"Did You Turn It Off and On Again?" Assessing How Knowing the Digital Literacy of Laypeople Changes Expert Leaders' Decision-Making

by

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ABSTRACT

This study demonstrates how knowing the digital literacy of those they serve helps information communications technology (ICT) leaders adjust their perspective-taking. Using a pre-and post-survey design assessing ICT leaders on changes in their thinking around key responsibility areas: support during new software adoption, troubleshooting an issue and preparing for a system upgrade. The study used a self and other-rated paired survey model using Computer Attitude Scale and Computer Self-Efficacy instruments to measure ICT leaders and those they serve. 31 ICT leaders at a west coast university participated in this study, and 85 non-ICT workers whom the ICT leaders serve. 31 ICT leaders at a west coast university participated in this study, along with 85 non-ICT workers who the ICT leaders serve. This study indicates that ICT leaders did indeed view the laypeople's digital literacy differently than the laypeople did. And that by showing ICT leaders the differences, they adjusted their support expectations according to the laypeople's self-ratings.

DEDICATION

To my grandmothers, who both instilled in me a priority of education, and to my father, who was always thinking of the next idea and the promise emerging technologies could provide.

ACKNOWLEDGMENTS

Going to graduate school while parenting in a pandemic was a crazy idea. Completing my thesis would not have been possible without my incredibly supportive husband. My now 8-year-old daughter made me commit to Tuesday nights with her and counts down the days until Mommy is done with school.

I've been blessed with a mom and stepparents who could understand my crazy-sounding ideas. They acted as sounding boards on multiple occasions as I tried to talk out what I was doing and why it would matter.

As a working parent in graduate school, this thesis would not have been possible without a supportive work environment. From emphatic yeses when asked to write my recommendation letters, provide cheerleading, and offer financial support and time off, I could not ask for better.

Finally, my chair, Mai Trinh, ensured that this thesis was the beginning of my research journey and not an end. Keeping my thesis scoped to a single problem without also solving its questions in a single project is no easy thing.

While the achievement might be my own, it took a village to keep me going. You know who you are to the hashtags #wineonline and #pinkiesup; thank you for making sure I stepped away from my desk.

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CHAPTER 1

INTRODUCTION

Information communications technology (ICT) leaders often make decisions regarding security policies, software procurement, and user training and support methodologies. They frequently serve as experts in departmental technology. ICT departments within larger organizations hold the bulk of the organizations' expertise in its computing infrastructure, from physical devices to software and systems specific to the organization. However, laypeople whom ICT groups serve—users in the larger organization— may not be as digitally literate as the ICT departments themselves. ICT employees may use terms or phrases unfamiliar to those in the larger organization who are not as familiar with ICT terms. For example, people in the larger organization may not understand that words like "hamburger icon" describe a 3-line graphic for a menu that opens upon clicking. People in the larger organization may not realize why 5 Mbps upload speed matters for video conference calls or how to identify potential phishing attempts in email. These examples may lead to confusion or disengagement by users within an organization. This difference in expertise can lead to miscommunications, challenges in knowledge transfer, overestimation by the ICT group of users' digital literacy, and, most importantly, bad organizational decisions due to this overestimation (Bromme et al., 2005; Bromme & Jucks, 2018; Huang et al., 2014; Nückles & Bromme, 2002; Wittwer et al., 2008). Experts, in general, consistently overestimate the knowledge held by less experienced individuals (Dane, 2010; Hinds, 1999; Hinds et al., 2001; Nückles et al., 2005; Wittwer et al., 2008).

By talking about an expert, there is an implication of people who are non-experts; these are referred to as laypeople throughout this thesis. As Bromme and Jucks (2018) defined, a layperson is a person who may hold an amount of knowledge in a domain but lacks specialization in the domain or a desire to gain any specialization within the topic (Bromme & Jucks, 2018). These laypeople seek out the advice and skill of experts to answer a question or solve an issue.

The layperson is distinct from novices seeking to gain the specialized knowledge held by experts through education or training by those experts (Ericsson, 2015).

The gap in technological expertise between experts and laypeople is sometimes called a *digital divide.* Thus far, digital divide studies have focused on large populations as a national data set and as a problem of access to education and workforce development (Brown et al., 1995; Davis et al., 2007; Ertl et al., 2020; Van Deursen & Van Dijk, 2011). These studies are so broad in scope that the data is not relevant in determining what actions ICT leaders could take to bridge the knowledge divide within the broader organizations they support. These studies' breadth makes it challenging for ICT organizations to know how they can aid in solving the societal challenges posed by digital divides. Within digital literacy and digital divide research, education sectors have focused on understanding the landscape of student knowledge (Buzzetto-Hollywood et al., 2018; Kaplan, 2013; Korkmaz, 2014; Owens, 2019). These studies identify a gap across gender, age, racial, and economic lines, concluding that a gap exists and further research should be done. These studies attempt to quantify the digital divide between those with and without access to physical equipment or knowledge of possible uses. In recent years Soomro et al. (2020), Howard et al. (2018), and Ouahidi (2019) have focused on the question of educators' (teacher, professor, instructor) digital literacy and their ability to use and demonstrate use effectively (Howard et al., 2018; Ouahidi, 2019; Soomro et al., 2020). Yet little is known about the interdependent relationship between ICT decision-makers and their constituents regarding digital literacy.

This study builds on prior studies and fills a research gap by asking how (much) ICT experts estimate, understand, and make organizational decisions based on the technological literacy of users in the organization. This study uses Expert Leadership theory and Cognitive Entrenchment to examine ICT leaders' perspectives when they more accurately know the digital literacy of those they serve (Dane, 2010; Dane & Pratt, 2007; Hinds, 1999). Expert leaders are challenged to develop solutions to problems as the expert leader draws on an array of past

experiences (Dane, 2010; Wittwer et al., 2008). Dane (2010) explored the idea of cognitive entrenchment: that within the expert's domain, their thoughts become inflexible due to the amount of experience experts hold. This inflexibility manifests when predicting how a novice will respond to a problem. The experts use their knowledge and previous experiences as references, forgetting that the novice may not have been exposed to or experienced the same things (Birch & Bloom, 2007; Hinds et al., 2001). The phenomenon of cognitive entrenchment causes ICT leaders to underestimate the challenge to the laypeople they serve of adapting to changes in technology. Hinds' (1999) work looked at experts' predictions of a novice's performance of a task, finding that even when presented with information on novice challenges, the expert still underestimated the time it took the novice to complete the task. This study proposes that when ICT leaders reflect on their users' digital literacy assessment compared to their users' self-rating of their digital literacy, ICT leaders can adjust their perception and approach in key areas of ICT organization responsibility.

This study combines measures used to assess digital literacy with research on expert perspective-taking. The study demonstrates that at an organizational level, ICT leaders do not know the skills of non-ICT workers as well as they think they do. While past research has shown the existence of a digital divide in society, this study contributes to our understanding of the digital divide impacts at an organizational level by examining a single organization's workforce. The study indicates that when given actual data on non-ICT workers' skills, ICT leaders can realign their perspective and improve their understanding of users for decision making. This study takes the previous lab-based research on ICT experts' perspectives of laypersons or novices and applies this research in a real-world setting. This study also connects the measures of digital literacy with perspective-taking by experts. Previous research has addressed these areas separately but has not asked, "what are ICT leaders' ideas of people's digital literacy in their organization?".

Chapter 2 outlines the theoretical foundations for this research and reviews relevant empirical literature. Chapter 3 discussed the hypothesis development. Chapter 4 discusses this study's research methods, sample/participants, procedures, measures, and analyses, while Chapter 5 discusses the results. Chapter 6 concludes with the implications of the effects on future research and an outlined summary.

CHAPTER 2

LITERATURE REVIEW

Digital Literacy

The American Library Association defines Digital Literacy as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring cognitive and technical skills." (Digital Literacy – Welcome to ALA's Literacy Clearinghouse, n.d.). Digital literacy takes many forms and levels, from a facility with a keyboard and mouse to understanding how to identify trustworthy sources of information on the internet or the ability to move comfortably through social media interfaces or structure a digital interface for others. Digital literacy goes beyond the traditional ideas of device ownership and internet access associated with the digital divide and enters the realm of understanding that have is a starting point; use is a distinguisher. In the current research, this distinction is referred to as digital divide 2.0 (Brotcorne et al., 2010; Davis et al., 2007; Ertl et al., 2020).

As most workers in a university setting have access to a computer and the internet, focusing on users' abilities and comfort with computer-based work is appropriate to the modern work context of this study. In work by Van Dijk (2005), he identifies 4 four types of access: material (computer and internet), motivational access (the desire to have a computer or internet), skills access, and usage (comprising time, diversity of activity, and creativity) (Van Dijk, 2005). In furthering this research, Van Deursen and Van Dijk identified the evolution from physical access to skill and use (Van Deursen & Van Dijk, 2011). Their study looking at the Dutch population found that the skills and usage definition of the second digital divide better applied to a population with high internet access. By using the computer attitude and computer self-efficacy scales to assess an organization, this study uses the motivational, skills, and usage definitions.

Examining Past Use of Computer Attitude and Computer Self-Efficacy Scales

Much of digital literacy and digital divide research looks at K-12 education and workforce development (Celik & Yesilyurt, 2013; Davis et al., 2007; Ertl et al., 2020; Gressard & Loyd, 1986; Owens, 2019; Soomro et al., 2017, 2020; Van Dijk, 2005). All these studies complete an assessment of individual skills across populations, yet, research has identified no analysis that looks at the utility of these population assessments with decision-makers. While examining teacher candidates, Celik & Yesilyurt (2013) found that the relationship of attitude toward technology significantly affects self-efficacy at a level of 0.64. A 2008 study by Garland & Noyes examined the relevance of several computer attitude scales. These scales have been used over the last four decades to determine the scale's current relevance, concluding that computer attitude measures were still relevant though reducing in value if not paired with other measures (Garland & Noyes, 2008). Soomro et al. (2020) looked at the digital divide among faculty in Pakistan's higher education system ending with a suggestion to invest in training and infrastructure (Soomro et al., 2020). While assessing the digital divide in college students at 4-year and 2-year universities in the Midwest United States, Owens (2019) suggests that further research may help policy and decision-makers. While Soomro et al. 2020 use a separately developed scale to assess the digital skills of faculty in Pakistan's universities, the scale is quite similar in measuring self-efficacy and attitude towards technology concepts.

Research on ICT project success factors indicates that digital infrastructure and skill should be considered when evaluating implementation, but all research found looked at this on a project basis and not as a factor of the organization itself (Alhabeeb & Rowley, 2018; Govender & Pretorius, 2015; Jere & Ngidi, 2020; Naveed et al., 2020; Tarutė & Gatautis, 2014). Because the second digital divide is technology adoption and usage, peoples' attitudes and self-efficacy with technology affect their engagement with technology (Celik & Yesilyurt, 2013; Garland & Noyes, 2008; Kim & Gassman, 2013; Owens, 2019; Simsek, 2011). The factors of confidence, attitude, and liking are assessed through two scales that have been developed and updated since the late 1980s: the Computer Attitude Scale (Gressard & Loyd, 1986) and the Computer Self-Efficacy

Scale (Murphy et al., 1989). Gressard and Loyd (1986) validated the Computer Attitude Scale they developed in 1984. The scale takes into account three factors in peoples' attitudes toward technology; 1) anxiety or fear of computers; 2) confidence in the ability to use computers; and 3) liking of computers (Gressard & Loyd, 1986; Loyd & Gressard, 1984). While Gressard & Loyd do not specifically define their terms in their published literature, the work since the mid-1980s does. These scales have consistently measured respondents' motivation, skills, and usage of technology with minimal time commitments from participants (Celik & Yesilyurt, 2013; Garland & Noyes, 2008; Loyd & Gressard, 1984; Murphy et al., 1989; Owens, 2019). Because these scales use Likert grid responses, they could be adapted to an other-rated process for ICT leaders to respond to regarding their perceptions (Park & Raile, 2010). The following section briefly reviews the Computer Attitude and Self-Efficacy Scales and their usage in previous literature.

Anxiety or Fear of Computers

While some may think of this as technophobia, with a complete distrust of benefits, a more apt definition used for this study is one of emotion or invoked by a self-perceived inability to work in a digital environment (Van Dijk, 2005). In the Computer Attitude Scale, this sense is self-rated by respondents asking them to respond to statements like, "computers make me anxious," "Working with a computer makes me nervous," and "I'm not the type to do well with computers." For this study, non-ICT employees were asked to rate themselves on these statements. ICT leaders were asked the same items on a perception of the non-ICT worker. For example, "I'm not the type to do well with computers" became "they are not the type to do well with computers." (Appendix Constructs).

Confidence in the Ability to Use Computers

Anxiety or fear of computers may cause an individual to avoid the use of technology; confidence in one's ability can allow a person to overcome challenges they may face when learning new technologies or troubleshooting an issue (Chetty et al., 2018; Harrison & Rainer, 1992; Owens, 2019; Van Dijk, 2005). In the Computer Attitude scale adopted for this study,

respondents react to statements like, "When there is a problem with a computer that I can't solve, I stick with it until I have an answer." ICT leaders were asked the same item on a perception of the non-ICT worker, for example, "When there is a problem with a computer that they can't solve, they stick with it until they have an answer." (Appendix Constructs).

Liking of Computers

While anxiety invokes a rejection or lack of desire to work with digital technologies, confidence displays a willingness to continue working with technology despite challenges. Liking is a general sense of enjoyment from working with digital tools (Owens, 2019; Van Dijk, 2005; Venkatesh et al., 2012). In the Computer Attitude Scale adopted for this study, respondents rate themselves on statements like, "I think working with computers is fulfilling," or, "Figuring out computer problems does not appeal to me." ICT leaders were asked the same items on a perception of the non-ICT worker, for example, "They think working with computers is fulfilling," or, "Figuring out computer problems does not appeal to them." (Appendix Constructs).

Skill Assessment

Respondents were asked to rate computer self-efficacy using updated prompts sensitive to the organization's computing infrastructure where this study was conducted. Unlike the attitude scales, computer self-efficacy adds the dimension of a person's familiarity with terms and use of hardware, software, and, more recently, internet and data usage (Kim & Glassman, 2013; Murphy et al., 1989; Owens, 2019; Venkatesh et al., 2012). By asking respondents to rank their ability on items such as "Deleting files," "Using a storage device (thumb drive, CD, etc.)" in the case of hardware and software skills; "Finding scholarly/referenced journal articles," "Online shopping," assessing Internet skills; and finally, data usage through prompts like, "I can use university systems to answer other people's questions in a productive way." (Appendix Constructs).

Expertise and Theories about Experts' Perspective Taking

Experts are defined in the research literature on the topic in three ways. First, experts have outstanding performance in their knowledge domain (A. Ericsson, 2015). Second as those who have mastered the complex challenges within their work over many years of training (Meig, 2001). Finally, experts transfer knowledge from scientists to users of the command (Stehr & Grundmann, 2011). Within the context of ICT groups in an organization, experts are designated to hold the organization's ICT systems knowledge, gain knowledge through high training levels, and transfer knowledge to others in the organization through training or support interactions. All three definitions may be applied to these groups because of the varied roles existing within the larger group.

Expert leaders can be challenged to develop innovative solutions to problems as the expert leader draws on an array of past experiences (Dane, 2010). Dane (2010) terms this challenge cognitive entrenchment. He defines it as "a high level of stability in one's domain schemas, [which…] tends to increase as individuals attain expertise within a given domain" (Dane, 2010, p. 579). Dane finds that within the expert's domain, they become inflexible by forming highly specialized skills and knowledge, causing experts to have difficulty adapting to novel changes and finding new solutions to problems. Dane develops the idea that experts have created a more complex schema of the knowledge area than one without the same level of expertise; this is exemplified in research on chess players' ability to view a board and determine the optimal strategy (Bilalić et al., 2008; Chase & Simon, 1973). On the opposite side, Dane also points out the inflexibility of high levels of expertise in a domain. They are challenged to recall and predict how a novice in their domain would respond to stimuli. These schemas form the basis for solutions that experts may propose, yet they can cause ICT leaders to forget the challenges of those less skilled. The inflexibility that can come from familiarity with a problem and solution was explored in research by Bilalić et al. (2008), looking at the Einstellung effect. Chess players were shown a mid-game chess board with a more familiar, less optimal solution and a less familiar, more optimal solution; expert chess players tended to gravitate toward the more familiar solution without identifying that a more optimal solution existed (Bilalić et al., 2008). Bilalić et al. did find

that those with a greater level of expertise were more likely to identify the less familiar, more optimal solution, which they attributed to a greater breadth of developed schemas to call. A distinguishing factor for ICT from chess is the ever-evolving nature of technology.

An example of the challenge posed when ICT leaders forget what it is like to hold less skilled or familiar with a system is Pamela Hinds' 1999 study. Hinds (1999) looked at experts' predictions of novice performance in completing a task, finding that even when presented with information on novice challenges, the expert still underestimated the time it took the novice. In the Hinds study, novices were given cell phones to complete a task and measure its time (Hinds, 1999). Hinds's work is foundational to preceding efforts to examine experts' prediction of laypersons' actions. The study asked the expert to focus on specific actions a layperson would need to take, and it did not ask how the expert might be thinking of the layperson's ability as they entered the design process for the cellphone.

This study examines experts' planning process to see if learning about the layperson aids in decision-making before a layperson is given any task to perform. In Hinds' study, novices were given cell phones to complete a task and measured the time required. Those with experience using the particular technology consistently underestimated the time it took the novice to complete the task (Hinds, 1999). While Hinds and others have used specific tasks to measure expert assumptions about novices, this study explores the ICT experts' perspective of the digital skills those they serve possess to see if learning about their laypeople's needs shifts the leaders' perspective before specific tasks are performed by non-ICT workers.

Using one's knowledge to predict others may cause ICT leaders to predict the adoption of new solutions within their organization falsely. Birch & Bloom (2007) showed that study participants who held knowledge of the location of an object in a room, and knew that another person did not have this knowledge, still predicted this second person would find the object in its location at a higher rate than study participants that did not know the object's location. This study demonstrated that holding specialized knowledge increases the likelihood of using said

knowledge when judging what another person knows. Wittwer, Nückles, and Renkl's 2008 study examined the effect of an expert's communication with laypeople when the expert was given an estimation of the laypersons' knowledge of web-based support interactions (Wittwer et al., 2008). In this study, experts were given information during a support interaction that indicated the layperson's skill level; at times, the information presented suggested that the layperson had more knowledge than they did; at other times, the expert was told the person had less understanding than they did. The study demonstrated that experts adopted the biased estimation and adapted their explanations accordingly. When laypersons' knowledge had been overestimated, the questions asked demonstrated comprehension challenges. When laypersons' knowledge had been underestimated, the layperson had to seek further explanations to address their needs (Wittwer et al., 2008). Bromme, Rambow, and Nückles (2001) examined expertise and estimated what others know through 2 studies. In study 1, ICT experts estimated students' knowledge of internet concepts and general computer knowledge, and the estimations were compared with values obtained from laypersons. Where in study 1, a distinction between general terms and specialized terms was made, in study 2, the distinction was removed, and experts were more likely to indicate that laypersons would be familiar with specialized terms in the ICT domain (Bromme et al., 2001)

As seen in the previous research outlined above, experts use perceptions gained through various means to predict the needs of laypersons influencing the experts' ability to respond and the layperson's ability to gain the support they seek (Birch & Bloom, 2007; Bromme et al., 2001; Hinds, 1999; Wittwer et al., 2008). Within an organization, ICT leaders may form a conceptual framework of the users of their services. This prototypical user may have attributes based on the laypersons in the organization developed over time and experience interacting with said groups. Yet research on how people form prototypical others in their minds indicates that we use ourselves as the primary measure (Koehler, 1991; Krueger, 2003). As discussed earlier, experts are challenged to recall what it is like not to hold their expertise. Therefore, a prototypical model they have is likely to hold an understanding of ICT systems that is closer to their knowledge than of the layperson in their organization (Krueger, 2003).

CHAPTER 3

HYPOTHESIS DEVELOPMENT

Drawing from prior empirical studies in the literature, it is expected that ICT leaders would have different perceptions of non-ICT workers' skill levels from the latter's perceptions of their own skills.

Thus far, the research has examined the relationship between experts and laypersons or novices, using a one-on-one relationship (Birch & Bloom, 2007; Koehler, 1991; Park & Raile, 2010) or prediction of execution on a specific task (Hinds, 1999). Within an organization, an ICT group holds specialized knowledge on the ICT systems administered to conduct the organization's business. These systems can vary in their functionalities, age, and support needs, from HR systems, managing payroll and hiring processes, financial management systems, and communications systems such as email.

Hypothesis 1: ICT leaders' perception of the non-ICT workers' skill level will differ from the non-ICT workers' actual skill level.

ICT Leaders' Realignment of Perception

Afolayan and de la Harpe (2020) illustrate the need to understand laypersons' digital literacy using technical skills (Afolayan & Harpe, 2020). They discuss the need for organizations to understand the technical skill needed in the decision-making process for technology adoption. Their work outlines multiple factors that small to medium enterprises should consider and not delve further into digital literacy understanding by decision-makers. Numerous other researchers have mentioned the need to take digital literacy into account when making product selection or implementation choices but also do not dive further into the particular factors (Alhabeeb & Rowley, 2018; Cid-López et al., 2015; Jere & Ngidi, 2020; Naveed et al., 2020; Zhang, 2015). Naveed et al. (2020) suggest that in the success factors for an e-learning system, the ICT skills of instructors and students' general internet self-efficacy are part of the critical success factor for

implementation (Naveed et al., 2020). Jere & Ngidi (2020) research on a framework for small and medium enterprise technology adoption indicated that ICT knowledge within the organization was necessary for successful technology adoption (Jere & Ngidi, 2020). In the previously referenced Wittwer et al. (2008) study, as experts were presented with information, they aligned their explanations to what they had been told about the layperson's knowledge (Wittwer et al., 2008). Based on this, it would be important for the ICT leader to have a reliably accurate picture of the layperson's digital literacy and realign any pre-existing perceptions.

Hypothesis 2: When presented with information on the digital literacy of those they serve, ICT leaders would realign their perception based upon actual data.

ICT Leaders' Tenure in Organization

ICT leaders who held their positions for longer periods will show less change in their decision processes as their tacit knowledge, accumulated over time in the organization, has given them a model of the layperson that is less flexible than those newer to the ICT organization (Bergh, 2001; Bilalić et al., 2008; Haerem & Rau, 2007). Ericsson (1994) indicates that expertise has held two definitions. In previous research on innate ability, recent research has used a definition that incorporates the acquisition of knowledge and skill within a domain (Bromme & Jucks, 2018; A. Ericsson, 2015; K. A. Ericsson & Chamess, 1994; Mieg, 2001). The more recent definitions for expertise incorporate knowledge acquisition, indicating a factor of time in the definition of expertise, which means that novices and experts lie on a spectrum of knowledge acquisition (Bromme & Jucks, 2018). While the dimension of time is not typically identified in past research on expertise, it is implied in the definition used to identify an expert in a field (Lewandowsky & Kirsner, 2000). This is further supported by Devine and Kozlowski (1995), who points out that the selection of experts for study in previous research used tenure to identify the experts of interest (Devine & Kozlowski, 1995). As knowledge is accumulated over time by ICT leaders about those in the broader organization, the prototypical user formed in their minds acts as a tacit evaluation with attributions that may turn out to be incorrect upon examination of information from those in the organization (Argyris, 1991; Wellman et al., 2019). Dane (2010)

points out that "cognitive entrenchment tends to increase with domain expertise"; the longer someone works in a place, the more entrenched they become. With inflexibility that comes from established schemas developed over time, the length of time in an organization acts as a status cue in which expertise is attributed. The longer someone is in the organization, the more you must know about the people in that organization (Bunderson, 2003; Dane & Pratt, 2007). Wellman (2019) also indicates that the longer tenure someone has, the more likely they will rely on their views that seek out information about others.

Hypothesis 3: ICT leaders who have held their positions for more extended periods would show less change in their decision process.

CHAPTER 4

RESEARCH METHODS

Sample/Participants

This study engaged participants from two groups within a major university in the Northwest region of the United States. Participants were categorized into two groups, the first group was ICT leaders. ICT leaders were defined as anyone who works in one of the multiple ICT groups within the university. This group of leaders included the ICT directors of the schools/colleges of the university who report to their Dean or Chancellor. It also included central ICT leaders who support the university's human resources, educational tools, and financial systems. ICT leaders were recruited by contacting Directors of ICT departments throughout the university. The directors aided in distributing invitations to those that work in their ICT group and those that rely the ICT group. The 2nd group identified will be referred to as laypersons within the organization; these people do not work for an ICT group within the identified university and seek the expertise of the ICT group for help.

ICT Leader Participants

31 responses were collected from ICT leaders throughout the University. 50% (n=15) of the participants were from School/College or Department IT groups, 43% (n=13) from a central campus IT group, and 6.67% (n=2) preferred not to answer. Of the 31 ICT leader respondents, 19.35% (n=6) indicated that they were a director of an IT group, 12.9% (n=4) were project manager/business analysts, 22.58% (n=7) managers of an IT team, 22.58% (n=7) individual contributors, 16.35% (n=5) indicated they held other roles, and 6.45% (n=2) indicated they preferred not to answer this question. Among the ICT leader respondents their years within the organization were the following, Less than 1 year 7.32% (n=3), 1-5 years 14.63% (n=6), 6-10 years 12.20% (n=5), 11-15 years 4.88% (n=2), 16-20 years 19.51% (n=8), 21-25 years 2.44% (n=1), 26-30 years 4.88% (n=2), more than 30 years 7.32% (n=3), 2.44% (n=2) preferred not to answer this question. The ICT leader gender breakdown was as follows, 22.58% (n=7) were female, 70.9% (n=22) were male, 3.23% (n=1) non-binary, and 3.23% (n=1) preferred not to

answer this question. Racial and ethnic demographics of the ICT leader group were as follows, Asian/Pacific Islander 3.23% (n=1), White/Caucasian 74.19% (n=23), Hispanic/Latino(a) 6.45% (n=2), and 16.13% (n=5) preferred not to answer this question. No respondents indicated a race or ethnicity of Black/African American, Middle Eastern/North African, or Native American. ICT leaders' ages ranged from 26-30 3.23% (n=), 31-35 3.23% (n=1), 36-40 9.68% (n=3), 41-45 12.9% (n=4), 46-50 16.13% (n=5), 51-55 22.58% (n=7), 56-60 12.9% (n=4), 61-65 6.45% (n=2), 66-70 3.23% (n=1), 3.0% (n=3) preferred not to answer. No ICT leaders responded with an age range of 18-20, 21-25, or over 70.

Layperson Participants

86 responses were collected from Laypeople in the organization. 91.86% (79) of the participants came from Schools and Colleges within the University, while 8.14% (7) were from Central Offices. Among layperson respondents their years within the organization were the following, less than 1 year 9.30% (n=8), 1-5 years 29.07% (n=25), 6-10 years 12.79% (n=11), 11-15 years 10.47% (n=9), 16-20 years 16.28% (n=14), 21-25 years 4.65% (n=4), 26-30 years 4.65% (n=4), more that 30 years 12.79% (n=11). The layperson respondents gender breakdown was as follows, female 44.71% (n=38), male 47.06% (n=40), non-binary 4.71% (n=4), and 3.53% (n=3) preferred not to answer this question. Racial and ethnic demographic of the layperson participants were as follows, Black/African American 2.35% (n=2), Asian/Pacific Islander 10.95% (n=9), White/Caucasian 76.47% (n=65), Middle Eastern/North African 1.18% (n=1), Hispanic/Latino(a) 2.35% (n=2), 7.06% (n=6) preferred not to answer this question. No respondents indicated a race or ethnicity of Native American. Layperson ages ranged from 21-25 5.88% (n=5), 26-30 11.76% (n=10), 31-35 8.24% (n=7), 36-40 9.41% (n=8), 41-45 10.95% (n=9), 46-50 7.06% (n=6), 51-55 10.59% (n=9), 56-60 8.24% (n=7), 61-65 12.94% (n=11), 66-70 2.35% (n=2), over 70 5.88% (n=5), and 7.06% (n=6) preferred not to answer this question. To understand the digital environment of lay people in the organization, they were asked about device ownership. 98.84% (n=85) reported owning a computer, 1 person indicated that they did not own a computer. 33.72% (n=29) reported owning a cellphone, 98.84% (n=85) reported that

they own a smartphone. 40.7% (n=35) indicated that they own an iWatch, Fitbit, or other wearable, and 72.09% (n=62) reported owning a tablet.

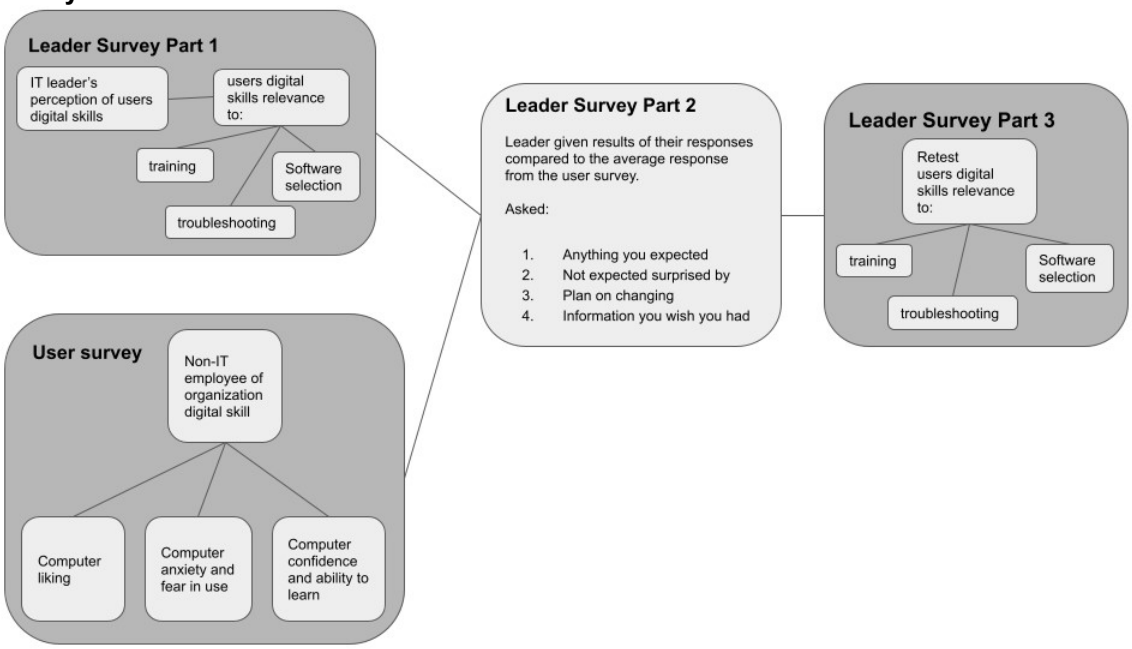
Study Procedures

This pre-post quasi-experimental study used a postpositivist worldview, attempting to ask the questions:

1. What is the difference between the laypersons' digital literacy and the IT leaders' perception of their level of understanding?
2. What changes in key decision areas, if any, do IT leaders show once they are made aware of the difference between their perceptions and the realities of the laypersons' self-rated digital literacy?

Using survey questions associated with past digital divide research, self-rated and other-rated questionnaires were developed. Showing ICT leaders the self-rated laypeople's average score and the ICT leader's other-rated score, asking the pre and post-questions rating the influence on software selection, training, and troubleshooting, allows assessing change in ICT leaders' thought process and possible decision-making. The figure illustrates the survey procedures.

Figure 1
Survey Procedure



The two surveys were administered to the respective groups. First, laypersons were surveyed to capture their responses to questions on their digital literacy (See Appendix). Using a combination of questions from the adapted Computer Attitude Scale and Computer Self-Efficacy Scales used by Owens (2019) to research students in Midwest universities and colleges. The specific systems respondents were asked about reflected the computing and information infrastructure of the university.

Once data was collected from laypersons, an ICT leader survey was distributed. The second survey was administered to ICT leaders within the university. In part 1, ICT leaders were asked to assess their perception of participants' digital literacy and the degree of support people need in key ICT responsibility areas. This survey asked the ICT leaders the same questions but reflected on the layperson using They/Them instead of I statements. For example, the layperson was asked, "I get a sinking feeling when I think of trying to use a computer," and the ICT leader was asked, "They get a sinking feeling when they think of trying to use a computer." By pairing questions in this fashion, the ICT leaders are directed to reflect on their prototypical user and were not asked to reflect on a specific interaction or person they work with (Koehler, 1991; Krueger, 2003).

In part 2, ICT leaders were shown the median score from assessing the participants' digital literacy and their layperson participants' score. With the comparison of their response about laypersons' digital literacy to what laypersons indicated, in part 3, ICT leaders were asked to reflect on the information in four qualitative questions:

1. In reviewing these results, is there anything you expected?
2. In reviewing these results, is there anything that you were not expecting?
3. In reviewing these results, is there anything you plan on changing?
4. In reviewing these results, is there information you wish you had?

ICT leaders were then asked a second time to rate the support people need in key ICT responsibility areas.

Measures

This study used a combination of the Computer Attitude Scale, Computer Self-Efficacy Scale, and the Internet Self-Efficacy Scale to measure non-ICT leaders' digital skills (Gressard & Loyd, 1986; Kim & Glassman, 2013; Murphy et al., 1989). The questions asked of laypeople and experts in each scale can be found in the Appendix under Constructs.

Gressard and Loyd's Computer Attitude Scale, developed in 1986, has been used in multiple studies and updated over time to reflect the current computing environment (Cetin & Ozden, 2015; Garland & Noyes, 2008; Gressard & Loyd, 1986; Owens, 2019; Rachmatullah et al., 2020). This scale measures anxiety, liking, and confidence. Responding to statements, participants choose one of 5 ordered responses on a Likert scale ranging from "strongly agree" to "strongly disagree." In this study, a 6th option was presented for those that stated the item did not apply to them. In this study anxiety subscale consisted of 7 items (Expert $\alpha = 0.93$, Layperson $\alpha = 0.96$), liking consisted of 5 items (Expert $\alpha = 0.79$, Layperson $\alpha = 0.75$), and confidence consisted of 5 items (Expert $\alpha = 0.76$, Layperson $\alpha = 0.68$).

Additionally, measures from the Computer Self-Efficacy Scale created by Murphy (1989), which has also been used in multiple studies and updated over time to reflect the current computing environment, were used (Celik & Yesilyurt, 2013; Kim & Glassman, 2013; Owens, 2019; Yeşilyurt et al., 2016). This scale measures a person's ability to perform target behaviors to produce outcomes (Bandura, 1986; Murphy et al., 1989). A set of self-efficacy questions based on the Internet self-efficacy scale development by Kim & Glassman (2013) was used to reflect data usage in an organization setting. Responding to statements, participants choose one of 5 ordered responses on a Likert scale ranging from "Very High" to "Very Low." Questions were tailored to the computing environment of the study site. In this study self-efficacy was broken into

3 sub-scales based on the types of behaviors Hardware and Software consisted of 25 items (Expert α = 0.94, Layperson α = 0.92), Internet consisted of 10 items (Expert α = 0.86, Layperson α = 0.85), and Data Use consisted of 3 items (Expert α = 0.85, Layperson α = 0.92).

ICT leaders were asked to rate the level of support laypeople would need in 3 key areas of ICT organizations, support during new software adoption, troubleshooting an issue, and preparing for a system upgrade. These areas were chosen based on the functions an ICT group performs for their organization (Jere & Ngidi, 2020; Oliveira & Martins, 2011). ICT leaders rated these on a scale of 1 to 10, 1 being no support and ten being one-on-one support. The scores were combined to create a support scale (time 1 α = 0.69, time 2 α = 0.81).

To ensure that laypeople within the organization saw the ICT leaders as leaders, they were asked to rate 5 statements to get their view of the ICT groups. These statements were:

1. IT Staff understand my skill level.
2. IT staff are experts whom I trust.
3. IT staff understand my needs.
4. IT staff are able to explain problems in a way I understand.
5. IT staff recognize that I have different expertise than theirs.

The reliability α=.890 of this measure was sufficient to indicate that ICT leaders are seen as experts in their organizations.

In contrast, ICT leaders were also asked if they see Laypeople in the organization holding expertise in their respective areas. ICT leaders were asked to rate the same five statements in the other direction. These statements were:

1. I understand the skill level of my non-ICT colleagues.
2. They are experts whom I trust.
3. I understand the needs of my non-ICT colleagues.
4. My non-ICT colleagues understand the explanations I give.
5. I recognize that my non-ICT colleagues have different expertise than mine.

The reliability α = 0.65 of this measure was sufficient to compare the laypeoples' score of the ICT leader.

Analyses

Data was loaded into SPSS 27 for analysis. Descriptive statistics were generated for the demographic variables. Comparative analysis was conducted on the layperson and ICT leader responses. ICT leaders' responses to the key responsibility areas pre and post-layperson information were compared using a paired sample t-test for any changes. ICT leaders' quantitative questions around the results of laypersons' responses compared to their own were analyzed for themes and suggestions for future work.

1. In reviewing these results, is there anything you expected?
2. In reviewing these results, is there anything that you were not expecting?
3. In reviewing these results, is there anything you plan on changing?
4. In reviewing these results, is there information you wish you had?

CHAPTER 5

RESULTS

Table 1
Expert Descriptive Statistics and Correlations

	Mean	s.d	1	2	3	4	5	6	7
(1) Liking	3.00	0.71							
(2) Anxiety	2.23	0.88	-0.83**						
(3) HardSoftware	3.25	0.58	0.65**	-0.64**					
(4) Internet	3.47	0.76	0.41*	-0.30	0.55**				
(5) DataUse	3.19	0.67	0.21	-0.27	0.34	0.07			
(6) Confidence	2.58	0.69	0.43*	-0.32	0.39*	0.33	0.13		
(7) Support Time 1	7.17	1.55	-0.16	0.17	-0.26	-0.08	-0.16	-0.22	
(8) Support Time 2	6.58	1.75	-0.20	0.14	-0.24	-0.09	-0.32	-0.01	0.75**

Note: N = 31
**p = 0.01 level (2-tailed)
*p = 0.05 level (2-tailed)

Table 2
Layperson Descriptive Statistics and Correlations

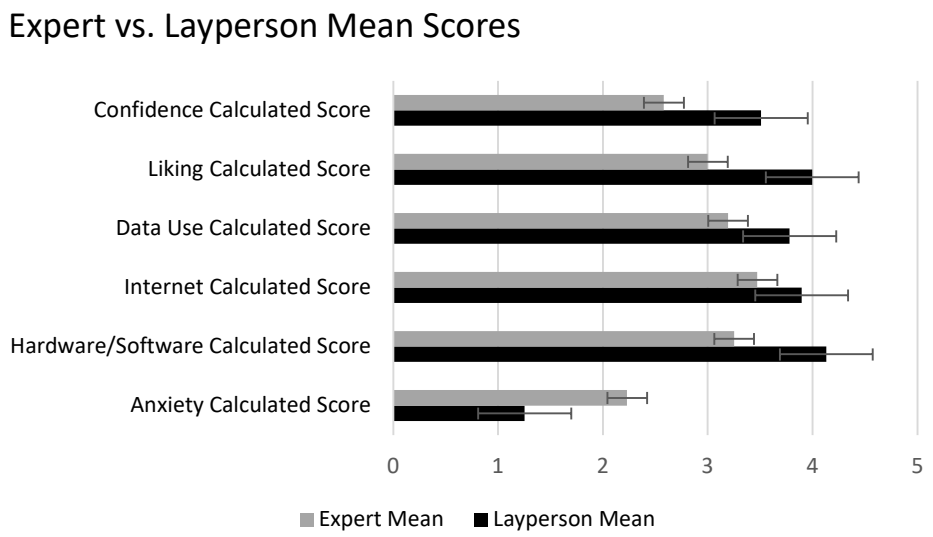
	Mean	s.d	1	2	3	4	5
(1) Liking	3.99	0.73					
(2) Anxiety	1.25	0.63	-0.71**				
(3) HardSoftware	4.12	0.52	0.66**	-0.67**			
(4) Internet	3.89	0.93	0.37**	-0.34**	0.67**		
(5) DataUse	3.78	1.17	0.31**	-0.23*	0.33**	0.22*	
(6) Confidence	3.50	0.80	0.71**	-0.36**	0.6**	0.42**	0.21

Note: N = 85
**p = 0.01 level (2-tailed)
*p = 0.05 level (2-tailed)

H1 states that "ICT leaders' perception of the non-ICT workers' level of skill will differ from the non-ICT workers' actual skill level." To examine the difference between ICT leaders' perception and non-ICT workers' level of skill, the calculated scores for Anxiety, Liking, Confidence, Hardware, and Software skill, Internet skill, and Data Use skill were compared. Laypersons' Anxiety score was (M=1.25, SD=0.63), while ICT leaders scored Anxiety at (M=2.23, SD=0.88). Liking was scored at (M=3.99, SD=0.73) among Laypersons, while ICT leaders scored Liking as (M=3.0, SD=0.71). When scored by Laypersons, confidence was (M=3.5, SD=0.8) while ICT leaders indicated (M=2.5, SD=0.68). In responding to Hardware and Software skills questions, Laypersons' scores were (M=4.12, SD-0.052), and ICT leaders scored Laypersons

(M=3.25, SD=0.575). Internet skills also showed a difference in rating, with Laypersons showing (M=3.89, SD=0.93) and ICT leaders (M=3.47, SD=0.75). Finally, Data User scores for Laypersons were (M=3.78, SD=1.17) and ICT leaders (M=3.19, SD=0.66). Consistently ICT leaders scored laypeople's digital skills lower than the laypersons themselves. Considering past research indicating a trend toward over estimation, this apparent under estimation is surprising (Bromme et al., 2005; Hinds, 1999; Nückles et al., 2005; Nückles & Bromme, 2002; Wittwer et al., 2008). This analysis supports hypothesis 1 that ICT leaders' perception and layperson's self-rating would differ.

Figure 2

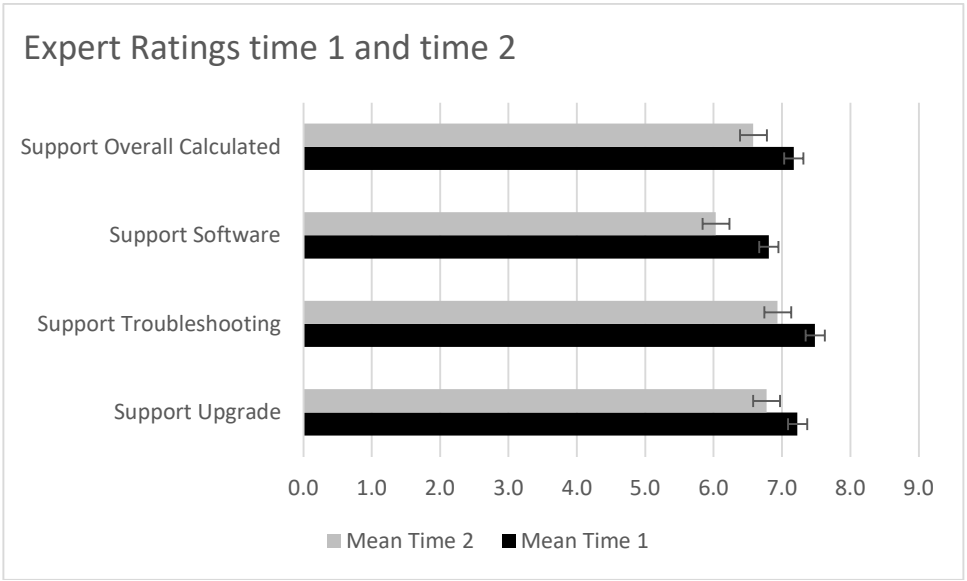


Note: standard deviations are displayed as error bars

H2 states that "When presented with information on the digital literacy of those they serve, ICT leaders would realign their perception based upon actual data." Using a paired sample t-test to analyze the results of the ICT leader, to measure first and second ratings of support needs, hypothesis 2 was determined to be supported. Scores for software, troubleshooting, and upgrades were combined to create the overall score. On average, ICT leaders (M=6.58, SD=1.75) reduced the anticipated level of support Laypersons would need after seeing the results of layperson's self-scoring in relation to their score, then when they were first asked

(M=7.17, SD=1.55). This difference, .59, BCa 95% CI [0.25, 1.03], was significant t(30) =2.8, p=0.009. Looking at the individual scores for software, troubleshooting, and upgrade support needs, the results were as follows. For upgrades, ICT leaders (M=6.77, SD=2.44) reduced the anticipated level of software support Laypersons would need after seeing the results of laypersons' self-scoring in relation to their score first asked (M=7.22, SD=2.29). For troubleshooting, ICT leaders (M=6.93, SD=1.80) reduced the anticipated level of software support Laypersons would need after seeing the results of laypersons' self-scoring in relation to their score, then when first asked (M=7.43, SD=1.80). For software, ICT leaders (M=6.03, SD=1.87) reduced the anticipated level of software support Laypersons would need after seeing the results of laypersons' self-scoring in relation to their score, then when first asked (M=6.80, SD=1.77). The analysis supports hypothesis 2, indicating that ICT leaders adjusted their support expectations based on seeing layperson ratings compared to their ratings. It appears to be a logical conclusion that when leaders see the laypeople's actual data, they reduce their expectations of the support other people will need. The clustered bar graph below illustrates the change for each of the three measures (software, troubleshooting, and upgrades) that were scored together to create the overall support score.

Figure 3



Note: error bars are standard deviations

H3 states that "ICT leaders who have held their positions for more extended periods would show less change in their decision process." A simple linear regression was calculated to predict the difference between the support time one and time two questions were analyzed with the independent variable of years in the organization, b = -0.17, t(31) = 1.95, p = 0.06. A non-significant regression equation was found (F(2, 28) = 0.90, p = 0.42, with an R2 of 0.06.

Table 3
Regression Analysis Time 1 and Time 2 Predicted by Years in Organization

Variable	ß	S.E.
Constant	1.64	0.84
Years in Org	-0.05	0.10
ΔR^2	0.06	
ΔF (df)	0.90 (2, 28)	

Note: N=31. Beta is standardized regression coefficient, significance levels are based on directional, one-tailed t-tests.

Reflecting on What Experts Saw

The ICT leaders were asked to respond to 4 open-ended questions reflecting on what they saw in comparing their scores to the self-ratings of the laypeople.

1. In reviewing these results, is there anything you expected?
2. In reviewing these results, is there anything that you were not expecting?
3. In reviewing these results, is there anything you plan on changing?
4. In reviewing these results, is there information you wish you had?

When asked, "In reviewing these results, is there anything you expected?", 15 participants indicated "no." 9 participants indicated they expected laypeople to rate themselves higher than they would. These comments, at times, included a statement that the expert's rating was the actual score of the layperson. One comment on the expected results was generally illustrative "I expected that my assessment of others would be harsher than how they measure themselves, which I think was demonstrated. What I consider above average for skill/experience is likely higher than what non-experts might consider above average. It's also likely that my assessment is skewed since those who are less comfortable are more likely to ask for support, so I see that end of the spectrum more often."

When asked, "In reviewing these results, is there anything that you were not expecting?", 5 ICT leaders indicated surprise at the high level of liking laypeople indicated or the low level of anxiety. 13 ICT leaders indicated "no" to this question. One comment illustrated the potential selection bias experts have in their perception of laypeople, "Separation and possible over-confidence from end-users in computer use. However, I understand my answers are biased based on end-user interaction with those that need assistance. It is somewhat the 80/20 rule. 80% of support calls might come from approximately 20% of users supported. It is too easy to forget the 80% of users that rarely contact IT for assistance."

When asked, "In reviewing these results, is there anything you plan on changing?",14 participants indicated "no." 6 participants used some form of a statement indicating the intention to give users more credit in the future, either through explaining deeper details or remembering that the layperson has likely been trying themselves before coming to the expert.
When asked, "In reviewing these results, is there information you wish you had?" 14 indicated "no." 7 participants desired more specific information, particularly around the demographics of respondents, age, the department they were from, or roles they hold in the university.

CHAPTER 6

DISCUSSION

This study set out to explore the ICT leaders' perceptions of digital literacy of the laypeople in an organization compared to the layperson's self-rated digital literacy. This study conducted a self and other-rated quantitative survey. This study found that ICT leaders' ratings and laypeople's self-ratings differed from each other, with laypeople self-rating consistently higher than the ICT leaders. This study also found that when ICT leaders were asked about support pre- and post-seeing, the laypeople's average rating adjusted the level of support they would require. In examining the connection between tenure in the organization and the ICT leaders' adjustment, this study found no significant effect.

The difference found in this study between laypersons' self-rating and ICT leaders' ratings of the layperson was anticipated and supports the idea that experts, when estimating layperson knowledge, indicated a different level than the people themselves will (Bromme et al., 2001; Hinds, 1999). Previous studies used specific tasks and asked experts to estimate the layperson on those tasks, while this study asked more broadly what they thought the layperson's literacy was. One exception in scoring was anxiety, where experts' mean score was higher than the laypeople's mean score; however, this indicates experts think laypeople have a higher level of anxiety than the layperson sees themselves as having. While the hypothesis proposed was that there would be a difference, the experts in this study consistently rated the layperson lower than the layperson participants.

Wittwer et al. (2008) illustrated that ICT experts adapt their communications to information presented regardless of the information being an over or underestimating the person's knowledge. The current study demonstrated that within the context of a particular organization, ICT leaders might be prone to an underestimation of laypersons' overall skill. Wittwer et al. (2008) also showed that ICT leaders adjusted to the provided information; through

examination of hypothesis 2, this study illustrated that ICT leaders realign their support expectations by reducing the amount of support they believed people required.

Limitations

Sample sizes for this study were small, with 85 laypersons and 31 experts. While these meet the central limit theorem for a quantitative study of 30 or more participants, a more extensive study may yield different results. This study used self-rating to assess the digital literacy of laypeople within an organization. The layperson's self-rating limits the potential accuracy of the rating to their actual skill set if measured through skills-based examination. ICT leaders commented to this effect, and one succinctly said, "No, it sounds right; the non-ICT staff sees themselves as more competent than reality dictates."

In the literature on expertise, novice, and layperson relationships, many focus on the communication between these individuals (Bromme et al., 2005; Kim & Glassman, 2013; Park & Raile, 2010). In this study, no questions were asked directly about communication planning implications of the differences ICT leaders saw. However, leaders referenced the information as helpful in thinking about their communication approaches.

This study recruited participants from a west coast university. The ICT leaders responded from throughout the Schools and Colleges of the university and the central IT unit. While this allowed for broad participation, it also meant that the laypeople surveyed and the ICT leaders reacting did not necessarily come from the same spaces. A future study may demonstrate different results to focus on a single school or college's ICT leaders and the laypeople within that school or college. As one could imagine, the English department's digital literacy may look quite different from the Computer Science department.

This research took place during the COVID-19 pandemic affected the operations of universities. The workforce of many universities before the pandemic worked on the college

campus. During the pandemic, the university this research took place in and many other universities moved to predominantly remote work at the beginning of March 2020. Data collection occurred between the end of 2021 and the beginning of 2022. Support needs of laypeople within organizations changed as their work location changed.

Upon reflection, when examining hypothesis 3, the recent shift to predominately remote for the organization may have caused leaders to change their cognitive entrenchment had shifted before the study. The lack of significance of hypothesis 3 also may indicate a difference in what the ICT leaders work. In an industry with rapidly evolving developments, the ability to become entrenched diminishes due to the need to learn something new continually.

Implications for Future Research and Practice

This study demonstrates a field research approach to examining expert layperson relationships in thinking about future research. The experts in this study knew the people within their organization. They were not asked to respond to a novice generically, in contrast to Hinds (1999), where the Nokia expert estimated the general novice. The knowledge possessed by the ICT leader in this study showed to counter past research on ICT experts overestimating skills. It showed that when ICT leaders have a pre-existing relationship with an organization, they may be biased to think of those they receive support calls from instead of those that can find solutions on their own. This study indicates that within a particular organization, the ICT leaders have formed a prototypical user in their mind, but that user is based more on their interactions with those that need to call on their expertise, rather than on the experts own level (Koehler, 1991; Krueger, 2003). As one expert said:

> "Separation and possible over-confidence from end-users in computer use. However, I understand my answers are biased based on end-user interaction with those that need assistance. It is somewhat the 80/20 rule. 80% of support calls might come from approximately 20% of users supported. It is too easy to forget the 80% of users that rarely contact IT for assistance."

The more we can understand the factors identified through this study will help us to continue to understand the relationship between IT support and the people they serve.

While in this analysis, means and standard deviations were used to discuss the results, individual organizations may find utility in reviewing the range of responses and clustering of responses to think about needs within the organization. With this information, ICT leaders could plan for the spectrum of the organization's digital literacy skills and develop the training environment to grow skills.

While this study used the well-established Computer Attitude and Self-Efficacy scales, these scales have not evolved to incorporate digital privacy and security concepts. Future work assessing individuals' computer self-efficacy may want to integrate questions that gauge a persons' familiarity with digital privacy and security concepts to create a more holistic picture.

Computer Attitude Scales measure liking, confidence, and anxiety; these are indicators of willingness to learn. This study illustrates that digital literacy reflections could help ICT leaders think differently about who they serve and how to support those individuals. As the ICT leaders saw the difference in their score versus what the laypeople scored, they lowered the expectation of 1:1 support need. These results may help ICT leaders redirect their energy into self-directed support tools.

Conclusions

This study contributes to expert leadership and digital literacy knowledge by demonstrating potential value in assessing organizational leaders' perceptions of the laypersons within an organization. This study illustrates a mechanism for organizational IT leaders to refocus their perspective on those they serve.

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APPENDIX A

CONSTRUCTS

Construct	Question to Users	Question to IT Leaders
Liking	1. I get a sinking feeling when I think of trying to use a computer 2. I feel aggressive and hostile towards computers 3. I think working with computers is fulfilling 4. Figuring out computer problems does not appeal to me 5. I don't understand how some people enjoy spending so much time working with computers	1. They get a sinking feeling when they think of trying to use a computer 2. They feel aggressive and hostile towards computers 3. They think working with computers is fulfilling 4. The challenge of solving problems with computers does not appeal to them 5. They don't understand how some people enjoy spending so much time working with computers
Anxiety	1. Computers make me feel uncomfortable 2. Computers make me feel anxious 3. Working with a computer makes me very nervous 4. Using a computer is challenging for me 5. I'm not the type to do well with computers 6. I'm no good with computers 7. I use computers as little as possible	1. Computers make them feel uncomfortable 2. Computers make them feel anxious 3. Working with a computer makes them very nervous 4. Using a computer is challenging for them 5. They are not the type to do well with computers 6. They are no good with computers 7. They use computers as little as possible
Confidence	1. If I have an unresolved computer problem, I continue to think about it afterward 2. Once I start to work with a computer, I find it hard to stop	1. If they have an unresolved computer problem, they continue to think about it afterward 2. Once they start to work with a computer, they find it hard to stop 3. The challenge of solving problems with computers does not appeal to them

	3. The challenge of solving problems with computers does not appeal to me 4. I do not enjoy talking with others about computers 5. When there is a problem with a computer that I can't solve, I stick with it until I have an answer	4. They do not enjoy talking with others about computers 5. When there is a problem with a computer that they can't solve, they stick with it until they have an answer
Internet Skill	1. Downloading/watching video podcasts 2. Accessing online social networks (Facebook, Twitter, etc.) 3. Downloading/listening to web-based music/videos 4. Blogging 5. Using collaboration tools (Microsoft Teams, Slack, etc.) 6. Online shopping 7. Playing computer games online 8. Using online chat rooms 9. Finding scholarly/refereed journal articles 10. Locating new sources that I find useful	1. Downloading/watching video podcasts 2. Accessing online social networks (Facebook, Twitter, etc.) 3. Downloading/listening to web-based music/videos 4. Blogging 5. Using collaboration tools (Microsoft Teams, Slack, etc.) 6. Online shopping 7. Playing computer games online 8. Using online chat rooms 9. Finding scholarly/refereed journal articles 10. Locating new sources that I find useful

Hardware/Software Skill	1. Understanding the functions of computer hardware (keyboard, monitor, etc....) 2. Understanding the terms/words relating to computer hardware 3. Troubleshooting computer problems 4. Understanding the terms/words relating to computer software 5. Installing computer software 6. Creating graphics (Photoshop, Illustrator, etc.....) 7. Creating Web pages (Drupal, WordPress, HTML, Java, etc....) 8. Using computer-aided design software (AutoCAD, etc...) 9. Using video/audio software (Window Movie Maker, iMovie, etc....) 10. Installing computer software 11. Managing content in a course management system (Canvas, etc....) 12. Using formulas in a spreadsheet (Excel, Numbers, etc...). 13. Using templates in a presentation (PowerPoint, Keynote, etc...) 14. Opening a file	1. Understanding the functions of computer hardware (keyboard, monitor, etc....) 2. Understanding the terms/words relating to computer hardware 3. Troubleshooting computer problems 4. Understanding the terms/words relating to computer software 5. Installing computer software 6. Creating graphics (Photoshop, Illustrator, etc.....) 7. Creating Web pages (Drupal, WordPress, HTML, Java, etc....) 8. Using computer-aided design software (AutoCAD, etc...) 9. Using video/audio software (Window Movie Maker, iMovie, etc....) 10. Installing computer software 11. Managing content in a course management system (Canvas, etc....) 12. Using formulas in a spreadsheet (Excel, Numbers, etc...). 13. Using templates in a presentation (PowerPoint, Keynote, etc...) 14. Opening a file 15. Escaping/exiting from a software program 16. Using the computer to write a letter/essay 17. Using a printer to make a copy of your work 18. Copying an individual file

	15. Escaping/exiting from a software program 16. Using the computer to write a letter/essay 17. Using a printer to make a copy of your work 18. Copying an individual file 19. Attaching documents to emails 20. Using a storage device (thumb drive, CD, etc....) 21. Entering and saving information into a file 22. Using emails for communication 23. Deleting files 24. Organizing/managing files and folders 25. Opening software programs	19. Attaching documents to emails 20. Using a storage device (thumb drive, CD, etc....) 21. Entering and saving information into a file 22. Using emails for communication 23. Deleting files 24. Organizing/managing files and folders 25. Opening software programs
Data Usage Skill	1. I can use university systems to answer other people's questions in a productive way 2. I can use university systems to answer my own questions in a productive way 3. I can organize the information I find on university systems so that it is coherent and answers specific questions	1. I can use university systems to answer other people's questions in a productive way 2. I can use university systems to answer my own questions in a productive way 3. I can organize the information I find on university systems so that it is coherent and answers specific questions

APPENDIX B

LAYPERSON DEMOGRAPHICS TABLES

Laypersons Gender	%	Count
Female	44.71%	38
Male	47.06%	40
Non-Binary	4.71%	4
Prefer not to answer	3.53%	3
Total	100%	85

Laypersons Race/Ethnicity	%	Count
Black/African American	2.35%	2
Asian/Pacific Islander	10.59%	9
White/Caucasian	76.47%	65
Middle Eastern/North African	1.18%	1
Hispanic/Latino(a)	2.35%	2
Native American	0.00%	0
Prefer not to answer	7.06%	6
Total	100%	85

Layperson Age	%	Count
18-20	0.00%	0
21 - 25	5.88%	5
26 - 30	11.76%	10
31 - 35	8.24%	7
36 - 40	9.41%	8
41-45	10.59%	9
46-50	7.06%	6
51-55	10.59%	9
56-60	8.24%	7
61-65	12.94%	11
66-70	2.35%	2
Over 70	5.88%	5
Prefer not to answer	7.06%	6
Total	100%	85

Location in University	%	Count
Schools and Colleges	91.86%	79
Central Offices	8.14%	7

Total	100%	86

Layperson Relationship to Organization	%	Count
I'm staff	38.21%	47
I'm faculty	13.01%	16
I'm a student employee	5.69%	7
I work primarily in a research center/lab	8.13%	10
I work primarily in a student support capacity	4.07%	5
I work primarily in an operational capacity (facilities, HR, etc.)	2.44%	3
I'm faculty working in an administrative capacity	2.44%	3
I'm professional staff	18.70%	23
I'm a member of a union	6.50%	8
Prefer not to answer	0.81%	1
Total	100%	123

Years at University	%	Count
Less than 1	9.30%	8
1-5	29.07%	25
6-10	12.79%	11
11-15	10.47%	9
16-20	16.28%	14
21-25	4.65%	4
26-30	4.65%	4
More than 30	12.79%	11
Total	100%	86

APPENDIX C

EXPERT DEMOGRAPHICS

ICT Leader Location	%	Count
School/College IT	48.39%	15
Central IT	45.16%	14
Prefer not to answer	6.45%	2
Total	100%	31

Role in IT Group	%	Count
I'm a director of an IT group	19.35%	6
I'm a project manager/business analyst	12.90%	4
I'm a manager of an IT team	22.58%	7
I'm an individual contributor	22.58%	7
Other	16.13%	5
Prefer not to answer	6.45%	2
Total	100%	31

Years in Current Role	%	Count
1-5	46.15%	6
6-10	7.69%	1
11-15	7.69%	1
15-20	30.77%	4
21+	7.69%	1
Total	100%	13

Year at University	%	Count
Less than 1	7.32%	3
1-5	14.63%	6
6-10	12.20%	5
11-15	4.88%	2
16-20	19.51%	8
21-25	2.44%	1
26-30	4.88%	2
More than 30	7.32%	3
Prefer not to answer	2.44%	1
Total	100%	31

Gender	%	Count
Female	22.58%	7

Male	70.97%	22
Non-Binary	3.23%	1
Prefer not to answer	3.23%	1
Total	100%	31

Race/Ethnicity	%	Count
Black/African American	0.00%	0
Asian/Pacific Islander	3.23%	1
White/Caucasian	74.19%	23
Middle Eastern/North African	0.00%	0
Hispanic/Latino(a)	6.45%	2
Native American	0.00%	0
Prefer not to answer	16.13%	5
Total	100%	31

Age	%	Count
18-20	0.00%	0
21 - 25	0.00%	0
26 - 30	3.23%	1
31 - 35	3.23%	1
36 - 40	9.68%	3
41-45	12.90%	4
46-50	16.13%	5
51-55	22.58%	7
56-60	12.90%	4
61-65	6.45%	2
66-70	3.23%	1
Over 70	0.00%	0
Prefer not to answer	9.68%	3
Total	100%	31

APPENDIX D

DESCRIPTIVE STATISTICS

Layperson Descriptive Statistics

	Mean	Std. Deviation	N
Anxiety Calculated Score	1.2521	.63339	85
Hardware/Software Calculated Score	4.1299	.52481	85
Internet Calculated Score	3.8953	.93209	85
Data Use Calculated Score	3.7804	1.17012	85
Liking Calculated Score	3.9953	.73483	85
Confidence Calculated Score	3.5082	.80626	85

ICT Leader Descriptive Statistics

	Mean	Std. Deviation	N
Anxiety Calculated Score	2.2304	.88270	31
Hardware/Software Calculated Score	3.2506	.57553	31
Internet Calculated Score	3.4730	.75839	31
Data Use Calculated Score	3.1935	.66541	31
Liking Calculated Score	3.0000	.71181	31
Confidence Calculated Score	2.5806	.68577	31

APPENDIX E

LAYPERSON SURVEY

I am Christine Noyes-Williams a graduate student under the direction of Professor Mai Trinh in the College of Integrative Sciences and Arts at Arizona State University and Primary Investigator for this study. I am conducting a research study to examine IT leaders' understanding of users' digital literacy in fulfillment of thesis requirements of the Master of Science in Organizational Leadership.

I am inviting your participation, which will involve completing this 15-20 minute survey. You have the right not to answer any question, and to stop participation at any time. Your participation in this study is anonymous and voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. There are no foreseeable risks or discomforts to your participation. Your responses will be anonymous. You must be 18 or older to participate in the study.

De-identified data collected as a part of the current study will be shared with others (e.g., investigators or industry partners) for future research purposes or other uses. The aggregate, anonymous results will be shared with IT leaders within the [research site].

If you have any questions concerning the research study, please contact the research team at: Christine Noyes-Williams (co-PI) cvwilli4@asu.edu or Mai Trinh (PI) mptrinh@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

○ I consent to participate in this study and confirm that I'm 18 years or older

Do you own a computer (desktop, laptop, tablet)?

- Yes
- No

Q2 Which of the following electronic devices do you own? (please mark all that apply)

- Cell phone
- Smart Phone (iPhone, Android, etc...)
- iWatch, Fitbit, etc…
- Electronic gaming system
- Tablet

Q3 Please indicate your level of agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	N/A (6)
I get a sinking feeling when I think of trying to use a computer	○	○	○	○	○	○
Computers make me feel uncomfortable	○	○	○	○	○	○
Computers make me feel anxious	○	○	○	○	○	○
Working with a computer makes me very nervous	○	○	○	○	○	○

I feel aggressive and hostile towards computers	○	○	○	○	○	○
Using a computer is challenging for me	○	○	○	○	○	○
I'm not the type to do well with computers	○	○	○	○	○	○
I'm no good with computers	○	○	○	○	○	○
I use computers as little as possible	○	○	○	○	○	○

Q4 Please indicate your level of agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	N/A (6)
If I have an unresolved computer problem, I continue to think about it afterward	○	○	○	○	○	○
Once I start to work with a computer, I find it hard to stop	○	○	○	○	○	○
I think working with computers is fulfilling	○	○	○	○	○	○

I don't understand how some people enjoy spending so much time working with computers	○	○	○	○	○	○
Figuring out computer problems does not appeal to me	○	○	○	○	○	○
The challenge of solving problems with computers does not appeal to me	○	○	○	○	○	○

I do not enjoy talking with others about computers	○	○	○	○	○	○
When there is a problem with a computer that I can't solve, I stick with it until I have an answer	○	○	○	○	○	○

Q5 Please indicate your level of ability in completing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Opening a file	○	○	○	○	○	○
Escaping/exiting from a software program	○	○	○	○	○	○
Using the computer to write a letter/essay	○	○	○	○	○	○
Using a printer to make a copy of your work	○	○	○	○	○	○
Copying an individual file	○	○	○	○	○	○
Attaching documents to emails	○	○	○	○	○	○
Using a storage device (thumb drive, CD, etc....)	○	○	○	○	○	○

Entering and saving information into a file	○	○	○	○	○	○
Using emails for communication	○	○	○	○	○	○
Deleting files	○	○	○	○	○	○
Organizing/managing files and folders	○	○	○	○	○	○
Opening software programs	○	○	○	○	○	○

Q6 Please indicate your level of ability in performing the following Internet tasks:

	Very Low	Low	Average	High	Very High	NA
Downloading/watching video podcasts	○	○	○	○	○	○
Accessing online social networks (Facebook, Twitter, etc.)	○	○	○	○	○	○
Downloading/listening to web-based music/videos	○	○	○	○	○	○
Blogging	○	○	○	○	○	○
Using collaboration tools (Microsoft Teams, Slack, etc.)	○	○	○	○	○	○
Online shopping	○	○	○	○	○	○
Playing computer games online	○	○	○	○	○	○

Using online chat rooms	○	○	○	○	○	○
Finding scholarly/refereed journal articles	○	○	○	○	○	○
Locating new sources that I find useful	○	○	○	○	○	○

Q7 Please indicate your level of ability in performing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Understanding the functions of computer hardware (keyboard, monitor, etc....)	○	○	○	○	○	○
Understanding the terms/words relating to computer hardware	○	○	○	○	○	○
Troubleshooting computer problems	○	○	○	○	○	○
Understanding the terms/words relating to computer software	○	○	○	○	○	○
Installing computer software	○	○	○	○	○	○

Q8 Please indicate your level of ability in performing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Creating graphics (Photoshop, Illustrator, etc.....)	○	○	○	○	○	○
Creating Web pages (Drupal, WordPress, HTML, Java, etc....)	○	○	○	○	○	○
Using computer-aided design software (AutoCAD, etc...)	○	○	○	○	○	○
Using video/audio software (Window Movie Maker, iMovie, etc....)	○	○	○	○	○	○
Installing computer software	○	○	○	○	○	○

Managing content in a course management system (Canvas, etc....)	○	○	○	○	○	○
Using formulas in a spreadsheet (Excel, Numbers, etc...)	○	○	○	○	○	○
Using templates in a presentation (PowerPoint, Keynote, etc...)	○	○	○	○	○	○

Q9 Please indicate your level of agreement with the following statement:

	Very Low	Low	Average	High	Very High	NA
I can use university systems to answer other people's questions in a productive way	○	○	○	○	○	○
I can use university systems to answer my own questions in a productive way	○	○	○	○	○	○

I can organize the information I find on university systems so that it is coherent and answers specific questions	○	○	○	○	○	○

Q10 Please indicate your level of agreement with the following statements regarding [location site name] IT Staff:

	Strongly Disagree	Disagree	Neither Disagree or Agree	Agree	Strongly Agree	NA
IT staff understand my skill level.	○	○	○	○	○	○
IT staff are experts whom I trust.	○	○	○	○	○	○
IT staff understand my needs.	○	○	○	○	○	○
IT staff are able to explain problems in a way I understand.	○	○	○	○	○	○

IT staff recognize that I have different expertise than theirs.	○	○	○	○	○	○

Q11 What location do you work on?

[Research site locations]

Q16 What is your relationship to the [research site]? (check all that apply)

- I'm staff
- I'm faculty
- I'm a student employee
- I work primarily in a research center/lab
- I work primarily in a student support capacity
- I work primarily in an operational capacity (facilities, HR, etc.)
- I'm faculty working in an administrative capacity
- I'm professional staff
- I'm a member of a union
- Prefer not to answer

Q17 How many years have you worked for the [research site]?

- Less than 1
- 1-5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- More than 30

Q18 What is your gender?

- Female
- Male
- Non-Binary
- Prefer not to answer

Q19 What is your ethnicity?

- Black/African American
- Asian/Pacific Islander
- White/Caucasian
- Middle Eastern/North African
- Hispanic/Latino(a)
- Native American
- Prefer not to answer

Q20 What is your age?

- 18-20
- 21 - 25
- 26 - 30
- 31 - 35
- 36 - 40
- 41-45
- 46-50
- 51-55
- 56-60
- 61-65
- 66-70
- Over 70
- Prefer not to answer

APPENDIX F

EXPERT SURVEY

I am Christine Noyes-Williams a graduate student under the direction of Professor Mai Trinh in the College of Integrative Sciences and Arts at Arizona State University and Primary Investigator for this study. I am conducting a research study to examine IT leaders understanding of users' digital literacy in fulfillment of thesis requirements of the Master of Science in Organizational Leadership.

I am inviting your participation, which will involve completing this 30-40 minute survey. You have the right not to answer any question, and to stop participation at any time. Your participation in this study is anonymous and voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. There are no foreseeable risks or discomforts to your participation. Your responses will be anonymous. You must be 18 or older to participate in the study.

De-identified data collected as a part of the current study will be shared with others (e.g., investigators or industry partners) for future research purposes or other uses. The aggregate, anonymous results will be shared with IT leaders within the [research site].

If you have any questions concerning the research study, please contact the research team at: Christine Noyes-Williams (co-PI) cvwilli4@asu.edu or Mai Trinh (PI) mptrinh@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

○ I consent to participate in this study and confirm that I'm 18 years or older

Q38 The following questions will ask you to rate your non-ICT colleagues on a series questions.

Do non-ICT staff own a computer (desktop, laptop, tablet)?

- Yes
- No

Q2 Which of the following electronic devices do non-ICT staff own? (please mark all that apply)

- Cell phone
- Smart Phone (iPhone, Android, etc...)
- iWatch, Fitbit, etc
- Electronic gaming system
- Tablet

Q3 When thinking of your non-ICT colleagues, please indicate your level of agreement with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	N/A
They get a sinking feeling when they think of trying to use a computer	○	○	○	○	○	○
Computers make them feel uncomfortable	○	○	○	○	○	○
Computers make them feel anxious	○	○	○	○	○	○
Working with a computer makes them very nervous	○	○	○	○	○	○
They feel aggressive and hostile towards computers	○	○	○	○	○	○
Using a computer is challenging for them	○	○	○	○	○	○
They are not the type to do well with computers	○	○	○	○	○	○
They are no good with computers	○	○	○	○	○	○
They use computers as little as possible	○	○	○	○	○	○

Q4 When thinking of your non-ICT colleagues, please indicate your level of agreement with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	N/A
If they have an unresolved computer problem, they continue to think about it afterward	○	○	○	○	○	○
Once they start to work with a computer, they find it hard to stop	○	○	○	○	○	○
They think working with computers is fulfilling	○	○	○	○	○	○
They don't understand how some people enjoy spending so much time working with computers	○	○	○	○	○	○
Figuring out computer problems does not appeal to them	○	○	○	○	○	○
The challenge of solving problems with computers does not appeal to them	○	○	○	○	○	○
They do not enjoy talking with others about computers	○	○	○	○	○	○
When there is a problem with a computer that they can't solve, they stick with it until they have an answer	○	○	○	○	○	○

Q5 Please indicate what you believe to be the non-ICT colleagues level of ability in completing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Opening a file	○	○	○	○	○	○
Escaping/exiting from a software program	○	○	○	○	○	○
Using the computer to write a letter/essay	○	○	○	○	○	○
Using a printer to make a copy of your work	○	○	○	○	○	○
Copying an individual file	○	○	○	○	○	○
Attaching documents to emails	○	○	○	○	○	○
Using a storage device (thumb drive, CD, etc....)	○	○	○	○	○	○
Entering and saving information into a file	○	○	○	○	○	○
Using emails for communication	○	○	○	○	○	○
Deleting files	○	○	○	○	○	○
Organizing/managing files and folders	○	○	○	○	○	○
Opening software programs	○	○	○	○	○	○

Q6 Please indicate what you believe to be your non-ICT colleagues level of ability in performing the following Internet tasks:

	Very Low	Low	Average	High	Very High	NA
Downloading/watching video podcasts	○	○	○	○	○	○
Accessing online social networks (Facebook, Twitter, etc.)	○	○	○	○	○	○
Downloading/listening to web-based music/videos	○	○	○	○	○	○
Blogging	○	○	○	○	○	○
Using collaboration tools (Microsoft Teams, Slack, etc.)	○	○	○	○	○	○
Online shopping	○	○	○	○	○	○
Playing computer games online	○	○	○	○	○	○
Using online chat rooms	○	○	○	○	○	○
Finding scholarly/refereed journal articles	○	○	○	○	○	○
Locating new sources that I find useful	○	○	○	○	○	○

Q7 Please indicate what you believe to be your non-ICT colleagues level of ability in performing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Understanding the functions of computer hardware (keyboard, monitor, etc....)	○	○	○	○	○	○
Understanding the terms/words relating to computer hardware	○	○	○	○	○	○
Troubleshooting computer problems	○	○	○	○	○	○
Understanding the terms/words relating to computer software	○	○	○	○	○	○
Installing computer software	○	○	○	○	○	○

Q8 Please indicate what you believe to be your non-ICT colleagues level of ability in performing the following tasks:

	Very Low	Low	Average	High	Very High	NA
Creating graphics (Photoshop, Illustrator, etc.....)	○	○	○	○	○	○
Creating Web pages (Drupal, WordPress, HTML, Java, etc....)	○	○	○	○	○	○
Using computer-aided design software (AutoCAD, etc...)	○	○	○	○	○	○
Using video/audio software (Window Movie Maker, iMovie, etc....)	○	○	○	○	○	○
Installing computer software	○	○	○	○	○	○
Managing content in a course management system (Canvas, etc....)	○	○	○	○	○	○
Using formulas in a spreadsheet (Excel, Numbers, etc...).	○	○	○	○	○	○
Using templates in a presentation (PowerPoint, Keynote, etc...)	○	○	○	○	○	○

Q9 When thinking of your non-ICT colleagues, please indicate your level of agreement with the following statement:

	Very Low (1)	Low (2)	Average (3)	High (4)	Very High (5)	NA (6)
They can use university systems to answer other people's questions in a productive way	○	○	○	○	○	○
They can use university systems to answer their own questions in a productive way	○	○	○	○	○	○
They can organize the information they find on university systems so that it is coherent and answers specific questions	○	○	○	○	○	○

Q10 Please indicate your level of agreement with the following statements regarding [research site] non-ICT staff:

	Strongly Disagree (1)	Disagree (2)	Neither Disagree or Agree (3)	Agree (4)	Strongly Agree (5)	NA (6)
I understand the skill level of my non-ICT colleagues.	○	○	○	○	○	○
They are experts whom I trust.	○	○	○	○	○	○
I understand the needs of my non-ICT colleagues.	○	○	○	○	○	○
My non-ICT colleagues understand the explanations I give.	○	○	○	○	○	○
I recognize that my non-ICT colleagues have different expertise than mine.	○	○	○	○	○	○

Q20 Using the slider, rate the degree to which users would need support in the following areas:

(0 = no support, 10 = one on one)

0 1 2 3 4 5 6 7 8 9 10

need support during new software adoption	
need support troubleshooting an issue	
need support preparing for a system upgrade	

Q40 The questions you were asked earlier about non-ICT colleagues, non-ICT staff were asked about themselves in an earlier survey. The following takes the non-ICT colleagues' average score and your score is given in 6 categories so that you can compare their scores and your own.

Q30 The chart above shows the median score non-ICT staff at [research site] gave for Liking working with computers. You indicated the typical non-ICT staff would **score ${gr://SC_6gjPESeEHtH0FaS/Score}**.

Q31 The chart above shows the median score non-ICT staff at [research site] gave for Anxiety working with computers. You indicated the typical non-ICT staff would **score ${gr://SC_1T9hXu3vMCl2eEK/Score}**.

Q32 The chart above shows the median score non-ICT staff at [research site] gave for confidence working with computers. You indicated the typical non-ICT staff would **score** **${gr://SC_9mePkpjAf5Dysh8/Score}**.

Q33 The chart above shows the median score non-ICT staff at [research site] were given for internet skill. You indicated the typical non-ICT staff would **score** **${gr://SC_9TargAZeUlGy5kq/Score}**.

Q34 The chart above shows the median score non-ICT staff at [research site] were given for hardware/software usage. You indicated the typical non-ICT staff would **score** **${gr://SC_554U6u44d8ahjmu/Score}**.

Q35 The chart above shows the median score non-ICT staff at [research site] were given for data usage. You indicated the typical non-ICT staff would **score** **${gr://SC_1zDnrp09QyYQNF4/Score}**.

Q26 In reviewing these results, is there anything you expected?

Q27 In reviewing these results, is there anything that you were not expecting?

Q28 In reviewing these results, is there anything you plan on changing?

Q29 In reviewing these results, is there information you wish you had?

Q41 Again using the slider, rate the degree to which users would need support in the following areas: (0 = no support, 10 = one on one)

	0 1 2 3 4 5 6 7 8 9 10
need support during new software adoption	
need support troubleshooting an issue	
need support preparing for a system upgrade	

Q11 What location do you work on?

[Research site]

Q16 What is your relationship to the [research site]? (check all that apply)

- I'm staff
- I'm faculty
- I'm a student employee
- I work primarily in a research center/lab
- I work primarily in a student support capacity
- I work primarily in an operational capacity (facilities, HR, etc.)
- I'm faculty working in an administrative capacity
- I'm professional staff
- I'm a member of a union
- Prefer not to answer

Q37 Please indicate your role within IT?

- I'm a director of an IT group
- I'm a manager of an IT team
- I'm a project manager/business analyst
- I'm an individual contributor (software engineer, database manager, etc)
- Other
- Prefer not to answer

Q36 How many years have you served in this role at the [research site]?

- 1-5
- 6-10
- 11-15
- 15-20
- 21+

Q17 How many years have you worked for the [research site]?

- Less than 1
- 1-5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- More than 30
- Prefer not to answer

Q18 What is your gender?

- Female
- Male
- Non-Binary
- Prefer not to answer

Q19 What is your ethnicity?

- Black/African American
- Asian/Pacific Islander
- White/Caucasian
- Middle Eastern/North African
- Hispanic/Latino(a)
- Native American
- Prefer not to answer

Q20 What is your age?

- 18-20
- 21 - 25
- 26 - 30
- 31 - 35
- 36 - 40
- 41-45
- 46-50
- 51-55
- 56-60
- 61-65
- 66-70
- Over 70
- Prefer not to answer

APPENDIX G

IRB Approval

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Mai Trinh
CISA: Leadership and Interdisciplinary Studies
480/727-0416
Mai.Trinh@asu.edu

Dear Mai Trinh:

On 11/22/2021 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	How Information Technology Leaders' Perception of Novices Differ from Reality
Investigator:	Mai Trinh
IRB ID:	STUDY00014812
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• CVWilliams Thesis IRB Social Behavioral.docx, Category: IRB Protocol; • Design layout_18-10-2021.pdf, Category: Technical materials/diagrams; • Expert consent.pdf, Category: Consent Form; • Expert survey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • IT leader invite to non-IT staff (1).pdf, Category: Recruitment Materials; • leader invite.pdf, Category: Recruitment Materials; • Novice consent.pdf, Category: Consent Form; • Novice survey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • UW sign off, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc);

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 11/9/2021.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

If any changes are made to the study, the IRB must be notified at research.integrity@asu.edu to determine if additional reviews/approvals are required. Changes may include but not limited to revisions to data collection, survey and/or interview questions, and vulnerable populations, etc.

REMINDER - All in-person interactions with human subjects require the completion of the ASU Daily Health Check by the ASU members prior to the interaction and the use of face coverings by researchers, research teams and research participants during the interaction. These requirements will minimize risk, protect health and support a safe research environment. These requirements apply both on- and off-campus.

The above change is effective as of July 29th 2021 until further notice and replaces all previously published guidance. Thank you for your continued commitment to ensuring a healthy and productive ASU community.

Sincerely,

IRB Administrator

cc: Christine Williams
Christine Williams