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# Choosing communication portfolios to accomplish tasks: The effects of individual differences

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ABSTRACT

The myriad of information communication technologies (ICTs) available today has changed the way students choose and use them. Specifically, individuals are increasingly relying on a mix of ICTs for communication to accomplish tasks. Yet, past studies on ICT use has largely assumed that people use a single ICT per task. We attempt to address this gap by focusing on the influence of individual differences on the choice of communication portfolio (a mix of ICTs) to accomplish learning tasks in school-based settings. Specifically, we focus on two dimensions of individual differences: learning styles and individuals' perceptions. Results suggest that individual differences do have effects on the choice of communication portfolios to accomplish tasks. In particular, we found that students who preferred to learn by hearing tended to choose the complex communication portfolio to accomplish their tasks. Interestingly, our results also indicate that students preferred to use the simple communication portfolio when communication partners were perceived to be unavailable.



## 1. Introduction

With the emergence of new technologies, educational institutions around the world are increasingly relying on information and communication technologies (ICTs) to promote active learning and collaboration among students (Martins & Kellermanns, 2004; Padilla-Melendez, Garrido-Moreno, & Aguila-Obra, 2008). Indeed, the availability of a myriad of ICTs is likely to change the way students accomplish tasks in school. Specifically, some scholars have observed that individuals have the tendency to rely on a mix of ICTs for communication (Nardi & O'Day, 1999; Nardi & Whittaker, 2002) and they do not use one ICT isolated from other ICTs (Stephens, 2007). Other studies note that switching from one technology to another is likely to derive a more optimal performance than using one ICT alone (Dennis & Kinney, 1998). Additionally, evidence from recent organization studies on ICT use also support the notion that completing a task often requires a mix of ICTs (e.g. Boczkowski & Orlikowski, 2004; Lee, Watson-Manheim, & Ramaprasad, 2007; Watson-Manheim & Belanger, 2007). Taken together, it seems that using multiple ICTs may provide redundancy and reinforce message clarity to reduce any threats of poor communication (Lee et al., 2007). For these reasons, we contend that with multiple ICTs available for usage, students too are likely to rely on a mix of ICTs to accomplish their tasks than just relying on one particular ICT.

Past research on ICT use has largely assumed that people use a single ICT per task (Stephens, 2007). Specifically, past studies are mostly concerned about providing explanations on whether the selection of a single ICT is contingent upon factors such as richness of the technology, fit between tasks and technology, influence of individual differences or social influence (e.g. Daft & Lengel, 1984; Fulk, Steinfield, Schmitz, & Power, 1987; Rice, 1993; Straub & Karahanna, 1998; Trevino, Bodensteiner, Gerloff, & Muir, 1990). Studies into the impact of ICT in education have examined the influence of affective components (e.g. Cooper & Brna, 2002), the effects on materials presentation (e.g. Riding & Grimley, 1999) and the impacts on learning (Burley, 1998). While these studies are of substantial value, their research focus has ignored issues such as combining ICTs and factors influencing the usage of multiple ICTs. Hence, the objective of this study is to examine the choice of ICT combinations used by students to accomplish tasks. To examine the choice of ICT combinations, we adapt the concept of communication portfolio from Lee et al. (2007), which refers to a single ICT or a set of ICTs used to manage a particular communication session. In recent years, some education researchers have noted that the role of individual differences in the use of ICT is increasingly important due to greater demands for personalized learning (Waite, Wheeler, & Bromfield, 2007). Here, we focus on the impact of individual differences on the choice of communication portfolios used by students to accomplish tasks. Except for a handful of studies (e.g. Trevino

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et al., 1990), the influence of individual differences on ICT use has not been widely examined in the literature. We focus on two aspects of individual differences in this study: individuals' learning abilities or styles and individuals' perception of their communication partners and the reasons for focusing on these dimensions are discussed in the following paragraph.

Some research has shown there is a natural tendency for individuals to constantly prefer one sensory input such as visual, verbal, or tactile over another under some circumstances (Sadowski & Stanney, 1999). Since people have substantial differences in their sensitivity and ability to process stimuli (Ramaprasad & Rai, 1996), it is likely that these individuals' preferences for different sensory dimensions (e.g. visual and verbal) are related to their learning ability (Riding & Rayner, 1998), which in turn influences how they choose ICTs to accomplish a task. Hence, we contend that students' learning abilities or styles are likely to influence how ICTs are used and combined to accomplish tasks. Further, it has been widely accepted that an individual's perception plays an important role during communication (Broadbent, 1958; Lee et al., 2007). In particular, multiple studies have indicated that individuals' choice of ICT use are often influenced by their perceptions of the capabilities afforded by the ICT (e.g. Carlson & Zmud, 1999; Trevino, Webster, & Stein, 2000). At the same time, the influences of the communication partners such as the availability of recipients and shared understandings of the communication partners have also been widely examined in the literature and have found to have significant influences on ICT selection (e.g. Cramton, 2001; Straub & Karahanna, 1998; Trevino et al., 2000). Hence, in this study we propose that individuals' perceptions of their communication partners are likely to influence the choice of communication portfolio used to accomplish a task. Specifically, communicators' perceptions of the recipients' availability and the lack of shared understanding among communication partners are likely to influence how they choose and combine ICTs for usage. Put differently, we contend that students are likely to use different ICTs when they perceive that their communication partners are unavailable for meetings or when there is a lack of shared understanding among the communication partners. For these reasons, our study focused on the effects of individuals' learning abilities and individuals' perceptions of their communication partners on the choice of communication portfolio used to accomplish task.

The remainder of this paper is structured as follows. We first provide a review of related literature, focusing on the interplay between communication portfolios, learning styles and perceptions of communication partners. Next, the methodology employed by the present study is described. We then present our findings obtained through two statistical techniques, cluster analysis and binary logistic regression. We conclude with a discussion of the implications of our findings, as well as opportunities for future work.

## 2. Background

### 2.1. Choice of communication portfolios to accomplish tasks

Recent organization studies on ICT use have observed that ICT usage to accomplish various tasks are firmly entrenched in the workplace (Boczkowski & Orlikowski, 2004; Lee et al., 2007; Stephens, 2007; Watson-Manheim & Belanger, 2007). More importantly, these studies have established the fact that organization members are choosing to use single as well as multiple ICTs in accomplishing their tasks. The choice to use multiple ICTs is occurring more frequently now than in the past because of a greater variety of new communication tools (Grandhi, Jones, Chivakula, & Patten, 2003) and this phenomenon is not restricted to only the workplace. In particular, this extends to educational institutions such as schools and universities because of their large investments in ICTs as well as the technological proficiency of students.

Lee et al. (2007) introduced the concept of communication portfolio to refer to a set of ICT(s) that individuals use for communication. Specifically, the communication portfolio may contain a single ICT or multiple ICTs. They proposed that different types of communication portfolios that vary in the size, content, and structuring mechanisms will be utilized in different communication contexts. The size of the communication portfolio refers to the total number of ICTs used by the sender and receiver(s) during the communication. The content of the communication portfolio refers to the ICT used or the combination of multiple ICTs used during the communication while the structuring mechanism refers to the pattern of usage (i.e. concurrent use, switching from one ICT to another) of a single ICT or combinations of ICT(s) for communication.

We adapt the concept of communication portfolio, and condense the size and content dimensions into a single dimension which we refer to as the *complexity* of the communication portfolio. The structuring mechanism is not within the focus of this paper. Specifically, we contend that a communication portfolio may be classified as simple or complex. The primary premise for such a classification is that different ICTs vary on different dimensions and certain technologies may impose constraints while providing certain modalities or affordances (i.e. capabilities provided by the ICTs) (Clark & Brennan, 1990). As such, a simple communication portfolio may consist of one or two ICTs and typically provides a single type of modality or affordance that is useful to the communicators, such as email facilitates written communication (Clark & Brennan, 1990). In contrast, a complex communication portfolio consists of more than two ICTs (e.g. combination of email, instant messaging and telephone) and usually provides very diverse modalities or affordances (i.e. written and verbal) for communication. Thus, a complex communication portfolio provides more affordances and as such is likely to allow communicators to handle more complex communication situations. However, we expect usage of complex communication portfolios to be more challenging than simple communication portfolios since handling more ICTs are known to be more costly and demanding (Reinsch & Beswick, 1990). This is because communicators have to deal with the complexity of processing different types of information provided by the different ICTs (Iselin, 1989). Furthermore, since people are limited in their capacity to process information (Broadbent, 1958; Kahneman, 1973), we contend that some individuals may not be able to handle these challenges and may choose to rely on simple communication portfolios instead. As such, we propose that individual differences may influence the choice of communication portfolios (i.e. simple versus complex) used to accomplish a task in an environment where multiple ICTs are available for usage. Hence, our general research question is

In an environment where multiple ICTs are available for usage, how do individual differences influence the choice of communication portfolios used by students to accomplish tasks?

### 2.2. Individual differences

Individual differences are the characteristics that make each human being unique and typically refer to differences in cognitive styles, cognitive controls, learning styles, and personality (Ayersman & von Minden, 1995; Waite et al., 2007). Past research suggests that an indi-