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A longitudinal experimental study on the interaction effects of persuasion quality, user training, and first-hand use on user perceptions of new information technology

Gwanhoo Lee [a,*], Weidong Xia [b]

[a] Department of Information Technology, Kogod School of Business, American University, United States
[b] Department of Decision Sciences and Information Systems, College of Business Administration, Florida International University, United States

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ABSTRACT

While prior research has investigated the main effects of external factors on user perceptions of a new IT, little work has been into the interaction effect of external factors on user perceptions. In a longitudinal experimental study, we examined the effect of the quality of persuasive argument, user training, and first-hand use on user perceptions of the new technology over time. We found that the effect of argument quality on users' perceived ease of use was greater when users had no training. However, we did not find the same effect occurred due to perceived usefulness. We also found that first-hand use changed users' perceived usefulness more over time when users received high quality arguments or when they had no training. While we found that first-hand use changed users' perceived ease of use more when users received high quality arguments, first-hand use did not change users' perceived ease of use differently whether they had or had not received prior training.

1. Introduction

Organizations continue to invest in new IT to improve their performance [6,10]. However, the resulting systems often fail to achieve the intended impact on organizational performance in part because the target users do not accept the technology [20]. Even when a technology adoption decision is made at the management level and its use is mandatory, users can still delay, obstruct, underuse, or sabotage the technology if they do not perceive it to be useful or easy to use [5]. We investigated how persuasive arguments, user training, and first-hand experience with technology influence the user's perception of it in a mandatory use setting.

The theory of reasoned action, the theory of planned behavior, and TAM have been used to try to explain the process of assimilation of IT in the organization [7,12,19]. According to these, user acceptance and adoption of a new technology is ultimately determined by users' behavioral intention to use the technology which, in turn, is determined by their beliefs and perceptions about it. Perceived usefulness (PU) and perceived ease of use (PEOU) are considered important user perceptions that determine user intention to use the technology [11].

User perceptions are, however, subjective and idiosyncratic and may change as users continue to re-evaluate the technology over time. Therefore, it is important to understand how managerial interventions and mechanisms influence user perceptions over time so that the organization can increase the speed of user adoption.

An individual's perception of new technology does not remain static and should be understood from a dynamic or longitudinal perspective [3,8]. Individuals develop their own idiosyncratic understanding and expectation of the new technology as they are exposed to persuasive arguments and training, and this is likely to change from their first use of the technology over time. Initial persuasion and internal training are important ways to convey the social norm to the users as well as provide the needed knowledge and skills.

Prior research has investigated how persuasion, user training, and first-hand use individually affect how users perceive a new IT. However, little research has examined the interaction effects of these factors on users' perceptions of a new IT. Our research aimed at filling this gap. As users typically experience all of persuasion, training, and first-hand use through the adoption lifecycle, it is critical for organizations to understand how these three factors interplay. Using a longitudinal experiment, we examined how

* Corresponding author at: 4400 Massachusetts Avenue, NW Washington, DC 20016-8044, United States. Tel.: +1 202 885 1991; fax: +1 202 885 1992.
E-mail address: glee@american.edu (G. Lee).

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persuasion, user training, and first-hand use interplay in shaping and changing users' perceived usefulness and ease of use of a new IT when its use is mandatory. The target technology in our research was a new software engineering tool that facilitates system analysis and design.

2. Theoretical background

2.1. Persuasion, training, and first-hand experience in innovation adoption

Innovation adoption is often viewed as a stage-based process; in this, a potential adopter passes from initial awareness and knowledge, to having a favorable or unfavorable perception, to making a decision to adopt or reject it. The introduction of an innovation into an organization creates uncertainty in the minds of potential adopters.

Innovation adoption is an on-going process involving persuasive communication and learning. Change agents who provide persuasive communication are important to the process [17]. User training is an important external factor that influences user perceptions about a new technology [16]. First-hand experience is one of the most important sources of information about the target object [9]. While persuasive communication and user training may be important managerial interventions that initially influence user perceptions of a new technology, users' actual first-hand use can be an invaluable source when re-evaluating the technology throughout the adoption lifecycle. Persuasion can be considered to be a signaling process, whereas user training and user first-hand use can be thought of as learning processes.

2.2. Quality of persuasive argument

Recent IS research has used persuasion theory and the elaboration likelihood model (ELM) to investigate technology adoption [1]. Persuasion is an active attempt to influence people's action or belief by an overt appeal to reason or emotion. It is one of the most important strategies for influencing beliefs and behavior and is also viewed as a social influence mechanism to form, transmit, and change social norm. In the early stages of innovation adoption, persuasion not only provides information about the target object but also signals to what important other users believe in and expect him or her to do with respect to the behavior.

ELM assumes that there are two basic routes in persuasion: one central to the issue under consideration and the other peripheral to it, emphasizing inessential cues associated with persuasive arguments (such as the length of an argument, source credibility, and attractiveness) [18]. It has been found that personal relevance or importance of an issue is a key factor that determines which persuasion route is used to influence perceptions and beliefs.

The quality of persuasive argument consists of two dimensions: argument valence (the audience's evaluation of the consequence or outcome of the target object under consideration) and argument strength (the audience's subjective probability that the target object is associated with that outcome or consequence). Thus, enhancing argument quality requires an increase in both parts. Argument valence can increase from being negative to positive, while argument strength increases when a causal explanation supporting a persuasive argument is provided and is supported by concrete, objective evidence (e.g., statistics), as opposed to abstract, subjective evidence such as personal opinion.

3. Hypothesis development

User perceptions are likely to be shaped and influenced by the information received from sources such as management and peers [14]. The quality of the arguments influences user perceptions when they process information and evaluate the credibility and merits of the arguments. Prior work has found that high quality arguments are likely to yield favorable cognitive and affective outcomes via the central route of persuasion, while low quality arguments lead to neutral or negative responses [4]. Therefore, the quality of the arguments was expected to positively affect users' perceived usefulness and ease of use of a new IT.

In addition, user perceptions are often shaped and influenced by user training during the early adoption stage. This provides users with conceptual and procedural knowledge about the IT innovations. Prior research suggests that training increases procedural knowledge, which, in turn, affects perceived ease of use, attitudes, and usage [13]. During a typical training session, users receive information about the features and functionalities of the target technology, which allows them to evaluate its merits and demerits. Furthermore, they usually gain some hands-on experience with the technology in the training session, and this allows them to assess the ease of use of the technology. Therefore, user training is expected to affect users' perceived usefulness and ease of use of the new IT.

If users' initial perceptions of the technology are formed without user training, their perceptions are likely to be unstable or unreliable over time. Therefore, if users do not have prior training, they are likely to be influenced by the arguments to a greater extent because they may not have other bases on which they can anchor their perceptions. As users evaluate the arguments against the initial perceptions that are relatively stable, their perceptions are likely to be less influenced by the arguments. Therefore, we proposed:

H1. The positive effect of argument quality on users' perceived usefulness of a new IT will be greater when users do not have prior training than when users have prior training.

H2. The positive effect of argument quality on users' perceived ease of use of a new IT will be greater when users do not have prior training than when users have prior training.

After adopting a new technology, users continue to learn about it through their first-hand use experience [2]. Users' pre-usage perceptions are likely to be unstable if their perceptions are based on second-hand information such as persuasive messages. As users gain first-hand experience, they modify and change their initial perceptions. First-hand experience with the technology provides users with concrete sensory information about its strengths and weaknesses. Information gleaned from first-hand experience is more accessible and inspires greater confidence than second-hand information or vicarious experience. As a result, we expected that the effect of argument quality on users' perceptions decreases over time due to increased experience.

First-hand experience would move users' idiosyncratic, subjective perceptions towards more objective attributes of the technology. The higher the argument quality, the more likely that the users' initial perceptions would be based on unrealistic, subjective, overly optimistic views. As a result, with more first-hand experience, users would be likely to make more adjustments to their initial perceptions based on stronger, higher quality persuasive arguments. Therefore, we proposed:

H3. As users' first-hand use increases over time, users' perceived usefulness of the new IT based on high quality arguments will change more than those based on low quality arguments.

H4. As users' first-hand use increases over time, users' perceived ease of use of the new IT based on high quality arguments will change more than those based on low quality arguments.