

How does IT Matter? A New Construct of Adaptive IT Use

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ABSTRACT

The contemporary Information Systems (IS) research defines and measures IT use simply by the amount of time, and the frequency of IT use, despite the fact that it has long been observed that individuals frequently modify their IT use behavior: they purposely switch and selectively combine IT features to cope with new task needs and changing environments. In my dissertation research, I challenge the existing static view of individual IT use and propose to study a new construct called adaptive IT use (AITU). From the Adaptive Structuration Theory perspective, five dimensions of adaptive IT use were conceptualized: feature set expanding, feature set decreasing, feature substitution, feature recombining, and feature repurposing. An instrument for these dimensions was developed using Moore and Benbasat's method. From an Activity Theory perspective, a process model of adaptive IT use was developed by introducing three types of antecedents of adaptive IT use: Triggers, Internal Factors and External Factors. The major outcomes of my dissertation include a new concept of AITU, an instrument and a nomological model of AITU. Findings from this dissertation can help in designing systems and organizational trainings to facilitate IT use behaviors that generate positive outcomes crystallized as higher productivity, more task innovation and more task management and control. **My research can be applied to study how social science researchers use grids adaptively to enhance their research productivity and collaborations.**

Keywords

Adaptive IT use, post-adoptive behavior, IT feature use, adaptive structuration theory

1. INTRODUCTION

Organizations invest billions of dollars in information technology (IT) and they expect great returns via IT use. This research is driven by a question that is often asked by organizations: what can we do to maximize the benefits of IT? This research approaches this question from a human agency perspective: transformations of organizational practice are enacted in IT use by individual users (Orlikowski, 2000).

IT use is a complex phenomenon because workers change their IT use behaviors frequently: they purposely switch and selectively combine IT features to cope with new task needs and changing environments. Unfortunately, the dynamics, richness and complexity of individual IT use are nearly absent from the contemporary information systems (IS) literature. The individual IT use construct has been simply defined and measured by yes/no, the amount of time, the frequency, the duration, the number of

tasks completed and the number of features applied. Therefore, I argue that, in addition to surface measurements, we should measure people's changes in their IT use. It is reasonable to argue that a person never changing her or his IT use in a fast-changing environment has lower effectiveness and efficiency.

In summary, the problem to date is "a too simplistic definition of this complex variable [IT use]... Simply saying that more use will yield more benefits, without considering the nature of this use, is clearly insufficient. Researchers must also consider the nature, extent, quality, and appropriateness of the system use..." (DeLone and McLean, 2003 p. 16). This research is therefore aimed at a better understanding of how employees use IT *adaptively* to cope with fast-changing technological and organizational environments.

I plan to focus on the adaptive behavior in IT use and address the following two general **research questions**: *What is adaptive IT use? And what are the antecedents of adaptive IT use?*

The importance of understanding these research questions is obvious in that organizations have invested heavily in information systems while the underutilization and improper use of these systems are ubiquitous (Venkatesh, 2000). It has been argued that organizations may be able to achieve considerable benefits by inducing and enabling users to enrich their use of existing systems (Jaspersen et al., 2005). In this sense, findings from my dissertation can help in designing systems to facilitate IT use that generate positive outcomes crystallized as higher productivity, more task innovation and task management and control (Torkzadeh and Doll, 1999) and keep users from behaviors associated with negative outcomes such as peer conflicts. Based on findings from this research, organizations can proactively adjust organizational settings, adjust job assignment and design training sessions to help maximize the benefits of IT.

2. WORK IN PROGRESS

From the Adaptive Structuration Theory (AST) perspective, five dimensions of adaptive IT use (AITU) were identified. These dimensions include feature set expanding, feature set decreasing, feature substitution, feature recombining, and feature repurposing.

To develop the nomological model of AITU, I refer to the Activity Theory. Three types of antecedents of AITU were proposed: triggers, internal factors, and external factors.

Qualitative and quantitative methods were employed. Specifically, fourteen interviews were conducted followed by two round card-sorting experiments. Then two rounds of surveys were conducted for instrument development and model testing.

Preliminary findings from this research have been accepted by the 2006 Pre-ICIS HCI Workshop (Sun and Zhang, 2006).

3. CONTRIBUTIONS

There are two major outcomes of this research: an easy-to-use instrument of AITU and a nomological model of AITU.

My dissertation will contribute to advancing knowledge and understanding IT use. First, the problem of simply defined IT use exists in the contemporary IS literature. My dissertation aims at filling this theoretical gap with an in-depth investigation of the richness of IT use based on a strong conceptual framework and a combination of both qualitative and quantitative research methods. Specifically, in the light of the fact that people usually change the pre-designed and current ways of using IT, this research systematically conceptualizes and test adaptive IT use.

This research has practical implications. IT managers and executives should pay attention to how people use the system adaptively. The sequential relationships among these five dimensions of AITU also suggest that we can use them as indicators of the degree or the "depth" of system use. For instance, repurposing usually requires high degree of familiarity and innovativeness, and usually voluntary (Jasperson et al., 2005). Thus, it can be seen as an indicator of using the system more deeply. Repurposing also means the system some restrictiveness on the tasks. Therefore, if employees often "push the boundary" of the system in use, this system may need some updates or even replacement. The instrument developed in this research provides practitioners a tool, in addition to currently used "surface measurements", to collect information regarding employees' use of the system in an adaptive manner.

The nomological model of AITU, on other hand other, can be used as a guideline for manipulating employees' IT use. Given the importance of IT use, IT managers should pay more attention to the *strategic management of IT use*. As mentioned earlier, IT use changes frequently and the changes may account for job performance. Therefore, how to generate desired changes and constrain undesired changes in IT use is an interesting topic. The antecedents of AITU examined in this research are thus important in the sense that they are closely related to the tangible IT infrastructure and organizational contexts. Findings from this research provide a better understanding regarding how IT managers can influence their employees' use of the systems. For example, training and informal communication were proposed as effective factors influencing. As for triggers, IT managers can increase the possibility of employees' exposure to new ways of using the features in existing systems, and recommend new features to employees to trigger employees' adaptive IT use. Also, IT managers can identify the factors accounting for employees' undesirable IT use by examining the triggers. For example, if

repurposings frequently observed, systems may not be appropriate and need redesign or even replacement.

4. BIO SKETCH

Heshan Sun is a PhD Candidate in the School of Information Studies at Syracuse University. Heshan holds a Masters Degree in Information Science from Peking University (Beijing, China, 2002), and a Bachelor Degree in International Economy / Trade from the School of International Business at Nankai University (Tianjin, China, 1999). His research interests include human-computer interaction, dynamics in IT use, e-commerce (trust and relationship quality), and statistics and quantitative methods, among others. His research has been published in journals such as the *Journal of the Association for Information Systems (JAIS)*, *Communications of the Association for Information Systems (CAIS)*, *International Journal of Human-Computer Studies (IJHCS)*, *Journal of the American Society for Information Science and Technology (JASIST)*, and *Journal of Information Technology Theory and Application (JITTA)*, and proceedings of AMCIS (2003, 2005, 2007), HICSS (2004, 2006), and the Pre-ICIS MIS/HCI Workshop (2004, 2005, 2006). He received the Best Paper Award from the 3rd Pre-ICIS MIS/HCI Workshop (2004). He has taught courses in "Human Factors and Ergonomics Design" and "Human Interaction with Computers". As for professional services, Heshan has been a reviewer for IS journals such as MISQ, JAIS, CJAS (Canadian Journal of Administrative Sciences), IJHCS, IEEE Transactions on Engineering Management, and Omega, among others, and various conferences such as ICIS, HICSS, AMCIS, and the Pre-ICIS HCI Workshop on a regular basis.

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