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The Impact of Unified Communications on Perceived Productivity Through Relationship Building in a Large Enterprise

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THE IMPACT OF UNIFIED COMMUNICATIONS ON PERCEIVED PRODUCTIVITY THROUGH RELATIONSHIP BUILDING IN A LARGE ENTERPRISE

A graduate project submitted to Dakota State University in partial fulfillment of the
requirements for the degree of

Doctorate of Science

in

Information Systems

March, 2014

By

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DISSERTATION APPROVAL FORM

This dissertation is approved as a credible and independent investigation by a candidate for the Doctor of Science in Information Systems degree and is acceptable for meeting the dissertation requirements for this degree. Acceptance of this dissertation does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department or university.

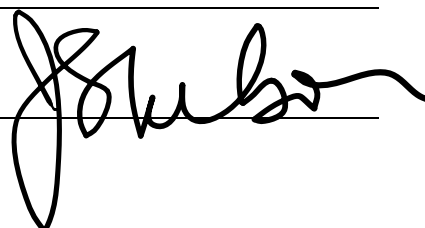
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ABSTRACT

Unified Communications (UC) is a combination of communication tools used to enhance the user experience and facilitate communications over several different mediums. UC is a collaborative technology that allows users to send instant messages, provide live video footage, and switch from instant messaging to live talk and conference real time with multiple users regardless of location. The ease of use of the tool provides support for collaboration and exhibits the potential to increase productivity for those working in teams that may cross various geographical regions. Through case study research at Hewlett Packard Company (HP) this research explores how the use of UC helps individuals create and build relationships with team members, and how such relationship building impacts perceived productivity. Interview data was analyzed from 30 participants within two organizational segments of HP. To validate findings from the interviews, email documents from within HP were also reviewed to determine if the impact expected and noted in the documents was consistent with the results of the case study. These results suggest that the use of UC tools has a direct impact on relationship building in both virtual and co-located teams where employees work in the same physical office space. UC provides an ease of communication therefore motivating more communication, and because of their enhanced relationships, users feel more productive. The contributions of this study will allow organizations to make better decisions regarding their investments in efficient communication technologies and gain a better understanding of the importance of interpersonal relationships within a global environment.

DECLARATION

I hereby certify that this project constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

I declare that the project describes original work that has not previously been presented for the award of any other degree of any institution.

Signed,

A handwritten signature in cursive script, appearing to read "Joy Fluker", written in black ink.

Joy Fluker

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CHAPTER 1

INTRODUCTION

UC Defined

Unified Communications (UC) includes many communication features and has been known by several names through its evolution including Unified Messaging (UM) and in some cases Instant Messaging (IM). The newer incarnations are called UC because the additional functionality that they offer, integrates instant messaging with the features included in unified messaging. The UM feature of UC incorporates synchronous messaging other than telephone calls and includes instant messaging (Hulme, 2003). Evans (2004) states that unified communications is the merging of multiple message types, across multiple communication points, with emphasis on presence management and collaboration.

UC Market

Infiniti Research is a global customized market intelligence firm with offices in the US, Canada, the UK, India and China. They have experience in conducting research projects serving 120+ global clients including 35 Fortune 500 companies. Infiniti Research released a report projecting that the UC market was set to grow at a compound annual rate of 4.2 % over the next few years until 2016 (Infiniti Research, 2013 and Companies and Markets, 2013). IDG Enterprises, a media company comprised of CFO world, CIO, CIO Executive Council, Computerworld, CSO, DEMO, InfoWorld, IT World and Network World, conducted a survey in 2012 that included more than 1,100 participants who were IT and business decision makers. Results of their survey indicated that 90% of those surveyed reported plans to invest in UC in 2013 and 74% were accelerating their investment plans in UC. The study findings

also indicated that UC increased productivity at a rate of 61%. Flexibility for employees increased at a rate of 42% and the ability to have faster response times and delivery of information at a rate of 39%. These were the top drivers for implementing UC solutions (IDG Enterprise, 2012). A study conducted by IDC, a premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets predicts, that the European, Middle East and African UC market will also grow over the next three years reaching \$11.7 billion by 2016 (IDC, 2013).

Purpose of the Research

Previous studies have looked at the elements of productivity and cost effectiveness of UC. However, these studies fall short of looking at how relationship building plays a key role in productivity when utilizing this technology (Hill, Yates, Jones, & Kogan, 2006). This study defines the integrated technologies of UC and investigates how relationship building facilitated through UC might play a fundamental role in increasing perceived productivity. As part of this study, the dissertation looks at the roots of UC technology which were founded in Instant Messaging (IM or chat).

This study is based on feedback received from voluntary participants in the Global Telecom organizational segment and participants from Global Real Estate IT MADO organizational segment at Hewlett Packard Company, a company which has been reported by senior leadership as being the largest enterprise to roll out full Unified Communications implemented via Microsoft Office Lync. Interviews were conducted with these participants to determine their use of UC and how it has impacted their ability to build relationships with team members. In addition, this study looks at how the use of UC has impacted their

perception of their ability to be productive. There are several technologies that offer UC features, such as Cisco Jabber, Yahoo Chat, Google Voice, and others; however the results of this study are not based on the tool or product chosen for use but on the functionality which is provided in most, if not all, forms of tools that are considered UC. Though it varies from system to system, a common set of functionalities is shared among most UC providers. The basic building block of these tools is a centralized place where users go for all their messages. There are minor to major differences which occur depending on the level of sophistication of the system and requirements of the company in which they are implemented. However, in all cases, these systems must be able to support a set of data conversions between text and sound files (Andrews, 2001). Research has shown that businesses recognize the need to bring together all communication and collaboration channels such as phone, video, chat and email, ensuring streamlined interactions with colleagues, customers, suppliers and partners. The UC market therefore should not be underestimated because its impacts are being felt on a global scale allowing people throughout the world to be more connected than ever before (Cross, 2012).

Significance and Potential Contributions

UC is a Computer Mediated Communication (CMC) tool. Tools such as UC make it easy for geographically dispersed group members to perform teamwork remotely and be productive (Wang & Russell, 2009). Weihua (2011) notes that some of the top benefits offered to users of UC are reduced delays in decision making creating speedier workflows, convenience of knowledge and information transfer, support to strengthen relationships with peers across countries and time zones, and the provision of real-time accessibility to other people. Therefore, UC is not just about technical capabilities, but about providing the ability

for people to be more productive no matter where they are physically located. Noting the benefits of UC, however, does not address how the technological support for real-time communications contributes to relationship building or impacts productivity. Due to the growing market trend of UC and reports espousing the benefits of UC, developing an understanding of the essence of these benefits is needed.

The goal of this dissertation is to examine how interpersonal relationships created through the use of UC impact perceived productivity. Research has shown that the technology itself has increased productivity but it has not addressed reasons for this (Pleasant & Jamison, 2008b). This study explores the possibility that the major reason attributed to increased productivity when UC is introduced into an organization is that the technology allows team members and those external to the organization, including those across regional borders, to communicate better and more easily which facilitates their ability to build interpersonal relationships.

In addition, this study contributes to the ability to enhance relationship building through the use of UC. Features of UC such as IM, video chat, and conferencing can be used to build those relationships when face-to-face interaction is not possible. UC can be utilized in almost any environment; for example, in the healthcare field to build doctor patient relationships when it is not possible for a patient to come into the office. The use of these tools should not replace face-to-face interactions but should be considered an added feature or alternative that supports an efficient flow of communication.

The revenue producing opportunities provided by the use of UC is causing organizations to investigate why this new collaborative way of working is proving to be so compelling (Cross, 2012). This study contributes to that investigation by examining whether

UC technologies facilitate relationship building among team members, which in turn, allows them to work more cooperatively as a team as well as in one-to-one situations. Ultimately, better working relationships lead to higher job satisfaction and increased productivity.

Establishing a personal relationship with associates and colleagues creates a more positive work environment than working with associates with whom one has no connection. Strong team member relationships can also encourage more collaboration. Collaboration is a key driver for business performance, innovation, and productivity (Kristensen & Kijil, 2010).

Understanding the impacts on productivity that relationships have on team members will help to guide organizations as they assess what technologies and features can be leveraged to enhance relationship building. Therefore, the purpose of this study is to determine if UC impacts relationship building, which in turn, improves perceived productivity. The questions addressed in this study include the following: *How do users perceive UC impacts productivity? Does UC affect relationship building among team members, and does this lead to an increase in perceived productivity?*

Organization of the Dissertation

This dissertation provides a literature review including the history of UC, as it began as separate communication tools, and reviews the definitions of UC as it stands today. It will then cover research on how UC has impacted productivity and how it has impacted relationship, but it will also show that prior research does not examine the impact of UC on perceived productivity through the relationships that it helps to build. It will also review the use and need for UC in virtual and globally dispersed teams and how the same technology can also be applied in co-located office settings. Chapter three develops a theoretical framework proposing that UC facilitates relationship building ultimately increasing perceived

productivity. Chapter four describes the research model and design which utilizes qualitative research employing interviews and reviews of supporting documentation. A description of the research site, data collection and analysis is also provided. Chapter five presents research findings and interpretation. Chapter six includes a discussion of the findings, a conclusion and an identification of the contribution of this study to the discipline.

CHAPTER 2

LITERATURE REVIEW

History of UC

UC is considered by many to be a new technology that has evolved over time as various communication technologies became available and added to a single base platform. The roots of UC began with communication technologies such as Instant Messaging (IM, or chat).

Unlike the quantity of studies available related to Unified Communications, there is plenty of research regarding instant messaging. IM is a key, underlying, feature of UC. Prior to the additional features that were incorporated into UC, collaborative communication tools were better known as Unified Messaging. The UM interface is a set of valid communications options that includes text messaging, email, and IM based on the current service capabilities of a selected contact (Banner, 2010).

Instant messaging was first introduced in 1996 with ICQ software by Mirabilis. ICQ works in the following way, “Upon registering with ICQ, the user is given a universal internet number, UIN, which allows the individual to be uniquely identified upon log-in” (Lancaster, Yen, Huang, & Hung, 2007, p 6). The technology was quickly adopted specifically by the younger generation as a communication method and its popularity has continued to grow making its way into the work place and becoming widely used by experienced professionals and what some call the ‘baby boomer’ generation (Lancaster, et. al., 2007).

Although IM did bridge itself into the workplace, there was a time that some felt that IM use at work was purely social; however research has shown that that IM can be used for business purposes, including solving mutual knowledge problems and other collaborative activities as it provides a channel for sharing, transferring and documenting knowledge (Ou,

Davison, Zhong, & Li, 2010). Instant messaging has been defined as a tool that allows for near-synchronous computer based one-on-one communication. IM applications include history-keeping, file transfer, real time video and audio chatting, offline messaging, e-mails, appearance status, pop up notifications, and buddy lists.

UC Business Benefits

There are several explanations of what constitutes UC. According to Blair Pleasant and Nancy Jamison of UCStrategies.com, Unified Communications consist of integrating communication methodologies including, but not limited to, voice messaging, video, and chat (Pleasant & Jamison, 2008b). It also introduces new ways of working such as the ability to determine if someone is available before calling them or sending them an instant message. Pleasant and Jamison identify the UC solutions and benefits that focus on the end user and end user productivity as UC-U (2008b). These tools have been proven to provide improved productivity and collaboration. The International Data Corporation (IDC) conducted a study on this technology as well. IDC is a global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals make fact-based decisions on technology purchases and business strategy. In a study conducted by Mahowald and Perry on behalf of IDC, customers who used the enterprise instant messaging features of Microsoft Office Communicator for a period of 12 to 36 months saved an average of 1.7 hours per month by using quick IM chats instead of waiting for email and telephony responses. Enterprise instant messaging accelerated file sharing and document collaboration and request approvals. It provided the ability to answer customer inquiries more quickly. Customers also reported lowering project completion time by as much as 13%. The study also noted that greater efficiencies enabled

these companies to move an average of 2.1 support staff to other projects, saving them \$2,860 per 100 users per year. In addition, service desk operations experienced a 9% monthly reduction in the number of trouble tickets as well as a 43% reduction in average call time (Mahowald & Perry, 2010).

UC is used for various purposes within an organization such as for call screening, forwarding calls to another number, on-screen directory dialing, and full control of phone features all facilitated from a Graphical User Interface (GUI) on a PC screen. Other uses include allowing mobile workers, regardless of their location, to have the same communication tools as when they are in the office, team collaboration by providing workers the ability to work together as a virtual team through audio/video/web conferencing, file sharing, application sharing, and other collaboration tools that support an efficient virtual team environment (Pleasant & Jamison, 2008a). Hulme (2003) noted that unified messaging, the legacy form of UC, attempts to make all messages types, regardless of origination, available using one interface. This functionality increases individual productivity as it allows users to remain up-to-date and in touch with other team members (Hulme, 2003). In the businesses environment, one of its most appealing features is the current status tracker. Unlike the delayed, asynchronous nature of e-mail, the current online status or presence of intended recipients is displayed and allows for immediate response if the individual is available (Glass & Li, 2010). This UC feature allows those who may be in a different area or location to know if a team member or colleague they are trying to reach is available, on a call, off work, or does not want to be disturbed.

Unified Communications is considered by some as a vision versus a product as it focuses on providing users with an environment for maximum communication flexibility. This environment includes all aspects of what was once considered unified messaging but with the benefit of real-time call control, accessibility by multiple devices, and benefits targeted at a variety of markets (Evans, 2004).

UC and Productivity

When trying to determine the impact on perceived productivity, one must first look at what is truly considered being productive. Measuring productivity in a large organization can be challenging as there are typically several business units offering various types of services. Each service department might measure productivity differently (Jääskeläinen & Uusi-Rauva, 2011).

In his study of productivity, Attaay (2006) analyzes labor productivity levels as a proxy to organizational performance rather than using financial measures. In the same manner, this study builds upon Attaay's research in that it examines how productivity is impacted through the use of UC at an IT department at Hewlett Packard. Rather than focusing solely on financial measures as a measure of productivity, areas explored include improved management capability, collaboration ability, and the ability to complete tasks more timely and efficiently. Therefore, for the purposes of this dissertation, productivity is examined and measured based on its qualitative results rather than on quantitative measures. The analysis of interview responses is used to determine how users of UC perceive their productivity has been impacted as a result of using these tools.

Productivity measurement and management is noted as essential for improvement in a company's management process. Further, research suggests that productivity and quality are needed for sustainable growth and competitiveness (Kongkiti, Anussornnitisarn, Sujitwanit, & Kess, 2009). It can be very difficult to measure IT and its impact on productivity, but there is a substantial amount of research and evidence that suggest that IT has played an important role in increasing productivity (Stiroh, 2002). Much research has been conducted that examines productivity based on Return On Investment (ROI). However, in terms of information technology resources, it is often the case that a strong argument must be articulated before management realizes the potential productivity enhancing benefits of IT applications (King, 2007). Research conducted by Tambe and Hitt (2012) suggests that the information technology return on investment can be substantially lower in midsize firms versus larger Fortune 500 firms. This is because in some cases the investment tends to materialize more slowly in smaller firms. The research of Tambe and Hitt (2012) also complements other research that state that the long-term effects of information technology investments are greater than the short-term effects mainly because of the learning periods that are required to reap the benefits from the information investments (Kunsoo, Young, & Jungpil, 2010).

User acceptance of technology is a prerequisite to its success. UC will only impact productivity if used. "Extensive research supports the notion that usefulness and ease of use are primary drivers of user intentions to adopt new technology" (Brown, Massey, Montoya-Weiss, & Burkman, 2002, p 283). Davis, Bagozzie & Warshaw (1989) note that one of the key barriers to technology acceptance is the lack of user friendliness; therefore, the friendlier the interface the more acceptance will be realized. In addition, for an IT resource to achieve

full acceptance, the system must not only be user friendly and easy to use, it also should appear as useful and serve a purpose for the user. For users to see the full benefit of the technology and understand its purpose and usefulness, training is required. When rolling out new technology training is crucial to the success of technological investments (Al-Gahtani, 2004). Research has shown that productivity can be increased by better enabling users to select and integrate IT services as their needs evolve (Hill, et. al., 2006). The exchange of knowledge between individuals and enterprises is accomplished by knowledge-sharing technology such as that promoted by instant messaging communication tools. In order to keep pace with the demands of the changing knowledge economy, organizations must be aware of the knowledge sharing tools that are in use today. Tools such as UC allow organizations to customize the technology, which in turn, helps them maintain a competitive advantage in the global marketplace. Benefits of these tools can be measured in terms of increased productivity (Hedgebeth, 2007). Belief in these benefits, which include speed and accessibility, has informed and fueled the evolution of various UC technologies. Scenarios advertised such as saved deals, nick-of-time solutions, and prevention of costly errors through rapid, real-time access to clients, and suppliers, are used to sell UC technologies implying a promise of increased productivity and a competitive edge (Rennecker & Godwin, 2003). Studies have also been conducted to assess possible impacts or reduced productivity that might occur as a result of using UC technologies. One study investigated whether interruptions caused, at times, by the chat feature of UC increased the level of perceived complexity of the task at hand. The study found that the interruptions had no significant impact (Li., Gupta, Luo, & Warkentin, 2011). Other studies have stated that when using messaging features, the messaging must solve more problems than it creates to compensate for any additional burden

that might arise by messaging interruptions (Schmandt, Marmasse, & Sawhney, 2000). The IM feature of UC supports multi-tasking as multiple windows can be opened at the same time or can be opened and responded to during a live-voice conversation. Studies have shown that multi-tasking does have an impact on the ability to be productive. These studies have also shown that the ability to share knowledge through information technology tools such as IM can improve performance (Sinan, Erik, & Marshall, 2012). For instance, emails are often sent without knowing the availability of a recipient or when they can reply, but with tools such as IM and other features of UC, presence of the recipient is provided making the interaction more worthwhile, and in many cases, value is added in knowing that the recipient is online (Bhagyavati, 2005)

Research conducted by Isaacs, Walendowski, Whittaker, Schiano, and Kamm, (2002) states that the UC feature of IM supports a broad range of uses including both single-purpose interactions and complex work activities. After logging thousands of workplace instant messages, they determined that the primary use of workplace IM was for complex work discussions and only 28% of conversations were simple, single-purpose interactions. Only 31% of IMs were about scheduling or coordination (Isaacs, et. al., 2002) Although there are many pros noted there are risks associated with the usage of tools such as IM that have multitasking capabilities. One risk is user perception of overload. As noted by Stephens (2008), the increased usage of IM can enhance productivity but it can also lead to overload perceptions for the user, create additional cost, cause user interruptions, such as sending chats while trying to finish other tasks, or attempting to multi-task with too many windows open. There is also risk associated with messages that are sent that do not consider user or cultural differences. These concerns and risks are more prevalent in single form platforms that can, in

some cases, also diminish message quality and productivity. However, when combining chat with other information communication technologies such as voice, presence, video, and other features provided by UC, many of these concerns are diminished and there is a noted increase in productivity (Stephens, 2008).

UC and Relationships

When looking at the impact that UC has on relationships it can be noted that previous research has shown that collective intelligence is considered a primary factor in the ability of group members to work together effectively. Groups whose members have higher levels of social sensitivity show more collective intelligence, meaning they are better able to recognize and respond to social cues from their group members and better able to treat each group member equally. Further, research on effective groups has shown that diversity is another key factor to consider. Gender diversity, for example, is one key factor because some studies have shown that women score higher in social sensitivity (Gwynne, 2012). In 1993, a study was undertaken in the UK to determine why some teams were more effective than others. Teams were selected from five different types of business groups in a multinational company. The results of this study indicated that members of the more effective teams had more interpersonal and nonthreatening types of participation when making decisions (Kellett, 1993). Siakas and Siakas (2008) suggested that in working with diverse groups, trust is a key factor that can be gained through improved communication. Improved communication resulted in enhanced capabilities allowing the group to solve problems and make decisions as well as resulted in improved efficiency and quality. Prior research has reviewed some of the impacts of the use of communication tools such as those offered by UC on college students and has reported that both email and instant messaging are popular communication

technologies on college campuses. Students use these technologies to trade messages with friends, keep in touch over distance, communicate on projects, and exchange new ideas (Lancaster, Yen, & Huang, 2007) This, too, can be applied when working with diverse teams within a corporate environment. “Building working relationships entails a high level of uncertainty in the process of negotiating work expectations and understanding social behaviors and contexts among the people involved” (Cho, Trier, & Kim, 2005, p. 6). Both formal and informal sources of information help set expectations about team members such as role responsibility or even about a colleague or team members’ personality and behavior (Cho, Trier, & Kim, 2005).

Dillon and Montano (2005) identified variables that influence relationships as driven by two sets of performance and human factors. Specifically they cite that “... performance factors emphasize the *technologies* employed for communication among the levels of the organization, and the human factors emphasize the *people* involved in communication among the levels of the organization” (p. 232). They further categorize human factors as either “Unifying” or “Distinguishing” to capture the range of human factors that might impact various types of relationships. Unifying refers to how individuals relate to their groups or the organization as a result of consistency, or sameness, across the organization whereas distinguishing is based on the individuality of the individual, group, and organization. The results of the research conducted by Dillon and Montano (2005) show that technology that facilitates easy communications among individuals strengthens their feelings toward the organization and groups to which they belong; individuals feel these stronger ties as more people use the same technology; and technologies that facilitate constant communications and

information linkages promote strong, positive relationships between the individual, the organization, and group.

Dillon and Montano (2005) identify several performance and human factors that affect relationships. Many of these factors can be mapped directly to features of UC. When mapping the factors provided by Dillon and Montano (2005) to UC, it appears that many UC attributes may be considered applicable by UC users, such as convenience, which is the ability to make communication easier and require less effort. UC provides the ability for users to go from instant messaging to a voice call by just clicking an option on a computer screen rather than having to dial a number. It can also help users obtain information as it enables the ability to chat through instant messaging, engage in a voice call, 'drag' another person into the call who might have additional information, provide presence information so that others are informed of the status of people that they may need to communicate with and provide knowledge as to whether a person is in a meeting, on a conference call, online, or away from their desk.

When looking at the Unifying Human Factors as depicted by Dillon and Montano (2005), connection, the ability to feel connected to one's group, may also be considered as applicable to UC. For example, when a user highlights a name, the user can automatically determine what organizational unit the other user belongs to by highlighting the profile option on the tool. Users can also create team groups or setup a 'hunt group' where all phones ring at the same time for all members of a specific group allowing any group member to answer the call. Organizations may customize specific group settings or enable features based on a group's role and responsibility within the organization. In regards to membership, UC prompts individuals to feel a sense of belonging to their group and to the organization in

many ways. The tool allows for the setup of restrictive group meetings, the ability to provide team only access to one's calendar information and allows individuals to be invited to private group discussions. For the Unifying Factor, entitlement, where users may feel they have a right to something because of their relationship to a group or to the organization, can be facilitated when certain features of UC are rolled out to a specific group or organization based on their role within the organization.

The Distinguishing Human Factors can also be applied where it looks at how an individual can feel important or unique based on their role and responsibility. For example, differentiation, the degree to which technologies enable individuals to be recognized as important and treated as unique, might be considered as a form of UC. Users of UC can be identified by name and job title when selecting them for communication. Through UC, users can use the emoticons such as a smiley face, a cup of coffee, a beer glass, etc. to share their personalities if they so choose. Customization might be considered as a factor of UC as well. Customization, as defined by Dillon and Montano (2005), is the degree to which technologies are tailored to the needs of the organization. As noted, organizations may choose which features of UC would benefit various teams and customize as needed. Dillon and Montano's factors of relationships are depicted in Table 1.

Table 1. Factors influencing relationships (Dillon and Montano, 2005)

Factor	Definition
Convenience	The degree to which technology makes communication easier, requiring less effort.
Informativeness	The degree to which technology is capable of providing the desired information.
Relevancy	The degree to which the technology is pertinent to the relationships.
Factor	Definition
Connection	The degree to which a technology causes individuals to feel linked to groups or the organization.
Membership	The degree to which technology prompts individuals to feel a part of their groups and the organization. This differs from connection in that the membership focuses
Entitlement	The degree to which individuals feel they have a right to something because of their relationship to a group or to the organization.
Factor	Definition
Differentiation	The degree to which technologies enable individuals to be recognized as important and treated as unique.
Customization	The degree to which technologies are tailored to the needs of the organization

Research conducted by McMullen (2003) investigates the role of technology in regards to facilitating human relationships. McQuillen (2003) noted that computer mediated communication was beginning to replace face-to-face interaction. This can be especially noted in global environments where relationships are not always initiated face-to-face but with projected images the users share on-line. Several types of ongoing relationships, in and between organizations, occur among people who may never meet face-to-face (George &

Sleeth, 2000). Another study examined the impact of instant messaging on the interpersonal relationships of Taiwanese adolescents and determined that during the initial relationship development period, IM was used in forming and maintaining individual friendships and for joining peer groups, but it also became a standard communication device during the later period of interpersonal relationship development. (Lee & Sun, 2009). Research conducted by Lowry, Cao, & Everard (2011) stated that IM and email are among technologies that are frequently used for self-disclosure. Both IM and email are features of UC. Lowry, et. al. (2011) proposed a theory of reasoned action, as shown in Figure 1, that suggests that behavioral intention to use self-disclosure technology positively predicts the use of self-disclosure technology, (P1), and a positive attitude toward self-disclosure technology positively predicts behavioral intention to use self-disclosure technology, (P2). Self-disclosure behavior is generally considered positive and beneficial in interpersonal communication and relationships (Lowry, et. al., 2011).



Figure 1. Basic Adaptation of Theory of Reasoned Action as Proposed by Lowry, Cao, & Everard, 2011

Prior research has determined that having a good work relationship among team members is the foundation of how most work is completed and goals are accomplished (Ferris, Linden, Munyon, Summers, Basik, & Buckley, 2009). Developing personal relationships with team members is therefore a very important factor among team members in both co-located and virtual environments. However, when using technology to complete

tasks, some electronic communication channels are more effective than others in building relationships (Pauleen & Pak, 2001). As noted in the research of Lowry, et. al. (2011) the way the user feels about the technology and their intentional purpose for use, will play a role in how effective the technology will be in facilitating relationship building between team members.

Virtual Teams and UC

With the new technology-enabled organizational tools, such as UC, organizations are increasingly relying on virtual teams to accomplish organizational objectives (Carte, Chidambaram, & Becker, 2006). Dube and Pare (2001) state, “It is widely recognized that collaborative technologies provide powerful support in making global virtual teams a reality” (p. 72).

As features of UC have been integrated into the workplace, global and virtual teams tend to rely on this form of communication in order to synchronously and asynchronously interact with teammates who may be located in other parts of the world. Virtual project teams are groups of people working together toward a common goal. In some cases they are called distributed groups or teams, but in any case, the team members are not co-located and may reside in different cities, states or countries (Reed & Knight, 2009).

Good working relationships and the ability to be productive are equally important for virtual teams as they are for those who are co-located in the same office building (Chang, Chuang, & Chao, 2011). The results of a study conducted by Lin, Standing, and Liu (2008) indicate that social dimensional factors need to be considered early on when creating a virtual team as these are critical to the effectiveness of the team. They also note that communication directly influences the social dimensions of the team and the performance of the team has a

positive impact on team satisfaction (Lin, Standing, & Liu, 2008). Research has also shown that diversified teams can in some cases provide superior performance as compared to groups located in the same office (Staples & Zhao, 2006). Further, diversified teams have also been shown to have less conflict. However, it should be noted that when compared with face-to-face teams, trust is more important when virtual teams are globally dispersed (Chang, et. al., 2011).

Research conducted by Carte and Chidabaram (2004) looked at the capabilities of collaborative technologies, such as UC, as they apply to diverse teams. In their study, they suggested that capabilities that limit aspects of traditional face-to-face communication are reductive capabilities because they curb normal communication and speech patterns which limit identification, equality of participation, and asynchronous communication. Carte and Chidabaram (2004) term capabilities of collaborative technologies that enhance normal communication additive capabilities because these capabilities that include coordination support, projects and priorities, an electronic trail, support decision making, and rich messaging. When looking at the reductive capabilities of collaborative technologies on diverse teams Carte and Chidabaram (2004) state that visual anonymity, which is defined as limiting identification, helps to reduce the importance of surface level diversity that breaks down cultural barriers, lowers evaluation apprehension, and forces teams to articulate their ideas in writing such as with email and chat. For equality of participation, which is defined as the reduction of turn taking in communication, these technologies create a level playing field and allow for various opinions to be voiced regardless of team member rank or role. These technologies also reduce turn taking restraints that can sometimes be seen in other forms of communication. Asynchronous interaction, which limits immediate feedback can slow down

interactions in these diverse teams and can, in some cases, reduce the ability to coordinate inter-communication if the technology does not provide an immediate synchronous response capability. However, if the response is asynchronous, it can enable members to think about the issues before responding and potentially provide a more valuable response.

Carte and Chidabaram (2004) state that the additive capabilities of coordination support, which is defined as the ability to track people, projects, and priorities, is available when using collaborative technologies as they help to coordinate complex multi-person projects. These technologies also provide an electronic trail. An electronic trail facilitates the ability to record and retrieve relevant information because it enables easy retrieval of communications and provides an audit trail which helps to provide clarification to issues that may arise. Enhanced capabilities, which support decision making and rich messaging, is apparent when using these technologies as the ability to provide decision support, data transmission, storage and retrieval can improve task performance. The audio and video capabilities such as desktop sharing and video conference can support rich communication as well. Table 2 represents a replica of the table provided in the research of Carte and Chidambaram (2004) as to how reductive and additive capabilities are applied within diverse teams. Their proposed theory states that the introduction of key collaborative technology capabilities can mitigate the negative aspects of diversity and leapfrog the pitfalls of diversity while simultaneously leveraging positive aspects such as informational diversity. These are key ingredients to team member productivity in virtual teams (Carte & Chidambaram, 2004).

Table 2. Effects of Collaborative Technologies on Diverse Teams (Carte & Chidambaram, 2004)

CAPABILITIES OF COLLABORATIVE TECHNOLOGIES	EFFECTS ON DIVERSE TEAMS	IMPACT IN INITIAL STAGES	IMPACT IN LATER STAGES
REDUCTIVE CAPABILITIES			
Visual Anonymity	<ul style="list-style-type: none">• Reduces salience of surface level diversity• Lowers evaluation apprehension• Forces members to articulate their ideas in writing	High (lowers possibility of subgroup formation)	Is likely to have some reduced impact
Equality of Participation	<ul style="list-style-type: none">• Provides a level playing field and allows minority opinions to be voiced• Removes constraints of turn taking	High (improves interaction processes and perceptions by allowing open and free dialog)	
Asynchronous Interaction	<ul style="list-style-type: none">• Slows down interactions• Reduces ability to coordinate• Enables members to think about issues before responding	High (by reducing off-the cuff or knee-jerk reactions)	
ADDITIVE CAPABILITIES			
Coordination Support	<ul style="list-style-type: none">• Enables group to keep track of people, projects and priorities• Helps coordinate complex multi-person projects	(Is likely to have some reduced impact)	High (will help focus on task related interactions)
Electronic Trail	<ul style="list-style-type: none">• Enables easy retrieval of communications• Provides audit trail and helps in clarification of issues		High (based on improved efficiencies in task execution)
Enhanced Capabilities	<ul style="list-style-type: none">• Decision support, data transmission, storage and retrieval can improve task performance• Audio- and video-support can support rich communication		High (given increased decision support, data access and additional bandwidth)

Research Gap

The review of the literature provides insights into how technology can assist in building better relationships through better and richer communication and how the technology can improve performance and perceived productivity in both virtual and co-located teams but it does not assess whether the technology can impact perceived productivity facilitated by the relationships that the technology has helped to create. This dissertation examines this gap investigating how users perceive UC impacts their individual productivity and if the relationships built through using UC have any impact on their perception of being more productive at work.

CHAPTER 3

THEORY DEVELOPMENT

In this chapter, a theoretical framework is presented in order to investigate whether UC facilitates relationship building, which in turn, positively impacts perceived productivity. To establish a common understanding, the first precept of the study is to ascertain how participants articulate the ways they perceive UC impacts productivity. Subsequently, a theoretical framework is developed to specifically explore interactions between functions of relationships facilitated through the use of UC and perceived productivity. The primary drivers and flow of this framework are portrayed in Figure 2. It is proposed that the features of UC that support communications facilitate relationship building which ultimately results in a positive impact on perceived productivity.

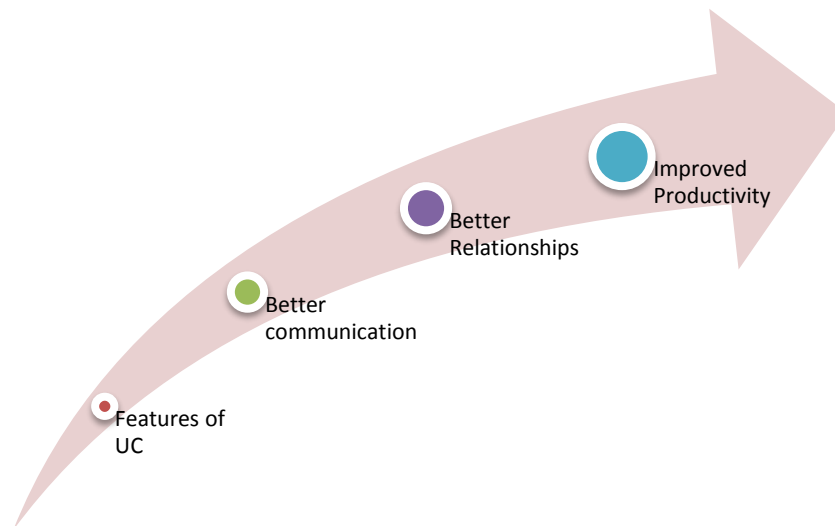


Figure 2. Path to Productivity

Previous theories regarding factors of relationships were leveraged to construct the theoretical framework. The research of Dillon and Montano (2005) weighed heavily in the development of the framework as they categorized the various functions of relationships as they apply to the use of technology. Based on their categorization, the model depicted in Figure 3 was developed. This model resulted in the development of eight hypotheses.

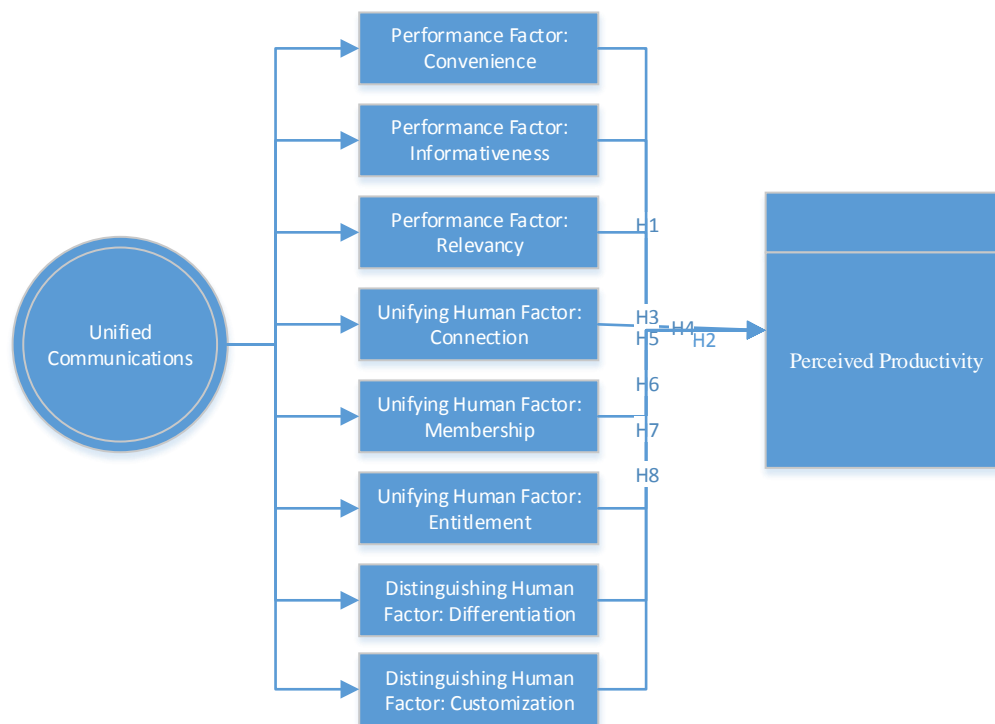


Figure 3. Factors of Relationships that impact Perceived Productivity

Relationship Performance Factor: Convenience

Convenience is defined by Dillon and Montano (2005) as the degree to which a technology makes communication easier by requiring less effort on the part of the communicators. When working collaboratively, research has shown that the most positive attitude observed when using information technology has been towards tools that enable

convenience. Collaborative tools such as e-mail and other common workspaces such as UC, enhance the value and continuity of communication between different partners (Kimiloglu, Ozturan, & Asli, 2012).

Other studies have suggested that both the ease of use and usefulness are significantly correlated with usage of technology. The convenience provided by using technological tools encourages users to evaluate the effectiveness of a tool. In addition, beliefs about the task value and the convenience of new technology form the basis for emerging theories of technology acceptance (Karahanna & Straub, 1999). When linking the convenience factor with perceived productivity via the use of UC, the statement would be that the ability to provide factual or technical data can be done conveniently requiring little effort. Therefore Hypothesis One is as follows:

H1: The relationship performance factor of convenience mediates the impact of Unified Communications on perceived productivity.

Relationship Performance Factor: Informativeness

Dillon and Montano (2005) define informativeness as the degree to which a technology is capable of providing the desired information. Research conducted by Ghasemi, Farahani, and Mashatan, (2012) found a significant relationship between the use of information and communication technology and organizational effectiveness.

Technology tools such as UC can play a major part in enhancing productivity as they mediate the ability to share information (Das, 2003). When linking the informativeness relationship factor to perceived productivity, it could be interpreted that UC allows for desired information to be provided, whether personal or work related. Information exchange is a vital component of relationship building. Therefore Hypotheses Two is as follows:

H2: The relationship performance factor of information mediates the impact of Unified Communications on perceived productivity.

Relationship Performance Factor: Relevancy

The relationship factor of relevancy is defined by Dillon and Montano (2005) as the degree to which a technology is pertinent to the relationship. As noted by Pauleen and Pak (2001), internet based and conventional electronic communication channels are used to build relationships with team members specifically in virtual teams.

In organizations, communication is a core process for building organizational intelligence and a sense of community, both of which are necessary precursors to result generation (April, 1999). Therefore when linking relevancy to perceived productivity, it can be interpreted as saying that various features of the technology itself provide the physical means suited to supporting relationship building within a team environment. Hypothesis Three is as follows:

H3: The relationship performance factor of relevancy mediates the impact of Unified Communications on perceived productivity.

Relationship Unifying Human Factor: Connection

The connection factor of relationships is defined by Dillon and Montano (2005) as the degree to which a technology causes an individual to feel linked to his/her group or the organization. Knowledge production and exchange is not primarily an individual process, but is a participative and collaborative process. A communication connection is derived from the importance of the human capability to communicate (Birdsall, 2011). Therefore, human

capability supported through information communication technology communities can initiate a productive dialogue through a communicative connection (Birdshall, 2011).

When linking the connection factor to perceived productivity, it can be interpreted that UC facilitates the ability to communicate allowing individuals to become or feel more linked to their group which makes them feel more productive. Therefore Hypothesis Four is as follows:

H4: The relationship unifying human factor of connection mediates the impact of Unified Communications on perceived productivity.

Relationship Unifying Human Factor: Membership

The relationship factor of membership is defined by Dillon and Montano (2005) as the degree to which a technology prompts an individual to feel a part of his/her group and the organization, with a focus on the individual as part of the group or organization. In most, if not all organizations, the mission statement is clearly communicated to each member. When creating these mission statements, a mission should result from consultation and discussion with a cross-section of organizational membership. The thought and development processes when creating such statements lead to consideration of issues such as productivity (Gregson, 1992).

High-performance companies maintain team continuity and one of the main components of these organizations that stands out is a strong feeling of membership (Anonymous, 1996). When linking the membership factor to perceived productivity, it can be interpreted as UC facilitates communication channels through which group allegiance is supported empowering individuals to feel more a part of their group. Hypothesis Five is therefore as follows:

H5: The relationship unifying human factor of membership mediates the impact of Unified Communications on perceived productivity.

Relationship Unifying Human Factor: Entitlement

The relationship factor entitlement is defined by Dillon and Montano (2005) as the degree to which an individual feels he/she has a right to something because of his/her relationship to a group or to the organization. The right to communicate is a basic universal human right. It has been argued that if the ability to exercise this right, or entitlement, is not provided then all other human rights are compromised (McIver, Birdsall, & Rasmussen, 2003).

Strengthening the rights of employees, including the ability to communicate and express themselves, can encourage employees to accept and even initiate increased participation. In general, the more employees participate in an organization, the more productive they are (Burchelle & Christiansen, 1995). When linking entitlement to perceived productivity, it can be interpreted that UC empowers individuals to feel entitled to engage in frequent and collaborative communication with team members. Therefore Hypothesis Six is as follows:

H6: The relationship unifying human factor of entitlement mediates the impact of Unified Communications on perceived productivity.

Relationship Distinguishing Human Factor: Differentiation

Dillon and Montano (2005) define differentiation as the degree to which a technology enables an individual to be recognized as important and treated as unique. Previous studies have determined that individual personality does affect engagement in various communication

tools. For instance, introverts have been shown to prefer tools such as chat or text whereas extraverts prefer mediums such as voice or video discussions (Blau & Barak, 2012). UC offers communication tools that can benefit various personality types and allows individuals to express themselves and show their personality through choosing the most optimal communication tool.

Research conducted by Bradley and Hebert (1997) found that personality types are an important consideration in establishing productive teams. When aiming for team effectiveness, organizations should analyze the personality type composition of group members, as well as help individual members understand their own personal attributes and learn to appreciate the contribution of other team members (Bradley & Hebert, 1997). When linking the factor of differentiation to perceived productivity, it can be interpreted that because individuals are able to choose features of UC most compatible to their personality, individuals feel recognized as important and treated as unique. Hypotheses Seven is therefore as follows:

H7: The relationship distinguishing human factor of differentiation mediates the impact of Unified Communications on perceived productivity.

Relationship Distinguishing Human Factor: Customization

The relationship factor of customization is defined by Dillon and Montano (2005) as the degree to which a technology is tailored to the needs of the organization. Other studies have suggested that information communication technologies such as UC enable organizations to customize their IT resources by combining a mix of technologies most suited to their needs such as enhancing team collaboration abilities. This IT customization can create a competitive advantage (Gupta, 2010). Further technology customization can result in

increased productivity as it allows companies to focus on their business objectives which can include the ability to enhance collaboration and relationship building (Davis, 2003). It can be interpreted as users are communicating through UC and providing feedback, organizations are able to assess the technology needs of the organizations and tailor UC to fit those needs.

Therefore Hypotheses Eight is as follows:

H8: The relationship distinguishing human factor of customization mediates the impact of Unified Communications on perceived productivity.

Summary

The results of this study will examine each identified hypotheses to investigate whether the factors of relationships as defined by Dillon and Montano (2005) are supported through the use of UC. The user perception of productivity when using communication technologies will also be defined as analysis is conducted to determine how users perceive improved relationships with team members resulting from the use of UC translates into higher levels of individual and team productivity.

CHAPTER 4

RESEARCH METHODOLOGY

Justification of research method

This study was conducted using a qualitative research approach through case study research which includes documentation review and interviews. An open coding technique was leveraged to examine user perceptions of productivity. This form of technique is leveraged in qualitative research in order to develop a theory that is grounded in data systematically and organizationally (Myers, 2009). The need for case study research arises when there is a desire to understand and contribute to knowledge about a social phenomenon. Case study research allows the investigator to retain the holistic and meaningful characteristics of real-life events caused by organizational and managerial processes (Yin, 2009).

As an employee of Hewlett Packard and user of UC, I am also a participant in this study. There are benefits to this form of research as it has been noted that participant observation can be the only practical way to achieve an awareness of common workplace practices, which can be concealed from external observation (Vinten, 1994). According to Myers (1997), “Qualitative research involves the use of qualitative data, such as interviews, documents, and participant observation” (p 241). It allows the researcher to understand and explain a social phenomenon, in this case UC, which bridges both the technical and the social (Myers, 1997). This methodology is a useful approach for this study as the focus of this research is not solely based on the technological features of UC as previously studied by Hewlett Packard, but it focuses on the managerial and organizational concerns of productivity and team relationship development through the use of this technology.

Interviews were used as a primary data collection method as they help the researcher to focus on the subject's world and use the subject's language rather than imposing one's own views (Yin, 2009). As most of the participants in this study were not co-located, the ability to observe their work on a daily basis was not achievable; therefore, a secondary data collection method of internal documentation review was employed. Documentation can help build a richer picture than what can be obtained through interviews alone. Documents and records can be anything such as emails, blogs, web pages, corporate records, etc. and are basically items that are left behind after a task has been completed (Esterberg, 2002). Both interviews and documentation data collection methods were used to obtain results of the findings.

The use of Unified Communications has become a global standard for Hewlett Packard (HP). HP has more than 300,000 employees located around the world. HP implements UC thru the Microsoft's Office Lync product. HP Global Telecom Platform Engineering Management have stated that Hewlett Packard was confirmed by Microsoft to be the largest organization, to date to roll out UC utilizing a majority of its features. HP has implemented Chat, Click-to-Talk, Ad Hoc Conferencing, Video, PC Phone, and Scheduled Conferencing. Chat, also known as Instant Messaging, or IM, allows users to send synchronous and asynchronous chat messages back and forth even while attending a call or conducting other activities. Click-to-Talk allows the user to choose to highlight the phone icon in the chat window and turn a chat conversation into a voice call. Click-to-Talk also can be achieved by highlighting a contact name, whether currently in a chat discussion or not, clicking the name making it a purely Lync call or dialing any of the numbers in the user's profile. Ad Hoc Conferencing allows the user to add others into a live discussion, whether it be a chat discussion or a voice call. The user simply has to click and drag the name of the

other participant or dial out to an outside line if PC Phone is enabled. PC Phone allows users to dial out to an outside line whether the recipient is a Lync contact or not. PC Phone also provides the ability for the user to have a direct dial number where callers can dial the Lync user back and it rings through the Lync tool. Voice mails may also be left using PC Phone. These messages show up as an emailed voice file. Scheduled Conferencing allows the user to select the Online Meeting Option through their Microsoft Outlook calendar. Once selected the invite populates with a conference bridge link, along with phone numbers that can be dialed to get into the bridge if not sitting at one's desk and a conference bridge ID that can be put in if calling in through one of the numbers. If using the link within the invite to dial into the bridge, participants are joined into the Lync conference bridge without the need to dial anything else and are then able to see other participants in the conference window which appears as a chat window. An example of a Scheduled Conference invite using Lync is shown in Figure 4. Actual phone numbers and meeting link data has been removed for privacy purposes.

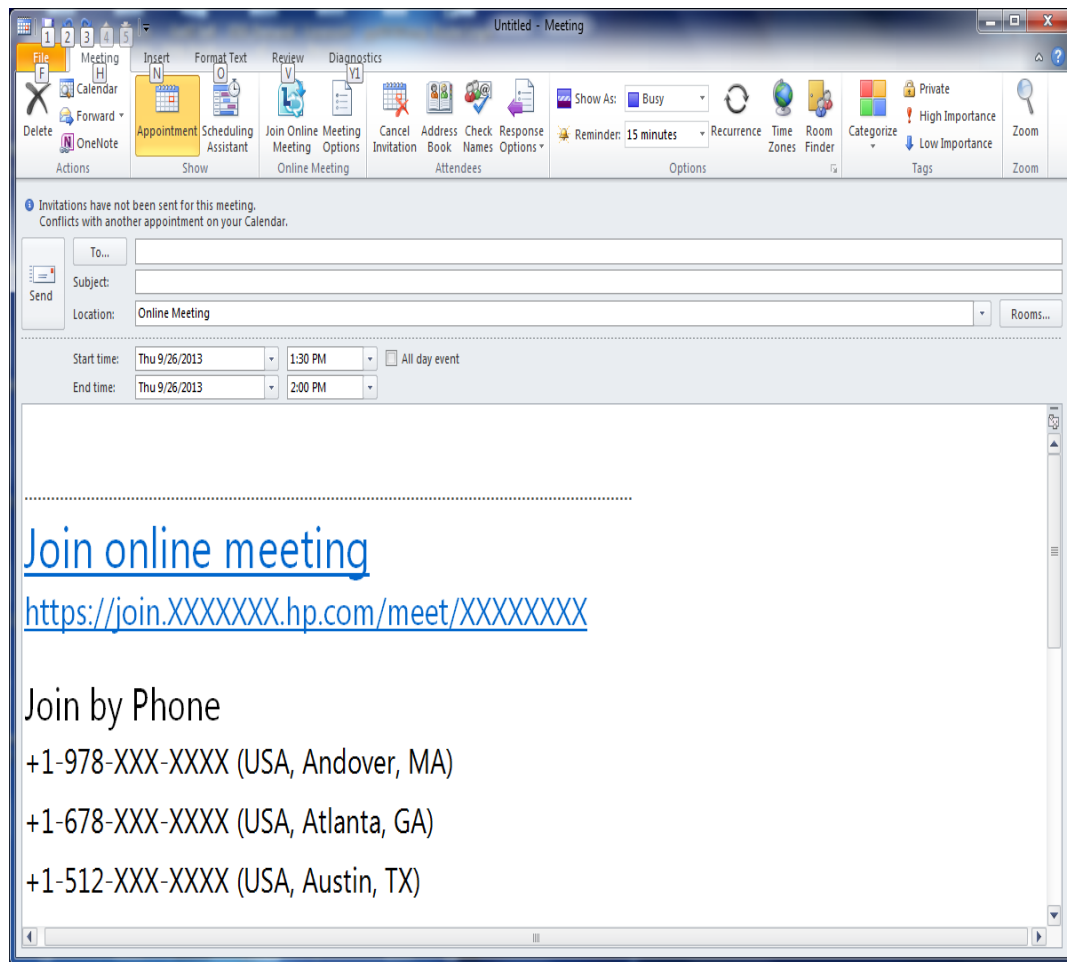


Figure 4. Example of a Scheduled Conferencing Invite

The conference organizer has the option to restrict the meeting to only those invited or provide participants with presenter access when using Scheduled Conferencing. In addition, the HP version of scheduled conferencing provides users the ability to dial into a Lync discussion if they do not have access to a PC. If a conference presenter dials in, they are provided with an ID to insure they are identified by a name rather than just a phone number. Participant names will be displayed if they dial in from a number previously set up in their profile. If they dial in from a number other than that listed in their profile, only the number will be displayed. The presenter has the option of requiring that any unknown participants,

such as those dialing in from outside numbers, to wait in what is called a lobby, until they are manually admitted to the conference. Scheduled Conferencing meeting options are shown in Figure 5.

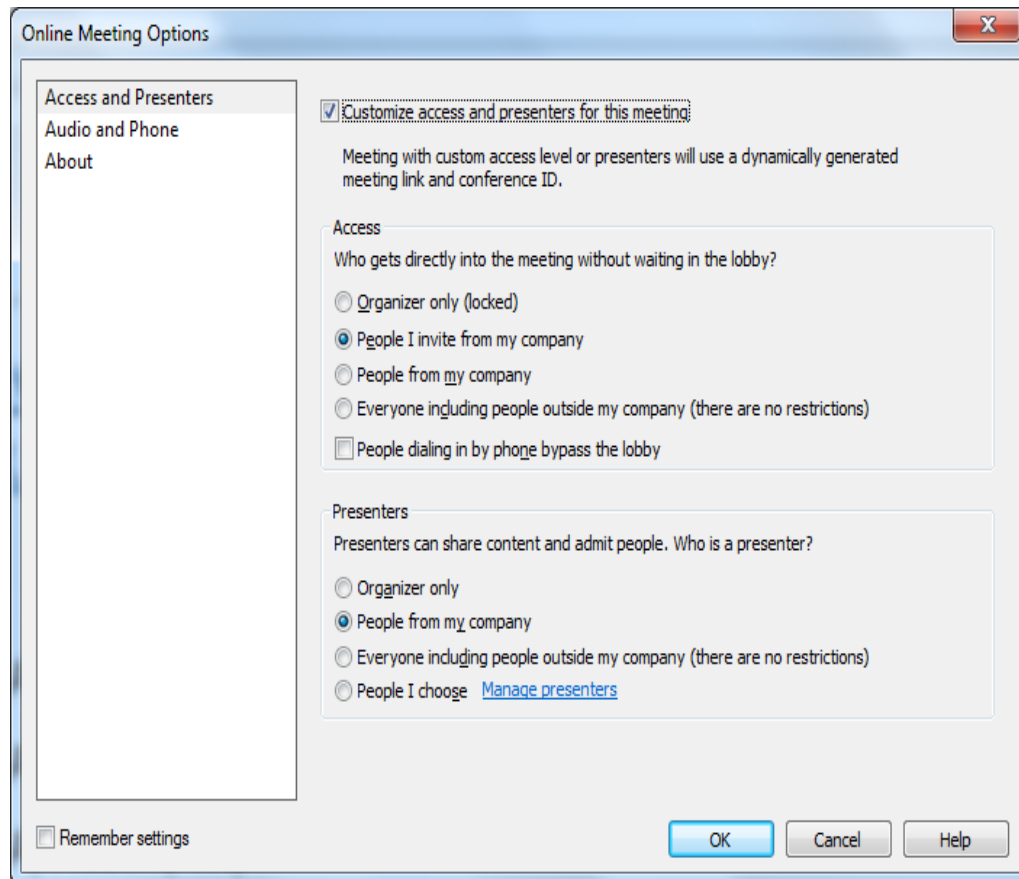


Figure 5. Scheduled Conferencing Online Meeting Options

As shown in Figure 5, the Scheduled Conferencing feature allows the conference presenter to have more control than with the Ad Hoc Conference feature, however, the Ad Hoc feature can be used for impromptu discussions using an active chat or Click-to-Talk window. Each of these features are enabled for presence management, allowing the users to see the current or selected status of other users. Because Lync is integrated with email, the presence status is also seen when sending emails so that the sender can determine if they

would like to send a chat invite or place a call rather than completing the email. In addition, a user who decides to add their picture to their profile will have their picture displayed on each email sent as well as in the Lync window. The Lync window also allows for emails to be sent directly from the window rather than having to open the Microsoft Outlook window. Other features of Lync that are currently being rolled out at HP include Lync Mobile which provides the ability to dial into a conference bridge link using a mobile phone as well as conduct chat messages on a mobile phone. If the cell number is tied to the user profile, the user's name will show up in the Lync window just as if they were using a PC. When calling into a conference bridge using the link in the invite, the Lync application will call the user back on the cell line and connect them to the bridge. In addition, Lync mobile allows callers to call other users using the Lync window on their mobile phone as if they were a cell phone contact.

The roll out schedule for the implementation of UC features is shown in Figure 6. Out of the 300,000 employees at Hewlett Packard, one of the first groups to receive the full roll out of UC was the Global Telecom Infrastructure and Architecture Organization. This group is also a member of 'IT First'. IT First consists of internal IT organizations at HP that are requested to review new technology service offerings and provide feedback, so that the technology implementation and programming teams can make any necessary changes to the technology before it is rolled out to the masses.

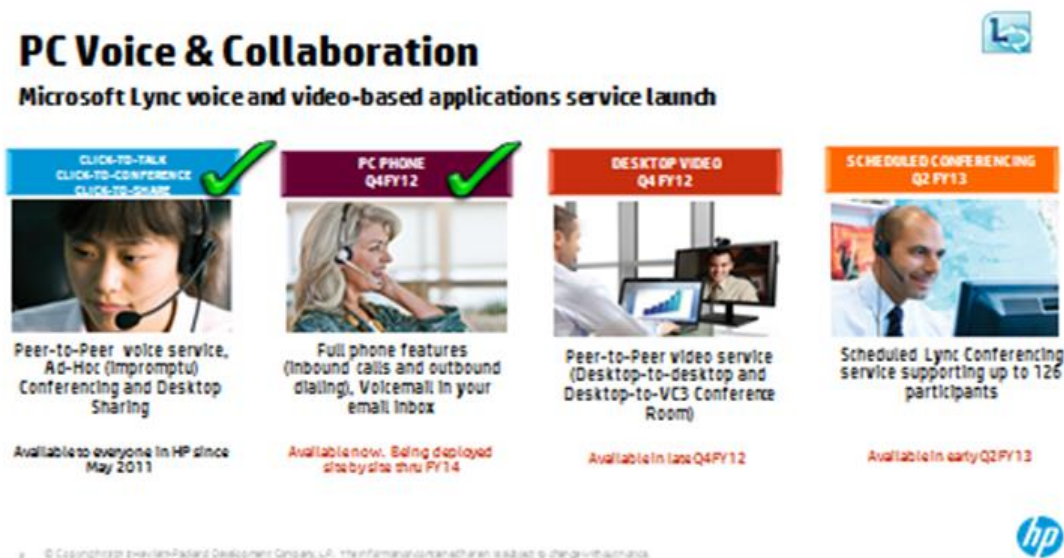


Figure 6. UC Rollout Schedule at HP

At the start of this study, the Global Telecom Infrastructure and Architecture Organization (also known as Global Telecom or GT) consisted of approximately 141 employees globally. This organization is one of many under the office of the CIO. It has recently merged with the Operations organization resulting in the creation of the Global IT Infrastructure and Operations organization, also known as ITIO. As noted on the HP internal website, the mission of this organization is as follows:

Global IT Infrastructure and Operations enables HP to maintain its position as the world's largest provider of information technology infrastructure, software, services, and solutions to individuals and organizations of all sizes. We are a services driven organization, with a laser focus on the end user, ensuring that the user experience is at the center of everything we do.

Our responsibility is to ensure the efficient management of HP's production environment while supporting HP's growth. Our vision is to provide innovative, high

quality, flexible, stable technology solutions in secure, cost-effective production environments while providing the best end-user and customer experience. When we do that, we protect the HP brand and enable HP's businesses to stay focused on their core business functions and be as productive as possible.

The Global Telecom segment of the ITIO consists of sub segments including voice engineering, data engineering, program management for both voice and data, telecom expense and management, as well as telecom applications engineering. Details describing each segment and the 30 participants in this study from those segments are noted in the following.

- Voice engineering – This team consisted of 21 individuals and supports the infrastructure for which back office users and contact center agents are connected in order to make and receive calls. From this segment, nine individuals volunteered to participate in this study, six individuals from the US and three from Asia Pacific. This group of individuals were chosen because of their involvement in global projects and their cross functional interaction among various teams in and outside of Global Telecom.
- Data Engineering – This team consisted of 12 core individuals who support the LAN and WAN connectivity at HP sites and locations on HPs corporate network. Similarly to the voice engineering team, these people work on global projects and maintain cross functional relationships. Three US individuals volunteered to participate in this study.
- Voice and Data Program Management – The program management office within Global Telecom manages the project managers who manage projects incorporating both voice and data. There are currently approximately 25

individuals considered part of this segment. Resources on these projects include voice and data engineering. These resources interact with all resources within Global Telecom, as well as resources outside of the organization in support of all of the various HP business units. Three individuals from the US volunteered to participate in this study.

- Telecom Expense and Management – This department deals with service management, billing, IT procurement, and the Global Telecom internal cost of service. It consists of approximately 16 individuals. This is a very cross functional segment of Global Telecom as it supports all revenue generating activities within this space. Participants from this department include two individuals from the US and one individual from Europe. At the time that this research began, there were no resources in Asia Pacific.
- Telecom Applications Engineering – This department supports the contact center applications used by agents to more efficiently receive calls via the current infrastructure. It contains approximately 22 individuals who work hand-in-hand with the platform engineering team regarding necessary licenses, capacity and what is approved to be utilized on the platforms that Global Telecom manages. Four individuals from the US participated in this study.

As a segment of a larger organization, there are many departmental roles that are rotated in and out of the Global Telecom segment. This is done to ensure that Global Telecom remains aligned with an ever evolving corporate strategy. However, it should be noted that voice and telecom engineering are always at the core of Global Telecom's work. The teams that serve as part of this group interact with other organizations that are part of HP

to complete projects with other internal organizations such as Global Real Estate, Global Real Estate IT, and Global Procurement. Therefore, the resources that are part of this organization are extremely cross functional.

Many team members, including team managers, of the Global Telecom organization have never met face- to -face, or have only met once or twice. As part of “IT First” and the group in charge of the UC roll out for HP, Global Telecom was one of the first to receive the full roll out of UC at HP. Because this is a global group, many work from home and many of the team mates reside in different regions of the US as well as in other countries. Various members of this group were selected for participation in this study because of their limited face-to-face interactions with their team members. This limitation facilitates their need to use UC on a daily basis. This group was also chosen because it is the group in charge of the UC roll out. In addition, they were the first to obtain many of the UC features and functionality making them an optimal candidate for this research. Finally, as a global team with very limited face-to-face interaction, their primary vehicle for team collaboration and communication is UC.

In addition to individuals from Global Telecom, project managers from Global IT Real Estate organization were also participants in this research. The Global IT Real Estate Department is setup similarly to the Global Telecom organization in that most team members have never met and use UC as their primary means of communication. This team works in conjunction with Global Telecom to deliver transformed environments including implementing upgrades to the LAN and WAN infrastructure utilizing Global Telecom resources. For the most part, the Global IT Real Estate team is segmented based on regions including the Americas, Europe, and Asia Pacific; however there is a smaller unique segment

of this organization that solely manages endeavors in relation to HP's Mergers, Acquisitions, Divestitures, and Outsourcing (MADO). At the start of this study there were a total of seven project managers who support this segment of GRE IT. They were chosen to be participants in this study due to the fact they represent a unique and small global team. They are comprised of three resources in Asia Pacific, two in the US, and two in Europe. In addition to their internal global capacity, as part of their role, they manage projects dealing with HP's external customers worldwide, making relationship and team collaboration imperative as they support revenue generating deals for HP. One participant who works for the Office of the CIO was also chosen to be a participant in this study. As part of his role at HP, he receives requests from various business units. These requests are reviewed and funneled through to the various IT program managers for further review. Once a request is approved, this participant submits the request for a GRE IT Project Manager assignment. Therefore this role is cross-functional as a representative for the office of the CIO and initiator for assignment of GRE IT MADO project managers. Because of the close working relationship with the GRE IT MADO team, and the need to preserve this participant's anonymity as his role is unique, this participant is included as part of the GRE IT MADO organization. Figure 7 represents where each of the organizational sub segments fall within HP.

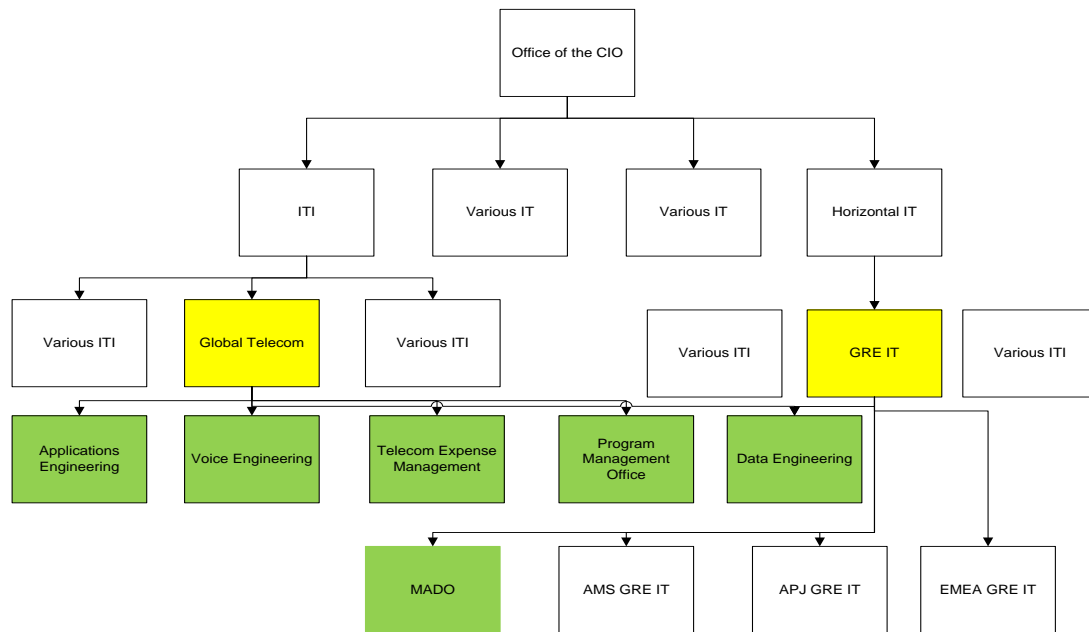


Figure 7. GT and GRE IT MADO Sub Segments at HP

The yellow boxes in this figure represent the organizational segments and the green boxes represent the sub segments that were part of this study. Table 3 provides a summary indicating the number of participants from each organizational sub-segment.

Table 3. HP Organizational Sub Segment with Number of Study Participants

Organization	Number of Participants
GT Voice Engineering	9 with 6 in the US and 3 in Asia Pacific
GT Data Engineering	3, all in the US
GT Voice and Data PMO	3, all in the US
GT Telecom Expense and Planning	3 with 2 in the US and 1 in Europe
GT Applications Engineering	4, all in the US
GRE IT MADO	8 with 2 in the US, 3 in Europe, and 3 in Asia Pacific

As seen in Table 3, members of both GT and GRE IT MADO are globally dispersed and therefore have to collaborate virtually in many cases if working with a team member not located in the same office.

Description of UC at HP

At Hewlett Packard, the only official internal means of communications, outside of face-to-face interaction, is via UC as implemented through Microsoft Lync. Figure 8 presents a sample main window for Microsoft Office Lync.

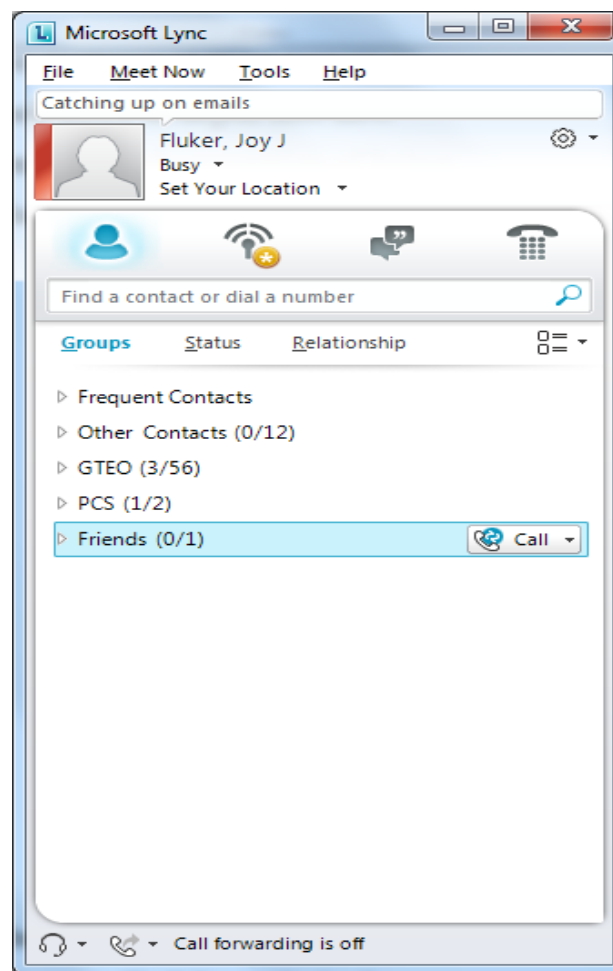


Figure 8. Microsoft Lync Main Window

All office phone numbers are Microsoft Lync numbers, conferencing is scheduled through Microsoft Lync, and the IM feature of Lync is used to facilitate instant chat sessions. Lync is also used for ad hoc conferencing.

Individuals using Microsoft Lync have an associated profile which is placed in a contact card that can be viewed when highlighting and right clicking on a user's name. Their contact card profile includes their picture, if they chose to load one, their status, their phone number (s), organizational unit, email address, time zone and office location. If the profile includes a picture, the picture is displayed whenever someone else is speaking with or chatting with that individual. It is also stored in the main window next to the contact name if they are listed as a contact. Visual contact between members is also facilitated through the synchronous Lync video feature. Many team members work remotely at home based locations, so it can be interesting to see others' home office space, where they live, and pictures of their family as one engages in communication with colleagues. Specifically, this research looks at several features of UC including Click-to-Talk, Click to Share, Instant messaging, Video Conferencing, and ad hoc conferencing.

The individual GRE IT MADO project managers and Global Telecom users of UC are the unit of analysis for this research. As shown in Appendix B, HP has studied the technical aspects of UC and its functionality, however their research does not investigate the impact that UC has made on productivity or team collaboration.

Primary Data Collection

This research includes interviews with 23 employees across the Global Telecom Organization. Participants made up about 15% of the team. All seven GRE IT MADO project managers were also interviewed as part of this study as well as a liaison with the Office of the CIO. These individuals were chosen based on their regional and global locations and their need to interact with team members on a regular basis in order to complete tasks. Table 3, presented earlier, shows the number of individuals from each organizational sub-segment that

participated in this study. Interview questions were organized to provide a flow that would elicit responses specifically related to how participants felt UC has impacted relationship building and perceived productivity. The first question pertained to demographics such as age, location, role and responsibility. To help frame the discussion regarding UC, participants were then asked to rank their usage level of the various features of UC. Next, participants were asked to provide a percentage of their usage of UC in order to determine how much they use the tool during their business day. They were then asked to identify their favorite and least favorite features in order to determine if and how these features may have impacted their communication and interaction with team members. Once these questions were addressed, participants were asked specifically how UC impacted their communication, their relationships and finally their productivity to see if the path to productivity was impacted by their usage of UC. A semi- structured interview format was used to allow for more candid and personable responses.

Interview Methodology

Most of the interviews were conducted in January and February of 2013, although two were conducted in June of 2013. Thirty two participants agreed to be a part of this study. Seven iterations were made to the interview guide based on responses obtained during data collection. As interviews were conducted, it became clear that in order to obtain rich and reliable data, some of the wording in the questions had to be changed and additional questions needed to be asked in order to elicit more detailed responses. Following is a description of the process by which the interview guide evolved over the course of the study.

Iterations of the Interview Guide

A list of guided questions was developed and initially tested on three participants. These interview sessions were scheduled in sixty minute intervals. Interviews from two of the test participants were not included in the final study. The purpose of the test interviews was to assess the completeness of the question set provided in the interview guide as well as to ensure the question wording would elicit responses that applied directly to the research study. In addition, the test interviews helped to assess logistics such as appropriate time intervals.

The first iteration to the interview guide resulted in a change to question # 2. The complete first version of the interview guide is included in Appendix A. The original question was worded as follows: “*What is your usage level for various UC features including voice, email, video conferencing, ad hoc conferencing, scheduled conferencing, instant messaging/chat?*” It became apparent after conducting the first two interviews, participants had to be reminded of the features of UC that were being discussed. In some cases, it was difficult for interviewees to articulate usage level when most, if not all, of these features were used on a daily basis. In an attempt to alleviate this challenge, participants were asked to rank their usage of the various features. This resulted in a new issue; interviewees tended to create their own ranking system, such as a scale of 1 through 10 or a scale of 1 through 6. This was addressed by creating a standard ranking system. Participants were asked to rank their usage on a scale from 1 to 6. It also became clear that further specification about the ranking system was needed when an interviewee thought that the number six in the ranking actually meant a higher usage and another interviewee thought that one meant a higher usage. The interview guide was then revised to note that that number one meant the highest possible usage ranking and six meant the least. As questions were asked, features were called out one by one to ensure that the participant was fully aware of which features had already been ranked and

which ones were yet to come. This provided a clear, concise response in understanding how much the user utilized the various features and also helped predetermine which features would likely be considered a favorite or least favorite.

A third iteration to the interview guide was made after the second interview. This change related specifically to question #3 which was originally worded as follows: “*What is your UC usage level for various tasks including social and work related?*” This question created a need for clarity as it was not clear how to determine usage level. This was an issue similar to the experience noted in the original question #2. Each participant had their own definition of what was meant by level and verbal clarification had to be given in order to provide a clearer understanding in regards to percentage level of usage.

After making this iteration to the guide, a third issue was uncovered. This, again, related to clarity in terms of percentage of use of various features of UC. This related to whether the percentage of use should be based on a 24 hour work day including sleeping hours, or simply include hours during the work day. The usage question was further clarified to specify that the time was based on usage during the work day. However, even with this specification, another issue arose pertaining to the fact that each participant logs into the UC tool at the beginning of their business day and does not log off until they are done working for that day, whether they are actually using UC or not. Therefore the question was further refined to include the verbiage “...*versus face-to-face interaction*” to capture that the percentage of use is based on time spent actually using the tool during the work day as opposed to communicating face-to-face with other employees.

A fifth iteration was made to the interview guide that specifically related to question # 10 which states the following: “*Do you think that your relationships with colleagues and*

those outside of your organization has remained the same, improved, or worsened your productivity at HP?” This question was asked to see if the participants noticed or felt a direct impact to their perceived productivity through relationship building. This was the only question asked as part of the interview that did not relate to directly to UC. This question was developed to elicit from the participants the linkage, if any, to relationships and productivity directly impacted by the use of UC. With these changes, there were a total of 6 versions of the interview guide used to collect data from participants.

Interview Structure

As most employees in the organization are remote or work in different cities and locations around the world, interviews were conducted via Lync, the UC tool used by HP. Interviews were scheduled and started in January 2013, and were completed in June 2013. In order to insure participant anonymity in this study, each participant was assigned a pseudonym name. Table 4 represents participant demographics including their pseudonym names and their role within Global Telecom and GRE IT MADO segments of HP. It also shows the length and date of each interview. This table is a depiction of the order that the data from each interviewee was analyzed; therefore, the “R” represents their order as a research participant. Participant ages ranged from 28 to 56 years of age. All participants had extensive experience in the field. Time of employment at HP ranged from 2 to 30 years. Those with five or less years at the company had worked at other corporations prior to joining HP.

Table 4. Participant Demographics

Name	Sex	Age	Region	Role	Yrs HP	Interview	
						Time*	Date**
Andrew (R1)	M	56	USA	GT Voice & Data PMO	25	58	1/17
Sam (R2)	M	38	UK	MADO PMO	13	57	1/25
Cindy (R3)	F	54	USA	MADO PMO	5	70	1/18
Charles (R4)	M	41	USA	GT Apps Engineering	3	47	2/4
Dan (R5)	M	43	UK	MADO PMO	2	31	1/29
Dick (R6)	M	35	USA	GT Data Engineering	3	70	1/23
Randy (R7)	M	28	Asia	GT Voice Engineering	3	40	1/30
Johnney (R8)	M	47	USA	GT Voice Engineering	25	59	1/30
Frenche (R9)	M	42	USA	GT Apps Engineering	20	25	2/6
Robert (R10)	M	46	USA	GT Voice Engineering	24	90	1/15
George (R11)	M	42	UK	MADO PMO	4	80	1/17
Mike (R12)	M	49	Asia	MADO PMO	23	32	1/29
Mary (R13)	F	56	USA	GT Voice Engineering	4	65	2/1
Jean (R14)	F	55	USA	GT Voice & Data PMO	30	60	1/17
Jonah (R15)	M	35	Asia	MADO PMO	2	20	2/13
Kolby (R16)	M	47	USA	GT Voice Engineering	25	60	1/29
Richard (R17)	M	47	USA	GT Telecom Expense & Planning	13	59	1/24
Barry (R18)	M	44	Asia	MADO PMO	12	60	2/5
Kris (R19)	M	57	USA	GT Apps Engineering	25	40	2/4
Blake (R20)	M	55	USA	GT Voice Engineering	29	35	2/12
Corey (R21)	M	47	USA	GT Apps Engineering	19	45	1/30
Josh (R22)	M	48	USA	GT Voice Engineering	6	51	1/23
Margaret (R23)	F	43	UK	GT Telecom Expense & Planning	15	60	2/27
Johnathan (R24)	M	38	USA	GT Telecom E Expense & Planning	2 .5	80	1/24
Sheila (R25)	F	54	USA	GT Voice & Data PMO	12	60	1/23
Daniel (R26)	M	40	USA	GT Data Engineering	14	30	1/28
Christian (R27)	M	39	Asia	GT Voice Engineering	2.5	47	1/29
Timothy (R28)	M	56	USA	MADO PMO	17	40	1/22
Jake (R29)	M	39	Asia	GT Voice Engineering	3	55	6/4
Samuel (R30)	M	55	USA	GT Data Engineering	12	49	6/14

*time is in minutes

**all dates are in 2013

Secondary Data Collection

To corroborate findings of the interview results, documents sent through email to teams regarding the purpose, functions and uses of UC at HP were also reviewed. The document review was conducted to determine if the functionality of UC met expectations set by HP as reported by interviewees. Emails sent from Senior Director and Director level management were reviewed as part of this process. These included emails sent from Operations and Operations Management requesting feedback from users on their perceptions of UC functionality. Research has shown that users who are involved in the planning, introduction, and the assimilation processes for information communication technologies can influence system attributes in accordance with their individual needs. Users can also attach a high degree of personal relevance to these tools and impose a positive attitude towards their use. Therefore, involving end users enables development and deployment of applications that are better understood by the users, ensures that the technologies are appropriately configured and valued; more user acceptance is obtained resulting in greater user satisfaction (Tarafdar, Tu, & Ragu-Nathan, 2010).

Follow up emails from End User Services and Operations teams, based on the feedback received from members of Global Telecom and other segments of IT, were reviewed as well as testimonial emails from senior leadership at HP. Other documents reviewed included results from HP's internal study on the use of applications such as UC as well as a review of HP's pilot study survey results in regards to UC functionality. Documents were actively and collectively produced, exchanged, and consumed indicating decisions made by multiple people regarding content, style, audience and purpose. "Social research that includes documents is distinctive....unlike talk or action, documents are preserved traces, which persist

beyond the local context of their production” (Mille & Alvarado, 2005, p 349).

Documentation provided as part of this research ranges in dates from June 2012 to May 2013.

Data Analysis Methodology

After all interviews had been conducted, interview transcripts were transcribed and analyzed. Each interview transcription was read several times in order to become immersed in the data. An Excel table was constructed for each participant that listed all transcribed statements made by the interviewees. Comments from the data were highlighted as they pertained to the impact of UC on relationships, and productivity, following the process as described by Eisendardt (1989). Each tab included a matrix organized by participant number. After each interview was transcribed comments were put into matrices for organization and analysis based on how they related to the factors of relationships (Miles and Huberman, 1994). Comments were separated out that specifically related to the performance, unifying and distinguishing human factors of relationships based on the research of Dillon and Montano, 2005. This matrix format is included as Appendix C.

Perceived Productivity Analysis

As previous research could not be found that clearly identified functions of perceived productivity, the open coding technique was leveraged to capture individual perception of their productivity. Open coding breaks down, compares, conceptualizes and categorizes data (Strauss & Corbin, 1990). Similar interview texts from the transcribed interviews were taken and grouped together to form codes. Interviewee statements that were considered to relate to productivity were added to a productivity matrix organized by individual participant. The coded data was put back together in grouping codes that were conceptually similar, a process

called axial coding (Strauss & Corbin, 1990). This coding was used to categorize functions of perceived productivity. This coding scheme is included as Appendix D. All statements related to productivity from the thirty interview participants were added to a table that included participant name, quote, related category and a description of the category. An example of this table is included as Appendix E. After the creation of the perceived productivity table, similar tables were created for mapping responses to the previously defined factors of relationships.

Preference in usage of various features of UC was also analyzed. Participants were asked to rank their use of the various features of UC on a scale of one to six with one being the most used and six being the least. The average ranking of all users for each feature included in the study was calculated. A frequency count was calculated and tallied for questions specifically asking participants to name their favorite and least favorite feature of UC. The methodology leveraged to collect and analyze these findings meet the four test criteria for case study research as described by Yin (2003) as follows:

Table 5. Four Test Criteria for Case Study Research (Yin, 2003)

Test	Case Study Tactic	Tactic Leveraged in Dissertation	Phase Tactic Occurs
Construct validity	Establish chain of evidence	Interviews and documentation used as sources. Documentation provided shows a chain of evidence.	Chapter 4: Data collection methods (See Primary and Secondary Data Collection Methods, Data Analysis Methodology)
Internal validity	Do pattern-matching Do explanation-building	Pattern matching conducted to determine functions of perceived productivity. Explained how the data results could be applied to the factors of relationships as defined by Dillon and Montano (2005).	Chapter 5: Data Analysis and Results (See Findings Related to Perceived Productivity, Relationship Findings)
External validity	Use theory in single-case studies	Created theoretical framework from which research methodology was based. Assessed interview responses against theoretical framework which provided structure as part of the exploratory analysis. Conducted pilot study.	Chapter 3: Theory Development and Chapter 4: Research Methodology (See Primary and Secondary Data Collection Methods, Interview Methodology)
Reliability	Use Case Study Protocol Develop Case Study Database	Used structured approach to all interviews. Used pilot study to create scale and revised interview questions for richer feedback based on results of pilot. All steps have been documented to allow for replication. Used same coding techniques across all interview responses using perceived productivity and Relationship Matrices.	Chapter 4: Research Methodology (See Primary and Secondary Data collection methods, Data Analysis Methodology, Interview Methodology)

Summary

The interview collection method serves the purpose of this research as it allows the respondents to talk and provide their own personal perceptions of the use of UC and the impact they perceive it has had on team member relationships and productivity. According to Bryne (2001), “Interviews allow participants to provide rich, contextual descriptions of events” (p 233). The ability to conduct the interviews remotely via the UC technology created an environment that was conducive to engaging participants in responding to interview questions in that it introduced the importance of professional and social status between interviewer and participant (Dambrin, 2004). In an effort to establish and enhance the accuracy of participant information, studies are increasingly relying on triangulation, the use of more than one data source. Triangulation can be achieved by including supplemental data sources to complement information acquired from study participants (Homburng, Klarmann, Reimann, & Schilke 2012). Employing document review through which emails and documents regarding the purpose of UC at HP was compared against findings from interviews provided the triangulation required to enhance the reliability of the study findings.

CHAPTER 5

DATA ANALYSIS AND RESULTS

The findings provided by both the interview data and the documentation data apply to the review of literature conducted in this study in regards to the benefits of computer mediated collaborative technologies. However, the findings provide the opportunity for a deeper analysis into the underlying impacts that the technology has on facilitating the ability to communicate, which in turn, impacts the ability to build relationships, and finally the ability to feel and be more productive. In addition, the findings support the research conducted by Dillon and Montano (2005) regarding relationships.

An analysis of the interview responses, indicated that the most used features of UC were email, the company standard communication tool, and the chat feature along with the presence management function that both of these tools provide. The least used feature noted was video conferencing. As participants of the study were part of global teams, this finding supports work done by Carte and Chidabaram (2004) that states that technology can provide visual anonymity, which is defined as limiting identification, and helps to reduce the importance of surface level diversity breaking down cultural barriers. The findings also suggest that more self-disclosure behavior is noted when using tools such as chat as it creates positive and beneficial interpersonal communication which eventually supports relationship creation as noted by the research of Lowry, et. al. (2011). Using the chat tool also forces the teams to articulate their ideas in writing as noted by Carte and Chidabaram (2004). Usage levels, using a scale of 1-6 with 6 being least used, of the features of UC at HP are depicted in

Figure 9. Video conferencing, which was the feature reported as least used, is represented by the tallest bar.

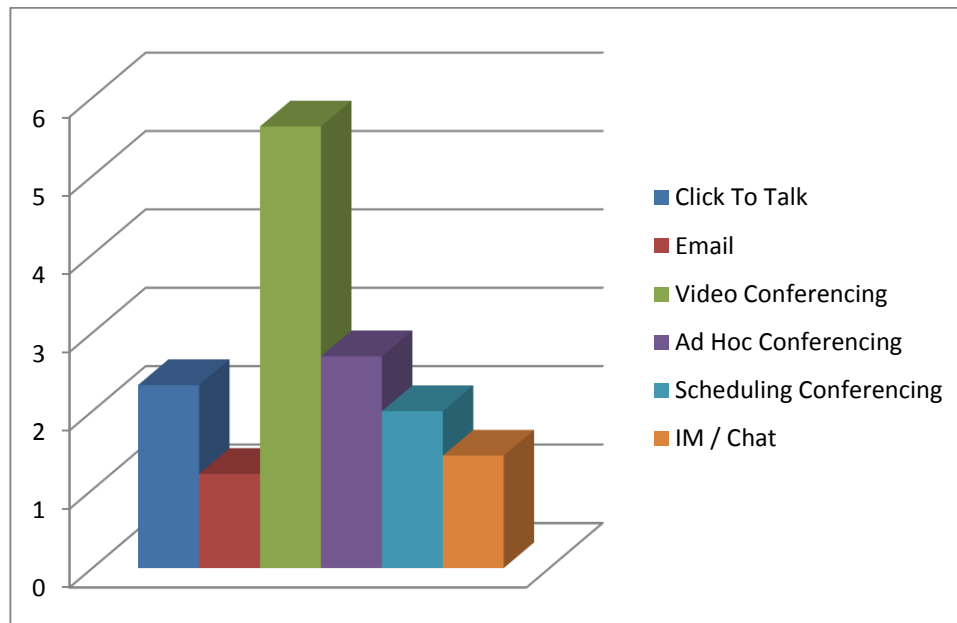


Figure 9. Least Used Features of UC at HP

Although email and chat were reported to be the most widely used features of UC, IM / chat is considered the favorite feature and Click-to-Talk is listed as the second favorite feature. Video Conferencing is ranked as the least favorite. It should be noted that in many cases where IM/chat was listed as a favorite feature, it was also ranked as a least favorite feature. Participants enjoyed the benefit of being able to use chat for multiple tasks but did not like it when it caused interruptions impacting their ability to complete other tasks. This supports the research conducted by Stephens (2008) noting that the usage of IM can enhance productivity but it can also lead to overload perceptions.

Participants were given flexibility to choose more than one feature as their favorite or least favorite. This allowed participants to give features the same ranking if they felt they had

the same value. Further, some participants indicated PC phone as a favorite feature even though this feature was not under discussion. Still, others indicated functionality that a feature provided rather than the feature itself. For example, one participant indicated accessibility and another the presence status as a favorite feature. One participant, rather than identifying a least favorite feature, stated that he did not like the technical requirements, such as bandwidth or fast Internet speed, which are necessary for UC to run efficiently. Figure 10 provides a visual of the least and most highly ranked features of UC.

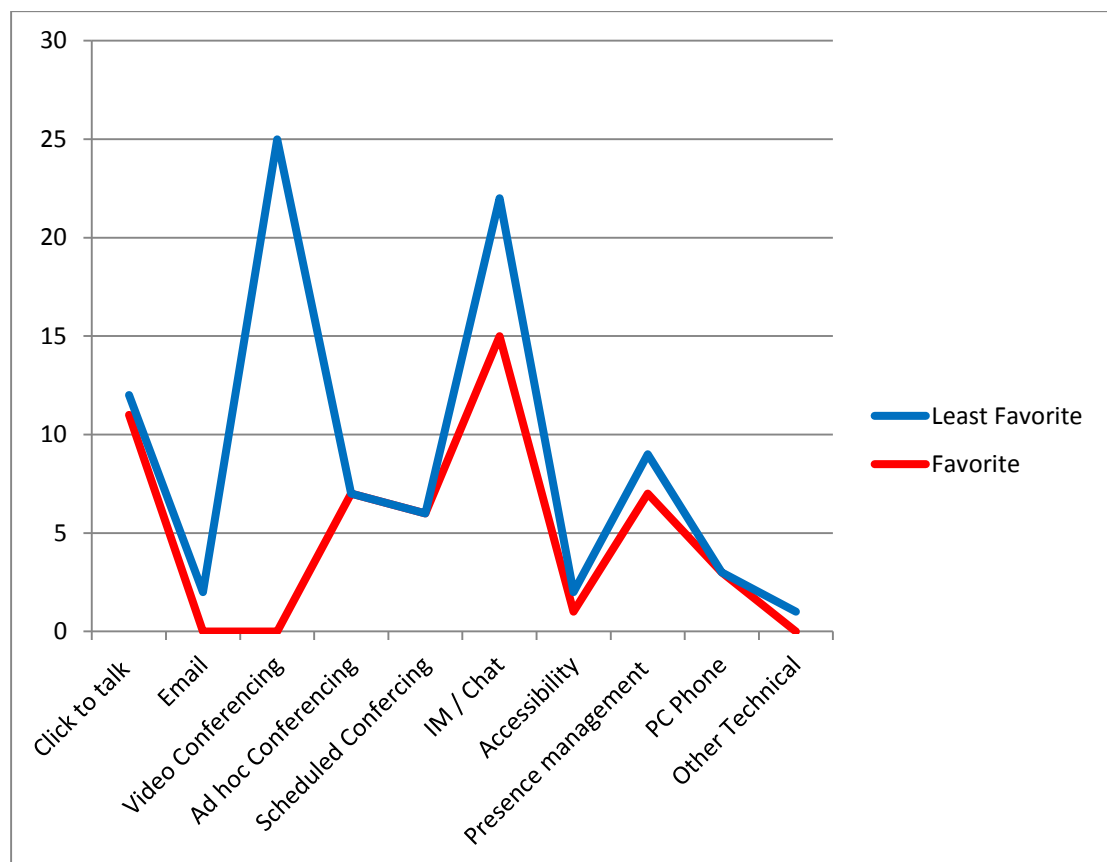


Figure 10. Favorite and Least Favorite Features of UC at HP

Findings Related to Perceived Productivity

The research of Dillon and Montano (2005) identifying the variables that influence relationships were used to categorize responses from participants as they relate to relationship building. Before an assessment can be made in regards to how UC fosters perceived productivity, it is important to investigate how users identify productivity in general terms, and how they perceive UC impacts that productivity. As there appeared to be no categories identified in prior research related to perceived productivity using communicative technologies, open coding techniques were leveraged to discover functions of productivity. After interviews were transcribed, participant responses were reviewed to determine common patterns. Through these patterns, four functions of perceived productivity were noted. These include efficiency, speed, the ability to multi-task and the development of interpersonal relationships. The definition of each perceived productivity function as defined by this research is noted below:

- Efficiency – The ability to save company cost while getting the job done
- Speed – The ability to resolve issues and get work done more quickly
- Multi task - The ability to work on more than one task at the same time
- Developing interpersonal relationships - ability to build an interpersonal relationship with teammates that enhances collaboration and creativity.

Efficiency

When looking at efficiency as it relates to perceived productivity very few participant responses fit into the definition provided as part of this study. Only four participants provided feedback that fit into the pattern that pertained to efficiency. All but one of these participants

were members of the project / program management teams across both the Global Telecom and the GRE IT MADO segments. The office of the PMO is budgetary and cost focused as each project must fit into an approved budget. Therefore, participants in this sub segment appear to be more conscious of the cost benefits that UC provides. For instance, one of the project managers, Barry, located in Asia and a member of the MADO PMO team states, that more than being productive, UC is a cost savings tool. He refers to the legacy version of Lync, known as Microsoft Office Communicator (OC), in his quote regarding cost savings:

So I think the benefit is the monetary benefit no need to buy headset, like pay 50 dollars, all of this is more of a cost savings rather than improved relationship or improved the work, I can't see it a lot. I think we work better with hard phone in terms of quality... actually most of the time without the OC I just call on mobile, we use OC on and off during the day to just talk about work, or they can call my phone through the OC. It has improved some, but it is more of an additional means to talk. I actually work at home all the time so they can call me on my cell or on Lync.

Andrew, located in the U.S. and a member of the GT PMO team, noted that without UC he would have to use a cell phone incurring the high costs of cell phone usage, in order to have the same quality of communication:

We are spread out around the world. Without being able to use UC basically I'd be stuck with a cell phone, worse yet, the cell phone or cell phone bill, cell phone and the calling card, or I'd basically have to dial on the regular phone. So of course it would be more expensive to me to be able to maintain the same quality of the communication. Just being able to have to do that back and forth, multiple times in the day it's just painful.... There are all sorts of things that you can start imagining that replaces things

in the traditional voice world that has lower cost of hopefully higher productivity, and the things we talked about such as having better relationships with coworkers, and other organizations around the globe. So HP basically becomes a stronger company and breaks down those barriers so basically I think that we add a great value to the company.

Blake, located in the U.S. and a member of the GT Voice Engineering team, noted that he is saving time and saving cost using UC and therefore can save the company money while at the same time getting the job done:

...the outbound [dialing], this is the greatest thing for me. I sit at my computer no matter where I am at and make an outbound call. I can sit at home and make conference calls at night. I don't have to dial in. I can just use OC and it saves me time and money whereas before when I used to work from home and had to make long distance calls I was paying that expense.

Sheila, located in the U.S. and a member of the GT Data and Voice PMO team, noted that she deems the greatest benefit to the use of UC is productivity but because of the boost received from being more productive there is also a cost savings as well. She no longer has to use outside conferencing services such as Intercall because she can now use the UC tool to conduct her meetings:

I think the greatest benefit besides the productivity is the productivity boost that you get from it, but there is also the cost savings. So if you look at what we are saving versus what we used to spend for conferencing with Intercall there is some significant cost benefits here. So on top of the productivity which is very important but also,

especially right now, when our stock prices are down, anything that helps our bottom line is very important to us.

The majority of participants that provided feedback in regards to efficiency function of perceived productivity were part of the PMO office. This office manages projects and programs and therefore has a greater concern in regards to budgets and cost savings. Participants expressed a value add and an increase in productivity as they are able to complete task while saving the company money.

Speed

The speed function decreases the time it takes to get work done and speeds up the time it takes to resolve issues. Several statements made where participants expressed removing UC would slow their work down tremendously and greatly impacting their productivity. Twenty-six participants provided feedback that fit into this pattern.

Four provided statements that clearly articulate the effect of the speed function of UC. Robert, located in the U.S. and part of the GT Voice Engineering team, noted that losing UC would be like going back to the ‘Stone Age’ and that UC ‘accelerates the speed of business’:

If I lost the ability to communicate via UC it would be going back to the Stone Age and would greatly hamper my productivity...UC provides the ability to get things done faster. It accelerates the speed of business.

George, located in the United Kingdom and a program manager with the MADO PMO team, noted that UC increases speed as it allows him to be more flexible and more available:

It increases flexibility and availability and it does not decrease the focus of my job. It would take longer to get my work done [without UC] and it would be difficult to meet the same timeframes.

Mike, located in Asia on the MADO PMO team, noted that because of UC he does not need time to get ready for work or commute to work so the ability to work from home allows him to start his work day earlier contributing to an improvement in his productivity:

I mean depending on the weather you could be sitting there in your shorts and socks. So you really don't want to show yourself then. I think the productivity of working from home is much higher than at office.

Kolby, located in the U.S. and part of the GT Voice Engineering team, noted that he would be less productive without UC because he can get a hold of people faster using the tool. This also allows him to resolve issues more quickly:

It would make me somewhat less productive [if I lost UC]. So I guess having UC has helped us with productivity is what I am saying. I couldn't get ahold of people as quick. It would fall back to a more formal means of communication such as calling them and leaving a voicemail, then them retrieving a voicemail and then returning my call and miss me then they leave a message on my voice mail. I think it gets rid of some of the back and forth via voicemail. As far as email goes I am dealing with information overload. Sometimes it is abused. People have the tendency to carbon copy others on things who really don't need to be there.

Participants that provided feedback in regards to speed function of perceived productivity made comments about their ability to obtain information quickly and the ability

to log into work more expediently through UC without having to change clothes in order to start working. UC provides them with the ability to work from home when needed so they don't have to worry about what they look like to others while completing their work if they choose not to come into the office nor use the Video feature of UC. They are able to quickly begin their work day and be productive.

Multi-Task

The ability to multi-task is defined in this study as the ability to work on more than one task simultaneously. As already noted, some of the features of UC, such as being able to drag icons of team member images into an active conference call, readily support multi-tasking. However, twelve participants provided feedback that directly supported the multi-tasking function of UC increasing their ability to be more productive.

Five participants demonstrated how they perceived productivity was positively impacting through multi-tasking as enabled through the use of UC. Charles, located in the U.S., and part of the GT Applications team noted that people are able to be part of conference calls and still work on other things, therefore doing more than one thing at a time while using UC.

There is probably some truth to not being able to focus as well on video but usually when you are in a conference call [using UC] and it is voice I know that most of the people that are not active in the conversation are doing something else anyway, they are reading their email or they are working on some other piece of work and all this kinda stuff.

Kris, located in the U.S. and also a member of the GT Applications team noted that he can have two or three chat sessions going while working on other task while using the chat feature of UC.

I guess favorite would be chat because you can have two or three chat sessions at the same time and still be working on other things while you wait for somebody to respond so it is very efficient and faster than email.

Richard, located in the U.S. and member of the GT Expense and Planning team noted that he uses UC over 80% of the time as it allows him to work on multiple items at the same time.

I mean it is part of every meeting it is there. I mean even while you are in a meeting you're getting IMs of lots of other topics. So you got this where you can kinda handle multiple items at one time so. So it is at least 80% on up depending on what is happening.

Josh, located in the U.S. and a member of the GT Voice Engineering noted that UC provides him the ability to have multiple conversations at the same time and the synchronous nature of UC allows him to get his work done much faster than if he had to walk over to someone else's office cubicle.

...my favorite would be the chat because you can have multiple conversations going with multiple people and easily bring multiple people in the same chat to share information together. It helps to get more stuff done because the communication is more synchronous than having a phone call or having to walk over to someone and talk to them. You can send them a chat and it takes them five minutes to reply they still have the history of the text versus having to come back and say what 'was the question?' It is more immediate than email and it takes a lot less time to go look at

chat than it does to keep looking at all the emails back and forth in your inbox. For example right now I'm getting a chat from someone on a topic from our previous meeting while I am on this phone speaking. So it helps me get more things done during a time span so like if I don't need to be paying 100% to one thing I can also attend to a chat message that is waiting for me.

Samuel, located in the U.S. and member of the GT Data Engineering team stated that UC provides him the ability to quickly provide his VP with answers while his VP is in active meetings. As a manager, it gives him more access to his team, and allows them to feel more comfortable communicating with him, and therefore provides the ability to complete more tasks.

I as a manager have access to all my team when I am sitting in a meeting where I need an answer and many, many times, when I first started using it was in our VPs purchase order reviews. He has got a question and 90% of the time I have the answer before meetings are over so he would know. That access to resources has truly improved. It makes me more accessible as well. People are afraid to talk to me but IM is a little bit easier. I can go to the VP and say “Hey I need to tell you about this”. You don't know if you are disturbing or not, but you can send and IM saying I don't want to bother you but, we need to talk about this before you go into a meeting, or I need to let you know about an outage or look at the email I just sent you. It is night and day of what we had before.

Participants that provided feedback in regards to multi task function of perceived productivity noted that they are able to have multiple chat sessions open at the same time

while they complete task. They are able to join conference bridges yet provide information to others not on the conference through the chat feature. Through UC users are able to obtain answers to questions from others while attending a live meeting without having to wait until the meeting is over to reach out to someone to obtain the information.

Development of Interpersonal Relationships

Some of the comments made by participants directly relate to interpersonal relationships and how this impacts productivity. In this section these comments are also reviewed as they relate to the perception of increased productivity based on interpersonal relationships established within the work environment using UC. These statements speak to how UC enhances the ability to build interpersonal relationships with teammates enhancing collaboration, creativity, and a better quality of work. Twenty-three participants provided feedback that directly relates to how UC has impacted their perceived productivity through technological support for interpersonal relationship building. A sample of these findings are noted below.

Andrew, located in the U.S. of the GT PMO team, said in his response regarding relationships impacting productivity that when he has a relationship with someone he does tend to respond more quickly, therefore helping others complete their task and enhancing collaboration:

... there is going to be time that people are going to rely on me to get them information whereas human nature I may take my time to get them that information whereas if I have a decent relationship with the person and we communicate well together and they say I need this information on this date I am going to work harder to try to exceed their expectations. That is all we are at HP, outside of servers it is about

people. All we do is about people, project management is just people, it is not a widget that we sell its people, so if you don't have those then you can't get your job done and other people can't get their job done and our CIO has to go in front of the board and say how come we didn't meet our numbers because he have bad relationships with each other.

Sam, located in the United Kingdom, and member of the MADO PMO team noted the qualitative benefits of UC in how the use of UC has impacted his relationships and therefore improved his productivity in its ability to create a good communication flow which provides a better quality of work:

The use of the tool has improved my productivity, and the use of the tool creates a good relationship and communication flow between myself and colleagues improving productivity as well by virtue of the fact.

Dick, located in the U.S. and member of the GT Data team advised that UC provides efficiency in its qualitative ability to allow him to instantly communicate with colleagues and customers as if they were in the same office which enhances collaboration and a better quality of work:

You know production is based on efficiency and UC allows me to be more efficient.

All of my coworkers are in Houston and we have customers around the world. Yet with UC I can instantly communicate as if they were right down the hall

Randy, located in Asia, and part of the GT Voice Engineering provided a live example in how his relationships has improved his productivity as members of the team reached out to him allowing him to develop an interpersonal relationship with teammates which enhances collaboration and provided him with a better quality of work:

....relationships helps productivity a lot, specifically to HP. I was quite surprised when I joined HP on the first year itself. This is something I went through personally, where the first six months at HP went by, I had a lot of challenge with my manager and he wasn't really working things out for us and he was frustrated himself because of he was moving from a different country to my country, so all these struggles and different issues were happening at the same time. Everyone was equally frustrated and there was no way to resolve it until we had one to two years down the road, so because of that all the relationship that I had were in the US, Singapore, and EMEA region. They have helped because they actually reached out to me directly and would ask me how am I doing? How can I ease the pain, can I offload some of the things you have and them offering that changes things a lot. It kind of gave me the feeling that “hey HP is a very good company” and it is very different than what I had in my previous company.

Mary, located in the U.S. and member of the GT Voice Engineering team noted that because of her relationships with people she can now use UC to get a quick answer to questions and be more productive enhancing her collaboration and a better quality of work. Her usage of OC means Office Communicator which is a prior version of the Lync version of UC used today. Many still call Chatting via Lync, OC:

Having a relationship with people I work with has improved my productivity mainly just because I can ask a quick question or they can ask a quick question and get a quick answer and I know I appreciate it when that happens to me. Like when I have a question and OC someone and they respond back right away it improves the relationship. I get so many emails that I don't read my emails as often as I can open up and OC and do an OC dialogue. I mean with the emails you are scrolling through 50,

60 emails a day you know and if you don't think it is important you probably don't open it then you are thinking you probably should have but if it is important they will usually OC. Sometimes I get emails from people I don't know because someone says "send an email to her she may know, she can answer", but if I don't know them I don't open the email right away. I see that they can tell that I am out there online and I can shoot them back a quick answer.

In regards to the developing interpersonal relationship building function of perceived productivity, participants provided more open ended discussion as participants began to tell stories and provided examples as to how UC did in fact impact their ability to be productive because of their relationships built in using UC. Some noted that the UC offered a better communication flow which allowed them to build relationships and get to know other better. Participants also noted that when they have a relationship with someone they tend to respond to their requests for information quicker because they know them and will review their request right away. Other comments made discusses the ability to communicate and build relationships with teammates virtually as if they were in the same office through UC which provides them the ability to collaborate and be productive.

Relationship Findings

Improving efficiency, increasing speed and facilitating multi-tasking are traits of collaborative communication technologies previously identified as impacting worker productivity (Mahowald & Perry, 2010). Less is known about the ways in which collaborative communication technologies supports team member relationship building and if workers perceive this increases their productivity. Participants in this study identified developing interpersonal relationships as a function of UC that increased productivity. To further investigate this phenomenon, participant response were examined using the eight factors identified by Dillan and Montano (2005) through which communication technology supports relationships. Participant responses were mapped to each of these factors to provide a foundational base of assessment as to whether users perceive UC affects relationship building among team members and if this lead to an increase in perceived productivity.

Performance Factor – Convenience

When examining participant response patterns based on the dimensions identified by Dillon and Montano (2005), most interviewees felt that the relationship dimension of convenience, the degree to which a technology makes communication easier and requires less effort, was supported by UC. UC made it easier to communicate and maintain and establish relationships with team members. Comments that reflect convenience were noted by 28 participants. Each participant gave an example as to how the tool allowed them to communicate and complete tasks more easily, quickly and conveniently improving their ability to be more productive.

For example, Daniel, located in the U.S. and a member of the GT Data Engineering team, noted that the ability to auto join a conference call using UC is his favorite feature. It

saves him from having to dial into a conference bridge reducing the steps and time it takes to participate in this type of communication medium:

Auto joining conferencing calls, not having to dial into a conference call. That's the best feature of UC overall. You don't have to get into the bridge line.

When asked about his favorite feature, Jonah, located in Asia of the MADO PMO team, noted that his favorite feature of UC is chat and Click-to-Talk because they are convenient and faster than calling on the phone.

Chat and Click-to-Talk [are my favorite features] because it is faster than calling on the phone. Lync is convenient.

Margaret from the United Kingdom, a member of the GT Expense and Planning team noted how easy it is to call someone as UC allows her to make a call by just clicking on a person's name. Before UC, she would have to make time to stop working and look up a phone number. UC has greatly reduced the time and effort it takes to place a phone call. She also noted that the integrated access to the chat feature further facilitates ease of communication.

I think my favorite feature is the chat. You know being able to just chat to somebody at any time irrespective of whether they are on a conference call or meeting is invaluable. It is fabulous...now you can just highlight someone's name and call them whereas without it you have to look up someone's information to call and you may not always have the time to stop and do that. Now if you have a quick question you can just chat with the person or if you need it to turn into a conversation you highlight their name to call. It is a fabulous invention UC.

Andrew, in the U.S. of the GT Data and Voice PMO team, provided an example of how he no longer has to tend to his physical appearance in order to get his work done and does not have to worry about people knowing what he looks like while talking to them.

I can interact with people; I can be in my PJs. I don't get dressed up. You know, when I went into the office in [XXX], I dressed up every day and it certainly was not my thing. Yes, most mornings I'm not even in socks, most mornings I'm just in some shorts. I'm talking to people on the phone, hair looking all funky but I mean it's literally about 7am that I start with the EMEA [Europe and Middle East] team until about 5 o'clock at night, and sometimes I'm on at like 3 'o clock [am] with APJ [Asia Pacific] so there is just no way that I would ever, ever subject people to what I look like all those hours.

A quote from Frenche in the U.S., a member of the Global Telecom Applications team, notes that UC gives him the convenience to communicate based on his need for immediate response or not. It also removes the concern of disturbing someone or feeling uncomfortable when trying to clarify duties or establish responsibilities. This is not just a factor of convenience but also facilitates issue resolution and positively contributes to maintaining interpersonal relationships. .

...having UC I can see if a person is available or not and try to have a quick conversation with that person. Without it I would have to call him / her directly and that would be disturbing for that person and even uncomfortable for me because I would probably have to leave a message and wait for that person to call me back. So I wouldn't be able know an immediate answer of their availability, so it would not be

that bad but it would definitely worsen the ability to communicate and slow things down.

Jonathan, located in the U.S. and member of the GT Expense and Planning team, stated that in his role, UC not only has improved his ability to communicate but also to maintain relationships. Without UC, he feels that much of the communication capability the organization has today would be lost. In his role as a director, UC allowed him to solicit participation quickly and conveniently.

...without UC I think that what would it would create is a lot of communication gaps and the relationship would worsen and I think what it would boil down to is there is a lot of things in there like organizational hierarchy, reporting relationships and phone numbers, and roles, and location. I think that generally speaking, it would be a pretty substantial communication breakdown which would generate a lot more calls and emails etc. It would make work harder, especially in a global organization like ours.

My communication has definitely improved since using UC.

Jonathan continues his assertions regarding the benefit of UC by telling a story of how when he ran the operations organization at HP during which time UC became a lifeline for communications. He advised that it would be extremely difficult to function without it if the company was to ever lose this capability.

I ran operations for several years and Lync itself has become a lifeblood of communication events and staying in constant communication then real time with people of the status of things that are affecting their business so losing that capability would instantly create a circumstance of fire and forget communication via email and then if the email were lost you are back to the cell phones and constant

bridges and those problems can get pretty Helter Skelter if everybody who are remotely involved and participating are all together in a conference bridge. It is a bit of irony chat may be the feature you hate the most because of the ability for people to interrupt you and have a slice of your time it is also the most powerful element to real time communications. It cuts both ways.

The quote from Blake, located in the U.S. and member of the GT Voice Engineering team, notes that the ability to conduct outbound dialing, which is a part of PC phone, is the greatest benefit to him because of its convenient nature. No matter where he is located, he can make an outbound call. This saves him both time and money.

...the outbound [dialing], this is the greatest thing for me. I sit at my computer no matter where I am at and make an outbound call. I can sit at home and make conference calls at night. I don't have to dial in. I can just use OC and it saves me time and money. Whereas before when I used to work from home and had to make long distance calls I was paying that expense.

Participants in this study all noted that a major strength of UC is that it makes communicating with team members more convenient. Features such as Click-to-Talk, the ability to auto join a conference call and autodial make it easy to instantaneously open a communications channel. Further, UC supports multiple modes of communication (chat, conference call, voice call, etc) allowing users to easily select the mode best suited for the purpose at hand. This ability to easily stay in communications was identified as improving one's ability to communicate which ultimately improves one's ability to be productive.

Participant responses in this study supported Hypothesis One: *The relationship performance*

factor of convenience mediates the impact of Unified Communications on perceived productivity.

Performance Factor – Informativeness

Dillon and Montano (2005) define informativeness to be the degree to which a technology is capable of providing desired information. All participants in this study provided feedback that expressed how their usage of UC facilitated their ability to provide and obtain relevant and desired information. Many participants noted that having the right information at the right time is a contributing factor to improving their ability to be productive.

Several study participants provided examples of how UC facilitates information sharing. Barry, located in Asia and a member of the MADO PMO team, noted that the chat feature is a good facilitator for information exchange because a response can be given immediately and, as such, he tends to get the information he is seeking more quickly.

I think it is more the IM chat feature because it is instant, if you can immediately get an answer or no answer.

Andrew of the GT Voice and Data PMO team, noted that UC provides him with the ability to ‘drag’ needed participants into a conference meeting. Through the display window he is able to see who participants are and manage the conference call based on who is in attendance. Not only is this feature convenient, it allows him to know what questions to ask expediting his ability to get relevant information in a timely manner.

When I go into a UC call I can see if I have the right people on, I can drag another person in to give some more expertise. If a vendor is on the call, I can change the conversation direction and then make sure that vendor is off and start the conversation

back up so you really do have more control and know who your participants are. So that is a definite good point.... A lot of work is spread off shore so there is just no way, I mean we don't work off shore so the ability to communicate is over the phone, so of course being able to get people all hours of the day and night, be able to contact people through IM and presence to see if they are available, be able to ask them a quick question. You see it definitely improves the communication.

As part of his assertion Andrew provides an example as to how UC improves his communication advising of how it allows him to obtain information regarding purchasing for the programs he manages.

An example I use of course is purchasing because of my job as a program manager I have definitely seen an improvement because I have to deal with contracts, purchases, capital.

Corey, located in the U.S. and a member of the GT Applications team, referred to UC as facilitating the ability 'to reach out and touch someone' providing multiple ways through which information can be quickly obtained.

Well, I like the Click-to-Talk and I like the ad hoc. I like to be able to drag someone in if you need someone else. I like the ability that you can actually communicate with individuals with the ability to do multitasking. So if someone is on a call you can quickly ping them without calling them on the phone directly with the ability to reach out and touch them real quickly and get some information for feedback.

Christian, located in Asia and member of the GT Voice Engineering team, states he would talk to people less often if he did not have UC. Using UC, he is able reach out and get

information, not just for work, but even outside activities such as advice for doing things around the house.

I would talk to them less [without UC] because with UC you can just see the people's presence and then if they are around, I would feel more like reaching out to them for not only work but help out on things like getting advice for around the house. Like if I see someone online I can contact them but with just regular calls you think like am I disturbing him. Unless it is urgent then you can call, but if you see them online now you can just ask the question. The greatest benefit I guess it is one tool for people to work instead of many tools. You have phone, virtual, rooms, etc. Now we have one single tool to do everything so I guess the learning curve, I think the people accepting the technology is more open when they see you only need to learn this one thing that will allow me to do all my jobs. I probably think that the unified part right, that one tool can do everything.

Jean, located in the U.S. and a member of the GT Voice and Data PMO team, noted how easy it is using UC to share one's desktop whether you are connected to the network or not. She no longer has to setup her VPN tunnel when needing to share a presentation or desktop file with others to share and provide information.

[Losing UC] would slow things down and I wouldn't get work done as quickly. I mean just desktop sharing...remember how long it took to get on Virtual Room? [Issues] like I'm not on VPN now so I can't get in but sharing desktop through Lync is so much easier. Sometimes the key didn't work in Virtual Room but this way whoever needs to share can share. You don't have to return control over or anything like that. You can just stop sharing and somebody else shares.

Jake, located in Asia and a member of the GT Voice Engineering team, spoke of how much easier it is to know when to reach out to someone when you need information. By seeing the presence status, he knows one's availability and, as such, when he can ask for the information he needs. This ability allows him to obtain information more quickly as he knows when to ask a question versus the method of sending a query which might take days before a response is given.

It would definitely impact my work [if losing UC] because the main UC function that I value is the presence feature, and because of that I would lose the ability, when I log in late at night I need to make sure that the people that I need to talk to are online. If I don't have that feature it increases the effort that I need to put to find out their ability, send an email, pick up the phone, and if they are not at their desk call them multiple times to try to reach them.

Randy located in Malaysia and part of the GT Voice Engineering team, noted that UC allows him to obtain information more quickly, not just because it supports synchronous communications but more so because it typically warrants a 'straight to the point' shorter response. Therefore, obtaining and providing technical data needed to ensure rational decision making occurs more frequently using UC.

You also get a response quicker than you do with email most of the time. It depends to because some people feel it is too problematic to respond to an email if you wrote them an essay. For example "oh there is a mail from this person" so just not respond. It can be very frustrating to see that so if I can get a one or two word answer through chat that works.

Mike, in Asia of the MADO PMO team, also discussed the speed in obtaining information using UC making it the tool of choice for him when he is need of a quick answer. Specifically his response focused at the integration of UC with email. He described the scenario where he began sending an email message to an individual, and while typing the message, he is able to see their status and know their availability. This feature gives him the option of deciding to place a voice call once seeing they are available or sending a quick chat request versus completing the email and sending it asynchronously.

When I send an Outlook message I can see if the status is red or green and know if the person is available or not because of UC. This way I know if I can send a quick chat with somebody looking at their status very quickly. I can know if I should call them or not as well.

Participants revealed that UC provides them with the ability to obtain information. Features such as chat and presence management allows them to reach out to individuals who they can easily see are online and, thus, obtain needed information. It also allows them to see who is on a conference call and ask questions based on attendees. Presence management eliminates many unknowns as to when to reach out to someone and be able to get a quick response regarding potentially urgent information. It allows users to see when someone is available, on a call, or offline. Therefore, Hypothesis Two, as stated, is supported:

The relationship performance factor of information mediates the impact of Unified Communications on perceived productivity

Performance Factor – Relevancy

When looking at how relevant the technology is to relationship building, all but three participants provided feedback expressing that the technology played a key role in supporting

their ability to build and maintain relationships with others. Most often noted was that the tools provided within UC allowed users to communicate with others more frequently. Dillon and Montano (2005) define relevancy as the degree to which a technology is pertinent to the relationship. The following quotes demonstrate how participants describe UC and its role in relationship building.

Timothy, located in the U.S. and a member of the MADO PMO team, noted that UC may not have brought the global organization as a whole closer, it has brought him closer to those he does speak with on a regular basis. Using UC, he now chooses to talk with team members more often communicating with them on a regular basis. He also referred to the ability to load a picture in one's profile as a positive factor. Being able to visualize who you are communicating with makes for richer communication and enhances his ability to build relationships.

If we didn't have UC I probably wouldn't know what they looked like. So the integration of that is interesting but I really can't say that UC has taken a global organization and made us closer, but it really hasn't done that. I mean there is a little bit of improvement there.... I do think that immediacy of the communication, you have these tools at your fingertips and you probably have quicker means of contacting people, quicker means of updating people and so that kind of means to me that you have more communication with somebody rather than less. So if you look at the minutes per day of communicating with somebody in all forms of communication you are doing that, you are spending more minutes communicating with somebody via UC than you are without it. So as the minutes of communication of your communication go up and down your familiarity with that person your knowledge of that person goes

up and down as well, so if we didn't have UC we would be talking to each other less and that means we would know each other less.

Jonathan, in the U.S. and member of the GT Expense and Planning Organization, noted that his relationships have improved since using UC because he gets to know people better, even people located outside of his office. He further notes how the informality of the chat feature creates an environment where things are communicated that one would not necessarily say in an email. UC enhances his ability to get to know who he is speaking with making UC pertinent to his relationship building capability.

I would say improved and you know and example is I would primarily target is towards my managers that I have worked for. You know it does seem to create an environment, I mean like the one we are having right now where you get to know people a little better and interact with them in ways that maybe work itself wouldn't bring you in contact with. So you know I have found that I have gotten to know people better because of it than I otherwise would. You know those interactions would probably be very limited to the people you sit around or the places you travel frequently. There are things you would say in a chat that you wouldn't say in a formal email as well because the chat is so informal... With Instant messaging there is almost like a social pressure to respond, you know. It is an implied rudeness if you don't.

A quote from Sam, located in the United Kingdom and member of the MADO PMO team, noted that through UC, he has the ability to joke and add humor to conversations which fulfills a social need contributing to his ability to build relationships:

You feel free to make comments or a joke. You add a bit of humor to OC that you don't do in email. It is a bit more personable. For instance you and I have never met.

Like if we were on a call I wouldn't think twice about saying to you like where is this going in OC, and message and you wouldn't think twice about that but some people might feel differently.

Kolby, located in the U.S. from the GT Voice Engineering team, stated that email makes him feel that the information contained in an email is stored and becomes part of a permanent record. On the other hand, chat sessions, although possibly archived, are less formal enabling him to express his feelings more comfortably and generate personal conversations. These acts leverage his ability to build relationships.

The chat is less formal. With emails you feel that they are kind formal stored, and remain part of the permanent record whereas chat is a little bit more informal even though it is probably being recorded just the same. It is something a little less formal and not as easily replicated. Personal discussions, how's your family, and having other discussions going and have those sort of discussions which helps relationships in addition to whatever kind of business you may be working on.

Kris, located in the U.S. and member of the GT Applications team, who also works virtually in the office, commented on the informality afforded in many features offered in UC. He believes this informality makes him feel a closer affinity to people located in other states more so than he does with his team located in the office. He contributes this to his ability to express himself more freely using the chat tool.

... in some ways yes [it does have an impact] because before the UC even though I sat in the office you have the tendency to be in your cubicle all the time doing the work and if you have something quick to say you might shout it over the wall but instead you might end up sending an email which might flatten everything and takes the

emotion out of it. The IM in particular, the chat you can still see people's feelings because it is more a stream of consciousness type message than the email stuff. Less formal than email is what chat does. In a way Chat allows you to be even closer than before when we were just siloes in our cubicles even all in the same place. I don't know about you but I often get chats about stuff that is work related but not directly work related or sites to other things to other things that are going on.chat allows for sidebar communication sort of allows you to move beyond the little cubicles with that sidebar communication.

Kris further notes that he feels closer to people in other locations than he does with people in his own office as he is more free in his communication with those that are not local to him while using UC to communicate.

For instance I feel a lot closer through UC to people in other states than people at my local office. It is as if the geography part doesn't matter it is who you spend the most time with and with that is that type of UC communication that develop the relationships with. This is why dating sites are so successful. You can share intimate things about yourself without worrying about the facial expressions or how you look while saying or providing information. This goes along with UC Communications.

Johnny, located in the U.S. and member of the GT Voice engineering team, stated that people feel they can say more through the UC chat feature than they can in email. He attributes this to the perception that chat is casual and email is formal. Therefore, this allows him to express his emotions and feelings more freely. He also noted that UC provides a social aspect, a necessary component of relationship building.

.....it is more informal in chat than in email because folks feel they can say things more where in email it can come back to bite your butt so to speak. There is a perceived expectation that IM / chat is casual and email is the formal approach to document actions, deliverables, or formulize a conversation that may have occurredLike with the IM we have the ability that if you are on a con call you can open up another window with an individual and say ok they are off the wall here, I think we need to do this or that , how is your day today, I hope things are going well. So yeah there is some of that personal relationships stuff that is there as well. Most of it I think it is through IM and in some cases it is nice to just get on a quick call with someone as well from the social aspect as well....Or if you got off a bad call and you can openly share thoughts and feelings and establish a bond.

Participants advised that UC is in fact relevant in their ability to build relationships which does impact their perceived productivity. Participants advised that UC broke down the cubicle walls that are in a traditional office setting allowing them to share information freely and not feel that they are intruding on each other. Participants also felt that UC was a more informal means of communication facilitating more personal expression that traditional tools such as email. Through UC, participants are able to get to know more about each other and therefore build interpersonal relationships. Therefore Hypothesis Three, as stated is supported:

The relationship performance factor of relevancy mediates the impact of Unified Communications on perceived productivity

Unifying Human Factor – Connection

During the interviews, as we discussed areas that involved the degree to which UC caused each participant to feel linked to his/her group or the organization. Most participants provided feedback that this is a feeling that they have obtained since using the technology. Dillon and Montano (2005) define the dimension of connection to be the degree to which a technology causes an individual to feel linked to his/her group or the organization. Only five of the 30 participants in this study did not provide a response that applied directly to this factor. It should also be noted, however, that an overlap was evidenced between the relationship factor of connection and the relationship factor of membership. Several participant responses related to both of these factors as they applied to their ability to breach cultural boundaries and be considered members of the same team regardless of their differences in cultural backgrounds or geographic locations. They are able to feel connected to their teams in other regions and countries through their UC tool. The perceived productivity function seen in the majority of these quotes is developing interpersonal relationships which is the ability to build an interpersonal relationship with teammates that enhances collaboration and creativity.

In many cases, the connections made occurred in a global context. For example, Kris, a GT applications engineer located in the U.S., stated that since using UC, he has developed relationships with and a deeper cultural understanding of people in other places such as in India and Europe. This increased understanding lead him to feel a greater link with the groups he works with regardless of their cultural inclinations or global location.

HP is such a wide geographic company that I find that I've developing a relationship with people in India and Europe and I have sympathies for them and things like this so that it generates not just specific work based understanding but understanding of the

cultures and the people and that helps you visualize what they might need not just individually but as a people as well. and when you look for the challenges and what you need to do you can take that into account when you make assignments or expect results, even if is not the one person you know, but I guess the bad word would be to call it profiling but it is not bad if you use it for good I suppose.

Margaret from the United Kingdom and member of the GT Telecom Expense Planning team, notes that she feels disconnected without UC. She notes that her mobile phone does not offer her the same feeling of connectedness She no longer uses a service line from her home but relies on Lync to stay connected. Therefore, with UC she feels linked to her group which enhances her ability to collaborate with them.

If I don't use UC it really impacts my productivity so. It is the air I breathe. Like I am working from home right now and I used to have a service line from home on my home line to make calls for HP right and I cancelled that because I don't need it with Lync but if my Lync connection doesn't work I am like disconnected. I mean you know I have my mobile phone but it is not the same.

Daniel, located in the U.S. and a member of the GT Data Engineering team, noted that UC has had an impact on his relationships with counterparts overseas. By using UC he feels empowered to initiate conversations which has resulted in his feeling more connected and linked to internationally based team.

It definitely has an impact especially with your counterparts overseas because it is so much easier to initiate a conversation with someone than to dial some weird number to Ireland or the UK or whatever. So it definitely encourages you to initiate those conversations. Without UC this would be gone.

Mike, located in Asia and a member of the MADO PMO team, made an impactful statement in saying that UC has become a lifeline for him and without it he feels disconnected. Just as noted by Margaret, UC creates a feeling of group connectedness that otherwise would not exist. Mike also stated that UC has allowed him to develop and maintain connections to coworkers as well as to others with whom he has relationships such as family and friends.

.....if the UC window is not on I feel disconnected. If Lync is not up I feel disconnected. It is a lifeline now. It is so important. It makes you feel so connected, not just with your coworkers but with family friends, everyone.

Samuel, located in the U.S. and a member of the Data Engineering team, noted that his usage of UC tools has allowed him to elicit collaboration as he is able to initiate many forms of communications and request commitments where needed by knowing the availability of his team. These features allow him to connect and collaborate with his team.

My favorite feature is IM because that can initiate many, many other things, it can initiate a phone call, it can initiate pulling others in, a video call. It all starts with IM. You can see presences. If it is red or green I can IM them. If I see them green instead of IM'ing them I will just call them. Further and deeper conversation through IM are started, you can see status, if I see them green sometimes I will just call them through UC.

George, a member of the MADO PMO team in the United Kingdom, used an analogy to express the benefits of UC. He compared UC to knocking on someone's door and inviting them to join in, even though it is a virtual environment. This makes the world feel a little bit smaller. This type of interconnectedness makes UC a collaboration tool of choice.

It makes global operation a more smaller operation where you feel that everyone is on the same virtual environment and you can just knock on everyone's door. If we couldn't work like this work would be much slower. It wouldn't be impossible but it would make home working much more difficult. It is functionality where as if UC wouldn't be available for those in the office or for home workers we would actually both be similarly disabled. It is a collaboration / visual collaboration tool where you can share documents. A communication tool where you can quickly send messages without voice, it is a communication portal where you can use it instead of a telephone. It is a true collaboration tool that is integrated into the MS office product so it works very well.

Andrew, located in the U.S. and member of the GT PMO team, also notes that because of UC better relationships can be established with those all around the world. This, in turn, makes HP a stronger company by removing barriers and eliciting feelings of connectedness.

We are spread out around the world. Without being able to use UC basically I'd be stuck with a cell phone, worse yet, the cell phone or cell phone bill, cell phone and the calling card, or I'd basically have to dial on the regular phone. So of course it would be more expensive to me to be able to maintain the same quality of the communication. Just being able to have to do that back and forth, multiple times in the day it's just painful. There are all sorts of things that you can start imagining that replaces things in the traditional voice world that has lower cost of hopefully higher productivity, and the things we talked about such as having better relationships with coworkers, and other organizations around the globe. So HP basically becomes a stronger company

and breaks down those barriers so basically I think that we add a great value to the company.

Participants advised that UC made them feel more connected to their groups as they are able to reach out to them regardless of geographic location and collaborate with them. Without having to check the time zone, they are able to clearly see when a team member is online and connect with them. In some cases, a simple chat session can evolve into other things such as a live phone call or voice conference allowing them to collaborate more effectively. These quotes support Hypothesis Four which is stated as follows:

The relationship unifying human factor of connection mediates the impact of Unified Communications on perceived productivity.

Unifying Human Factor – Membership

Dillon and Montano (2005) define membership as the degree to which a technology prompts an individual to feel a part of his/her group and the organization, with a focus on the individual as part of the group or organization. Feedback directly from participants in regards to membership was provided by just over half of the interviewees. Fourteen participants did not provide feedback in regards to this specific dimension. However, based on feedback received, an issue of participants not feeling they were a part of their group or segment was not evidenced. Perhaps the fact that all participants were members of the group providing feedback for the UC roll out accounted for mutual feelings of membership. However, the technology appears to have brought some participants closer together as noted in the data specifically applied to the relationship factor of connection. There is overlap between the connection and the membership dimensions in the feedback. They represent similar ideals, an

individual feeling as if they are part of something. Several participants noted that UC did facilitate feelings of belonging.

The comment noted by Sam, located in the United Kingdom and member of the MADO PMO Team applies to convenience, connection, and membership as it states how one can now hear the sincerity in voices when using the Click-to-Talk feature in UC. Sam went on to express how much clearer the communication is when he can talk to people versus only having the ability to type a message. He states that the UC technology has reinforced his ability to maintain interpersonal relationships.

You can communicate more clearly to them. I think I like that because that brought back a more interpersonal working relationship with people that I think we lost when it was jabber or email, and phone because people stopped using phones but just jabber and email and now you can just say pick up the phone and say let's have a chat (Click-to-talk). People can hear the sincerity in your voice. It can sometimes come across quite stern when you type it in in OC.

Samuel, located in the U.S. and member of the GT Data Engineering Team, noted that through the IM feature of UC, he is able to bond more with his team and speak with others whom he normally would not have a chance to communicate. He can also get information on task related items from his team without interrupting them and feels he is more open and available to his team. This strengthens, not only Samuel, but his team's feelings of membership to the group.

So for me building a better relationships with individuals that I normally would not have the contact with on a routine or daily basis, it makes the work the work environment a lot more personal and like I said when I talk with people more often whether it is just IM

and I work with them closer, otherwise it is an email most likely, it builds a better relationship and certainly builds confidence in the both of us, and hopefully it builds in my confidence in them and hopefully it is the same where they feel hey he is easy to reach out to or “Hey can I ping you”. I tell my team I’m there, I’m on IM I live on it and that is how I conduct a large amount of my business, don't hesitate... There are people that I talk with so much because there are so many things that are crossing our paths and I say “Hey how are you doing today” comes out, just to keep that relationship, but the majority of people I would not have contact with on a routine basis on my team if I did not have UC... I am able to IM with freedom to say “How’s it going” and “Hey can you provide something” and I am not truly interrupting what they are doing... I wouldn't talk to them as often. I talk to people via IM all the time and am open for them to reach out to me and say hey how you doing. Don't ever hesitate to do that. Through UC I know something else is coming 90% of the time.

Similar to responses received when reviewing the relationship factor connection, participants advised that UC made them feel as if they were more a part of their group as they are able to talk more because of the convenient elements of UC and perceive sincerity in the sound of other team member voices. They are able to use the tool freely and asked members of their groups “how they are doing”, etc. before jumping into work conversations which creates a bond that reiterates they are a team and are in it together. As previously discussed, there is some overlap in connection and the membership factors but based on the participant responses, Hypothesis Five is also supported:

The relationship unifying human factor of membership mediates the impact of Unified Communications on perceived productivity.

Unifying Human Factor – Entitlement

Very few of the participants stated anything that related to a feeling of entitlement.

Dillon and Montano (2005) define the entitlement dimension of relationships to be the degree to which an individual feels he/she has a right to something because of his/her relationship to a group or to the organization. This, again, might be attributed to the fact that the majority of participants were engaged in the roll out of UC and were entitled to having first access to using the tool. In addition, as noted by McIver, et. al. (2003), the right to communicate is a basic universal human right, so users may perceive that entitlement is implied through the use of UC.

Three participants did provide comments that related to how they might expect something in return for using UC or from mutuality based on relationships maintained through the use of UC. One example might be an expectation of more expeditious responses.

Dan, located in the United Kingdom and a member of the MADO PMO team, advises that as he gets to know someone he is more apt to notice a message they send more quickly than a message he received from someone he does not know. He also indicated that people tend to make more time for him and he can get them to do favors if he has a relationship with them. Therefore, he feels those individuals are entitled to a quicker review and a faster response and, in return, he is entitled to be able to ask them for favors.

It, [UC], helps that you know someone for sure. You notice what they send you in the queue more versus someone you don't recognize. It makes it a bit easier. I think it would help because the person would have more time for you. They would do more

favours. You could get them to do a change done a bit faster than they normally would because they know you.

Jean, located in the U.S. and a member of the GT PMO team, notes that she expects a response right away or in a few minutes when sending messages through UC, especially if the other person's status is green, meaning available. Jean feels entitled to a response from an individual she is working with if they are showing available in UC.

I love being able to see what people's status is, whether they are available, in a conference call, in a meeting, I love that, because then you know if you can just ping them and get the expected answer right away, but I think everybody at HP is pretty good about keeping their status accurate. So those expectations, if you are green and are available you should respond within a minute or a couple of minutes anyway.

Sam, located in the United Kingdom and a member of the MADO PMO team, notes that he expects, or is entitled to, a straight forward response from team members who also use UC. For example, when he has established a relationship with someone, he is willing to accept a short 'yes' or 'no' response without perceiving it to be rude.

You build up the relationship of being able to talk like we are now using the Click-to-Talk functionality. Me knowing you like I know you now, and you giving me a response such as "NO" I know that you are just giving me the response, because I know how busy people are and you giving me a response such as "NO" that's all I wanted anyway and you build that up. That is why I like the Click-to-Talk feature because you can get to do that (build it up) whereas if you don't know a person they would take a response like that differently.

As Jake, from Asia and a member of the GT Voice Engineering team, put it simply. When

using UC, a response via UC will come sooner or later. Therefore when sending someone a chat invitation through UC he feels entitled to some form of response.

...if you need to engage somebody you can engage their availability based on their presence and get their responses sooner than later.

Only three participants provided feedback in regards to entitlement. Each advised that they felt that a response, or participation was guaranteed to come eventually when using UC. One person advised that with people to whom you have a relationship, it is not an issue to receive a quick response such as 'NO' through a chat window as it is accepted as a form of response to a question.. It is not taken in the wrong way because of the relationships that the two users have with each another. Another participant expressed that a response will come eventually when sending a message through UC. However, because of the small percentage of participants providing feedback that could be applied to entitlement it does not appear that the interview data supports Hypothesis Six which is as follows:

The relationship unifying human factor of entitlement mediates the impact of Unified Communications on perceived productivity.

Distinguishing Human Factor – Differentiation

Comments relating to the degree to which UC enables each participant to be recognized as important and treated as unique, as defined by Dillon and Montano (2005) as differentiation, were somewhat vague. Comments most closely related to differentiation were more associated with individual credibility and recognition for the roles performed within their organization. The technology allows for one to see another person's status and their title but that within itself may not be considered to be differentiating. The general consensus

appears to be that UC promotes feelings of equality, not hierarchy. Further UC does not inhibit anyone's ability to approach another individual due to their role or status in the company. The only possible characteristic of differentiation identified by a majority of participants was a feeling that UC allowed them to use more informal communication structures when communicating with someone to which they had a working relationship.

Four participants did provide responses that might indirectly support the factor of differentiation. However, each of these comments could also be attributed to a different relationship factor.

The comment made by Dick, located in the U.S. and member of the GT Data Engineering team, could just as easily apply to the convenience factor as to differentiation., Dick describes how he can organize contacts into pools or groups. It might be indirectly argued that he is differentiating each individual based on their role in the company or relationship he has with them, therefore enabling them to be recognized as important and treated as unique. On the other hand, grouping members together makes it convenient to share information commonly amongst that group.

[Through UC] I also can create pools of my contacts which allow me to organize contacts better.

Randy, located in Asia and member of the GT Voice Engineering Team, stated that he has noted improvement in his communications since using UC. Specifically, he noted that individuals reach out to him directly now and they appreciate that capability. He further noted that without UC, individuals tend to reach out more so in email where words were more carefully chosen. On the other hand, he noted that the chat feature of UC tends to help 'tone things down a bit.' His statement certainly applies to the benefits UC brings to

communication but it also can be inferred that through the use of UC he has gained more recognition as an expert. UC has allowed those he supports to get to know him more as a unique individual and because of UC he is more so recognized as important and treated as unique for his expertise in his area of responsibilities.

Because I have never met them [some of the people I support] personally so all our communication is done over UC. So I have seen a lot of improvement where people will just get on Lync [the UC tool] with me and just reach out to me and talk to me in chat. If the project managers need help they will just call me up directly and I usually do entertain them and they are more than happy with it and with that it kinda builds up a different relationship. If we were not to have the UC we would just email each other and sometimes the choice of words used in email tends to offend people because people read it different ways and might find it offensive. Sometimes the call or chat will tone things down and let them understand the kind of person you are.

Robert, located in the U.S. and member of the GT Voice Engineering team, discusses the feature capabilities of UC allowing users the ability to list their personal contact information or state their status such as 'Do Not Disturb' (DND). This can be perceived as a differentiation factor because you can identify yourself as unique by providing personal information. Further, having the ability to choose your status as DND, Busy, or Away gives one control over their status. However, as all users have this same control, this feature of UC might better be described as a customization dimension of relationships.

Lync allows you to give users capabilities, such as contact information, etc. interrupt in DND, etc.

Corey, located in the U.S. and member of the GT Applications Team, noted that since using UC he is able to communicate with “those outside of his organization and develop a respect and kinship with those he communicates with.” This could be viewed as a means to differentiate as mutual sharing and getting to better know someone increases recognition and treatment as an individual.

For example when dealing with this migration for WFM I communicated with a couple of individuals outside my org whom I had been working with and we overtime developed this kind of kinship and respect for each other right and so when an opportunity came to travel and do some training together we already had informal communication outside of work. So we would be dealing with the work situation but then diving into the personal stuff. So when we met each other it was like we already had some type of relationship and respect for each other so. It was like oh "hey so and so". So when we met face to face it eased the tensions that you have when you typically first meet someone.

Each of the comments relating to differentiation leverage different functions of perceived productivity, however they appear to be too vague to validate Hypothesis Seven. Participant feedback could easily be attributed to customization but when trying to define them as confirming differentiation it is more so a matter of interpretation and therefore does not clearly validate Hypothesis Seven which is noted as follows:

The relationship distinguishing human factor of differentiation mediates the impact of Unified Communications on perceived productivity.

Distinguishing Human Factor – Customization

Twenty-four participants provided comments that relate to the degree to which a technology is tailored to the needs of the organization as defined by Dillon and Montano (2005) as the distinguishing human factor of customization. UC provides many features that may be customized based on the needs of the organization. However, as the UC roll out continues, features and functions made available to organizational users of UC will be customized based on user feedback. For example, the call and conferencing recording feature was not implemented by HP as there were concerns that it might violate privacy requirements in some countries.

Most comments related to customization made by participants in this study were about the ability to choose to use or not use the video conferencing feature of UC. Through the tool, there are ways one can customize whether to talk with or without video turned on. Several reasons were cited as to why such customization is important.

Charles, located in the U.S. and a member of the GT Applications Team, noted that he works from home a lot and chose not to use the video feature because it is not of benefit to him and is not required to meet his organizational needs. He states that when activating the video feature, he has to remind his wife or children to not interrupt him while he is trying to work. .

I work at home a lot...[and] when you are not at the office and you are like yeah ok [to use video]. When you are sitting at your desk you are like yeah that's fine you know but then if my wife or my kids are around I have to remind them to not ask me a question or interrupt the conference and all that kinda stuff. It's more trouble than it's worth.

Cindy, located in the U.S. of the MADO PMO team commented that she does not think the video feature is used as much as the other features of UC. She also noted that she does not want people at work to see her in her pajamas or before she has had her coffee so she does not use the feature. She also indicated she does not need the video feature to meet her organizational needs.

I don't know that everyone has a camera; it is just not as prevalently used as the other forms of UC. I'm also not near an office with a HALO Room, [a video conferencing room]. I take conference calls in my PJs, and I don't want people to see that or see me when I first wake up before my coffee.

Sam, in the United Kingdom of the MADO PMO team, noted that he views the Video Conferencing feature of UC to satisfy a more personal need rather than a work requirement so he chooses not to use it.

From my perspective video conferencing for personal use for people who are apart thumbs up. Video conferencing with in the work environment, and using it all the time with every conversation you have with someone...I just don't see the point of it. It actually to me would be more of a distraction.... I just don't see the value of it in anyway.

Christian, located in Asia of the GT Voice Engineering team stated that he rarely chooses to use the video conferencing feature of UC because it is not required to satisfy his organizational needs. He also notes that it takes time to setup the camera, and when he works from home, he feels it encroaches on his home environment.

I would say the one that I least use, not that I hate it, it is just that I can get most of my things done without using it is video conferencing. You have to setup the camera, to

use it, so it takes more effort instead of just click and you are on a call and also the visual kind of thing [I don't like]. I'm at home, and you don't want people to see you and also you have to setup your camera and setting up my camera is not probably the best thing. I think I have done that a few times before and the camera has to be you know setup properly. It doesn't feel like home anymore if I have to get dressed up just to do video conferencing.

Most of the participants provided feedback advising of the customization abilities offered through UC and expounded upon how they are able to use the technology more appropriately to fit their needs making them able to work more efficiently. As previously noted, most of the comments deal with the ability to choose when to use the video conferencing feature. This being a global company, many of the participants work at odd hours and due to their various job functions some work at home. In cases where at home or not in an office, it is a benefit to not be required to have video running. However, video can be a benefit when trying to be more personable and work as an alternative when in person face-to-face interaction is not possible. Because most of the participants provided feedback regarding the customized abilities of UC, the responses validate Hypothesis Eight which is stated as follows:

The relationship distinguishing human factor of customization mediates the impact of Unified Communications on perceived productivity.

Documentation Findings

In order to further assess the impact of the use of UC at Hewlett Packard Company, internal documentation was reviewed. The documents in this section represent communication sent from senior leadership alerting employees of different UC functions and features as they are rolled out to various organizational segments. In most cases organizations within the company such as Global Telecom are given the first opportunities to try out UC functions and features prior to its roll out to the masses. GT as well as other internal IT organizations within HP are considered part of what is termed “IT first.” Teams within IT First were tasked providing feedback to the IT support teams in regards to noted issues they encountered while using UC, or required changes they would recommend. Many of the documents reviewed supported the hypotheses as outlined in Chapter 4. Individual names of those sending these emails have been removed for privacy purposes. An analysis of the document review follows.

On June 27th, 2012 an email was sent from the VP of HP IT Operations Control to members of IT First notifying of the roll out of Lync PC phone functionality. This is an enhancement to the Click-to-Talk feature as it provides the ability to dial a number through Lync. This number will show up caller ID. PC phone also provides a call back option. The VP advised that being part IT First, members were given the opportunity to test new services first. Members were asked to provide feedback about their experiences so that the operations team could make changes before PC Phone was rolled out to the rest of HP. On October 24, 2012, a subsequent email was sent stating, as a result of the feedback received, PC phone would be included as part of the UC platform roll out.

These documents provides support for several of the stated hypotheses. The convenient nature of the options provided with PC Phone supports Hypothesis One (H1) as

the PC Phone feature was specifically added to make communication easier by requiring less effort on the part of users. The enhancement provided by the tool that allows users to share information through dialing an outside line, when needed to obtain information supports H2.

Finally these documents demonstrate support for H6 and H8. The documents confirm that HP supports that users are entitled to communicate and they are enabling the ability to do so. In addition, the documents demonstrate that the technology is customizable and this customization is informed by user feedback. A copy of the original emails can be found in Appendix F and Appendix I.

On August, 8th, 2012 the Global IT Services team sent out an email to members of 'IT first' as a follow up to the notification of adding the desktop video functionality through Lync. In this email, the team asks for feedback and asks that those who are not using the feature to begin using it. This email supports the interview findings that many study participants chose not to enable the video feature. A copy of the original email can be found in Appendix G.

One September 28th, 2012, a HP Manager forwarded an email highlighting feedback received from a previously held IT Town Hall meeting. One person provided feedback that indicated UC actually made travel easier as it provided a solid means of communication even when cell outages were experienced. Another respondent stated that at the Town Hall meeting, an IT director stood up after hearing someone complain about Lync and discussed his experiences with Lync including how easy it is to use and how it is a great productivity tool for him. This same director advised that he prefers Lync to using a mobile phone. He also indicated how easily he was able to initiate a conference call with someone in the Far East.

Finally, he asked everyone at the Town Hall to raise their hand to see if Lync was a productivity enhancement. Approximately 95% of about 300 people raised their hand. In another story, a CIO told of how he used to call his wife from his cell phone but now uses the UC platform to call her. His wife expressed how much better he sounded and asked that he never call her from his cell again. These types of testimonials from senior leadership encourages user acceptance especially as they demonstrate its usefulness and purpose (Davis et al, 1989). A copy of the original email chain can be found in Appendix H.

On December 18th, 2012, Jonathan forwarded an email ‘news flash’ stating how Microsoft Lync is changing the way that HP communicates. Jonathan calls the news flash a “Great global advertisement of an innovative service changing HP!!” referring to the UC tool, Microsoft Lync. This applies to the studies reviewed by Rennecker and Godwin (2003) as this communication shows the belief in the benefits of the technology and encourages user acceptance (Davis et. al., 1989). This email demonstrates that users perceive UC as having an impact on the way they communicate and subsequently their productivity. A copy of the original email can be found in Appendix J.

On May, 7th, 2013, a letter was sent from the Vice President of HP IT Employee Experience Services requesting feedback from ‘IT first’ members on the Click-to-Conference feature of Lync and advising of the other features currently available including Click-to-Talk, Click-to-Conference (also known as Ad hoc conferencing) Click- to-Share, PC Phone, desktop video, and scheduled Conferencing. The original email also includes links to user guides and training resources imbedded in each feature. In order to fully realize a technology investment, users must see the full benefit of that technology and training is a primary way to

facilitate this (Al-Gahtani, 2004). Providing training resources also encourages use. A copy of the original email can be found in Appendix K. For privacy purposes the links contained in the email have been disabled.

Summary of Findings

The findings helped to discover a set of clearly delineated functions that users attribute to productivity. These functions were a result of improved communication capabilities and support relationship building opportunities facilitated through the use of UC. The documentation analysis demonstrated that HP has repeatedly attempted to show its employees the benefits and usefulness of UC which supports research conducted by Brown, et. al. (2002) that states that the ease of use and usability of technology are drivers to its use. The roll out of the various features as identified in the documentation findings and the ability of the users to choose which functions to use is a reflection of the research conducted by Hill, et. al. (2006) who advise that allowing users to integrate the technology as their needs evolve increases productivity as well. HP has offered rewards for those who agree to provide feedback of the technology showing a clear assumption that they believe the technology will provide the benefits such as speed and accessibility as noted in the research conducted by Rennecker and Godwin (2003).

The documentation findings compliment the interview data. UC has been received positively by the participants in this study. For the most part, they perceive it has had a positive impact on their productivity in ways such as improving efficiency, speed, supporting multi-tasking and facilitating interpersonal relationships. Further, as demonstrated in

interviews and documentation, UC provision for customization plays a major role in its applicability to meeting organizational needs directly contributing to the successful implementation and use of UC at HP.

The findings related to relationships clearly show that participants feel UC provides them with an improved ability to communicate with global team mates and the other groups they support. Because UC provided both formal and less formal channels for communication, users are able to choose the medium that best suits the situation. This has a positive impact on relationship building and contributes to users feeling more productive as they are able to obtain information more quickly. They also contribute to other's productivity as UC makes them feel a stronger obligation to respond to requests more quickly. Users expressed how much closer they feel to those who maybe overseas as UC provides them the feeling that the person they are communicating with is in the next cubicle. The results of this study support the factors of relationships as described by Dillon and Montano (2005) combined with the results of this study's theory of perceived productivity. Of the eight purposed hypotheses, six were supported by the findings of this study. This implies that the use of UC does in fact improve perceived productivity because of the relationships that UC helps participants to build across global boundaries.

CHAPTER 6

DISCUSSION AND CONCLUSION

Discussion

This study attempts to answer the following questions: *How do users perceive UC impacts productivity? Does UC affect relationship building among team members, and does this lead to an increase in perceived productivity?*

Based on the findings, it appears that the features of UC facilitate better and easier communications. This ultimately encourages communication between colleagues and members outside of the organization. UC provides support for speed, efficiency, multi-tasking, and developing interpersonal relationships. These functions facilitate perceptions of increased productivity as users are able to easily communicate through one means yet still continue to be on a conference call, type up an email or work on another task. In addition, the results show that participants take pride in knowing that using this tool saves the company money. Senior leadership has provided testimonials as to how they feel this technology has made them more productive and through a series of emails senior leadership has identified to members of the IT organization that their feedback is important and is being incorporated into the overall strategy for the company wide roll out of UC.

Through the ability to communicate more easily, countless relationships are formed which in many cases cross regional boundaries. UC helps to remove cultural barriers and builds respect for those with diverse cultural backgrounds. As noted in the results, some of the participants feel that when even in the same office location, UC has made their ability to

communicate more successful as they no longer have to get up from their desk or leave a voicemail to seek out an answer to a question. The research noted by Carte and Chidambaram (2006) is applied as the results show that the technology provides enhanced capabilities to these diverse teams as it provides a rich form of communications. It also provides an electronic trail and encourages equality in participation in that everyone at all levels of hierarchy use the same tool to communicate.

Based on the results of the findings, it does appear that the most valued feature is the chat feature, outside of the company standard email. Chat allows for multiple windows to be opened at the same time, allows for concurrent chat sessions to be maintained while on a conference bridge and if a voice call is warranted, it is only a click to turn a chat into a voice call. The research conducted by Lowry and Cao (2011) can also be applied here as through the ease of use there is a reasoned action to self-disclosure for the purpose of expressing feelings, establishing credibility, or interacting socially because of the ability to use the tools for and while completing work related tasks. HP leadership has encouraged a positive attitude towards the use of this technology. According to Lowry and Cao (2011), a positive attitude toward self-disclosure technology positively predicts behavioral intention to use self-disclosure technology.

The least used feature of UC appears to be video conferencing as most respondents did not see the value add, or the need to use this feature, in order to successfully complete their work. Features of UC such as the chat feature and the ability to see presence status and images appear to be the preferred alternatives as video requires more restrictions in the ability to multi-task as well as the ability to be in any form of attire while completing work. As noted by Kayan, Fussell and Setlock (2006), while numerous IM clients are moving toward

supporting audio/video interaction, the preponderance of previous work has failed to show the benefits of using video.

Research gaps appear to exist in that previous studies of UC appear to be single focused in regards to its impacts, therefore isolating the impact it has on productivity from the impact it has on relationship building as two separate occurrences. This study, however, supports previous research but points out that the end result of better communication and better relationships is improved productivity and therefore these three variables are linked and form the final result of productivity for organizations who thrive on collaboration and diversified teams.

Future research

This study examines the impact of UC on individual perception of relationship building and productivity. In future research, quantitative methods can be applied to validate the perceptions denoted as part of this study. This research can possibly be derived from reviewing HR files to show yearly evaluations of work and accomplishments of users of the tool and note any improvement or lack of in their yearly goals. If looking at other organizations such as sales or marketing, perhaps reviewing how many deals were won since using the tool versus before the tool was implemented. Other areas of research could include employee retention and determining if relationship building and maintenance facilitated through the use of UC encourages employees to remain in their positions longer or to stay with the company. Researchers can also look at UC to see if there are any negative impacts resulting from a reduction in face-to-face interaction and if this lack of interaction contributes to reduced productivity.

Conclusion

The results of this study support that the communication capabilities provided via UC do have an impact on relationship building which, in turn, has an impact on perceived productivity. Results further show that UC tools once only required in a virtual team environment can also be leveraged when workers are co-located in the same office. Investment in technology, such as UC, can, in fact, remove the perceived barrier or isolation of virtual versus co-located teams as users in both types of environments can benefit from the technology and feel more productive. For instance, some of the findings suggest that the ability to be able to work from home makes one feel more productive as they are more comfortable and do not have to take time to dress to go into the office even while they retain the ability to be communicative and build relationships with their team members. Comments such as these would of course apply to the remote or virtual worker. However, other comments such as noting that through UC there is no longer the need to walk to another cube, as the tool allows one to continue working at their desk while interacting with a coworker in the same office, would apply to someone co-located with other team members who also leverage the technology. Synchronous communication through computer mediated communication helps foster creativity and idea generation in a team environment (George & Sleeth, 2000).

Information noted in Appendix N, from the HP internal study suggest that even those who do go into the office on a regular basis tend to go home and work and therefore become virtual workers after hours. Appendix M shows that even in other diverse organizational segments, users tend to notice their Office Communicator (older version of Lync) upon

logging in and it is one of the top six applications used by these various teams even before going into the office.

The key here is communication and in order to have a good communication flow, the results show that some form of relationships must exist. Relationships among team members contributes to a willingness to be more responsive, provide more assistance, and do more favors which, in turn, increases perceptions of productivity. Therefore, this study contribute, to the literature in regards to similarities of virtual and co-located teams due to UC technology as well as provides a better understanding of the soft benefits that technology such as UC can provide. Businesses can leverage this information as well as they consider which features and functionality of UC should be prioritized for implementation and provides the best benefit to their organization. The ability to be able to work with and communicate on the same platform can also remove cultural barriers and enhance diversity within a team. It also removes barriers of time zones.

The theory of perceived productivity when using communicative technologies developed as part of this study can be applied to prior research such as that of Sinan, Erika and Marshall (2012) that states that multi-tasking and the ability to share knowledge through information technology tools has a positive impact on productivity. Other research such as that of Weihua (2011) state that some of the top benefits of UC is the ability to create a speedier workflow and facilitate real-time accessibility increasing the speed at which issues are resolved and work is completed. . Other benefits noted by Weihua (2011) include that knowledge and information transfer provide the ability to strengthen relationships between peers.

This dissertation proposes that users feel more productive when communicative technologies such as UC allow them to build interpersonal relationships with team members, feel more efficient in doing their jobs because they are saving the company money, have more speed in getting tasks completed, and are able to get more than one task completed at a time. When evaluating each of these functions and the results from the findings, it is assumed that the functions of efficiency, speed, multi- tasking, developing relationships are the product of using UC as a communicative technology. As noted in the findings, many participants felt that the use of UC made them feel more approachable and on a level playing field with all members of HP regardless of title or role in the company,. UC made the communication less formal and therefore gave them the freedom to express themselves not offered in other formal communications such as email.

Based on this theory, organizations as a whole, can then leverage and accommodate the opportunity for their employees to have better relationships knowing that the end result will be ensuring that their employees will also be more productive. This can be done by offering technology tools such as UC which allow employees to communicate more easily and therefore give them a wide array of communication options. The results of this study also compliment the research of Carte and Chidambaram (2004) which show that high levels of additive capabilities when using technology such as UC in diverse teams therefore enhancing coordination support, projects and priorities, an electronic trail and enhanced capabilities that support decision making and rich messaging.

Contributions

This research contributes to studies on perceived productivity and the functions that should be considered when assessing perceived productivity including the ability to communicate informally and therefore build relationships. It provides an understanding of the impact UC has on relationships and improved productivity in environments where collaboration is required to complete task. In addition, this research can be applied to future studies on organizational effectiveness when using collaborative technologies. It can help organizations determine which tools of UC have the most impacts in building relationships and make investments where needed to enhance the ability to build more relationships among teams. The study confirms that for some the benefits of UC can be seen whether working co-located in the same office or working on a virtual team. As seen in the results of this study, this technology can also assist in removing cultural and diversity barriers as it promotes informal conversation and therefore the ability to form interpersonal relationships enhancing team effectiveness on a global scale.

Limitations

Limitations of this study include the fact that the research participants of this study work for an IT services company; therefore, the use of technology such as UC may not be typical in other industries. HP has over 300,000 employees but only a small segment of these employees were able to be participants as part of this study which can limit the representativeness and thus the external validity of the study, however this sample is considered representative of the organizational segments included as part of this study. In addition, the company is a global operation where companies that are based in the same region may not rely as heavily on UC for communication. Other limitations include that the

interviews were not able to be conducted face to face, however this may not be considered a limitation by some as conducting interviews using features of UC remove certain challenges including the need to travel (Volda, Mynatt, & Erickson, 2004).

The data from this study also comes from two organizations within the same company. Data results may differ in other organizations at this company such as in sales, or marketing and there remains the possibility of various impacts on relationship building and perceived productivity in those environments. For example, Appendix L shows HPs internal study in regards PC usage prior to going into the office setting is much heavier in engineering organizations versus clerical roles such as administrative assistants as they tend to leave their computers on.

Summary

Dillon and Montano's (2005) factors of relationships can easily be mapped to UC features as depicted in Table 6. The findings also provide an analysis as to how these factors also influence the user perception of their productivity.

Table 6. Variables Influencing Relationships Mapped To Features of UC

Factor	Definition	UC Function
Performance Factors		
Convenience	The degree to which technology makes communication easier, requiring less effort.	The Click-to-Talk, chat, and conferencing features of UC have provide convenience as they allow the user to change from instant message to voice conversation without having to pick up a phone and dial a number.
Informativeness	The degree to which technology is capable of providing the desired information.	Users can share desired information through all the communication tools UC offers.
Relevancy	The degree to which the technology is pertinent to the relationships.	Through UC, groups can be created based on affiliation with the user. Relationships can be created through being able to communicate quickly using the various features of UC.
Unifying Human Factors		
Connection	The degree to which a technology causes individuals to feel linked to groups or the organization.	Members of the various groups can always be accessible through UC regardless of location.
Membership	The degree to which technology prompts individuals to feel a part of their groups and the organization. This differs from connection in that the membership focuses on the individual as part of the group or organization.	Users have the ability to check status and reach out to team mates regardless of location and add them to various personal groups through UC.
Entitlement	The degree to which individuals feel they have a right to something because of their relationship to a group or to the organization.	Specific groups can be given different access to UC based on their organizational roles and feel they have a right to this access.
Distinguishing Human Factors		
Differentiation	The degree to which technologies enable individuals to be recognized as important and treated as unique.	Users of UC can be identified by name and job title when selecting them for communication functions.
Customization	The degree to which technologies are tailored to the needs of the organization.	Organizations and individuals can choose which features of UC would be more beneficial and customize as needed.

The results of this study validate that of prior research in that technology such as UC can improve communication, relationships, and improve perceived productivity. This study however builds upon prior knowledge in that it shows that the reason it can improve productivity is because of the relationships it has helped users to build through providing them with better forms of communication. It also validates that the use of these technologies and its impacts can be seen in co-located as well as virtual teams and eliminates barriers that may appear more prevalent in more face to face driven organizations.

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APPENDICES

APPENDIX A: INTERVIEW GUIDE

**Interview Guide to examine how UC has impacted your relationships with your peers
and ability to be productive**

1. Demographics (age, gender, years at company, location, roles and responsibilities).
2. Rank your usage level from 1 to 6 for various UC features including Click-to-Talk, email, video conferencing, ad hoc conferencing, scheduled conferencing, instant messaging/chat. One meaning you use it the most and 6 meaning you use it the least.
3. What percent of your time do you use UC for various tasks including social and work related during the business day versus face to face interaction?
4. What is your favorite feature of UC? Why?
5. What is your least favorite feature and Why?
6. Do you feel your interpersonal relationships with colleagues / team members has remained the same, improved, or worsened since communicating via UC? Please provide an example.
7. Do you feel your communication with those outside of your organization has remained the same, improved, or worsened since communicating via UC? Please provide an example.
8. How would losing the ability to communicate via UC impact your relationship with your colleagues? Please provide an example.
9. How would losing the ability to communicate via UC impact your work? Please provide an example.
10. Do you think that your relationships with colleagues and those outside of your organization has worsened or improved your productivity at HP? Please Explain
11. What do you perceive to be the greatest benefit to the use UC at Hewlett Packard?

APPENDIX B: HP'S SURVEY STUDY

Hewlett Packard has already conducted its own research in relation to their use of UC. The first roll out of UC was given to all those part of the Global IT organizations. Surveys conducted by IT focused on identifying and remediating issues with PC Phone and Scheduled Conferencing infrastructure and services, as well as validate if performance of service is optimal for end-users. 4,591 HPIT employees at 12 locations within the US, France and Ireland were asked to participate in the survey with only 20% participation. An isolated study of 120 users was also conducted at Bern Switzerland to determine what improvements were needed. The goal was to provide a seamless transition of users from a legacy voice platform to Lync PC Phone in order to produce a Site Pilot playbook by validating deployment procedures in support of site transformations led by Global Real Estate at HP. Ranking by service at the Bern site consisted of the following results:

Average Rating by Service

- Click-to-Talk = 4.75
- Click-to-Share = 4.50
- Conferencing = 5.00
- Instant Messaging = 4.25
- PC Phone = 4.21

Very Bad	Bad	Ok	Good	Very good
1.00	2.00	3.00	4.00	5.00

Feedback Comments

- This is more than cool...well done!
- Hope that we roll out as quick as possible for all sites
- Absolutely great service, works flawless for me

- The functionality is really good
- Impressive performance, audio quality outstanding
- Easier to make a call but incoming call is not easy to recognize
- From home, audio quality suffers

These comments and survey results are interpreted to mean that the technical functionality of UC are considered good on average.

APPENDIX C: RELATIONSHIP MATRIX

Category	Dimension	Quotes from interview #
Performance Factors	Convenience - the degree to which a technology makes communication easier and requires less effort	
	Informativeness - the degree to which a technology is capable of providing the desired information	
	Relevancy - the degree to which a technology is pertinent to the relationship	
Unifying Human Factors	Connection - the degree to which a technology causes an individual to feel linked to his/her group or the organization	
	Membership - the degree to which a technology prompts an individual to feel a part of his/her group and the organization, with a focus on the individual as part of the group or organization	
	Entitlement - the degree to which an individual feels he/she has a right to something because of his/her relationship to a group or to the organization	
Distinguishing Human Factors	Differentiation - the degree to which a technology enables an individual to be recognized as important and treated as unique	
	Customization - the degree to which a technology is tailored to the needs of the organization	

APPENDIX D: PRODUCTIVITY GROUPING FORMAT

R#	Productivity/Performance
	Productivity
	Quote from Interview in relation to productivity
Category	Quote from Interview

APPENDIX E: PRODUCTIVITY TABLE FORMAT

Name		Quote		Perceived Productivity		Categories		Description	

APPENDIX F: EMAIL SENT JUNE, 2012 ASKING FOR PC PHONE FEEDBACK

From: [- HP IT Global Operations Control]
Sent: Wednesday, June 27, 2012 12:28 PM
Subject: We need your feedback about PC Phone!



[Vice President, HP IT Global Operations Control]

To: IT personnel in Les Ulis, Grenoble, Leixlip, Boise, Houston, Alpharetta, Ft. Collins, Palo Alto, and San Diego

Please do not forward this message

Being part of HP IT gives you the opportunity to test new services. One of the services that was rolled out to your site recently is PC Phone. We need your feedback about your experience with the service so we can make any changes before PC Phone is rolled out to the rest of HP. Please take less than 5 minutes [to tell us what you like and what needs improvement](#). Your input matters! Even if your experience with PC Phone has been positive – we want to hear that too! Any and all feedback is needed and appreciated.

We know you're busy, to help encourage participation **we are raffling off a \$100 American Express gift card** – anyone who fills out the feedback form will be automatically entered into the drawing; there is nothing extra you need to do. If you have already provided input on PC Phone, you are already entered (one entry per person). The deadline for providing IT First input and being entered for the gift card raffle is 6 July; the winner will be notified via email on 9 July.

Go to the [PC Phone Support page](#) to find more information about the service including the discussion forum where you can find or ask a question.

In order to be able to use all of the features of PC Phone, make sure you [install the latest version of Office Communicator \(Lync 2010\)](#).

Best regards,

APPENDIX G: EMAIL SENT AUGUST 8TH, 2012

REQUESTING FEEDBACK ON DESKTOP VIDEO

From: [Global IT Services]

Sent: Wednesday, August 08, 2012 5:11 PM

Subject: Send us your feedback for Desktop Video!



ITfirst



Global IT Services

To: IT personnel in Alpharetta, Austin, Boise, Ft. Collins, Galway, Houston, Leixlip, Palo Alto, Plano, Roseville and San Diego

Please do not forward this message!

In June we announced that the new Desktop Video service is available to IT personnel at your site. Desktop Video allows you to use Microsoft Lync to connect from your PC to a colleague's PC via video.

If you are using Desktop Video, please [let us know about your experience.](#)

If you are not yet using Desktop Video start using it now!

Before you can use Desktop video, make sure you:

1. Get an [approved headset](#), if you do not already have one.
2. Get an [approved web camera](#), if you do not already have one. Similar to headsets, the cost of the web camera will be charged to your cost location. Please check with your manager before you order for a web cam.
3. [Install the latest version of Office Communicator \(Lync 2010\).](#)
4. Activate the Desktop Video service:
 - From an HP office, connect to the network and reboot your PC.

- If you cannot perform this step from an HP office, refer to [activating the service remotely](#).

We know you're busy, to help encourage participation **we are raffling off a \$100 American Express gift card** – anyone who fills out the feedback form will be automatically entered into the drawing; there is nothing extra you need to do. If you have already provided input on PC Phone, you are already entered (one entry per person). The deadline for providing IT First input and being entered for the gift card raffle is 3 September; the winner will be notified via email on 7 September.

If you experience issues with Desktop Video, go to the [Desktop Video support page](#) for information about the service, including support.

[Submit a feedback form](#) as often as you like. We will review your feedback and make appropriate changes before we make the service available to the rest of HP.

Best regards,

APPENDIX H: EMAIL SENT SEPTEMBER 28TH, 2012 REQUESTING FEEDBACK FROM TOWN HALL MEETING

From: [*Sheila GT PMO Manager*]
Sent: Friday, September 28, 2012 12:07 AM
To: [*PMO Direct reports*]
Subject: FW: Feedback Requested: Houston Global IT Town Hall

FYI..

From: [*Previous GT Infrastructure Director*]
Sent: Thursday, September 27, 2012 8:00 PM
To: [*Various GT Teams*]
Subject: RE: Feedback Requested: Houston Global IT Town Hall

Great feedback [*Richard*]....I can say it makes travel very easy compared to the past...on this trip to APJ we have had various cell coverage issues...even in hotel and office...Lync has been solid and main voice device we are using....you all can be very proud of what we have created and are creating....its only going to get better ☺

From: [*Richard, Director GT Telecom Expense and Planning*]
Sent: Thursday, September 27, 2012 5:49 PM
To: [*Various GT Teams*]
Subject: FW: Feedback Requested: Houston Global IT Town Hall

Just wanted to pass along a pretty neat story from the CIO visit to Houston....

We were in the Q&A session and someone stood up and started to complain about the **tools** they have use.....they started with PPM, then mentioned some other tool they didn't like, and then mentioned issues with **Lync**.

Well, [*The GRE IT Director*] stood up and talked about his experiences with Lync:

1. He said he uses it all the time and it is great productivity tool for him
2. He talked about how easy it is to use Lync (with a Jabra speakerphone) from the hotel or home, instead of using calling card or mobile phone
3. He mentioned he was in a meeting with the CFO [...] and they needed to talk with someone in Singapore...he plugged in his speakerphone, connected directly with the person in Singapore and they talked for 2 hours. Afterwards, [*She*] said “whatever that is, I want it, and I want everyone on the EC to have it!” Note: This is actually causing us some other concerns to ensure the EC is properly supported for Lync, but it was a great example of Lync in action
4. He then asked everyone in the room to raise their hand if Lync has been a **productivity enhancement** for them....probably 95% of the room (of maybe 300) raised their hand. All [*The GRE IT Director*] said back to the person who asked the question was “well, that is pretty overwhelming, so you must have an isolated issue!”

Then [*IT Operations Control Director*] stood up and talked a little about **IT First** and told the person to submit **Feedback** so we can track this, but also said they could send him an email with the issue and we would get it fixed....that pretty much diffused the whole situation.

But then, [*The CIO*] told a story that he used to call his wife from his cell phone and blue-tooth headset, but recently converted to calling her from Lync. His wife asked what changed because he sounded so much better...he said he is now calling from his laptop.....and she said never call me again from your cellphone!

This was all pretty amazing....it started with a question that seemed to pretty negative, but turned 180 degrees in the matter of minutes.

Great job to all involved in getting Lync out there and functioning (LAN, WAN, Servers, Voice, Headsets, Websites, IT First, Feedback, Support, PMs, etc)!!

Please share with your teams.

From: [*HP Global CIO*]

Sent: Thursday, September 27, 2012 5:00 PM

Subject: Feedback Requested: Houston Global IT Town Hall



Feedback Requested: Houston Global IT Town Hall

Houston Team,

Thank you for your time Tuesday at our IT Town Hall.

To help us drive continuous improvement, please take a few minutes to give us your feedback in this [short online form](#). All responses are anonymous.

Thank you again.

APPENDIX I: EMAIL SENT OCTOBER 24TH, 2012 REGARDING ROLL OUT OF PC PHONE AND OTHER UC FEATURES

From: [HP IT Support team]

Sent: Wednesday, October 24, 2012 10:53 PM

Subject: Learn about more collaboration services!

Learn about more collaboration services!



To: IT personnel

Please do not forward this message!

Thank you to those of you who participated in the PC Phone IT First Initiative! Because of your valuable feedback, PC Phone will be provided as part of the Global Real Estate site transformation efforts going forward. Read on for information on how to make the most of PC Phone and our other enhanced collaboration services.

Service Name	Description
PC Phone	<p>For support with the PC Phone service, use the standard IT support mechanisms available on the PC Phone page.</p> <p>If you were not part of the PC Phone IT First Initiative, we will deploy PC Phone to several more HP IT locations over the next several months. View the sites that have been enabled for the service. Keep checking back as this list changes frequently.</p>

Desktop Video	<p>Desktop Video is now available to HP IT employees. You can add video to a Click-to-Talk or Click-to-Conference session, allowing you to see as well as hear the person who is speaking. To use it:</p> <ul style="list-style-type: none"> • Ask your manager for approval; then order a web camera. The average cost of the web camera is \$43 U.S. Web camera availability varies by country. • Learn more by visiting the Desktop Video page and reviewing the Quick reference guide and Quick training guide. • Make sure your location supports Desktop Video. You can use Desktop Video from anywhere, except if you are working from one of these sites.
Scheduled Conferencing	<p>Scheduled Conferencing lets you use Outlook to schedule a Lync-based meeting. This service is available now to HP IT personnel only. If you need support for Scheduled Conferencing, use any of the support options (chat or call a support agent) on the PC Voice and Collaboration page. Don't forget to check out our training page for instructional videos and reference guides for all the Lync based services.</p>

[Follow these instructions](#) to install the latest version of the Remote Access to HP software. The new version includes enhancements for Lync that will improve performance and voice quality

As you use these services, please continue to [give us your feedback!](#)

APPENDIX J: EMAIL SENT DECEMBER 18TH, 2012 REGARDING HP'S NEW FLASH ON MICROSOFT LYNC

From: [Jonathan GT Expense and Planning Senior Director]

Sent: Tuesday, December 18, 2012 4:09 PM

Subject: Congrats to Lync/UC/Voice Eng and Ops Teams!

*Great global advertisement of an innovative service
changing HP!!*

The screenshot displays the @hp Portal website. At the top right is the HP logo. Below it is a navigation bar with links: Home, Job tools & services, Careers, policies & total rewards, Organizations & locations, Business performance, Indexes, and Help. The main content area features a sidebar on the left with the @hp content logo and links to Quarterly archive, Content guidelines & requests, Metrics requests, Search @hp, and Support. Below this is the 'HP in the' section. The central part of the page shows a Microsoft Lync interface with a contact list on the left (Diane Forsyth, Peter Krebs, Tim Toyoshima, Lola Jacobsen) and a right-hand pane displaying a context menu for a contact. The menu options include 'Send an Instant Message', 'Start a Conference Call', 'Start a Video Call', 'Share', 'Send an E-Mail Message', 'Schedule a Meeting', 'Copy', 'Find Previous Conversations', 'Pin to Frequent Contacts', and 'Copy Contact To'. The 'Start a Conference Call' option is expanded, showing sub-options: 'Start Conference Call Now Using Lync', 'Start Conference Call by Calling Me At', 'Mobile' (+1 (425) 591-7502), 'Home' (+1 (952) 353-4604), 'Custom Number' (+1 (425) 707-4943), and 'New Number...'. On the right side of the page, there are links for Email, Print, and Bookmark. Below the Lync interface is a news article titled 'The telephone bites the dust' with the subtitle 'Microsoft Lync is changing the way we communicate at HP'. The article is dated 18 December 2012 and has an 'Average Reader Rating' section. To the right of the article is a section titled '@hp top stories' featuring a small version of the article and a list of authors: Diane Forsyth, Peter Krebs, and Mr. Kanan (4/10).

APPENDIX K: EMAIL SENT MAY 7TH, 2013

REQUESTING CLICK TO CONFERENCE FEEDBACK AND DEFINING OTHER AVAILABLE UC FEATURES OF LYNC

From: [HP IT Employee Experience Services -]
Sent: Tuesday, May 07, 2013 3:06 PM
Subject: Send us your feedback for Scheduled Click-to-Conference!

Vice President, HP IT Employee Experience Services



To: Personnel using Scheduled Click-to-Conference services

The



Through different feedback channels you have told us that you need enhanced collaboration services. IT organization is listening, and Scheduled Click-to-Conference is one example of that.

[Send us your feedback!](#) We want to know what is working and what we can improve. I hope you have had a chance to use this innovative service. You are already using some of the Lync services such as Click-to-Talk, Click-to-Share and Click-to-Conference.

Here is a list of all the services that you can use now with Microsoft Lync.

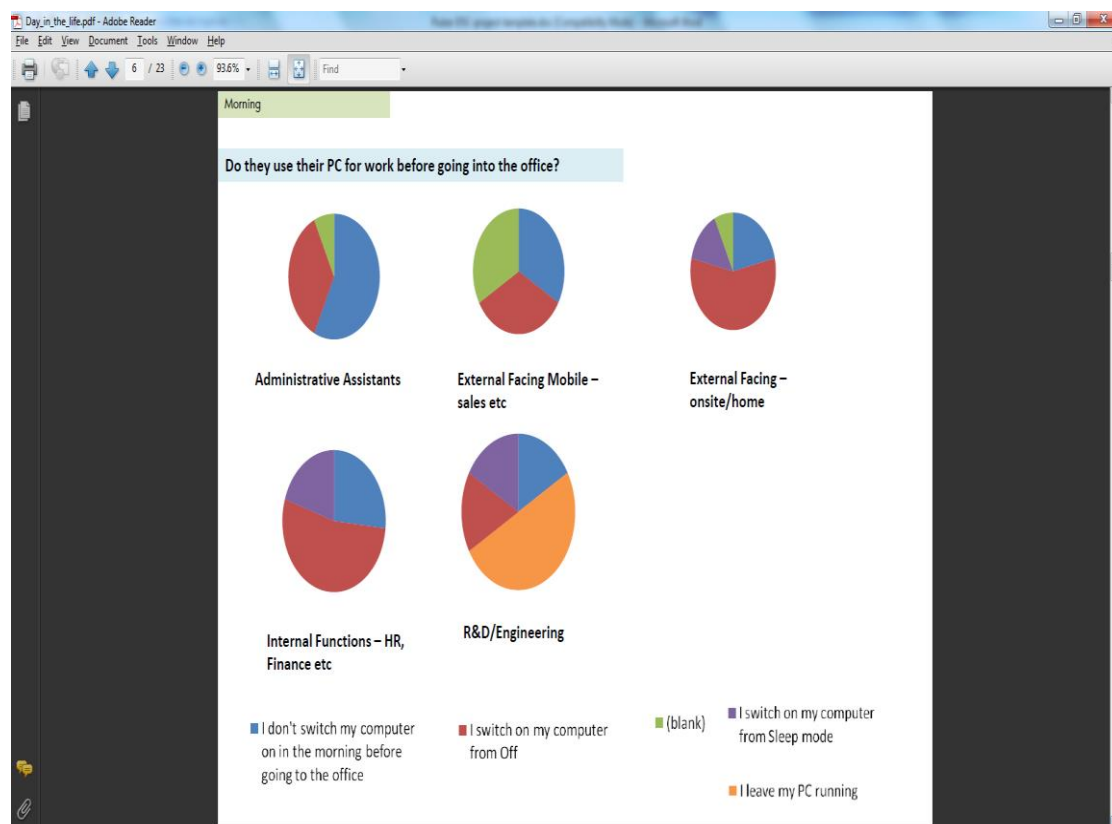
Service Name	Description
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Click-to-Talk	Find your colleague, check his/her availability, put on your headset, and make a call.
Click-to-Conference	Hold an ad-hoc or impromptu conference call directly from a Lync group, or using the drag-n-drop method.
Click-to-Share	During a Lync call or instant messaging session, you can share your desktop or a particular document or application to enhance your collaboration with your colleagues.
PC Phone	Open the dial-pad from Lync and dial any phone number, anywhere in the world directly from your PC. (Not available to everyone yet)
Desktop Video	Launch desktop video to make your interaction with your colleagues more personal and positive.
Scheduled Click-to-Conference	Allows you to schedule a meeting from Outlook or start an impromptu conference with a single click. The meeting roster clearly displays attendees' names.

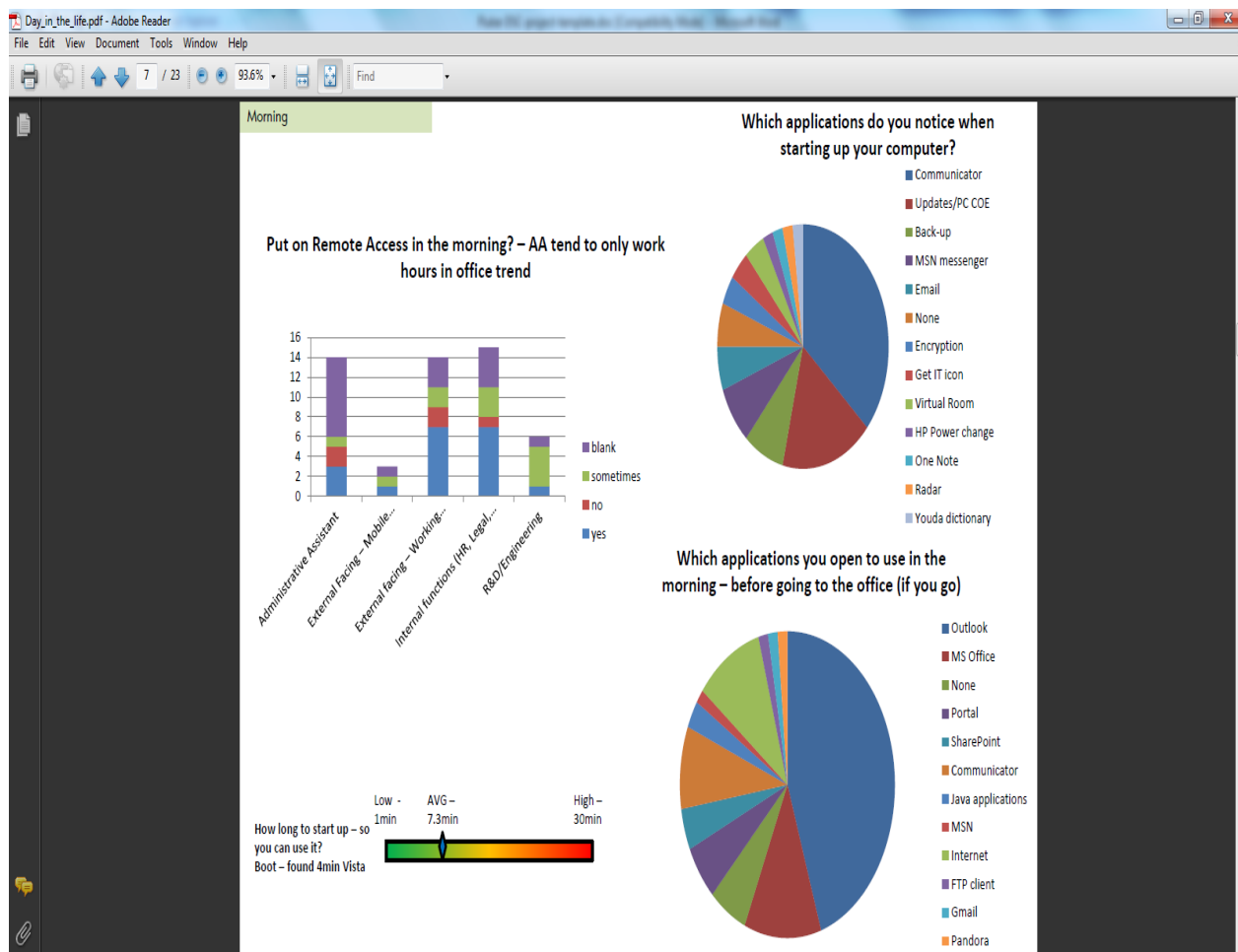
Please refer to the [Scheduled Click-to-Conference](#) for future information and training.

Best regards,

APPENDIX L: HP'S STUDY ON PC USAGE PRIOR TO GOING INTO THE OFFICE



APPENDIX M: HP'S STUDY ON MORNING APPLICATION USAGE



APPENDIX N: HP'S STUDY ON PC USAGE AFTER LEAVING THE OFFICE

