Temporal Aspects of Information Technology Use: Increasing Shift Work Effectiveness

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ABSTRACT

The dynamic nature of organizations and technologies require a comprehensive understanding of how organizational forms and information technology interact. While previous research and theories of information technology have investigated aspects such as organizational structure, individual and group behavior, and inter-organizational relationships, shift work, an important temporal aspect often found in service organizations, is surprisingly absent in the literature. The purpose of this paper is to examine the effect that shift work has on employee use and satisfaction with information technology. The results of a field study of a police organization indicate that information technology systems are valued differently by workers on different shifts. The authors discuss how this research helps advance theories of technology use and effectiveness (such as task-technology fit and technology acceptance model) and present important practical implications of this study for strategic alignment of technology in the areas of systems design, implementation, addressing the needs of peripheral workers, and resource management.

Keywords: Police Organization, Shift Work, Task-Technology Fit, Technology Acceptance Model, User Satisfaction

INTRODUCTION

The dynamic nature of organizations and technologies necessitate that we develop a comprehensive understanding of how organizational forms and information technology interact to affect work. While previous research and theories of information technology have investigated aspects such as organizational structure, individual and group behavior, and inter-organizational relationships, an important temporal aspect of service organizations, shift work, is surprisingly absent in the literature.

Although studies have investigated many aspects of shift work, the majority of these studies have not considered relatively recent organizational changes. Perhaps one of the biggest changes that we have seen in organizations is in the use of information and communication technology to enable new ways of working. For example, prior to the introduction of email, the...
Internet, and knowledge management systems, night shift workers were limited with regard to the people and resources that they were able to access, most of which operated on a 9-to-5 schedule. Now, night shift workers are able to utilize different technologies to access resources that were not previously available to them. Thus, this research examines how information technology unleashes the potential to leverage shift work in a way that has not yet been studied.

In May 2004, more than 17.7% of wage and salary workers, or approximately 21 million employees in the United States worked alternative shifts that at least partially fell outside of the standard working hours (i.e., hours other than 9am-5pm) (McMenamin, 2007). Shift work in general refers to a schedule of work that falls outside the standard daytime working hours (Spurgeon & Cooper, 2000). Shift work is most prevalent in organizations providing 24-hour services. For example, it is estimated that 55% of protective service employees, 42% of employees in food services, 37% of employees in transportation services, and 36% of health service employees are shift workers (Beers, 2000). With the increased need for organizations to work effectively across time zones in the international arena (Holsapple, Luo, & Morton, 2000) and given the advent of technologies that support work without temporal boundaries, shift work has become a more prevalent means of work in all types of organizations (Fandray, 2000). Thus, it is imperative to understand the relationship between shift work and information technology use.

There is considerable literature on the effects of shift work on a number of different types of physiological, organizational, and social variables (Furnham & Hughes, 1999). Research on the relationship between shift work and physiological outcomes has shown that night shift workers are more likely to suffer from sleep problems, body function problems, and gastrointestinal disorders than day shift workers (e.g., Bøgglid, Burr, Tüchsen, & Jeppesen, 2001; Morshead, 2002; Oexman, Knotts, & Koch, 2002). Studies looking at shift work and organizational variables have shown that working the night shift is related to job dissatisfaction (Barton, 1994; Furnham & Hughes, 1999) and job stress (Barton & Folkard, 1991; Kandoliña, 1993). Night shift workers also suffer more familial and home conflicts (e.g., Dunham, 1977; Demerouti, Geurts, Bakker, & Euwema, 2004) as community and life activities are often built around a traditional 9-5 day. While the effects of shift work on physiological, organizational, and social variables have been studied, there is little in the literature examining the relationship between shift work and information technology use. Thus, we are interested in exploring the effects that a shift system has on information technology use and productivity.

To frame our examination of shift and technology, we focus on the work context of professional service providers who must provide job coverage 24 hours a day, 7 days a week. Emergency medical technicians, patrol officers, nurses, fire fighters, and television news crews are examples of these service providers. These types of jobs require trained individuals who must often make immediate decisions based on the information and resources currently available to them (Geisler, 2009; Tucker, Edmondson, & Spear, 2002).

In this paper, we present the results of a field study at a police organization to explore the effects that shift work has on information technology use, effectiveness, and satisfaction with technology. To explain these expected effects we build off of and extend existing theories in the areas of task-technology fit and technology acceptance models. The results of this study will help organizations that use a shift system better understand how information technology use can differ between employees working different shifts.

**LITERATURE REVIEW**

Although there are different types of shift work that have been studied in the literature (see e.g., Kogi, 1985), the type of shift work that is of interest to our study is fixed shift-work. Fixed shift-work refers to the type of permanent, non-
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