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Coping with IT-related Demands: A Behavioral Change Experiment through Online Training

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ABSTRACT

Information systems (IS) used in the workplace give various demands. Behaviors contributing to successfully coping with the demands of IS can support healthier IS use. Inducing behavior change in IS use is challenging due to the influence of habits. We aim to understand how users' coping behavior changes through adaptive coping training for IT-related demands and how to design this online training. We developed an online training based on behavior change theories and IS research. Our study uses mixed methods, combining qualitative and quantitative data collection through questionnaires in an experimental design. We will conduct a multigroup analysis for quantitative evaluation. Further, we use inductively open coding and clustering by axial coding for qualitative data analysis. Our research will provide insights into the feasibility of behavior change through online training and for practitioners to design practical online training.

Keywords

Health action process approach, online training, coping

INTRODUCTION

The use of digital technologies in the workplace creates many demands related to Information Technology (IT). IT-related demands are objective demands that are facilitated by IT (Galluch, Grover, & Thatcher, 2015) and include, for example, IT-enabled interruptions, unreliability, or complexity of IT that users have to handle (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). Information System (IS) research has identified many measures that organizations can take to reduce such demands, such as technology support and literacy facilitation (Ragu-Nathan et al., 2008). Yet, it is often unavoidable that users will be confronted with some of these IT-related demands. In such situations, users can cope with the demands to solve problems and reduce potential negative psychological and physiological consequences (e.g., IT-related exhaustion) (Gaudioso, Turel, & Galimberti, 2017). Valuable IS research has detailed IT-related demands and various coping strategies for dealing with them (Pirkkalainen, Salo, Tarafdar, & Makkonen, 2019; Salo, Makkonen, &

Hekkala, 2020). Many of these publications derive practical implications that call for IT training, which may include self-reflection (Pirkkalainen et al., 2019), self-management (Galluch et al., 2015), or improving technical skills (Benlian, 2020). Undoubtedly, these are essential aspects for fostering digital well-being at the workplace, which can potentially reduce problems in the use of IT. Such training could, for example, encourage adaptive coping and enable users to effectively manage or modify stressful situations to minimize or avoid undesirable consequences (Gaudioso et al., 2017). However, changing the way users cope with IT-related demands requires behavioral adaptation, and IS research has long indicated that inducing behavioral change in IS use is not trivial. Habits often prevent users from acting on their intentions (Jaspersen, Carter, & Zmud, 2005; Limayem, Hirt, & Cheung, 2007). Further, psychology research suggests that coping behaviors may be specific to individual preferences, coping styles, experiences, and habits (Bem & Allen, 1974). If the rich findings from IS research on IS coping are to be translated into actionable outcomes that help users reduce stress, insights into how to change coping behaviors and styles are needed. Therefore, this study aims to sharpen our understanding of how users benefit from IT training regarding adaptive coping with IT-related demands, and how such training must be designed to yield effective results. For that, we developed an online training based on the Health Action Process Approach (HAPA) and findings on coping with IT-related demands from IS research. The HAPA is a theoretical framework that explains how individuals change health behaviors and the factors that influence their success (Schwarzer, 1992, 2008).

THEORETICAL BACKGROUND

Coping with IT-related Demands

The technological environment in the workplace can be perceived as a significant demand on the individual, requiring users to adapt in order to avoid negative outcomes (Tarafdar, Cooper, & Stich, 2019). This adaptation encompasses various coping behaviors that result in psychological, physiological, and organizational outcomes (Tarafdar et al., 2019). Theoretical frameworks for coping with IT-related demands (e.g., IT unreliability

or IT-related interruptions) emphasize individuals' cognitive and behavioral strategies for managing them (Tarafdar et al., 2019). Coping strategies can help individuals regulate their emotions, thoughts, and behaviors in response to IT-related demands (Tarafdar et al., 2019). Gaudioso (2017) distinguishes between adaptive coping strategies and maladaptive coping strategies. Adaptive coping strategies aim to control or change the stressful situation so that adverse outcomes are reduced or prevented (Gaudioso et al., 2017). Maladaptive coping strategies, on the other hand, are dysfunctional (e.g., ignoring a situation or behavioral disengagement) (Gaudioso et al., 2017). While much research exists about coping with IT-related demands (Salo et al., 2020), to the best of our knowledge, no systematic attempt has been made to educate individuals on how to cope with IT-related demands. Whether such an intervention would be fruitful is unclear because there has long been a debate in psychology about whether coping behavior is a user-specific or a situation-specific (i.e., IT-related demands) factor (Bem & Allen, 1974). Additionally, behavioral adaptation is not trivial, and IS research has long assumed that IT-related behavior is relatively stable once habits are formed (Jasperson et al., 2005; Limayem et al., 2007). Yet, theoretical knowledge about training to cope with IT-related demands is crucial because it provides insight into whether and how new IT-related behaviors can be changed and established. It also explains how training must be designed to achieve a desired behavioral change.

HEALTH BEHAVIOR CHANGE

HAPA is a theoretical framework that explains how individuals engage in health behavior change and the factors that influence their success. Developed by Schwarzer (1992, 2008), HAPA integrates cognitive and volitional processes to understand how people plan, implement, and retain health behavior change. According to HAPA, health behavior change can occur in two phases: The motivational phase, which leads to a behavioral intention, and the post-intentional volition phase, which leads to the actual behavior change (Schwarzer, 2008). In the motivational phase, the intention to change health behaviors is influenced by the perceived risk of failure to change, outcome expectancies associated with a change, and motivational self-efficacy (Schwarzer, 2008). In the volitional phase, individuals move from intention to action (Schwarzer, 2008). They engage in self-regulatory processes such as planning, monitoring, and maintaining the behavior (Schwarzer, 2008). The model provides a comprehensive framework elucidating the complex health behavior change process. Such interventions are designed to include systematic procedures known as behavior change techniques (BCTs), considered active intervention components. According to Michie et al. (2011), BCTs possess specific defining characteristics. These include being observable, replicable, and irreducible. Mechanisms of action (MoA) are conceptualized as different theoretical constructs that describe how BCTs influence an

individual's behavior (Carey et al., 2019). MoA refer to constructs outlined in behavior and behavior change theories that mediate interventions' effects (Carey et al., 2019). They include constructs such as "Beliefs about Consequences," "Knowledge," and "Skills" (Carey et al., 2019). BCTs addressing specific MoA can be implemented in online training. In our study, online training is defined as a digital learning environment available through an IT system (Carliner, 2004).

HYPOTHESIS DEVELOPMENT

We develop hypotheses about the effect of online training on coping with IT-related demands. Consistent with HAPA, we propose relationships to change in coping behavior, a change in adaptive coping behavior, and related health outcomes (IT-related exhaustion). HAPA suggests that behavioral intention is positively influenced by the combined reinforcement of three factors: Risk perceptions, outcome expectancies, and self-efficacy (Schwarzer, 2008). These three factors can be addressed through BCTs in online training (Michie et al., 2013). An individual's risk perception can be increased by providing information about the negative consequences of a condition and by making the individual aware that they are affected by these risks (Michie et al., 2013). Self-efficacy can be promoted by demonstrating the target (adaptive coping) behavior and persuasion about individual abilities (Michie et al., 2013). Positive outcome expectancies can be developed by providing information about the positive health, social, and emotional consequences of behavior change (Michie et al., 2013). When online training includes these BCTs, we assume its completion will increase the users' intentions to change their IT-related coping behaviors. Our model refers to such an online training as the *motivational training phase*. Based on this, we formulate the following hypothesis:

H1: Users who have completed the motivational training phase will have higher intentions to change their coping behavior with IT-related demands than those who have not.

Intentions refer to personal goals set by oneself or others (Fishbein & Ajzen, 1975). Several social cognitive theories consider an individual's intention to change as the primary predictor of actual change (Fishbein & Ajzen, 1975). In the HAPA model, the intention to change one's behavior is a basic prerequisite for achieving behavior change (Schwarzer, 2008). For this reason, we assume that an individual who intends to perform in adaptive coping behavior to deal with IT-related demands will subsequently perform adaptive coping behavior to deal with IT-related demands more often than an individual with a lower intention to do so. Therefore, we formulate the following hypothesis:

H2: Users' intention to perform adaptive coping behavior to deal with IT-related demands is positively associated with the performance of adaptive coping behavior.

#	Phase tutorial		HAPA	Mechanisms of action	Implementation of the learning platform based on BCTs
1	Motivational training phase	Tutorial 1	Risk perception	Perceived susceptibility	Information about negative health consequences and salience of problem
			Outcome expectancy	Beliefs about consequences	Information about positive consequences
			Task self-efficacy	Beliefs about capabilities	Demonstration of the behavior & verbal persuasion about capability
2	Volitional training phase	Tutorial 2	Action planning	Behavioral cueing	Use knowledge for action planning
			Setback planning	Behavioral regulation	Problem solving & reflection of past behavior
			Maintenance self-efficacy	Beliefs about capabilities, knowledge & skills	Focus on past success
3	Volitional training phase	Action Reflection	Action & action control	Behavioral regulation	Self-monitoring of behavior & habit formation
			Recovery self-efficacy	Beliefs about capabilities	Focus on past success

Table 1. Conceptualization of the Online Training

For individuals who develop a clear intention to change their behavior, the precise planning of the behavior forms the basis for the actual execution of the action (Schwarzer, 2008). Providing behavioral cues and detailed action planning can support the planning of such behavior (Michie et al., 2013). Therefore, we assume that an online training that explains and demonstrates adaptive coping behaviors and gives advice on how to apply them will support the initiation of adaptive coping behaviors. Following BCTs, monitoring one's behavior and the outcomes experienced in the process helps to maintain actions (Michie et al., 2013). Thus, online training that includes reflection on coping behavior and the associated outcomes could support the individual in maintaining adaptive coping long-term and thus support habit formation. We call such online training the *volitional training phase*. Based on this, we formulate the following hypotheses:

H3: IS users who have completed the volitional training phase are more likely to use adaptive coping strategies to deal with IT-related demands than users who have not.

Studies show that adaptive coping behaviors reduce work exhaustion and strain (Galluch et al., 2015; Gaudioso et al., 2017; Pirkkalainen et al., 2019). These results can be explained by the fact that adaptive coping behaviors often effectively change the underlying problem (e.g., reduce the IT-related demands). Further, adaptive coping behaviors strengthen the individual's mental resources, through which feelings of exhaustion are reduced (Gaudioso et al., 2017). On this basis, we formulate the following hypothesis:

H4: Users who perform adaptive coping behavior to deal with IT-related demands will experience less IT-related exhaustion.

METHODOLOGY

Development of the Digital Learning Platform

The learning platform follows HAPA's two phases and associated influencing factors (Schwarzer, 2008). We

contextualize the BCTs to adequately address the various influencing factors (Michie et al., 2013) and report the MOA behind these techniques (Carey et al., 2019). The resulting learning platform and associated experimental stage includes three tutorials, which are summarized in Table 1. There, we also point out the elements of the platform and the IS research on which it is based. Tutorial 1 refers to the motivational training phase. Tutorial 1 educates the participants about the possible risks (e.g., exhaustion) and the positive effects that adaptive IT-related coping behavior can have (e.g., increased user satisfaction) (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007). Tutorial 2 refers to the volitional training phase and is designed to support behavioral planning for adaptive coping behaviors. The individuals receive extensive input on how to cope with IT-related demands. Participants are then asked to formulate which adaptive coping behavior they can apply in which situation and to define solutions for possible obstacles. The last phase of the online training, which we call apply and reflect, refers to the volitional training phase. Applying and reflecting addresses the implementation of the behavior. Participants actively apply the adaptive coping behavior to their work life. During this time, the participants keep a diary to document and reflect on their coping behavior and experienced outcomes. Users can progress through online training autonomously, asynchronously, and at their own pace within a set time frame. The online training allows to track the input of the users (Carliner, 2004).

Research Design

Our study mixes methods and follows an experimental design in which we collect qualitative and quantitative data using questionnaires (Venkatesh, Brown, & Bala, 2013). We use a nested design and collect quantitative data during the online training and qualitative data at different points before, during, and after the online training is performed (see Figure 1). The mix of quantitative and qualitative data follows the purpose of complementarity, in order to gain overlapping views of the phenomenon (Venkatesh et al.,

2013). By combining quantitative analysis of user behavior with qualitative exploration, we aim to understand and provide explanations for the observed quantitative findings. The research design follows a between-subjects design with two intervention groups and one control group. The experiment includes the following three groups: Volitional group (completion of the motivational and volitional training phase), motivational group (completion of the motivational training phase and no completion of the volitional training phase), control group (completion of neither the motivational nor the volitional training phase).

Procedure

The experiment consists of a pre-experimental stage, an experimental stage, and a post-experimental stage (see Figure 1). The three stages are described below.

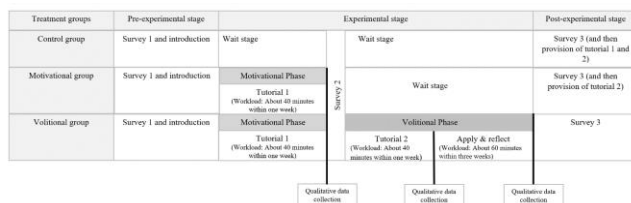


Figure 1. Experimental Procedure

In the *pre-experimental stage*, participants are randomly assigned to either the control, motivational, or volitional group. All participants are then required to complete the first survey, which asks about their intention to change adaptive coping behaviors, their current use of adaptive coping behaviors, IT-related exhaustion, and control variables (IT use experience, IT-related self-efficacy). The experiment is then introduced as an online training to teach participants how to work with IT in a healthy way. The control group is informed that they are on a waiting list and will have access to the learning platform in five weeks (Shreekumar, 2021). The motivational group is told that they will complete the first tutorial, take a four-week break, and then have access to phase 2. The volitional group will complete the online training immediately within the following four weeks. In the *experimental stage*, the online training consists of two consecutive phases. The online training is conducted over four weeks: During the first week, participants in the volitional and motivational groups complete the first tutorial, which includes a detailed introduction to the online training, a description of the procedure, the tasks, and the duration. Participants then work through the different contents and complete the associated tasks. The first tutorial takes approximately 40 minutes to complete. After completing tutorial 1, participants in the motivational, volitional, and control groups complete survey 2, which asks about intentions to change coping behaviors. The volitional group is notified by e-mail that the second tutorial is now available. Again, the volitional group processes the various contents and completes the tasks. The third tutorial must be carried out in weeks two to four of the experiment. During this time,

participants in the volitional group are asked to reflect on their behavior change regularly (triggered by email twice a week). Participants will be asked for their qualitative feedback after each tutorial. In the *post-experimental stage*, participants in the control, motivational, and volitional groups complete survey 3, which asks about adaptive coping behaviors and IT-related exhaustion. Participants' demographic data will also be collected.

Technology, Recruiting, and Measurement

The learning platform was developed in the learning management system Moodle. Participants receive their own Moodle use account, which they can access via individual logins. Moodle offers several interactive elements and polls. The learning platform also contains several learning videos created with the video creation tool Vyond. We plan to primarily recruit participants via their employers. To do this, we are asking organizations to distribute the offer to participate in our free online training to individuals who feel they could benefit from it. We are also interested in recruiting individuals who are experiencing IT-related demands to participate in our study. We plan to pay participants for completing surveys 1-3 as an incentive to participate in the online training. To measure the constructs, we will use items that already exist and are used regularly. We will use a 5-point Likert scale ranging from 1 strongly disagree to 5 strongly agree for all constructs. Our research model considers satisfaction with adaptive coping behavior and frequency of repetitive adaptive coping behavior as control variables.

Analysis and Expected Results

We plan to conduct a multigroup analysis using partial least squares structural equation modeling to measure our research model. Further, we plan to code the qualitative data inductively using open coding. We will cluster the codes using axial coding and report the results accordingly. Finally, we derive meta-inferences from the analysis of the quantitative and qualitative data (Venkatesh et al., 2013). We expect the qualitative data to shed light on how the online training was perceived and how it helped individuals change their coping behavior. In addition, we assume the qualitative data may help explain why participants may have failed to change their behavior or stopped following their initial plans and intentions.

DISCUSSION, EXPECTED CONTRIBUTIONS, AND OUTLOOK

Our study aims to sharpen our understanding of how users may benefit from adaptive coping interventions for IT-related demands. Psychology research has long suggested that coping may be both situation-specific (different IT-related demands) and individual-specific (different users and their coping behaviors, experiences, and habits) (Bem & Allen, 1974). Previous research on IS use has found that feature use becomes relatively stable after the introduction of IT (Benlian, 2015; Jaspersen et al., 2005). However, other research suggests that deliberate initiatives and novel

situations (Sun, 2012) can lead to behavioral adaptation. IS research has generated comprehensive knowledge about coping with IT-related demands, and has frequently suggested that IT-related training is beneficial for fighting IT use's adverse effects (Benlian, 2020; Galluch et al., 2015; Pirkkalainen et al., 2019). However, to our knowledge, no research has investigated how such an intervention should be designed to lead to sustainable behavior change and whether such training is effective. Our research aims to fill this void and provide contextualized insights for researchers on the feasibility of behavioral change through such training, and for practitioners on how to design such online training. The online training is designed and implemented. The videos are created. We are currently recruiting participants. We aim to do the first pre-tests and plan to conduct the experiment as the next steps.

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