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Understanding factors influencing information communication technology adoption behavior: The moderators of information literacy and digital skills

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ABSTRACT

Digital inequality is one of the most critical issues in the "information age", few studies have examined the social inequality in information resources and digital use patterns. In the rural areas, such information communication technology (ICT) facilities could not guarantee that users can easily access information technology and overcome the so-called "digital divide." This research aims to discover the psychological factors that influence information and communication technology (ICT) adoption behavior, as well as confirm whether "information literacy" and "digital skills" have moderator effects in the research model. Using a survey of 875 participants and a structural equation modeling approach, we find that task characteristics and social interaction improve media richness, media experience, and media technostress, which in turn enhance ICT adoption behavior. The proposed theoretical model shows that the impact of ICT adoption behavior is moderated by information literacy and digital skills. The findings of this research can offer guidelines for policy makers and educators who evaluate a community's ICT adoption behavior so as to provide proper access to ICT and promote its visibility by incorporating ICT in educational activities.

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1. Introduction

According to Taiwan's internet users behavior investigation (Taiwan Network Information Center, 2013), the number of regular Internet users in Taiwan reached 17.98 million in 2013, comprising 77.10% of the entire population. We are in the midst of globalization and the so-called "Information Age". Although the cost of information and communication technology (ICT) devices has dramatically decreased in recent years, their acquisition and maintenance still require financial commitment for households in the rural areas. According to Venkatesh and Sykes (2013), social inequality informational resource may manifest itself not only in differential digital access but also in differential digital use patterns. The "digital divide" generally implies differences in access based on socio-economic divisions (van Deursen & van Dijk, 2015). In many

countries, residents of urban areas have better information literacy than those in the rural areas, making the existence of the digital divide a common rural phenomenon. Compared with the significant penetration of information technologies in urban areas, the application of ICT is less prevalent in rural areas (Gerpott & Ahmadi, 2015a). Hence, individuals who have been reared within more privileged socio-economic environments acquire more opportunities to access ICT. ICT adoption behavior is a vital topic because ICT has become ubiquitous, pervading our daily lives in various ways. This is especially true for the Taiwanese youth, whose exposure to digital media shapes the way they communicate and interact with the rest of the world. Some scholars (Friemel, 2016; Ghobadi & Ghobadi, 2015; van Deursen & van Dijk, 2015; Venkatesh & Sykes, 2013) have suggested that the high failure rates of projects meant to reduce the digital divide are due to a lack of understanding of different ICT choice behaviors. In fact, the acceptance/adoption of the ICT approach has been identified as a critical issue in improving digital divide in its successful usage. Many theoretical frameworks have been used to measure technology usage and adoption; however, few have been used in the context of improving

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the ICT digital divide.

Recent researches (Brown, Dennis, & Venkatesh, 2010; Weber & Kauffman, 2011) define ICT as medium that support data and information processing, storage, transmission, and communication via the Internet and other means. The flexibility of technology-enabled work has not only brought many advantages to businesses and various organizations, but has also become embedded in the fabric of every activity. The willingness of people to use ICT needs to be considered together with technology, products or services, social interaction, and human factors (Goldhammer, Naumann, & Keβel, 2013; Zylka, Christoph, Kroehne, Hartig, & Goldhammer, 2015). ICT conveys forms of knowledge and literacy as well as integrate places (e.g., home, school, work, and community) of learning (Moore, 2013). The primary reason is the greater expansion of completed Internet infrastructures in urban than in rural areas. Therefore, in recent years, the utilization of ICT in rural areas has gradually received more attention because, from both of economic and social concerns, those ICT drive rural regional economies and improve the quality of life. Therefore, reducing the digital divide between urban and rural areas has become mainstream public policies in many countries (Bruno, Esposito, Genovese, & Gwebu, 2010; Gerpott & Ahmadi, 2015b; Ghobadi & Ghobadi, 2015). van Deursen, van Dijk, and Peter (2015) argued that digital technologies and media have influenced not only the intensified social connections but also human daily activities as well. ICT use can reduce the digital divide across the curriculum, as revealed by examinations of information technology skill and standardized measures of information literacy. Consequently, while ICT appears to motivate some people to use new information technologies, measures have hardly capitalized on the intrinsic properties of information literacy as well as interactive and online technology. The digital divide debate has centered on the acquisition of necessary skills and literacy to use ICT efficiently and effectively. These changes challenge our understanding of the digital divide, information literacy, and information technology skills in rural area communities.

In the contemporary knowledge-based economy and the Internet era, personal wealth is no longer the sole attribute that gives a person a rich or poor social status; at present, knowledge and information have also become important determinants of wealth (Ayanso, Cho, & Lertwachara, 2014; Van Deursen & Van Dijk, 2011) under the premise that accumulated knowledge is conveyed worldwide through the Internet-based media. Thus, those who have no digital skills or no access to computers and the Internet at home have become the minority groups. Therefore, the digital divide has lead to a new era of social welfare issue.

In order to understand the usage of technology and ICT adoption behavior, this study aims to address the following research questions:

Research question 1. We follow the stream of research that focuses on individual acceptance of technology by using intention as the dependent variable. What are the psychological factors and the characteristics of ICT media impacts of rural residents' ICT adoption behavior.

Research question 2. How does the information literacy and digital skill mix moderate the impacts of media experience and media technostress on ICT adoption behavior.

2. Theoretical foundations

The medium of information technology has rapidly shortened the communication speed between the communicators and receivers, thus improving knowledge communication diffusion and collection. Zhong (2011) and Aesaert, van Braak, Van Nijlen, and Vanderlinde (2015) argued that the role of information in social differentiation lies in the information environment based on a society's resources, relationships, and ICT. Furthermore, ICT itself plays the role of being the communicative bridge between individuals and others in a society (De Wit, Heerwegh, & Verhoeven, 2012). The ICT medium could provide service interaction to people and enable them to access peer opinions; hence, people can see the potential for additional benefits (e.g., more choices, lower prices, better quality of goods) through additional effort. Meanwhile, people all want to eliminate the incompatible barriers within different media form in ICT, and expect ICT to greatly increase the collection capability of information and knowledge (King & Xia, 1997; Wu, Chang, & Sha, 2016; Zhang, Li, Ge, & Yen, 2012). In the process of communication, users have to use their own understanding of information structure or content to express knowledge; the process of information transfer is influenced by individual or group capabilities, which involve individual factors (e.g., core capabilities of information and information literacy, social pressure, common beliefs, and incentives motivation), social network structure, physical proximity, recipient availability, and media characteristics (presence of symbols and accessibility to media) (Aesaert et al., 2015; Gerpott & Ahmadi, 2015a; Wang, Guo, & Jou, 2015). According to Burns, O'Connor, and Stocklmayer (2003), the objective of effective communication is to achieve the five English characters of AEIOU: present awareness, enjoyment, interest, public opinion, and understanding; these comprise the core of a so-called "net-society."

2.1. Media richness theory

MRT was first proposed by Daft and Lengel (1986). This theory posits that different platforms of communication have different levels of media richness (medium richness/information richness). Carlson and Zmud (1999) integrated MRT, the symbolic media, communication patterns, and so on, and proposed channel expansion theory to clarify the relationship between group communication and the channel of communication. The term "media richness" refers to the richness of communication media that can pass through a number of information channels (Ayanso et al., 2014; Friemel, 2016; Purdy & Nye, 2000). MRT initially focused on information in organizations and the process by which media selection affects organizational structure. MRT posits that communication consists of a variety of cues, such as verbal tones, facial expressions, body language, dress, appearance, and settings, which convey information to receivers, that in turn, creates or elicits cognitive interpretations and concomitant social, emotional, and characteristic states (Kahai & Cooper, 2003; Van Deursen, van Dijk, & Peters, 2011; Kishi, 2008; Purdy & Nye, 2000; Xu, Ma, & See-To, 2010). Furthermore, the richness of a communication medium refers to its capacity for immediate feedback, multiple cues, language variety, and personalization. On the one hand, the lower the level of richness, the more difficult it is to quickly communicate, develop an understanding of each other's viewpoints, and resolve differences (Bertot, Jaeger, & Hansen, 2012; Liu, Liao, & Pratt, 2009). On the other hand, the higher the level of richness, the easier it is to convey information to receivers, thus facilitating better communication and social interaction because the information receiver could rapidly and correctly understand the other party (Dennis & Kinney, 1998; Purdy & Nye, 2000; Liu et al., 2009; Anandarajan, Zaman, Dai, & Arinze, 2010; Van Deursen et al., 2011). A number of researches about online classes (e.g. Baehr, 2012; Giesbers, Rienties, Tempelaar, & Gijselaers, 2013; Lin, Wen, Jou, & Wu, 2014; Liu et al., 2009; Lu, Kim, Dou, & Kumar, 2014; Wang et al., 2015), workplace (e.g. Badger, Kaminsky, & Behrend, 2014; King & Xia, 1997; Sheer & Chen, 2004; Wu et al., 2015) and social networking service (e.g. Lee, Son, & Kim, 2016; Ogara, Koh, &