The Past, Present, and Future of End-User Performance

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INTRODUCTION

Over the last decade, end-user computing has become an integral part of the organizational landscape. The emergence of end-user computing can be attributed to the necessity to manage and to effectively use information to function in a knowledge-based economy. Because of the increased organizational computing needs, computer literacy requirements have skyrocketed for clerical and support staff and for many middle and senior management positions (Bowman, Grupe, & Simkin, 1995). The proliferation of microcomputers and the availability of sophisticated user application tools (Shayo, Guthrie, & Igbaria, 1999) have facilitated the widespread implementation of end-user computing technology.

End-user computing has the potential to enhance productivity. However, for this potential to be realized, end users must learn EUC skills and perform at high levels. Given the significance of end-user performance to organizations, literally hundreds of studies have examined factors with potential to influence end-user performance. The purpose of this review is threefold: to review what we know about end-user performance, discuss some of the limitations of research on end-user performance, and to offer suggestions for future research on end-user performance.

BACKGROUND: FACTORS KNOWN TO INFLUENCE END-USER PERFORMANCE

Research in the areas of psychology and organizational behavior has clearly established that characteristics of the individual and the environment influence behavior and performance (e.g., Terborg, 1981). This approach, labeled the interactional approach, is an effective framework to review the factors that influence end-user performance (Jawahar, 2002).

Characteristics of End Users

To be sure, research has examined a variety of individual difference factors with potential to influence end-user performance. For instance, previous research has investigated the influence of attitudes (e.g., Jawahar & Elango, 1998; Kernan & Howard, 1990; Szajna, 1994), aptitudes (e.g., Evans & Simkin, 1989), learning styles (e.g., Bohlen & Ferratt, 1997), cognitive styles (e.g., Davis & Davis, 1990), self-efficacy (e.g., Jawahar & Elango, 2001), goal setting (e.g., Jawahar & Elango, 2001), experience (e.g., Dambrot, Silling, & Zook, 1988), education (e.g., Davis & Davis), age (e.g., Czara, Hammond, Blascovich, & Swede, 1989), and sex (e.g., Harrison & Rainer, 1992) on end-user performance. Organizations and managers can influence some of these individual difference factors, such as attitudes, aspiration or goals, and self-efficacy, more than other factors (e.g., aptitudes, learning/cognitive styles, and demographics). Therefore, this review focuses on the former set of factors.

Attitudes. The preponderance of research on end-user performance has focused on attitudes toward computers to predict end-user performance. However, these studies have generally reported inconsistent results. About one half of the studies that examined the relationship between attitudes and end-user performance have reported a relationship. While some of these studies reported a positive relationship (e.g., Nickell & Pinto, 1986), others have reported a negative relationship (e.g., Hayek & Stephens, 1989). Alternatively, roughly one half of the studies failed to find a relationship between attitudes and end-user performance (Kernan & Howard, 1990; Szajna, 1994). After reviewing these studies, Jawahar and Elango (1998) attributed the inconsistent results to the fact that many of these studies had incorrectly used the constructs of computer anxiety and negative attitudes toward computers interchangeably (see Kernan & Howard) and had relied on global attitudes to predict end-user performance.

Drawing on Ajzen and Fishbein’s (1980) behavioral intentions model, Jawahar and Elango (1998) theorized that behaviors or outcomes could be best predicted by attitudes that specifically relate to those behaviors than by more global and general attitudes. They proposed that attitude toward working with computers is much more specific and relevant to performance of tasks which require the use of computer skills than the more general attitudes toward computers. Individuals who hold favorable attitudes toward working with computers are more
likely to practice and learn end-user computing skills, and
evidence higher levels of performance on tasks that require
the use of those skills than those who hold less
favorable attitudes. As expected, Jawahar and Elango
found that attitudes toward working with computers but
not attitudes toward computers explained unique vari-
ance in end-user performance. These results were repli-
cated in a follow-up study (Jawahar & Elango, 2001).
These two studies together with previous research indi-
cate that attitudes that are specific to the task of working
with a computer or a particular software package or pack-
ages are more likely to be predictive of end-user perfor-
mance.

Goals. The positive effect of goal setting on task
performance is one of the most robust and replicable
findings in the psychological literature (Locke & Latham,
1990; Locke, Shaw, Saari, & Latham, 1981). Literally,
hundreds of studies have been conducted on goal setting
in a variety of settings and with a wide range of subjects
including managers, engineers, and scientists (Locke &
Latham). Research on goal setting has documented that
specific and difficult or challenging goals lead to higher
levels of performance than the absence of goals, easy
goals, or “do your best” goals (Locke et al.). Locke and
Latham have shown that goal setting, when combined
with feedback or knowledge of results, leads to high levels
of performance. Thus, goal setting is most likely to im-
prove task performance when the goals are specific and
sufficiently challenging, and feedback is provided to
show progress in relation to the goal. In a series of two
studies, Jawahar and Elango (Jawahar, 2002; Jawahar &
Elango, 2001) found that end users’ goals to learn and
master a software package is in fact strongly related to
their performance with the software package.

Self-Efficacy. Self-efficacy is the belief in one’s ability
to effectively complete a task or exhibit a specific behavior
(Bandura, 1982). Theory and research on self-efficacy
suggests that, in contrast to individuals with low levels of
self-efficacy, the highly efficacious are less apprehensive
of change, set more challenging goals, exert more effort,
persist in the face of difficulty, and achieve higher levels
of performance (Jawahar, Stone, & Cooper, 1992). Prior
research has also documented that self-efficacy influences
diverse behaviors and performance on various tasks including
tasks involving end-user computing (e.g., Gist, Schwoerer, &
Rosen, 1989; Jawahar, 2002; Jawahar & Elango, 2001; Stajkovic &
Luthans, 1998). For instance, in one study, Gist et al. studied managers and administra-
tors undergoing two types of training in the use of
computer software. Trainees with higher self-efficacy
prior to training performed better than their low self-
efficacy peers on a timed computer task at the end of
training. In another study, Jawahar and Elango reported
that self-efficacy explained more unique variance in end-
user performance than attitudes and goals or aspirations
of end users. Enhancing self-efficacy of end users might
very well be the single most effective approach to enhanc-
ing end-user performance.

Characteristics of the Environment

In contrast to the voluminous research on end-user char-
acteristics, very little research has focused on character-
istics of the environment. Even so, several different char-
acteristics have been studied. In deciding which charac-
istics to include in the review, I relied on two criteria:
the quality of research support for the characteristics and/
or the relative ease with which organizations and manag-
ers change the characteristic.

End-User Training. Several scholars have acknowl-
edged end-user training as an essential contributor to the
productive use of computer systems in organizations
(e.g., Compeau & Higgins, 1995). The practitioner litera-
ture also supports the view that training is essential for
effective use of computer technology (Finley, 1996). Be-
cause training can affect the success or failure of end-user
computing in organizations (Bostrom, Olfo, & Sein,
1990; Rivard & Huff, 1988), training employees to use
information technology productively has become a high
priority in many organizations (Aggarwal, 1998). It is now
well established that training end users enhances their
performance (e.g., Gist et al., 1989). The next step, then, is
to identify characteristics of training that facilitate end-
user learning and performance.

Opportunity to Practice. Opportunity to practice in
the training environment and in the posttraining environ-
ment is likely to affect how well trainees learn and use their
newly acquired skills to perform their jobs. While the
importance of practice for learning new skills is widely
acknowledged (Tannenbaum & Yukl, 1992), training and
work environments differ in the extent to which they
provide trainees opportunities to practice newly acquired
skills. For instance, Ford, Quinones, Sego, and Speer
(1991) studied Air Force technical trainees after they
completed training and found significant differences in
opportunity to apply the training; they also noted wide
variations in the lengths of time before trainees first
performed the tasks for which they had been trained.
Opportunities to practice newly acquired skills are likely
to strengthen learning and influence how well trainees
use those skills. In a study of IRS managers, Pentland
(1989) found that attempts to practice trained computer
skills immediately upon returning to the job had a major
impact on long-term retention. These studies suggest that
the opportunity to practice trained skills will significantly
influence how well trainees learn and perform with those
skills.
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