Appendix M

Team Learning Survey Data Analysis

Item #	In our team... Item	Total # of Responses	Total # FD	Total # MD	Total # SD	Total # NA/D	Total # SA	Total # MA	Total # FA	Average Score (a)	Average Rating (b)	Standard Deviation (c)
1	The end products of our work include performance improvements	66	0	0	0	4	22	22	18	5.81	MA	0.90
2	Members share the results of their personal insights or learning with one another	66	0	1	2	0	9	29	25	6.07	MA	1.01
3	We often learn through trying out new behaviors	66	0	0	3	4	11	28	20	5.86	MA	1.05
4	We build upon one another's ideas	66	0	0	1	2	6	40	17	6.05	MA	0.78
5*	Members do not have the opportunity to define and develop the team's objectives	66	6	18	15	9	9	6	3	4.60	SA	1.64
6	We find that we need to balance getting the task accomplished with building relationships	66	0	0	9	3	23	22	9	5.28	SA	1.18
7	The end products of our work include new approaches to work	66	1	3	5	5	12	35	5	5.23	SA	1.34
8	We learned to drop our departmental perspectives and think from an organization-wide perspective	66	1	2	8	15	15	17	8	4.86	SA	1.40
9	We change our perspectives about ourselves and others	66	0	0	6	16	22	15	7	5.02	SA	1.12

Item #	In our team... Item	Total # of Responses	Total # FD	Total # MD	Total # SD	Total # NA/D	Total # SA	Total # MA	Total # FA	Average Score (a)	Average Rating (b)	Standard Deviation (c)
10	We try to understand one another's viewpoints	66	0	0	1	3	9	31	22	6.02	MA	0.89
11*	Speaking one's mind is not valued	65	22	15	14	0	8	3	3	5.33	SA	1.77
12	Members take sufficient time to get to know each other before working on the task	66	1	5	23	10	15	9	3	4.12	N	1.40
13	The end products of our work include new ways of thinking	66	0	3	8	10	23	16	6	4.89	SA	1.28
14	We often revise our viewpoints based on input or new information from others outside the team	66	0	0	1	8	23	25	9	5.49	SA	0.93
15	Members try out new approaches to their jobs as a result of the team's work	66	0	1	6	6	22	23	8	5.23	SA	1.16
16	Most members are open to new ideas or ways of thinking	66	0	3	12	3	1	27	20	2.07	MD	3.81
17*	People do not feel free to express their negative feelings about changes	66	17	17	12	11	3	1	5	5.67	MA	1.80
18	We are developing beliefs, values, and guiding principles	66	0	1	8	15	8	25	9	5.12	SA	1.32
19	The end products of our work include new social norms	66	1	5	12	20	12	11	5	4.33	N	1.42

Item #	In our team...	Total # of Responses	Total # FD	Total # MD	Total # SD	Total # NA/D	Total # SA	Total # MA	Total # FA	Average Score (a)	Average Ratings (b)	Standard Deviation (c)
20	The act of working collaboratively results in greater learning for each of us than if we had worked alone	66	0	0	3	0	8	23	32	6.23	MA	0.98
21	We generally incorporate the perspectives of most members in analyzing issues and making decisions	66	0	0	3	6	14	29	14	5.67	MA	1.05
22	We look at issues from multiple perspectives	66	0	1	0	5	13	23	24	5.95	MA	1.05
23	We spend much time gaining clarity around our purpose and structure	66	3	1	6	11	26	13	6	4.77	SA	1.38
24	The end products of our work include new ways of managing	66	1	2	4	20	22	14	3	4.72	SA	1.17
25	We often find that our views of the problem change as a result of our team discussions	66	0	1	4	6	17	34	4	5.35	SA	1.04
26	We invite people from outside the team to present information or have discussions with us	65	3	8	9	10	8	16	11	4.62	SA	1.82
27	Team effort is valued over individual achievement	66	1	2	5	3	8	28	19	5.67	MA	1.42
28	We discuss our feelings as well as our thoughts	66	0	5	13	6	23	9	10	4.79	SA	1.49
29	The end products of our work are of a much higher quality that any one of us could have produced alone	66	1	0	0	5	22	15	23	5.77	MA	1.15

Item #	Item	Total # of Responses	Total # FD	Total # MD	Total # SD	Total # NA/D	Total # SA	Total # MA	Total # FA	Average Score (a)	Average Rating (a)	Standard Deviation (a)
30	We listen to the perspectives of every member of the team	66	0	1	8	0	9	23	25	5.79	MA	1.35
31	We generally revise our viewpoints based on input or new information from others outside our team	66	1	3	4	9	24	19	6	4.98	SA	1.30
32	Most members are able to express their thoughts clearly	66	0	4	1	5	17	27	12	5.44	SA	1.26
33	The end products of our work include new work processes or procedures	66	0	3	4	6	22	25	6	5.19	SA	1.20
34	Members change their behavior as a result of seeing other team members change	66	1	1	9	17	17	13	8	4.72	SA	1.35
35	We share what we learn from our team with others outside the team	66	3	6	4	8	15	24	6	4.81	SA	1.62
36	We try to capitalize on each other's strengths and compensate for one another's weaknesses	66	0	1	3	3	13	28	18	5.77	MA	1.12
37	We challenge our basic beliefs or assumptions about the issues under discussion	66	0	3	1	7	10	32	13	5.53	MA	1.22
38	We increase our knowledge base by going outside of our team for information	65	3	3	1	0	23	18	17	5.43	SA	1.53
39	Members feel valued and appreciated by one another	66	1	2	1	0	15	29	18	5.79	MA	1.21

Table Key

* these items are scored using a reverse rating scale

(a) – **Average Score** is determined by aggregating all the scores across the item and dividing by the total number of responses.

(b) – **Average Rating** is determined by comparing the Average Score with the Rating Scale Range found below:

Rating	Rating Definition	Rating Value	Rating Scale Range
FA	Firmly Agree	7	7.0 – 6.51
MA	Moderately agree	6	6.50 – 5.51
SA	Slightly Agree	5	5.50 – 4.51
N	Neither Agree or Disagree	4	4.50 – 3.51
SD	Slightly Disagree	3	3.50 – 2.51
MD	Moderately Disagree	2	2.50 – 1.51
FD	Firmly Disagree	1	1.50 – 1.00

(c) – **Standard Deviation** reflects the amount of distance one standard deviation is from the mean (Average Score).

Appendix N

Coding Scheme Table

This table provides a high-level overview of the codes used in this research study. Initial codes were derived from the Literature Review and Conceptual Framework. Definitions were created that were subsequently tested for validity and reliability during the CIP instrument pilot process. Once the first research interviews were conducted, additional reliability testing occurred. The researcher used NVivo software for coding the CIP interview transcripts. NVivo does not have code designators, so the researcher created them for display purposes. Operational definitions for each code are included along with which coding cycle the code was generated.

TLC – Team Learning Conditions

Code	Code Title	Definition	1st Cycle	2nd Cycle
TLC-1	Appreciation of Teamwork	Includes the openness of team members to hearing considering others' ideas. It also reflects the degree to which members value paying a team role and the extent to which they act in ways that help the team build on the synergy of its members	X	
TLC-2	Operating Principles	The extent to which the team has organized itself for effective and efficient operation; how well the team has established a set of commonly held beliefs, values, purpose and structure; and how effectively the team has balanced working on tasks with building relationships within the group	X	
TLC-3	Individual Expression	The extent to which members have the opportunity to give their input in forming the team's mission and goals, influence the team's operation on an ongoing basis, as well as feel comfortable expressing their objections in team meetings.	X	
TLC-4	Psychological Safety	A shared belief in the team that they are safe for interpersonal risk taking characterized by an expectation to share experiences, risk free environment, no retaliation, openness new ideas		X

TLC – Team Learning Conditions (continued)

Code	Code Title	Definition	1st Cycle	2nd Cycle
TLC-5	Trust	The expectation that others will behave as expected. Good faith to meet commitments. Integrity and concern for well-being of others.	X	
TLC-6	Technology/ Communication Tools	The processes of transferring information, meaning and understanding between people through e-mail, data sharing sites, meetings, conference calls, Instant Messaging	X	
TLC-7	Organization/ Structure	How the group organizes itself for work. Assigned roles and responsibilities. Locations for conducting work. Skills required for work.		X
TLC-8	Goals	Designated mission for the group. Understanding of the role of the team and where it fit into business objections. Tasks assigned for the team to accomplish.		X

TLP – Team Learning Processes

Code	Code Title	Definition	1st Cycle	2nd Cycle
TLP-1	Framing/Reframing	The group’s initial perception of an issue, person or object based on past understanding and present input. Process of transforming initial perception into a new understanding or frame	X	
TLP-2	Experimentation	Iterative group approach taken to systematically test hypotheses or actions, or to discover and assess impact of new activities	X	
TLP-3	Crossing Boundaries	Going across physical, mental or organizational structures to seek or give information, views, and ideas through interaction with other individuals or units.	X	
TLP-4	Integrating Perspectives	Group members synthesize their divergent views such that apparent conflicts are resolved through dialectical thinking, not compromise or majority rule. The group acts on this altered judgement of a situation.	X	

TLP – Team Learning Processes (Continued)

Code	Code Title	Definition	1st Cycle	2nd Cycle
TLP-4	Collaboration	A group of individuals working together towards a common goal through sharing information and deciding on a course of action to achieve that goal.	X	
TLP-5	Facilitation	Designing and running a meeting between a collection of individuals with some sort of goal in mind.		X
TLP-6	Group Reflection	Group discussion around an event attempting to discern what went well and what when wrong. Attempt to discover any underlying causes of performance – organizational, behavioral, or structural.	X	
TLP-7	Individual Reflection	An individual stepping back to ponder the meaning of what has just transpired with an interaction between people or an event.		X

TLO – Team Learning Outcomes

Code	Code Title	Definition	1st Cycle	2nd Cycle
TLO-1	Team Learning Outcomes	An output of team learning that can be performance improvement; new or revised ways to work; new or revised norms; enhanced quality of output; or changed ways of thinking.	X	
TLO-1	Team Performance	Team products are acceptable to customers or meets some organizational standard for completion.	X	
TLO-2	Results/Artifacts	Documents or other articles that a group creates to codify what or how something is done.	X	
TLO-3	Cognitive Measures	An individual or group’s change in knowledge in how to do an activity.		X
TLO-4	Affective measures	A group’s emotional connection or satisfaction with the work being conducted		X
TLO-5	Central Data Repository	An accessible technology-enabled location (site) where data, artifacts or information can be stored which enables a group to perform its activities		X

EL – Experiential Learning

Code	Code Title	Definition	1st Cycle	2nd Cycle
EL-1	Experiential Learning	Utilizing prior experience on a group or individual level as the prime source and stimulus for learning.	X	
EL-2	Learning Agility	An individual quickly and knowingly applying past experiences to a current situation or circumstance. Can apply to how the person deals with people, tasks, change, or thinking.		X

IL – Informal Learning

Code	Code Title	Definition	1st Cycle	2nd Cycle
IL-1	Informal Learning	Acquisition of new skills, knowledge, understanding, or attitudes which people do on their own. Learning that is predominately unstructured, experiential and non-institutional. Can be characterized by discovery of new information, incidents of trial and error, and networking.	X	
IL-2	Self-directed Learning	When individuals take ownership of their own learning by diagnosing their knowledge gaps and formulating a learning plan to address those gaps.		X
IL-3	Incidental Learning	Learning that takes place through everyday experience, but the individual is not always conscious of it. Can be characterized by learning through mistakes, observing another’s behavior, release of control over situation, recognizing personal power over a situation.	X	
IL-4	Knowledge Sharing (Transfer)	Sharing or disseminating information (tacit or formal) to a person or group of individuals that will give the person or group the knowledge, skills, or abilities to conduct some course of action.		X