Age and the Digital Divide

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The digital divide is putting older workers at a disadvantage in gaining access and maintaining job opportunities. Despite this concern, little research has examined the extent that the digital divide (i.e., the gap between those who have access and can use the Internet and those who do not) (Hoffman & Novak, 1998) affects employment-related outcomes. Therefore, the primary purposes of this paper are to assess the extent that there are age differences in the digital divide, and examine the influence of these differences on employment opportunities. We present a model to guide research, offer hypotheses, and consider implications for future research and practice.

INTRODUCTION

The Internet has transformed many aspects of our lives including the way that we purchase products, apply for jobs, access healthcare, and communicate with others (Stone, Deadrick, Lukaszewski, & Johnson, 2015). Use of the Internet in the workplace has aided in decreasing transaction times, increased efficiency, and improved communication (Kavanagh, Thite, & Johnson, 2015). Furthermore, organizations are using the Internet to facilitate recruiting, selection, performance management, and retention of employees (Stone & Dulebohn, 2013). For example, some estimates indicate that 100% of large organizations now use the Internet for recruiting (SierraCedar, 2016), and newspapers publish job ads only once per week or not at all. As a result, applicants must now be able to use the Internet to search for jobs or apply for them. However, the rise in the use of the Internet in organizations has prompted concerns from analysts who argue that many individuals in our society (e.g., ethnic minorities, older workers, those in rural areas) do not have access to or the ability to use the Internet. This lack of ability and access may exacerbate several employment problems such as high unemployment rates, low advancement rates, and low salary levels (Stone, Krueger, & Takach, 2017). For example, many older workers have little access to the Internet or computers, and may not have the ability or computer self-efficacy needed to use the Internet to apply for jobs, promotions, training, or other services (e.g., social security, unemployment insurance). Surveys by Pew Internet (2017) reported that Internet access and use is almost ubiquitous among young affluent individuals in our society, but 75% of those 55-64 and only

55% of those 65 or older have Internet access. Thus, the lack of Internet access and usage rates is likely to put older workers at a disadvantage in gaining access and maintaining job opportunities.

Despite these concerns, relatively little research has examined the extent to which the digital divide (i.e., the gap between those who have access and can use the Internet and those who do not have access or the ability to use the Internet) (Hoffman & Novak, 1998) affects employment-related outcomes. Therefore, the primary purposes of this paper are to assess the extent to which there are age differences in the digital divide, and examine the influence of these differences on employment opportunities. We will briefly discuss the digital divide, present a model that can be used to understand these problems, and review the research on age and the digital divide. Finally, we will consider the implications for future research and strategies for helping older workers and organizations overcome age differences in the digital divide.

The Digital Divide

The digital divide is the gap between individuals who have access to computers and the ability to use them and those who do not (Hoffman & Novak, 1998). Given the widespread use of computers and the Internet, this divide has a negative impact on individuals' ability to gain access to jobs, social services, education, healthcare, and many other important outcomes. Further, access to and ability to use the Internet differs for individuals based on race, ethnicity, gender, education, socioeconomic status, national differences, and age (i.e., Hoffman & Novak, 1998; Jackson, Ervin, Gardner, & Schmitt, 2001; Van Dijk & Hacker, 2003). Stone et al. (2017) discussed several demographic differences (e.g., gender, racial, ethnic, and cross-national differences), and social issues associated with the Internet at work (e.g., the digital divide and privacy concerns). They also provided a theoretical framework to understand these issues. Our paper extends this work by discussing age differences associated with the digital divide, and the influence that these differences have on employment-related outcomes (e.g., access to jobs, promotions, benefits, etc.).

Researchers have argued that age is a key factor that affects the digital divide and the Internet use rate (i.e., Hoffman & Novak, 1998; Jackson, Ervin, Gardner, & Schmitt, 2001; Van Dijk & Hacker, 2003). In fact, 88% of adults in the United States (U.S.) use the Internet (Pew Research Center, 2016), but younger individuals use the Internet much more than those who are older. Although the age differences in Internet use has improved over time (Pew Internet, 2017), still one-third of individuals 65 years of age and older report that they never use the internet. This gap is important because many older individuals are working long after retirement age due to economic issues, and organizations need their specialized expertise to ensure that they are competitive. Further, Burlacu, Truxillo, and Bauer, (2017) argued that many older individuals are remaining in the workplace for a number of reasons. First, the retirement age for Social Security's full-benefit is increasing in the U.S (e.g., the full benefit age has increased from 65 to 66, for people born in 1943 – 1954, and will increase to 67 years of age for individuals born in 1960 or later. Second, employers are trying to retain older individuals because they do not have replacements for them, and they often have very specialized expertise that is critical to organizations. Third, many older individuals do not have the retirement savings needed to live comfortably after retirement, and some become bored and decide to return to work after retirement (Burlacu et al., 2017). Even though older workers have many unique skills, they do not always have computer or Internet experience because systems were implemented in recent years (i.e., 1990's and early 2000's). Further, organizations do not always take the time to train older workers to use these new systems. The result is that older workers often have fewer computer skills, and lower computer self-efficacy (CSE) than younger workers, and this makes it difficult for them to gain access to jobs or perform at high levels once they are employed.

Not surprisingly, the lack of Internet and computer skills among older workers may mean that organizations do not have the talented employees needed to help them remain competitive, and older individuals may not have the opportunity to utilize their skills and enjoy a satisfying work life. In view of these issues and the fact that relatively limited research has examined age and the digital divide, the primary purposes of this paper are to (a) present a theoretical model that can be used to guide research on

age and the digital divide, (b) review the existing research to uncover the factors that may influence this divide, and (c) offer directions for future research and practice on the topic.

THEORETICAL BASIS FOR AGE DIFFERENCES AND INERNET USE

There is limited research regarding age and the digital divide, and most of the research that does exists is a theoretical. In the context of the workplace, there is less research regarding age differences and Internet use than gender or ethnic differences in Internet use (Stone et al., 2017). One theory that may explain age differences in attitudes and use of the Internet is social cognitive theory (Bandura, 1986). According to social cognitive theory, an individual's thoughts and self-efficacy beliefs affect their motivation and behaviors. Lack of Internet access often provides few opportunities for older individuals to learn computer-related tasks, which has a negative impact on their computer self-efficacy (CSE). However, access to the Internet often enables older individuals to master computer skills which should improve CSE, and their computer use in the workplace. Self-efficacy is the strength of one's beliefs in their ability to complete a task successfully (Bandura, 1986). One's self-efficacy will determine the amount of effort he or she is willing to put toward tasks. When obstacles arise, an individual's level of self-efficacy will determine how long they will persevere. Thus, an individual with high self-efficacy is more likely to complete a task, and sustain those efforts longer than someone with low self-efficacy (Bandura, 1986). Individuals with low self-efficacy may perceive task as being more difficult than they actually are. This may result in higher stress levels, less confidence, and lower performance levels. Two studies by Vancouver, Thompson, Tischner, & Putka, (2002) found that high self-efficacy can be negatively related to task performance, several other studies indicated that high self-efficacy was positively related to performance (Bandura & Jourden, 1991; Stone, 1994; Vancouver et al., 2002). Overall, we believe that social cognitive theory and CSE can facilitate the understanding of age differences in computer usage rates.

Social cognitive theory suggests that self-efficacy beliefs are shaped by involvement in a task. Successful involvement in a task increases self-efficacy, and failure lowers it. Modeling is another factor shaping self-efficacy beliefs. For example, if we see someone who is similar to us carrying out a task, then we tend to believe that we to can be successful at that task as well. However, if someone who is similar to us fails at a task, then our self-efficacy will decrease. Results from research in management information systems (Compeau & Higgins, 1995; Marakas, Yi, & Johnson, 1998) also shows that CSE beliefs are positively related to computer attitudes and rates of use. Given that older individuals often have less access to computers and the Internet than those who are younger, they are likely to have lower levels of experience with the Internet, and therefore, lower levels of CSE than their counterparts. Further, the lack of CSE and experienced with the Internet should have a negative impact on their ability to gain access to web-based recruiting, or access to promotions and other job-related opportunities (e.g., training). They may also have difficulties performing some of the new requirements of jobs because 62% of jobs in the US require use of the Internets and many of these jobs have higher pay rates than those that do not require Internet use.

Given this framework, older individuals are less likely to have access to and use computers or the Internet, and, therefore, have fewer opportunities for successfully completing computer-related tasks. This is likely to have a negative influence on their self-efficacy beliefs, attitudes toward computers, motivation levels, and job opportunities. In the following paragraphs, we provide a brief review of the research related to age differences in the elements of this model.

RESEARCH ON AGE DIFFERENCES IN THE DIGITAL DIVIDE

Previous research has shown that there are a number of demographic differences that contribute to the digital divide (e.g., gender, racial and ethnic differences, socio-economic status (SES), cross-national differences, and age) (Stone et al., 2017). However, there is limited research regarding age differences and the digital divide in the workplace. Therefore, we will discuss some of the more general, albeit

limited, research on age differences and the digital divide. It merits noting that this is not meant to be a comprehensive review of the literature, but an overview of the research in order to identify factors that may influence age-related differences in the digital divide. The age aspect of the digital divide is likely to be related to computer or technical skill levels, attitudes toward technology, motivation, and computer anxiety.

Age and Technological Skills

First, an individual's level of technological skills may be one reason for the age difference in Internet use. For example, one study found that individuals who were older (individuals in their sixties) were slower on the internet when compared to individuals who were younger (late teens and twenties) (Hargittai, 2001). Hargittai also argued that the difference in pace regarding Internet use may be due to older individual's low levels of comfort with technology.

In another study Sarkar et. al. (2011) examined the use of a patient medical portal for individuals with diabetes. Overall, individuals who were older (over seventy years of age) were less likely to use the portal than those who were younger. Interestingly, those patients who requested a password and had access to the internet, were older and more likely to log on to the patient portal than those who were 40 years of age. The authors explain that this may be due to increased healthcare and self-management needs among older individuals. Thus, older individuals may be more likely to log onto a medical portal when there is a critical need to do so than when there is not. As a result, need to use the Internet may be a key factor affecting older individuals use of the Internet. However, this study assessed logging into a patient medical portal, and did examine the types of activities requiring different skill types.

Finally, a study by Van Deursen, and Van Dijk, (2011) examined differences in Internet skills among the Dutch population. Questionnaires and assignments were given to individuals ranging from 18 to 80 years of age. The authors found that age was the main contributor to the time spent on operational skill assignments (the skills needed to operate computer and network hardware and software). Furthermore, older individuals completed fewer assignments and spent more time on the assignments than younger individuals. Additionally, the authors indicated that individuals who were older performed more poorly on Internet tasks than members of younger generations (i.e., they had lower ability to understand and handle the formal characteristics of the Internet and network such as file structures and hyperlinks). However, age did not appear as a significant contributor to the level of information found on the Internet (i.e., the ability to find, select, process and evaluate information in specific sources of computer and networks), or the capacity to use the information to achieve specific goals or improving one's position in society.

Given the research just reviewed, it appears that one factor that may affect Internet use is lack of technical skills, but the research also revealed that older individuals may be more motivated to use the Internet when there is a need to do so or the Internet is a means to helping them achieve their goals. We believe that more research is needed on these factors, and we offer the following hypotheses to guide that research.

> H1: When older individuals perceive that they have high levels of technical skills they will be more (a) motivated to use the Internet and (b) likely to use it.
> H2: When older individuals perceive that the Internet will help them meet their needs or achieve their goals they will be more (a) motivated to use it, and (b) more likely to use it.

Attitudes toward Computers

Another factor that may affect age differences in Internet use is attitudes toward computers. We also believe that attitudes toward computers may be influenced by individuals' level of computer self-efficacy and computer anxiety. Quite simply, those who perceive that they have low levels of CSE are likely to have high levels of computer anxiety and negative attitudes toward computers. We know of only a few studies that assessed computer self-efficacy and Internet use. For instance, one study (Cody, Dunn, Hoppin, & Wendt, 1999) indicated that a four-month internet surfing training program for seniors, involving weekly meetings with a mentor, showed that those staying with the program tended to have

lower levels of computer anxiety, higher efficacy, and more positive attitudes toward computers than those who did not stay with the program. Furthermore, more time was spent online when computer efficacy was high, computer anxiety was low, and attitudes were positive.

In another study, Choi and DiNitto (2013) studied Internet use patterns and attitudes toward the Internet among adults who were older, low-income, and homebound. The authors used eHealth to measure computer self-efficacy. The results of their research found that individuals who were older had low levels of confidence in their Internet search skills even though they used the Internet almost daily. Furthermore, those who were older had lower perceptions of their computer self-efficacy than their younger counterparts. Thus, this research suggests that another factor that may affect age and the digital divide is older individuals' low levels of confidence about Internet use and low levels of CSE regardless of their daily use of the Internet. It is clear that self-confidence, CSE, successful experiences, and attitudes toward the Internet are likely to be key factors that affect older workers' motivation and use of the Internet. Thus, we believe that more research is needed to examine these factors, and we present the following hypotheses in order to facilitate that research.

> H3: The more that older workers (a) perceive that they are confident in their ability to use the computer or Internet, and (b) have high levels of computer self-efficacy the more that they will be motivated to use the Internet.
>
> H4: Older workers' self-confidence and CSE will be positively related to their attitudes toward the Internet, their motivation to use it, and their actual use of it.
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> H5: When older workers have successful experiences using the Internet the more they will be motivated to use and actually use the Internet.

Lack of Interest in Internet Use

Another factor that may affect age differences in Internet use is lack of interest in using these new systems. In one study, Melenhorst, Rogers and Bouwhuis, (2006) researched e-mail use and non-use for individuals who were sixty-eight years of age and older, and found that it was the absence of a perceived benefit for e-mail nonusers, rather than effort, expenses, and lack of skills that accounted for the nonuse. Thus, lack of use of the Internet may be a function of the fact that older workers do not perceive that it is beneficial, and the perceived benefits are likely to influence their motivation to use it. However, the authors mentioned that high level of use may also affect the perceived benefits of using the Internet. It merits noting that this research was limited to email use, and did not address other uses of the Internet (e.g., applying for jobs, social services, managing benefits).

In another study, Selwyn (2006), conducted research in West England and South Wales and examined the non-use and low-use of the Internet among individuals. The author found that among the non-computer users, individuals who were older (41-60 years old) were likely to attribute non-use of the Internet to no need or no interest. Individuals in the oldest group (61 years of age and older) were more likely to attribute non-use to age, no access, health, and time.

Further, Morris, Goodman, and Branding (2007) found that lack of interest was a key reason that older individuals did not use the Internet. Using results of surveys of computer and Internet use for individuals fifty years of age and older in Derbyshire and Scotland, the findings indicated that most common reason for not using the Internet was due to a lack of interest. The authors concluded that this lack of interest was due to misconceptions about computers such as: they are not suitable for older people, too difficult, not useful, and older people cannot or do not use computers. It is suggested that although individuals who are over the age of sixty-five use the internet less, they still value their online access.

Another study indicated that individuals who are older would rather not use technology than face their fears about it or admit to the fact that they lacked Internet skills (Millward, 2003). Millward (2003) found that individuals who were older believed, that information and communication technologies are for individuals who are younger and explained that this could result in a long-term lack of interest in using the internet. Participants mentioned several reasons for not using the Internet, with the biggest factor being no interest (26.7%). Furthermore, one participant explained that individuals of that age group

typically fear technology. Another participant explained that rather than admitting to the lack of skills it would be less stigmatizing to have no interest.

Stigmatization refers to a deeply discrediting mark or the discrepancy between an ideal view of a person and the actual view of the person (Stone, Stone, & Dipboye, 1992). There is some research regarding stereotypes about individuals who are older. For example, in a meta-analysis with laboratory and field settings, and 52 independent effect sizes, Gordon and Arvey (2004) concluded that applicants and workers who were younger were evaluated more positively than applicants and workers who were older. In addition, Posthuma and Campion, (2009) summarized research from 117 articles and books regarding age stereotypes in the workplace. Although the authors describe the research in the area as a whole (i.e., stereotypes regarding age in the workplace) as being incomplete, they do mention that results from two studies (Arrowsmith & McGoldrick, 1996; Perry & Finkelstein, 1999) indicated that there are strong negative stereotypes about older individuals' ability to use technology and employment in computing industries.

Taken together, the research just reviewed suggests that another reason that older individuals do not use the Internet as much as younger individuals is that they lack interest in it. Further, the research indicated that their lack of interest may be due to their fears about their lack of technological skills, and the fact that they fear being stigmatized by their lack of computer and Internet skills (or being viewed as inept or incompetent). Thus, research is needed to determine if computer anxiety and fear of stigmatization may affect older individuals' interest in using the Internet, and motivation to use it. Further, studies are needed to determine if older workers are stereotyped as inept or incompetent if they have low levels of computer or Internet skills. In addition, the question is do these negative stereotypes influence the job-related outcomes of older individuals (e.g., hiring for jobs, advancement or training opportunities). In order to foster research on these issues, we present the following hypotheses to guide future research on age and the digital divide.

H6: When older individuals have low levels of interest in using the Internet, the less they will be motivated to use and actually use the Internet than when they have high levels of interest.

H7: When older individuals are provided with the benefits of Internet use, the more that they will be motivated to use and actually use the Internet.

H8: The more that older individuals perceive that they will be negatively stereotyped by their lack of Internet skills, the lower will be their (a) interest in using the Internet, (b) motivation to use it, and (c) actual use of it.

H9: When older individuals are stereotyped as having lower levels of computer or Internet skills, the less likely they will be hired for jobs.

Stereotype Threat

Based on the research reviewed above, another factor that may affect age differences in Internet use is stereotype threat. Stereotype threat is the risk of confirming a self-characteristic or negative stereotype about one's group (Steele & Aronson, 1995). Results of research indicated older individuals are often stereotyped negatively, and their lack of technological or computer skills may be one reason for those negative stereotypes (Posthuma & Campion, 2009). Research on stereotype threat has consistently shown that it increases one's anxiety, and reduces individual performance among those who belong to a negatively stereotyped group (e.g., women, ethnic or racial minorities) (Steele & Aronson, 1995). As a result, if older individuals perceive that they are negatively stereotyped as having low levels of computer or Internet skills, then they are likely to perform at lower levels on Internet tasks than their counterparts. Although research regarding stereotype threat of individuals who are older is minimal, we did find one example. In a meta-analysis reviewing age-based stereotype threat, Lamont, Swift, and Abrams (2015) found that memory and cognitive performance of individuals who are older were negatively affected by age-related stereotype threat.

We believe that stereotype threat is an important issue because older individuals may perceive a threat due to the negative stereotypes about their group, and this threat may increase their anxiety and decrease performance on computer or Internet-based tasks. Then, their low levels of performance may have a

negative influence their ability to gain access or maintain jobs. Thus, stereotype threat may have negative consequences regarding the employment opportunities for older workers, and negatively affect the degree to which they are hired (Bal, Reiss, Rudolph, & Baltes, 2011), or are offered job opportunities (Goldberg, Finkelstein, Perry, & Konrad, 2004; Maurer, Shultz, & Adams, 2007; Morris & Venkatesh, 2000, Shiu, Hassan, & Parry, 2015). Therefore, negative stereotypes about ability to use the Internet and stereotype threat may affect older workers' access to jobs, and influence the extent to which they are relegated to low paying dead end jobs.

Given the lack of research on stereotype threat and older workers' use of the Internet, we believe that additional research is needed to examine the extent to which it affects their motivation to use the Internet and their actual performance on it. Thus, we offer the following hypotheses:

H10: When older individuals perceive that their group is stereotyped as having low levels of computer or Internet skills, the more that they will be (a) anxious about using the Internet, and (b) lower will be their level of Internet performance.

DISCUSSION

In summary, there has been relatively little research on age differences in the ability and actual use of computers or the Internet. However, the research that exists suggests that the following factors may affect the Internet use of older workers: Lack of technological skills, negative attitudes toward computers, lack of interest in Internet use, anxiety about their ability to use the Internet, and stereotype threat or fear of stigmatization based on the negative stereotype of older individuals' ability to use the Internet. Our review indicates that much more research is needed to examine the extent to which these factors and others influence older individuals CSE and use of the Internet. As a result, we offered a number of hypotheses that can be used to foster research on these key issues. Of course, there may be many more factors that affect older individuals use of the Internet, but we believe that our model and hypotheses will serve as a point of departure for that research. Further, our review also has a number of important implications for enhancing the CSE and use of the Internet among older individuals. These issues will be considered below.

Implications for Practice

Our review of the research on age and the digital divide has a number of key implications for increasing the self-confidence and CSE of older individuals, and their motivation to use the Internet in organizations. First, communities and organizations should offer training in Internet use to older individuals in our society because this training is likely to enhance their CSE. Further, given that older individuals are anxious about their ability to use the Internet and fear that they will be stigmatized by their lack of ability to use it, then mentoring programs might be set up to decrease their anxiety and allay their fears. Mentors who are similar in age and background should help them feel that if the mentor can learn the Internet then so can they. Research has also shown that the use of similar role models can be used to enhance CSE and the motivation to use the Internet (Bandura, 1986; Finkelstein, Allen, & Rhoton, 2003). Therefore, communities and organizations should use successful, similar role models to increase older individuals' perceptions that they can learn Internet skills, and motivate them to use it. Furthermore, communities should find ways of offering older individuals affordable access to the Internet (e.g., libraries, schools, computer cafes, and decrease the cost of home Internet access). We also recommend that organizations use multiple strategies to advertise jobs instead of solely using web-based systems. This will help older individuals learn about job openings and encourage them to apply for jobs. Further, organizations should offer clerical or other assistance if they do not have the computer or Internet skills to complete online applications. They can be trained to use new systems once they are hired.

CONCLUSION

Although there are many positive benefits to using the internet in the workplace, the increased use of the Internet in human resource management and other fields has some negative unintended consequences for job applicants, employees, and organizations. One consequence of the digital divide is that some individuals who are older may be less likely to have access to job opportunities offered on the Internet because they do not always have access to the Internet or Internet-based skills. Thus, this divide may prevent organizations from utilizing the many talents and skills that older workers bring to the workplace. In addition, many older individuals may not have the opportunity to utilize their skills or enjoy a satisfying worklife.

In this paper, we noted that there has been relatively little research on age and the digital divide, and most of the research has been a theoretical. Thus, we extended an existing model about the factors influencing the digital divide to include age-related factors. We also reviewed the literature on the topic, and offered directions for future research and practice. We hope that this paper will enable organizations to utilize the many talents that older workers bring to the workplace, and help older individuals gain access to satisfying jobs.

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