From E-learning Courses to Businesses: What Technologies Do They Share?

Yair Levy
Graduate School of Computer and
Information Sciences
Nova Southeastern University, USA
levyy@nova.edu

Michelle M. Ramim
Huizenga School of Business and
Entrepreneurship
Nova Southeastern University, USA
ramim@nova.edu

Abstract

Diffusion of Innovation (DoI) theory has been well studied when it comes to exploring how technologies are defused. However, DoI theory lacks distinction between personal and organizational uses of technologies, as well as diffusion for reasons other-than technology adoption. The past three decades have demonstrated a major increase in the dependency on information and communication technologies (ICTs). In this study, we have investigated the level of use, perceived organizational relevance, and informing associated with six business related ICTs. We fuse the DoI theory with the Informing Science theory to better understand the relationships among the three constructs investigated in the context of diffusion of ICTs from e-learning courses to businesses. Our preliminary findings indicate that when it comes to ICTs introduced, the current usage and organizational relevance of Social Networking Sites and Enterprise-Wide Systems are significantly different, whereas for other ICTs, the two constructs seem similar. Additionally, individuals appear to divide their underlying process of informing others about ICTs between personal and organizational role of the ICT. Our findings also demonstrated that by-in-large, informing about ICTs is consistent with the level of use of the ICTs studied. In this initial research, we're reporting some preliminary findings and conclude with discussions for future research.

Keywords: Diffusion of Innovation theory, Informing Science Framework, informing, IT informing in workplace.

Introduction

The concept of sharing ideas related to information systems is not new. The Diffusion of Innovation (DoI) theory has been well studied when it comes to exploring how technologies are defused across various industries (MacVaugh & Schiavone, 2010). However, one observed limitation of such theory is the distinction related to the purpose of the diffusion of technology, specifically the distinction between personal and organizational uses of technologies, as well as diffusion for reasons other-than technology adoption. Moreover, the past three decades have demonstrated a major increase dependency on information and communication technologies (ICT) (Geri & Ahituv, 2008). As a matter of fact, the Pew Research Center has indicated that in 2008, in the United States (US) "among those who are employed, 96% are in some way making use of new communications technologies" (Madden & Jones, 2008). Additionally, during these three decades, businesses and educational institutions have capitalized on such growth and incorporated ICTs primarily to reduce communication costs and increase employee productivity (Friedman, 2007). While at the same time, there has also been a major growth in the use of ICTs for personal uses. Nowadays, with the proliferation of Internet-enabled cell phones, the lines between using ICTs for personal versus organizational uses are blurring. When it comes to

emerging technologies that individuals are exposed to, it is not fully clear how informing about such technologies is done and what are the fundamentals driving such informing?

The rest of this paper is divided into three sections. In the next section, the theoretical background is presented to provide the literature review and context for this study including the proposed research questions. Next, the research methodology, sample, and initial results are presented. Finally, conclusions and discussions of the results are discussed.

Theoretical Background

DoI theory was originally introduced by Rogers (1983) and was concerned with the classification of organizations and later of individuals into five categories: pioneers, early adopters, early majority, late majority, and laggards. His work has been adopted in various social sciences disciplines. In the field of information systems, DoI was also used to guide adoption of technologies by organizations (Beatty, Shim, & Jones, 2001; Moore & Benbasat, 1991). Rogers (1983) noted that when it comes to sharing of innovation, "undoubtedly one of the most important motivations for almost any individual to adopt an innovation is the desire to gain social status" (p. 215). However, DoI has some limitations as its dependent variable as a measure of the level of diffusion is percentage of organizations and/or individuals who actually adopt (or reject) the innovation. Moreover, some researchers argued that current research on DoI has a major limitation as it assumes that newer innovation will replace older ones (MacVaugh & Schiavone, 2010; Mørk, Hoholm, & Aanestad, 2006). As such, it is also evident that one can gain social recognition and status by sharing or demonstrating a new innovative technology to others. Specifically, we argue that the mere essence of the process of sharing, or 'informing', has also underlying social recognition motivations. Raban and Rafaeli (2007) have also argued for the importance of information sharing in today's economy, and that it's a pure humanistic nature for individuals to share information. While their work concentrated on sharing information online, this work is concentrating on informing others but not limited to online. Additionally, it appears that individuals don't have to necessarily demonstrate adoption, rather simply inform others, and thereby gain a social status. More specifically, we think that individuals indicate to others around them about mature and emerging technologies to brag and to show off, including in the event that such technology has been used and/or seen before. In such context of bragging and showing off, the construct of relevancy appears to be valid. We define relevance of a given technology as the individual's perception for the relative compatibility of a given technology for them and/or their workplace.
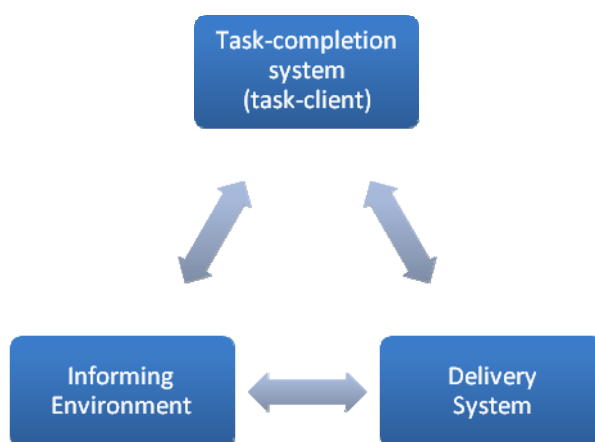

Figure 1. The Informing Science Framework – adopted from Cohen (1999)

One theory that guides the work associated to such philosophy of 'informing' is known as the Informing Science introduced by Cohen (1999). He argued that informing science is a field that combine other research fields such as business, applied computer science, information systems, and other related fields that are "providing a client with information in a form, format, and schedule that maximizes its effectiveness" (p. 215). He outlined three interrelated components of the theory, including: a) the client, b) the delivery system, and c) informing environment. Similarly, the Informing Science Framework includes: a) the informing environment, b) the delivery system, and c) the task-completion system (i.e. the task that a client needs to complete or 'task-client') (Figure 1).

The role of higher education in preparing individuals for the workforce has been a great point of debate over the years (Rubin & Dierdorff, 2009). Moreover, the importance of course information and offering has long been argued among academics. With the increase popularity of e-learning in higher education, the need to better understand if introduction of such ICTs in e-learning courses has propagated its way into business and organizations is warranted. If so, to what extent such informing was done in the context of personal task versus organizational tasks? Such research appears to be necessary.

This study deals with the intersection between the DOI theory and the Informing Science Framework. Specifically, in this exploratory study, we address the following research questions in the context of the experiences individuals obtain with various mature and emerging ICTs while attending e-learning business courses.

*RQ1: To what extent do individuals **use** various mature and emerging ICTs at their workplace?*

*RQ2: To what extent do individuals perceived the **organizational relevance** of mature and emerging ICTs that they currently use and/or have been exposed to outside their workplace?*

*RQ3: To what extent do individuals **inform** their co-workers and supervisors about mature and emerging ICTs that they have been exposed to outside their workplace?*

*RQ3a: If informing occurs, to what extent do individuals **talk** with their co-workers and supervisors about mature and emerging ICTs that they have been exposed to outside their workplace?*

*RQ3b: If informing occurs, to what extent do individuals **demonstrate** to their co-workers and supervisors mature and emerging ICTs that they have been exposed to outside their workplace?*

In the case of this work, the three components of the informing science framework are observed. First, the informing environment in this study includes the e-learning courses where individuals are experiencing the various technologies, as well as businesses where they inform their co-workers. Second, the delivery system in this study is the e-learning system and the other Web-based systems introduced during the e-learning business courses (enterprise-wide systems simulations, Web 2.0 presentation tools, etc). Lastly, the task-completion system (i.e. task and client) will include either personal task, organizational task, or the combination of both tasks. The client includes the employee's co-worker and/or supervisor.

We also attempted to better understand the level in which some informing is taking place by assessing the level that individuals talked about a given technology with their co-worker and/or supervisor compared with the level such individuals have actually demonstrated that technology to their co-worker and/or supervisor.

Methodology, Sample, and Initial Results

This exploratory study used a mixture of quantitative and qualitative methodologies in order to address the research questions noted above. The study surrounded an introductory to management information systems (MIS) course conducted as part of a business program. The course provides a general survey to ICTs in the context of businesses. Students engage in weekly activities including discussion board, homework assignments (Web2.0 presentation tools - Animoto® & YouTube®), Enterprise Resource Planning simulation (SAP®), and demonstration about ICTs.

Our initial results included 80 responses. The quantitative survey investigated six specific ICTs including mature ICTs (e-mail, discussion boards (DB), & e-learning systems) and emerging ICTs (Social Networking Sites (SNS), ERP/SAP simulation, & Web 2.0 presentations). The survey assessed the extent that individuals are using such ICTs in their workplace, how relevant each ICT is for their workplace, and the extent that they have informed others (via taking & demonstrating) about such technologies. In the quantitative data collected, gender distribution included 56% males and 44% females, the average age was 32 years. Similarly, the majority of the participants (70%) where working full time. Company size distribution included 48% very large companies (>1000 employees), 20% companies with 100 to 1000 employees, 18% companies with 50 to 99 employees, and 14% companies with 25 employees or less. All participants indicated that they use a computer for their work several hours a day.

In addressing the research questions we proposed earlier, our results in regards to RQ1 indicate that in general, the use of e-mail is the most pervasive of all ICTs at their workplace, followed by SNS, ERP, e-learning systems, discussion boards, and Web 2.0 tools respectively (see Table 1). Regarding the employee's perceived organizational relevance (RQ2), our results indicated that also e-mail is the most relevant of all ICTs to their workplace, followed by ERP, e-learning systems, SNS, discussion boards, and Web 2.0 tools respectively (Table 1). Figure 2 provides a representation of the findings from the reported use along with the reported perceived organizational relevance, which reveals two interesting significant differences ($p < .001$) on SNS and ERP. In regards to RQ3 and its sub-questions RQ3a and RQ3b, our findings demonstrate consistent records among both *talked* and *demonstrated* of ICTs to others at the workplaces, where e-mail is the most informed ICT followed by SNS, ERP, e-learning systems, discussion boards, and Web 2.0 tools respectively (see Table 1). Figure 3 depicts the results indicated somewhat a consistent trend between *use*, *talked*, and *demonstrated*, while only for Web2.0 tools, *talked* is slightly above use indicating an interesting phenomena that may warrant additional research beyond this study.

Table 1. Descriptive of the Use, Organizational Relevance, Talked, and Demonstrated levels of the Six Assessed ICTs (N=80)

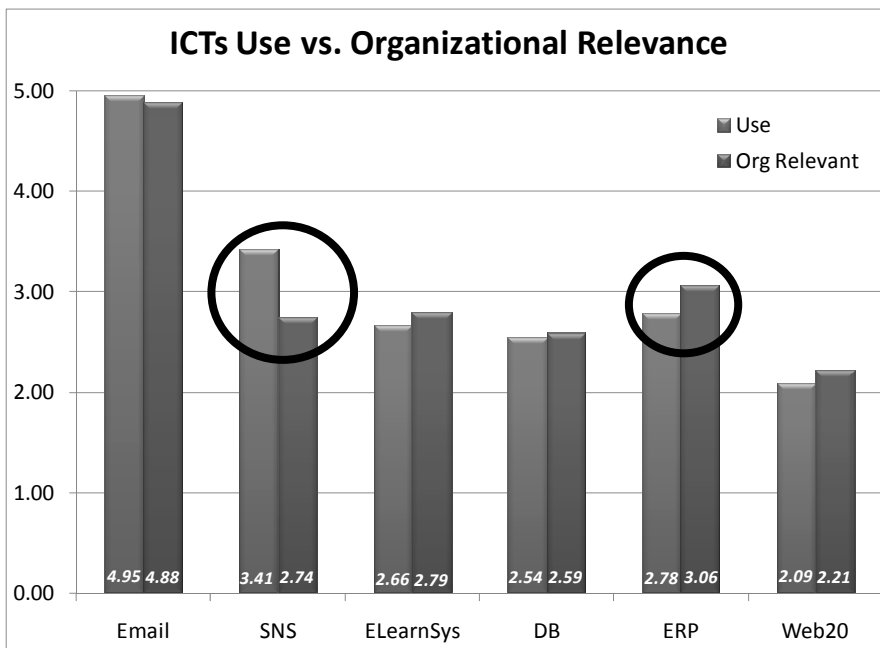| ICTs	Use		Organizational Relevance		Talked w/Co-workers and Supervisors		Demonstrated to Co-workers and Supervisors	
	Mean	Std.D.	Mean	Std.D.	Mean	Std.D.	Mean	Std.D.
Email	4.95	0.271	4.88	0.432	4.30	1.237	3.88	1.372
SNS	3.41	1.770	2.74	1.541	2.80	1.586	2.44	1.466
Elearning Sys	2.66	1.526	2.79	1.565	2.23	1.441	2.08	1.320
DB	2.54	1.396	2.59	1.402	2.24	1.486	2.05	1.368
ERP	2.78	1.559	3.06	1.512	2.39	1.522	2.26	1.430
Web2.0	2.09	1.304	2.21	1.219	2.16	1.453	1.90	1.269

Figure 2. Use level vs. organizational relevance of the six assessed ICTs (N=80)
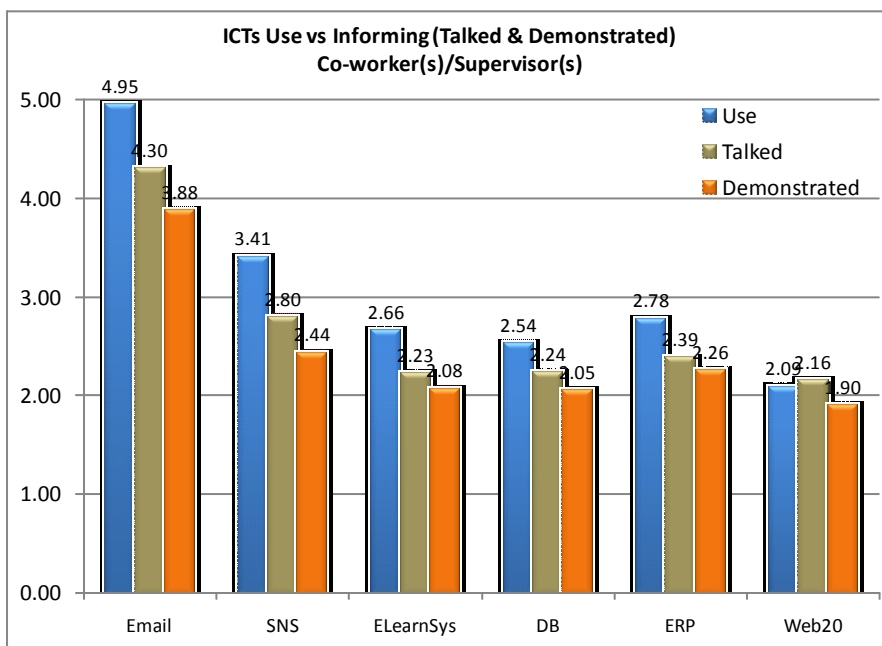

Figure 3. Use, talked, and demonstrated levels of the six ICTs assessed (N=80)

Next, our study included a follow-up qualitative investigation with 42 out of the 80 individuals. In these discussions, participates were asked to tell us additional information on how they informed their co-workers and supervisors about the ICTs discussed and demonstrated in class. The qualitative feedback from these participants provided us additional elaborations on our initial quantitative findings. Some relevant statements from participants included in Figure 4.

"I've suggested that we should use Facebook to promote our business to my supervisor."

In contrast, a typical statement made by a respondent that was shared by several individuals is:

"In reference to Web 2.o tools, my workplace has blocked the use of social networking sites such as Facebook, Twitter, and YouTube"

Other respondents noted that:

"I did show a few employees the Animoto video that we did for class and they were very interested in my video and a few signed up on the Animoto site and began to experiment creating their own videos"

"The reaction to the Animoto was excitement because most of my co-workers didn't know about it"

"The most interesting technology discussed from the list was Wiki. No one at my work I spoke with had ever used one but seemed very interested in trying it."

"Since discussing and demonstrating Facebook and Twitter with colleagues, a few of them began social networking profiles to become familiar with the technologies."

A young participate indicated:

"I discussed these Web 2.0 tools at a meeting with the vice president of Operations and others within my work organization. The focus of our discussion had to do with incorporating a "Lunch and Learn" session about the do's and don'ts of Social Networking in our safety month program."

Figure 4. Qualitative feedback provided

Our findings appear to be consistent with the work by Raban and Rafaeli (2007) who noted that "information perceived to be owned by the organization was less likely to be shared… the perception of the source as being public (the organization) or private (the person)" (p. 2370). We observe that the context of informing others about ICTs, individuals appear to divide their underlying informing processes with the following postures: informing others about ICTs for personal use and organizational use. However, with the qualitative discussions it appeared that an additional dichotomy is needed to provide additional specification. Figure 5 provides an overall model of the results of such overlapping.
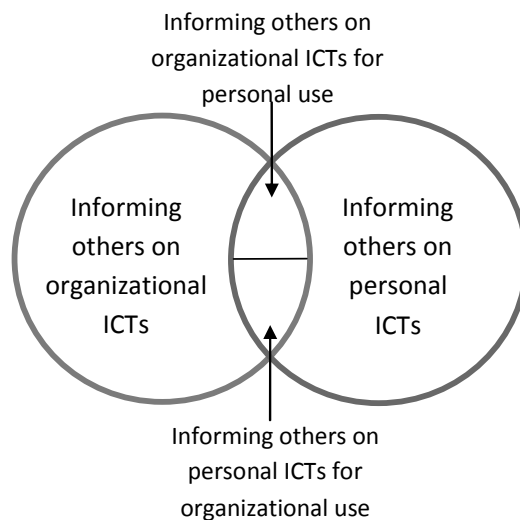

Informing others on organizational ICTs for personal use

Informing others on organizational ICTs

Informing others on personal ICTs

Informing others on personal ICTs for organizational use

Figure 5. Proposed model of informing postures of organizations vs. personal ICTs

Conclusions and Discussions

In this research we have attempted to understand the extent that ICTs are being used in organizations by business students. Additionally, we compared such level of use with the participants' reported organizational relevance. We also attempted to understand the fundamentals behind informing co-workers and supervisors about mature and emerging ICTs. Using a quantitative and follow-up qualitative methodology we propose a model of informing others about personal versus organizational ICTs use. Our preliminary findings indicate that when it comes to ICTs introduced, the current usage and organizational relevance of Social Networking Sites and Enterprise-Wide Systems are significantly different, whereas for the other four ICTs, the two constructs (seem usage & organizational relevance) appear similar. Additionally, individuals appear to divide their underlying process of informing others about ICTs between personal and organizational role of the ICT. Our findings also demonstrated that by-in-large, informing about ICTs is consistent with the level of use of the ICTs studied. Future research should propose taxonomy of informing others about ICTs used for personal versus organizational tasks, and ICTs ownership. Additional future work can focus on the specific organizational and personal tasks which informing about what technologies users inform others versus the specific tasks.

References

Beatty, R. C., Shim, J. P., & Jones, M. C. (2001). Factors influencing corporate web site adoption: A time-based assessment. *Information & Management, 38*(6), 337-354.

Cohen, E. (1999). Reconceptualizing information systems as a field of the transdiscipline informing science: From ugly duckling to swan. *Journal of Computing and Information Technology, 7*(3), 213-219.

Friedman, T. (2007). *The world is flat: A brief history of the twenty-first century*. Vancouver: Douglas & McIntyre.

Geri, N., & Ahituv, N. (2008). A theory of constraints approach to interorganizational systems implementation. *Information Systems E-Bususiness Management, 6*, 341–360.

MacVaugh, J., & Schiavone, F. (2010). Limits to the diffusion of innovation a literature review and integrative model. *European Journal of Innovation Management, 13*(2), 197-221.

Madden, M., & Jones, S. (2008). *Networked workers*: Pew Research Center's Internet & American Life Project. Retrieved Oct 13, 2010, from http://pewinternet.org/Reports/2008/Networked-Workers.aspx.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*(3), 192-222.

Mørk, B. E., Hoholm, T., & Aanestad, M. (2006). Constructing, enacting and packaging innovations. *European Journal of Innovation Management, 9*(4), 444-465.

Raban, D. R., & Rafaeli, S. (2007). Investigating ownership and the willingness to share information online. *Computers in Human Behavior, 23*, 2367–2382.

Rogers, E. (1983). *Diffusion of innovations* (3rd ed.). New York, NY: The Free Press.

Rubin, R. S., & Dierdorff, E. C. (2009). How relevant is the MBA? Assessing the alignment of required curricula and required managerial competencies. *Academy of Management Learning & Education, 8*(2), 208–224.