Computers in Human Behavior 34 (2014) 333–338

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Non-significant intention–behavior effects in educational technology acceptance: A case of competing cognitive scripts?

Ambar Murillo Montes de Oca [a,b,*], Nicolae Nistor [a,c,d]

[a] Ludwig-Maximilians-Universität, Faculty of Psychology and Educational Sciences, Leopoldstr. 13, D-80802 Munich, Germany
[b] Deutsches Zentrum für Luft- und Raumfahrt, Remote Sensing Technology Institute, Münchner Straße 20, 82234 Weßling, Germany
[c] Universität der Bundeswehr München, Faculty of Human Sciences, Department of Teaching and Learning with Media, Werner-Heisenberg-Weg 39, 85577 Neubiberg, Germany
[d] Walden University, Richard W. Riley College of Education and Leadership, 100 Washington Avenue South, Suite 900, Minneapolis, MN 55401, USA

ARTICLE INFO

Article history:
Available online 15 February 2014

Keywords:
Educational technology acceptance
Use behavior
Academic help seeking
Informal learning
Scripts

ABSTRACT

Current technology acceptance research insufficiently considers complex educational settings. Recent research in educational technology acceptance has found weak or non-significant intention–behavior effects. To understand this finding, this paper presents a learning scripts approach to acceptance. A mixed methods approach is used to examine the intention–behavior effect in the context of informal learning in the workplace, focusing on the use of a virtual community of practice (vCoP) where participants share knowledge about the technical use of a software used in daily work tasks. Alternatively, users can access expert knowledge by contacting a Help Desk. As expected, the quantitative results show that the participants develop an intention to use the vCoP, however this intention has a limited effect on the actual vCoP use behavior. Qualitative results reveal that users have two cognitive scripts: an acceptance script, resulting in intention formation, and a help-seeking script, a well-established script in users which is leading them away from the technology and toward alternative help-seeking strategies. The help-seeking script is therefore interfering with the acceptance script, thus explaining weak or non-significant intention–behavior effects. Further research is needed to explore additional scripts that play a role in educational technology acceptance.

1. Introduction

As the interest in educational technologies increases, so does the need for educational technology acceptance (ETA) research. Technology acceptance is defined both as intention to use, and as actual use of the technology, assuming that intention is a strong predictor of behavior. However, according to Bagozzi (2007, p. 245), "the intention–behavior linkage is probably the most uncritically accepted assumption in social science research in general and in [information systems] research in particular". And indeed, a closer look at intention–behavior effects in ETA yields in several cases (e.g., Agudo-Peregrina, Hernandez-Garcia & Pascual-Miguel, 2014; Nistor, 2013; Nistor et al., 2014; Nistor, Lerche, Weinberger, Ceobanu, & Heymann, 2012) weak or even non-significant effects. These counterintuitive findings may be explained by Bagozzi's (2007) observation that previous acceptance studies were originally developed for relatively simple technology-based environments, thus oversimplifying the technology adoption phenomenon when applied in more complex educational contexts.

A more in-depth understanding of technology acceptance and adoption in educational environments may be reached by employing the notion of cognitive scripts. Cognitive scripts were initially proposed in response to the question "what guides peoples' behavior?", and were defined as a framework which delineates a series of events, which are activated by a particular situation, and which take certain dependencies into account (each action builds on the preceding one) (Schank & Abelson, 1977). These dependencies could be viewed as an "if...then" phrase, where a precondition sets the stage for a following activity. In educational environments, Fischer, Kollar, Stegmann, and Wecker (2013) formulate their script theory of guidance, applying a collaboration script framework to computer supported collaborative learning (CSCL), demonstrating that the concept of scripts can add explanatory power to a variety of learning activities.

In line with current conceptual models (Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012), technology acceptance can be regarded as a cognitive script: users evaluate a technology against the background of their own expectations of

* Corresponding author at: Ludwig-Maximilians-Universität, Faculty of Psychology and Educational Sciences, Leopoldstr. 13, D-80802 Munich, Germany. Tel.: +49 89 6004 5120; fax: +49 89 2180 99 5284.
E-mail addresses: ambar.murillo@psy.lmu.de (A. Murillo Montes de Oca), nic.nistor@uni-muenchen.de (N. Nistor).

http://dx.doi.org/10.1016/j.chb.2014.01.026
0747-5632/

performance vs. effort; if the evaluation is positive, they develop an intention to use the technology; if the necessary material resources are available, they turn the use intention into actual use behavior. Schoonenboom (2012) exerts a more complex understanding of acceptance as a decision making process, describing technology adoption as a two-step script, in which the users first choose to perform a task, then choose a learning management system as a tool.

Complex human activity may be the result of several scripts at the same time, as Schank and Abelson (1977) and Fischer et al. (2013) observe. Considering technology acceptance in educational settings, acceptance scripts are very likely to concur with various learning scripts. It is an open question whether and how multiple cognitive scripts interact or even interfere with each other, and to which overall behavior they lead.

Against this theoretical background, the field study presented in the following paper examines a case of new technology introduced to support knowledge sharing in a large company. Following an acceptance script, the participants indeed develop an intention to use the technology. However, their use intention has no significant effect on the actual use behavior. Assuming that this contradiction may be the result of concurring or competing cognitive scripts, users' behavior is subsequently explored qualitatively through semi-structured interviews. The results confirm the existence of competing scripts, explaining thus the non-significant intention–behavior effect. For acceptance research, this study suggests that a script-based approach may contribute to a more in-depth understanding of technology acceptance and adoption in complex educational settings.

The following section begins with a theoretical overview of scripts, thus providing the framework with which ETA will be studied. Following this, a theoretical background focused on technology acceptance models is presented, and finally a brief theoretical grounding in academic help-seeking strategies is given. The research questions and methodology of the empirical study will then be presented, followed by results, interpretations, and conclusions.

2. Theoretical background

2.1. Cognitive scripts

This study starts from the assumption that a more in-depth understanding of technology acceptance and adoption in educational environments may be reached by approaching acceptance from the perspective of cognitive scripts. Scripts provide individuals a framework with which to understand a sequence of behaviors (Schank & Abelson, 1977). Scripts pursue specific objectives, and sequence behaviors to reach them, defining activities to be performed and the actors involved (Kollar, Fischer, & Hesse, 2006). In educational environments, Fischer et al. (2013) formulate their script theory of guidance, looking at external scripts, their effect on CSCL and on learners' internal collaboration scripts, as well as how the latter affect CSCL practices. The authors take the concept of scripts, and use them to further understand and explain CSCL practices and outcomes. This indicates how the concept of scripts provides a framework through which different phenomena can be understood.

Complex human activity may be the result of several concurring scripts. In CSCL, Dillenbourg (2002) points out that over-scripting can also have disadvantages, such as disrupting what he calls "natural" interactions and processes, and increasing cognitive load. Fischer et al. (2013) consider the interplay of diverse collaboration scripts and conclude that the way in which multiple cognitive scripts interact with each other, and their overall behavioral effects are not sufficiently studied.

2.2. Technology acceptance as a cognitive script

ETA theories and models seek to measure technology acceptance as use behavior. Acceptance models are derived from the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), a behavioral prediction model in which subjective norms and attitudes toward a behavior predict behavioral intention, which further impacts behavior. Later versions of acceptance models were also influenced by the Theory of Planned Behavior (TPB; Ajzen, 1991), which shares the same structure as the TRA, with perceived behavioral control as an additional predictor for intention. One of the first technology acceptance models in the field is the Technology Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989), a parsimonious model predicting technology acceptance and subsequent use. According to the TAM, all external variables, attitudes and perceptions are subsumed into use intention, which predicts actual system use. Use intention is directly influenced by perceived usefulness and users' attitudes toward the system, which are in turn predicted by perceived usefulness, and ease of use. Perceived ease of use also has an effect on perceived usefulness. External variables can have an effect on both perceived usefulness and perceived ease of use. Later versions of this model, such as TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008) introduce additional external variables that influence perceived usefulness and ease of use. The Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003) synthesizes previous models explaining larger parts of the variance in use intention and actual use behavior. The UTAUT2 (Venkatesh et al., 2012) introduces a number of other variables, two noteworthy ones being experience and habit.

If we view technology acceptance through a scripting lens, in simple terms, the user is weighing the benefits versus the disadvantages to using a system. In terms of the variables mentioned in the UTAUT2 (Venkatesh et al., 2012) the script might be: "if little effort is required, and there are benefits to using the system, and there are the facilitating conditions and social influence to do so, then I intend to use the system". Moving on from intention to behavior, the user might then consider habit, perhaps even in an automated, subconscious way. If a user has a habit that interferes with the use of a particular technology, this might interfere with the script indicating an intention.

Building off on Schoonenboom (2012), usage continuation appears as a repeated decision to use the technology, or a continued script (or scripts) resulting in technology use. Repeated use enables script automation, a possible mediating variable between habit and acceptance that may explain the role of habit in technology acceptance described by Venkatesh et al. (2012). As Fishbein and Ajzen (1975) noted, habit could lead to a break in the intention–behavior link, because it implies that a behavior has been automatized to a certain degree, and it is regularly performed under less cognitive control.

In more complex settings, such as learning environments, it is likely that there is not a single technology acceptance script at play. In educational settings, acceptance scripts are very likely to concur with various learning scripts. It is an open question whether and how multiple cognitive scripts interact with each other, and to which overall behavior they lead. Bagozzi (2007) observes that little research has been conducted to understand the larger context and to catch the complexity of technology use. Current acceptance models treat use behavior as an end goal. Seen through a scripting lens, this means that behavior is viewed as a single script, in which the user considers the use of the technology itself as an end goal, in a script such as "if the use of the technology is my end goal, then I must use the technology." In real-life situations, however, acceptance scripts are likely to concur with other cognitive scripts. Presently, acceptance research findings are