7-3-2018

The Effects of IT-Related Attributional Style in Voluntary Technology Training

Stanislav Mamonov
Montclair State University, mamonovs@mail.montclair.edu

Marios Koufaris
City University of New York

INFORMATION SYSTEMS MANAGEMENT
2018, VOL. 35, NO. 3, 220–233
https://doi.org/10.1080/10580530.2018.1477302

The effects of IT-related attributional style in voluntary technology training

Stanislav Mamonov[a] and Marios Koufaris[b]

[a]Information Management & Business Analytics Department, Feliciano School of Business, Montclair State University, 1 University Ave, Montclair, NJ, USA; [b]Paul H. Cook Department of Information Systems and Statistics, Zicklin School of Business, Baruch College, CUNY, New York, NY, USA

ABSTRACT
IT training is firmly established as a key condition that influences successful technology adoption, yet little is known about factors that can affect voluntary training participation. We evaluate the predictive value of IT-related attributional style in relation to the intention to participate in voluntary training in the context of a mandatory enterprise resource planning system rollout. We find that individual IT-related attributional style is highly predictive of the intention to participate.

KEYWORDS
attributional style; technology adoption; training; ERP

Introduction

IT training is broadly acknowledged as a key factor in successful technology adoption and use (Legris, Ingham, & Collerette, 2003). However, some prior studies have shown that mandatory training can trigger a counterproductive employee response involving system misuse and obstruction (Choudrie & Zamani, 2016; Laumer, Maier, Eckhardt, & Weitzel, 2016). This is also reflected in some industry guidelines that have suggested that voluntary training may be the best way to accomplish employee buy-in and assure successful system implementation (Dudhagundi, 2016; Marder, 2016). There are several reasons why that may be the case. Mandatory training requires clear documentation of the personnel roles and functions. This is not always feasible in organizations that are very large or have large variability in roles and functions. In addition, it is sometimes the case that systems are sufficiently intuitive in that formal training is not strictly required for the employees to learn and navigate them. Further, in many cases, just-in-time support in the form of explanatory pop-up windows or video tutorials that are embedded within the systems can be a more efficient and effective way to offer training to the system users.

However, little is known about factors that affect participation in voluntary technology training. An introduction of an enterprise resource planning (ERP) system on a university campus provided us with an opportunity to explore the effects of user cognitions on the intention to participate in voluntary ERP training. Understanding individual factors that can affect voluntary training participation is important in this context because while the new system training was optional, the adoption of the new system was mandatory. The new ERP system supported all the key business processes at the university including human resource information management, financial reporting as well as course registration and academic program audits and it affected all campus constituencies: administrative staff, faculty, and students.

While technology training is broadly accepted as important system adoption factor across a range of different technologies (Legris et al., 2003), it is particularly important in the context of ERP systems (Wagner, Najdawi, & Otto, 2000). ERP systems play a critical role in facilitating information flow and process coordination within modern organizations (Aloini, Dulmin, & Mininno, 2007). This is reflected in the latest industry forecasts that predict ERP market growth through 2022 (GrandView, 2015). Yet, successful ERP adoption continues to pose challenges in practice (Ghosh, 2012). Research on factors influencing technology adoption is a central theme in Information Systems research (Straub, 2012; Venkatesh, Thong, & Xu, 2012). Training on the use of a new system is generally seen as an important facilitating condition in technology adoption (D. Davis & Davis, 1990; S. a Davis & Bostrom, 1993; Nelson & Cheney, 1987; Warkentin & Beranek, 1999), yet there are certain factors that may influence individual participation in training, particularly if training is optional. While the connection between training and successful technology adoption

CONTACT Stanislav Mamonov stanislav.mamonov@montclair.edu Information Management & Business Analytics Department, Feliciano School of Business, Montclair State University, 1 University Ave 07043 Montclair, NJ

Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/uism.

is firmly established, there is a gap in our understanding of factors that can influence the individual user participation in voluntary technology training. In this research project, we begin to address this gap in research by focusing on the role of individual characteristics of system adopters.

Research across different domains of human activity has highlighted the role of individual attributional style, which is defined as a trait-like stable pattern of causal attributions for events, as an important factor that influences individual motivation and actions (Bellu & Sherman, 1995; Bridges, 2001; Proudfoot, Corr, Guest, & Gray, 2001). Studies in the organizational context have shown that it is possible to modify employee attributional styles to improve individual employee performance and organizational outcomes (Corr & Gray, 1996). We draw on attribution theory to examine the relationship between individual causal attribution tendencies for information technology related problems and the intention to participate in voluntary system training. Acknowledging the growing body of research that indicates that people often treat technology as an independent agent, ascribing human like characteristics to the information technology artifacts (Hess, 2009; Qiu & Benbasat, 2009; Sah & Peng, 2015), we expand the conception of the causal agents within the attributional theory to include IT artifacts as an independent agent and we empirically validate the conceptual distinction of the proposed framework and the differential effects of attributions of IT-related failures to either the person herself, others or information technology on the intention to participate in voluntary training.

In the sections that follow, we provide a brief overview of the key studies on ERP adoption and the role of training in technology adoption. Next, we draw on attribution theory and we develop the conceptualization for the IT-related attributional style that identifies attributions to three potential causal loci: the user herself, other people, or the information technology. We conduct a survey study of university employees in the period prior to a new ERP system rollout. We evaluate the relationship between the individual IT-related causal attributions and the intention to participate in voluntary training. We also examine the potential mediating role of the anticipated quality of training. We find that IT-related causal attributions are highly predictive of the intention to participate in voluntary training. We conclude with a discussion of our findings, contributions to theory and practice as well as limitations and directions for future research.

Theoretical background and research model development

An ERP system implementation serves as the context for our study. ERP systems play a key role in modern enterprises and they represent a $25 billion market (GrandView, 2015). ERP system rollouts are often wrought with challenges (Barker & Frolick, 2003; Gargeya & Brady, 2005). A large-scale analysis of enterprise performance outcomes has shown that introduction of new ERP systems often leads to organizational performance declines in the short term, highlighting the importance of the early adoption stages (Hitt, Wu, & Zhou, 2002).

Studies of ERP system adoption identified a broad range of factors that can play a role, including expected benefits, expected costs, barriers, internal organizational pressures, external pressures, technical compatibility, specific stakeholder interests, existing information technology infrastructure, organizational size, and relationships with partners among them (Khoumbati, Themistocleous, & Irani, 2006). The Technology Acceptance Model (TAM) is the dominant theoretical framework, which is often employed in technology adoption research (Davis, 1989; Venkatesh et al., 2012). TAM and much of the research on technology adoption often assumes that the decision to adopt technology is voluntary. Yet, in the organizational context, individual employees often have little choice in the matter. There are a few studies, which explored factors that can affect mandated system adoption. For example, a study in the banking industry showed that perceived ease of use becomes the dominant predictor in mandated system adoption (Brown, Massey, Montoya-Weiss, & Burkman, 2002), whereas typically perceived usefulness is the dominant factor in predicting voluntary system adoption (King & He, 2006).

The role of training in technology adoption

Across different contexts, studies have shown that training plays a central role in facilitating system implementation and user adoption (Davis & Davis, 1990; Davis & Bostrom, 1993; Nelson & Cheney, 1987). A survey of information technology professionals has reported that training and education are critical coping mechanisms for dealing with IT changes (Benamati & Lederer, 2001). Other studies have found that training has a positive impact on perceived ease of use (Igbaria, Zinatelli, Cragg, & Cavaye, 1997) and it can help create a shared perception of system benefits (Amoako-Gyampah & Salam, 2004).

Training can be mandated or voluntary. Table 1 summarizes studies on mandatory technology training. To the best of our knowledge, there are no published studies examining voluntary technology training. This is an obvious gap in research because practitioners have repeatedly suggested that voluntary training may be the best way to achieve successful system adoption and use (Dudhagundi, 2016; Marder, 2016). In this study, we seek to understand individual

Table 1. Studies on mandatory technology training.

Reference/Research question(s)	Key insights
(Venkatesh & Speier, 1999) RQ: How does mood influence motivations and intention to use technology?	Positive mood intervention has only transient short-term effects on the intention to use the system, no actual differences in the system use.
(Coulson, Shayo, Olfman, & Rohm, 2003) RQ: How does the approach to ERP training affect training outcomes?	An experimental study shows that providing the trainees with a conceptual model for the system as a whole at the beginning achieves better outcomes.
(Amoako-Gyampah & Salam, 2004) RQ: How does training influence successful ERP adoption?	Mandatory training helps users to develop shared beliefs in the benefits of the system, which affect perceived ease of use and perceived usefulness of the system.
(Gravill & Compeau, 2008) RQ: How does self-regulated learning affect self-efficacy?	A study of student learning shows that establishing specific goals, note taking, rewarding self, and monitoring frustration in the course of ERP training is associated with higher self-efficacy.
(Dezdar & Ainin, 2011) RQ: How do organizational factors affect the success of ERP implementation?	A survey of 384 ERP system users in Iran shows that user training is a key factor that affects user system satisfaction.
(Chou, Chang, Lin, & Chou, 2014) RQ: How does training affect ERP usage post implementation?	Willingness to learn is a key predictor of continued learning post ERP implementation.

user factors that can affect participation in voluntary training associated with a mandatory system adoption. Management often underappreciates the individual employee effort that is required for successful system adoption (Lim, Pan, & Tan, 2005). Prior research has shown that in mandated system adoption the use of normative controls can be counterproductive (Ke, Tan, Sia, & Wei, 2012) and employees may obstruct implementation, resent, underutilize or sabotage the new system (Brown et al., 2002). However, not all employees respond to challenges the same way. Extensive research on employee behavior in the organizational context has shown that individual attributional style is an important predictor of whether an employee will behave in a constructive or counterproductive manner when faced with challenges at work (Corr & Gray, 1996; Norman, Collins, Conner, Martin, & Rance, 1995; Welbourne, Eggerth, Hartley, Andrew, & Sanchez, 2007). In the next sections, we review prior research on attributional style and develop the research framework for our study.

Attribution theory

Attributional style is defined as a trait-like "characteristic way people attribute causes of events" (Proudfoot, Corr, Guest, & Dunn, 2009). Attribution theory has its roots in the work of Fritz Heider (1958) whose studies established the concepts of social perception and causal attribution in interpersonal relationships (Heider, 2013). Heider noted that people seek to make sense of positive and negative events in their lives. The process of sense making involves assignment of causes to the observed outcomes, which over time leads to people developing stable attributional patterns. Kelly and Weiner have also made seminal contributions to attribution theory. Kelly's work focused on the dimensions of information (consistency, consensus, and distinctiveness) and their effects on causal attributions (Kelley, 1973; Kelley & Michela, 1980). Weiner, among other contributions, proposed a typology of causal attributions encompassing four possibilities: ability, effort, task, and chance and examined the motivational effects of these attributions (Weiner, 1974, 2010).

The practical importance of attributional style as a predictor of outcomes initially emerged in the studies of clinical depression, which revealed that individuals prone to attributing negative outcomes to stable, global, and internal causes are highly likely to develop clinical depression (Seligman, Abramson, Semmel, & Von Baeyer, 1979). Subsequent work has shown that psychotherapeutic interventions aimed at cognitive modification of the attributional style can be effective in alleviating depression symptoms (Seligman et al., 1988). The early research also revealed a connection between attributional style, cognition, and motivation (Weiner, 1985). Internal attribution of negative events was found to suppress motivation (Anderson, 1983) and these results sparked the next wave of studies that explored the importance of attributional style across different domains of human activity: education, athletic performance, workplace teams, organizational leadership, and consumer behavior among them (Bellu & Sherman, 1995; Welbourne et al., 2007). A study of college athlete performance showed that optimistic attributional style, which attributes negative outcomes to external, unstable causes, is associated with higher performance (Gordon, 2008). A study of stress and job satisfaction among nurses demonstrated that optimistic attributional style is positively associated with higher satisfaction and lower stress levels (Welbourne et al., 2007). An examination of attributional style among financial services sales personnel revealed that optimistic attributional style was associated with significantly higher productivity (Corr & Gray, 1996). These results demonstrate that attributional patterns play a role across a broad spectrum of human activities.

Researchers in clinical psychology examined the original concept of attributional style across three dimensions: internality/externality, globality, and stability (Peterson et al., 1982). Internality/externality refers to the individual perception of causal influence over the outcomes either to oneself or to external causes. Globality refers to the individual perception of causal responsibility for outcomes being always present across different contexts. Stability refers to the individual perception of how stable/unstable the causes of events are. Further, the original concept of attributional style distinguished attributions related to positive events versus attributions related to negative events (Peterson et al., 1982). The pessimistic (internal, global, and stable) attributional style associated with negative events is highly predictive of clinical depression (Sweeney, Anderson, & Bailey, 1986).

While the original concept of attributional style examined aggregate measures, more recent studies showed that the dimensions are independent and have distinct empirical effects (Hewitt, Foxcroft, & MacDonald, 2004; Higgins, Zumbo, & Hay, 1999). Notably, the internal versus external attribution of negative events has been found to be predictive of performance across different domains: educational outcomes (Peterson & Barrett, 1987), performance among salesmen (Corr & Gray, 1996), and success among entrepreneurs (Bellu & Sherman, 1995). Further, while the initial studies on attributional style had focused on general attributions related to life events, the subsequent studies of attributional style in specific areas of human function have always focused on domain-specific attributional styles (Ashforth & Fugate, 2006; Proudfoot et al., 2001). For example, a study of athlete performance focused on how athletes interpret losing in competition (Gordon, 2008) and a study of medical personnel evaluated how nurses ascribe causality to negative events at work (Welbourne et al., 2007). Given that our research objective is to understand the relationship between individual IT-related attributional style and the intention to participate in optional technology training, we focus on a context specific attributional style. In the next section, we review prior research that has shown that people often treat information technology as an anthropomorphic agent and we develop the conceptualization for the IT-related attributional style focusing on the attributions related to negative IT-related events.

It-related attributional style

Following prior definitions of general attributional style (Proudfoot et al., 2009), we define the IT-related attributional style as a trait-like characteristic way that describes how people attribute causes of IT-related events. Given that, prior research emphasizes the predictive value of attributional style related to negative events (Proudfoot et al., 2001), we focus specifically on how people ascribe causes to IT-related failures.

To the best of our knowledge, all prior studies on attributional style have focused on the distinction between internal and external causal attribution without further investigating how different external attributions may affect cognitions, attitudes, and behaviors. Research in information systems and computer science has noted that people often treat IT artifacts as social agents (Reeves & Nass, 1996). A series of experiments have revealed that people can mindlessly apply social rules and expectations to computers, such as gender and ethnical stereotypes. People also exhibit social behaviors toward computers, for example, politeness and reciprocity. Further, people can develop perceptions of a computer "personality" (Nass & Moon, 2000). Computer users can assign moral characteristics to computer systems (Magee & Kalyanaraman, 2010) and they may experience grief and loss when computers crash (Ruzich, 2008). Incorporation of appearance or functional elements in information technology artifacts, which endow the artifacts with human-like appearance and function, for example, speech, has profound effects on how people react to technology (Bickmore & Cassell, 1999). Experiments with recommendation agents have shown that addition of human-like imagery and voice functionality increases perceived enjoyment and trust toward the system (Qiu & Benbasat, 2009).

While the IT artifacts can be perceived to possess many human-like qualities and elicit social reactions, IT artifacts are clearly distinct from external human agents who may be ascribed responsibility for technology-related failures. Therefore, we expand the original conceptualization of the internal/external dimension of attribution style to include three potential causal loci: oneself, other people and IT artifacts. In other words, given a situation involving an IT-related failure, people will seek to make sense of the causes to avoid similar failures in the future. Modern organizations commonly rely on information technology to share information and coordinate processes across the organizations. We expect that information workers have ample of opportunities to encounter various technology-related problems during their tenure. Consequently, we expect that employees develop stable attributional patterns of IT-related problems and we expect to find stable attributions of IT-related failures by users to either themselves, other people, or the IT artifacts, across different contexts involving IT-related failures.

The effects of IT-related attributional style in voluntary training

Weiner argued that causal attribution tendencies shape perceptions and motivations (Weiner, 1980, 1985). Prior

research has established attributional style as an important predictor of human behaviors across different domains: athletic performance, academic achievement, and workplace productivity among them (Bridges, 2001; Martin-Krumm, Sarrazin, Peterson, & Famose, 2003; Peterson & Barrett, 1987). Our interest is in examining how IT-related attribution style may affect the intention to participate in voluntary training associated with a mandatory ERP system implementation. Causal attribution reflects the perceived locus of causality, which affects motivation (Weiner, 1985). Internal attributional style reflects a perception of responsibility for the outcomes. Prior research shows that internal attribution is associated with proactive behaviors. This effect has been demonstrated for students, athletes, and employees (Hanrahan & Cerin, 2009; Peterson & Barrett, 1987; Seligman & Schulman, 1986).

Participation in training on a new system affords employees an opportunity to learn the system and possibly avoid/prevent IT-related failures. In agreement with the effects of internal attributions seen in other contexts, we expect that the tendency to ascribe causal responsibility for IT-related failures to oneself will be positively associated with the intention to participate in voluntary training.

H1. The propensity to blame oneself for IT-related problems is positively related to the intention to participate in optional training.

The corollary hypotheses relating the tendency to ascribe causality to external factors and active engagement in solving the problems follow from the arguments provided in the preceding text. External attributions reflect perceptions of causality laying outside the individual and therefore individuals are less motivated to take initiative in resolving problems. We expect that the propensity to ascribe the causal role for IT-related problems to either other people and/or IT artifacts will be negatively related to the intention to participate in optional training.

H2a. The propensity to blame others for IT-related problems is negatively related to the intention to participate in optional training.

H2b. The propensity to blame information technology for IT-related problems is negatively related to the intention to participate in optional training.

While there was been a substantial body of work on the connection between the attributional style and motivation, much less is known about the effects of attributional style on attitudes and perceptions. Perceived training quality has been previously shown to be an important predictor of system adoption intention (Quinzio et al., 2003) and it is likely an important predictor of the intention to participate in voluntary training. To understand how external IT-related attributional style will affect anticipated quality of training, we draw on cognitive dissonance theory, which posits that people feel uncomfortable holding conflicting beliefs and will seek to resolve the conflict by revising what they believe to avoid conflicting notions (Festinger, 1962). We expect that an external attribution style for IT-related problems provides a cognitive blueprint that would be inconsistent with perceptions of high quality of training because the training offers an opportunity for the individual to learn about the system, but external attribution tendencies indicate a cognitive pattern suggesting there is little the person can do about IT-related problems. Hence, perceptions of high training quality and the tendency to ascribe causality for IT-related problems to external factors would be inconsistent with each other. The IT-related attributional style develops over a relatively long period of time involving employee interactions with computer technology and it represents a stable mental schema. By comparison, the perception of training quality would represent a transient cognition which would be revised if it is incompatible with the general perception of the causal loci associated with IT-related problems. Therefore, we expect that an external IT-related attributional style will negatively affect perceptions of anticipated quality of training to avoid the experience of cognitive dissonance.

H3a. The propensity to blame others for IT-related problems is negatively related to the anticipated quality of training.

H3b. The propensity to blame information technology for IT-related problems is negatively related to the anticipated quality of training.

Although, to the best of our knowledge, the direct relationship between perceived quality of training and the intention to participate in voluntary training has not been previously demonstrated in research, the relationship between perceived quality and behavioral intention is firmly established in information systems. The relationships between perceived system quality and adoption intention is the central tenet of the Model of Information Systems Success (Delone & McLean, 2003; DeLone & McLean, 1992) and it has been affirmed in many studies (Petter & McLean, 2009). A study of online learning has also shown that perceived quality of training is a predictor of system adoption intention (Quinzio et al., 2003). We expect to find a strong

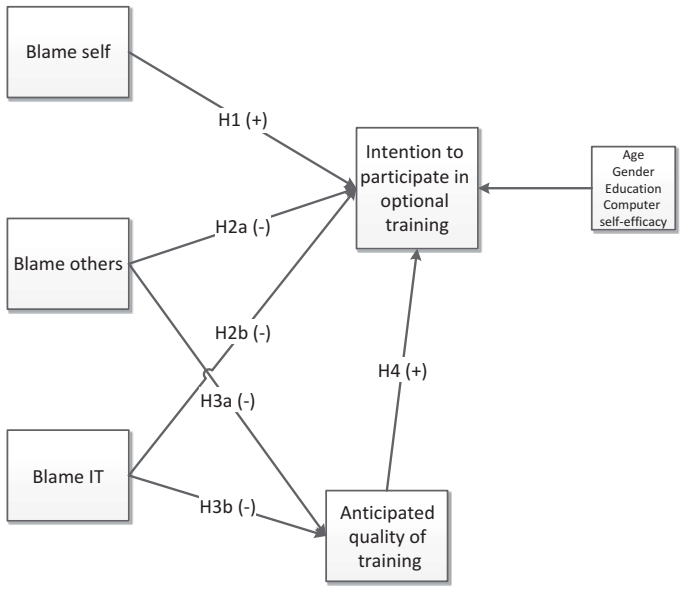

Fig. 1. Research model.

positive relationship between perceived training quality and the intention to participate in voluntary training.

H4. The anticipated quality of training will be positively related to the intention to participate in optional training.

The research model is summarized in Figure 1 below. In addition to the core hypotheses in our model, we also include age, gender, education, and computer self-efficacy as covariates of the behavioral intention to participate in voluntary training.

Methodology

Research context

A new ERP system implementation at a large public university in the Northeastern United States provides the context for our study. ERP systems play a central role in the organizational coordination of educational institutions and they account for at least $600 million in annual spending (Hoovers, 2015; Straumsheim, 2013). Because ERP system implementations occasionally trigger lawsuits, we do not provide further information about the university or the vendor. The adoption of the new system was mandatory, but the system training sessions were optional. This context provided an ideal opportunity to examine our research questions. The use of voluntary training in cases of mandatory ERP system adoption is not unique in practice. Both authors work at large public universities that have recently transitioned to new ERP systems that were different across the two universities. In both cases, the new ERP system training was voluntary. In the case of the ERP system that was the focus of this study, the system is a university-wide system that is used for *all* processes.

We utilized an online survey to collect the data for our study. The data were collected in the period of 2 months prior to the ERP system rollout and before voluntary training sessions were available. We recruited voluntary participants via an announcement to the campus mailing list, which included all faculty and staff. The announcement included a brief description of the study and a link to a survey hosted on Qualtrics, a commercial survey platform.

It is important to note that while administrators and staff were obvious users of the university-wide ERP system in our study, the system was designed in such a way that faculty members were equally dependent on its use for all of their work. The ERP system became the only way for faculty to access course rosters, to submit grades, to submit travel authorization requests or expense reports for conference travel, to maintain their human resources personnel records, to access student advising information, and just about every other aspect of a faculty member's daily work. Therefore, the impact of IT attributional style on whether users attended the voluntary training sessions and their perceptions of it is important for all participants in our study.

Measurement

A measure of IT-related failure attributional style was developed for this study. We followed prior studies on domain-specific attributional style in developing the

Table 2. Common IT-related problems.

1	The employee is unable to connect to the internet at work.
2	The employee computer at work keeps freezing up.
3	The employee is unable to access her email account at work.
4	The employee is unable to access a web site at work.

measure (Ashforth & Fugate, 2006; Proudfoot et al., 2001). In the first step, before administering the main survey, we developed a list of typical IT-related problems, which employees may encounter in the organizational context by discussing common IT-related problems with seven employees and identifying the most commonly encountered problems. Our final list of the most frequently encountered IT-related problems is shown in Table 2.

Following prior research on attributional style measurement (Gordon, 2008; Proudfoot et al., 2001), the survey instructed the study participants to vividly imagine themselves experiencing each of the problems on the list and for each of the problems to indicate a likely cause and then to indicate to what extent the problem was due to something about them, due to something about other people, or due to something about technology using 0–100 slider scales for each possible causal locus.

The measure of training quality is adopted from (Gupta & Bostrom, 2012). The measure of the intention to participate in voluntary training was developed for this study. We used a single item 7-point Likert measure "I intend to take part in the voluntary ERP training sessions" anchored in 1—strongly disagree and 7—strongly agree. The use of the single-item measure is appropriate when the measure reflects a simple fact, as is the case for our measure of the intention to participate in training (Wanous, Reichers, & Hudy, 1997). We used the computer self-efficacy measure developed and validated by Compeau and Higgins (1995). The details for the individual scales are provided in the Appendix.

Results

As a first step in our analysis, we evaluated the distributions of the data. The Kolmogorov–Smirnov and Shapiro–Wilk tests for normality showed that none of the measurements in our model were normally distributed. Examination of the histograms and Q-Q plots revealed severe deviations from normality for most of the measurements. Covariance-based structural equation modeling (CB-SEM) techniques assume multivariate normal distribution of the data (Hair, Ringle, & Sarstedt, 2011), while component-based structural equation modeling techniques, such as Partial Least Squares (PLS), do not impose such assumptions. Because of the normality violations in our data and because the goal of our study is prediction (Gefen, Rigdon, & Straub, 2011), we employed PLS for data analysis in our study. We used SmartPLS version 3 software to evaluate our research model. PLS offers the advantages of robust latent construct model analysis with non-normally distributed data and relatively small samples (Ringle & Sarstedt, 2012).

Common method variance

Common method variance (CMV) is a common concern in survey-based research (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). To assess the degree of CMV in the current study, we conducted a partial correlation test following Lindel and Whitney (2001). We used the second smallest positive correlation among measurement items (0.01) as a proxy for CMV to adjust the correlations between the principal constructs. The adjusted correlations were only slightly lower than the unadjusted correlations and their levels of significance did not change. These results suggest that CMV is unlikely to have spuriously inflated the relationships among the constructs in our study (Lindell & Whitney, 2001).

Measurement model

As the first step in our analysis, we evaluated the convergent, discriminant validity and reliability of the survey instrument in the present study. We assessed convergent validity by evaluating item cross-loadings on constructs in the research model. The results are shown in Table 3. Individual survey items have loadings above 0.7 on the respective constructs. The loadings on the respective constructs exceed loadings on other constructs in the model indicating good convergent validity. Discriminant validity was assessed by comparing interconstruct correlations with the square root of average variance extracted (AVE) for the respective constructs. The data are shown in Table 3. The AVE is above 0.7 for all constructs and the square root of AVE is greater than the correlation coefficients among the constructs, indicating appropriate discriminant validity. Construct measurement reliability was assessed using composite reliability and Cronbach's alpha scores. The data are provided in Table 4. All values for composite reliability and Cronbach's alpha are above the generally accepted threshold of 0.70.

Structural model

We assessed the hypotheses in our research model by evaluating the structural model using PLS. R^2 values of the dependent variables reflect variance explained for

Table 3. PLS loadings and cross-loadings.

	Blame self	Blame others	Blame IT	Perceived quality of training	Intention to participate in training	Computer self-efficacy
BlameSlf1	**0.826**	0.006	0.163	−0.030	0.298	−0.468
BlameSlf2	**0.765**	0.041	−0.173	0.250	0.097	−0.173
BlameSlf3	**0.810**	−0.162	0.100	−0.169	0.243	0.046
BlameOth1	−0.155	**0.811**	−0.677	0.356	−0.131	0.162
BlameOth2	−0.056	**0.916**	−0.586	0.474	−0.281	−0.099
BlameOth3	−0.061	**0.887**	−0.524	0.584	−0.257	−0.159
BlameIT1	0.010	−0.583	**0.812**	−0.209	0.034	−0.117
BlameIT2	0.220	−0.604	**0.947**	−0.347	0.189	−0.204
BlameIT3	−0.121	−0.380	**0.753**	0.067	0.189	−0.343
PQTrain_1	−0.099	0.560	−0.309	**0.975**	0.046	−0.170
PQTrain_2	−0.158	0.499	−0.253	**0.945**	0.039	−0.098
PQTrain_3	−0.095	0.489	−0.233	**0.976**	0.082	−0.189
PQTrain_4	−0.081	0.536	−0.412	**0.845**	0.037	−0.361
PlanTrain	0.333	−0.267	0.155	0.054	**1.000**	−0.204
CSE1	−0.217	−0.182	−0.153	−0.381	−0.030	**0.763**
CSE2	−0.264	0.009	−0.179	−0.207	−0.215	**0.926**
CSE3	−0.198	−0.131	−0.186	−0.140	−0.164	**0.857**

Table 4. Descriptive statistics, measurement reliability, interconstruct correlations, and square root of AVEs (in the diagonal).

	Mean	SD	CA	CR	1	2	3	4	5	6
1. Blame self	7.26	9.28	0.76	0.75	0.86					
2. Blame others	37.85	29.20	0.85	0.91	−0.09	0.87				
3. Blame IT	65.98	24.94	0.78	0.82	0.16	−0.66	0.85			
4. Perceived quality of training	4.06	1.62	0.95	0.97	−0.12	0.56	−0.32	0.94		
5. Intention to participate in training	4.53	0.50	na	na	0.33	−0.27	0.16	0.05	n/a	
6. Self-efficacy	2.90	1.12	0.83	0.72	−0.26	−0.07	−0.20	−0.22	−0.20	0.85

SD: standard deviation; CA: Cronbach's alpha; CR: composite reliability.

the respective constructs. Statistical significance of the standardized path coefficients in the model was assessed through a bootstrapping resampling technique.

The propensity to blame oneself for technology related problems *(Blame Self)* was positively correlated with the intention to participate in optional training ($\beta = 0.26$, $p < 0.01$). The propensity to blame others (*Blame Others*) for technology-related failures is strongly positively correlated with the anticipated quality of training ($\beta = 0.61$, $p < 0.001$) and it is strongly negatively correlated with the intention to participate in optional training ($\beta = -0.64$, $p < 0.001$). The tendency to blame information technology (*Blame IT*) was not statistically significantly correlated with the *anticipated quality of training*, but it was negatively correlated with the intention to participate in optional training ($\beta = -0.27$, $p < 0.01$). The anticipated quality of training was positively correlated with the intention to participate in the optional training ($\beta = 0.33$, $p < 0.001$). Among the covariates in the model, gender was significantly correlated with the intention to participate in optional training ($\beta = 0.21$, $p < 0.01$). Women were more likely to take part in the training. Computer self-efficacy was significantly negatively correlated with the intention to participate in training ($\beta = -0.15$, $p < 0.05$). We found no significant effect for the campus role (faculty or staff) in our model.

To assess the mediation effects of the anticipated quality of training, we followed the recommendations in Hair, Hult, Ringle, and Sarstedt (2016) and we compared the structural models with and without the mediation effect. Introduction of the mediation had only minor effects on the direct paths between the attributional tendencies and the intention to participate in optional training. These results confirmed the complementary partial mediation role of the anticipated quality of training in our model. Figure 2 summarizes the results.

Discussion

In this study, we focused on understanding how individual employee characteristics affect the intention to participate in voluntary system training associated with a mandated system adoption. Specifically, we examined how the individual attributional style for information technology-related problems affects the intention to participate in voluntary training. Recognizing that people often treat information technology artifacts as social agents, we extended the internal/external dimension of attributional style to include three potential causal loci associated with IT-related problems: oneself, other people, and information technology. Drawing on attribution theory, we hypothesized a positive relationship between internal (self) IT-related attributional style and the intention to participate in voluntary training, and a negative relationship between external IT-related attributional style (other people or information technology) and the intention to participate in voluntary

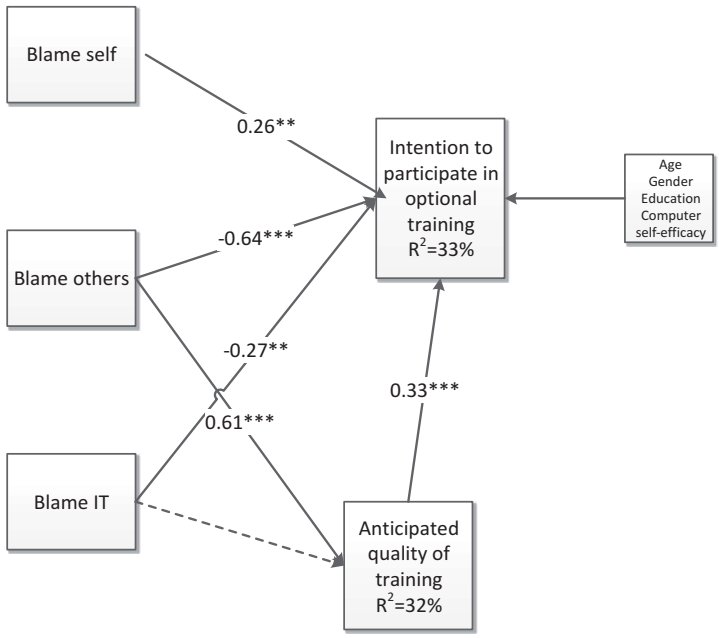

Fig. 2. PLS structural model analysis.
***significant at $p < 0.001$, **significant at $p < 0.01$.

training. The results provide support for hypotheses H1, H2a, and H2b. These results lend support for the predictive value of IT-related attributional style in voluntary technology training contexts. In other words, individual employee tendencies to ascribe causality for IT-related problems to either oneself, others or IT are highly predictive of the individual intention to participate in voluntary training—these factors explain 33% of variance in the intention participate in voluntary training in our study. We find a particularly strong negative correlation between the tendency to blame others for IT-related problems and the intention to participate in training ($\beta = -0.67$, $p < 0.001$).

We also examined the effects of the internal/external dimensions of IT-related attributional style on the anticipated quality of training. Contrary to our expectations, we found a strong positive relationship between the propensity to blame others and the anticipated quality of training (H3a) and no support for a significant relationship between the propensity to blame information technology for IT-related problems and the anticipated quality of training (H3b). In other words, we find that individual tendency to ascribe IT-related problems to others is strongly positively associated to anticipated quality of training ($\beta = 0.62$, $p < 0.001$), yet it is strongly negatively associated with the intention to participate in training. This is an unexpected result that merits further inquiry. Lastly, we find support for the hypothesized (H4) positive relationship between the perceived quality of training and the intention to participate in voluntary training ($\beta = 0.38$, $p < 0.001$).

Contributions

Our study makes a number of contributions to theory and practice. First, we develop the concept of IT-related attributional style. Recognizing that people often treat IT artifacts as social agents, we extend the conceptualization of internal/external dimension in attribution research to distinguish potential attribution of causality for IT-related problems to oneself, others, or IT artifacts. Our results show that people are much more likely to blame IT-related problems on IT itself (average 66 ± 24) versus self (average 6.8 ± 9.3) or others (average 37.8 ± 29.2). Our results also show that the three causal attribution propensities (self, others, and information technology) have differential effects on the intention to participate in voluntary training. Consistent with our predictions, individual tendency to ascribe causal responsibility for IT-related problems to oneself is positively associated with the intention to participate in voluntary training and individual tendencies to blame other people or IT artifacts are strongly negatively associated with the intention to participate in voluntary training. In combination, these factors explain 33% of variance in the intention to participate

in training. To the best of our knowledge, this is the first study to examine the role of attributional style in technology training and adoption. Attributional style has been shown to play an important role in academic achievement, sports, and employee productivity (Martin-Krumm et al., 2003; Peterson & Barrett, 1987; Proudfoot et al., 2009). We build on prior research, which emphasizes the significance of individual traits (McElroy & Hendrickson, 2007; Thatcher & Perrewe, 2002) and cultural values (Srite & Karahanna, 2006) in technology adoption and we add IT-related attributional style as an important consideration. IT-related attributional style may also be relevant in the broader research stream focusing of employee job satisfaction and retention where studies have already highlighted the importance of individual personality characteristics (Eckhardt, Laumer, Maier, & Weitzel, 2016; Lounsbury, Moffitt, Gibson, Drost, & Stevens, 2007).

Our study also extends the diversity of contexts in technology adoption research. While much of the prior research has focused on voluntary technology adoption, there are fewer studies that examined factors affecting the success of mandated technology adoption (Venkatesh et al., 2007). To the best of our knowledge, no prior studies examined factors that can impact the intention to participate in voluntary training associated with mandated system adoption. Our results demonstrate the importance of individual employee characteristics in this context. Prior studies have examined the impact of normative control in system adoption and concluded that normative control can be counterproductive to system exploration and use (Ke et al., 2012). Voluntary training affords employees individual control over the decision to participate in training and practitioners have suggested that voluntary training may be more effective than mandated training (Dudhagundi, 2016; Marder, 2016). Our results show that employees develop different attributional styles for IT-related problems and these can impact the individual decision to participate in voluntary training. Our results suggest that a more nuanced view of the interplay between differential effects of normative and individual control with the individual employee attributional tendencies may be needed to understand participation in technology training. Prior research on attributional style in the organizational context has suggested that attributional style can be modified through training. An experimental study of financial services sales people showed that cognitive-behavioral training can be used to promote positive attributional style and enhance productivity (Proudfoot et al., 2009). This offers a further opportunity for practice to examine the effects of IT-related attributional style modification efforts on training participation and technology adoption.

Limitations and opportunities for future research

No research is without limitations and this study is no exception. The following points should be considered in evaluating the results presented here. First, the present study relies on a cross-sectional survey methodology to evaluate the relationships among the theoretical constructs. While the proposed relationships are grounded in theory and prior empirical evidence, the cross-sectional nature of the study precludes definitive claims of causality in the model. Such claims will require experimental evaluation. Further, while we exerted much effort to procure a representative sample, participation in our study was voluntary and thus there could be a self-selection bias in our sample. A further limitation of our study is the relatively small sample size—we were able to obtain only 78 usable responses.

Our study provides many opportunities for further search. For example, recent studies in mandated ERP adoption have highlighted user resistance as one of the key challenges in attaining organizational objectives (Choudrie & Zamani, 2016; Laumer et al., 2016). Choudri and Zamani (2016) proposed that individual personality characteristics influence the degree of individual user resistance. The proposed model offers an opportunity to examine the relationship between the IT-attributional style and individual user resistance to IT. Task complexity commonly performed by the individual ERP system users could be another important variable that could be examined in future research.

We see yet another potential avenue for further research in the examination of the role of IT-attributional style in the migration of computing services to cloud infrastructure. The introduction of cloud services diminishes the role of local IT support personnel thus offering less of an opportunity for technology users to blame other humans for any potential failures (Schneider & Sunyaev, 2016). We would expect that individual propensity to blame information technology for negative technology-related events would have even higher explanatory value in predicting the intention to participate in voluntary training when there are few if any other humans to ascribe the blame to. With a similar rationale, we would expect that the effects of the individual IT-attributional style would also play an important role in the adoption of automated systems that are replacing humans in many contexts, for example, automated investment advisers, robotics, and self-driving cars.

Conclusion

Attributional style has been established as an important predictor of individual motivations and behaviors across a broad range of human activities: academic achievement,

athletic success, and workplace productivity among them. Drawing on the attribution theory, we developed the concept of IT-related attributional style, which reflects general individual tendency for people to ascribe causality for IT-related failures to either oneself, other people, or information technology. We examined the effects of IT-related attributional style on the individual employee intention to participate in voluntary system training associated with a new ERP system rollout in an educational institution. We find that attribution style is highly predictive of individual intention to participate in voluntary training, thus highlighting the importance of this trait-like characteristic in technology adoption and providing the foundation for further research on the role of IT-related attribution style in other technology adoption and use contexts.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Stanislav Mamonov is an Assistant Professor in the Information Management & Business Analytics Department at the Feliciano Business School, Montclair State University. He received a Ph.D. in Information Systems from the Zicklin School of Business, Baruch College, City University of New York (CUNY). His research focuses on the strategic value of information assets, applied predictive analytics and information privacy related topics. His research has been published in *Communications of the Association of Information Systems, Journal of Information Privacy and Security, International Journal of Electronic Commerce, Computers in Human Behavior*, and *International Journal of Information Management* among other journals.

Marios Koufaris is a Professor in the Paul H Cook Department of Information Systems and Statistics at the Zicklin School of Business of Baruch College, CUNY. He received a PhD in Information Systems from the Stern School of Business, New York University. His research focuses mainly on the determinants of user beliefs, attitudes, and behavior in different contexts. His work has been published in multiple journals, including *Information Systems Research, MIS Quarterly, European Journal of Information Systems, Journal of Management Information Systems, International Journal of Electronic Commerce*, and *Information & Management.*

References

Aloini, D., Dulmin, R., & Mininno, V. (2007). Risk management in ERP project introduction: Review of the literature. *Information & Management*, *44*(6), 547–567.

Amoako-Gyampah, K., & Salam, A. F. (2004). An extension of the technology acceptance model in an ERP implementation environment. *Information & Management*, *41*(6), 731–745.

Anderson, C. A. (1983). Motivational and performance deficits in interpersonal settings: The effect of attributional style. *Journal of Personality and Social Psychology*, *45*(5), 1136.

Ashforth, B. E., & Fugate, M. (2006). Style in work settings: Development of a measure. *Journal of Leadership and Organizational Studies*, *12*(3), 12–29.

Barker, T., & Frolick, M. N. (2003). ERP implementation failure: A case study. *Information Systems Management*, *20*(4), 43–49.

Bellu, R. R., & Sherman, H. (1995). Predicting firm success from task motivation and attributional style: A longitudinal study. *Entrepreneurship & Regional Development*, *7*(4), 349–364.

Benamati, J., & Lederer, A. (2001). Rapid information technology change, coping mechanisms, and the emerging technologies group. *Journal of Management Information Systems*, *17*(4), 183–202.

Bickmore, T., & Cassell, J. (1999). Small talk and conversational storytelling in embodied conversational interface agents. *AAAI Fall Symposium on Narrative Intelligence*, 87–92.

Bridges, K. R. (2001). Using attributional style to predict academic performance: How does it compare to traditional methods? *Personality and Individual Differences*, *31*(5), 723–730.

Brown, S. A., Massey, A. P., Montoya-Weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems*, *11*(4), 283–295.

Chou, H. W., Chang, H. H., Lin, Y. H., & Chou, S. B. (2014). Drivers and effects of post-implementation learning on ERP usage. *Computers in Human Behavior*, *35*(June), 267–277.

Choudrie, J., & Zamani, E. D. (2016). Understanding individual user resistance and workarounds of enterprise social networks: The case of Service Ltd. *Journal of Information Technology*, *31*(2), 130–151.

Compeau, D., & Higgins, C. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, *19*(2), 189–212.

Corr, P., & Gray, J. (1996). Attributional style as a personality factor in insurance sales performance in the UK. *Journal of Occupational and Organizational Psychology*, *69*(1), 83–87.

Coulson, T., Shayo, C., Olfman, L., & Rohm, C. (2003). ERP training strategies: Conceptual training and the formation of accurate mental models. *Proceedings of the 2003 SIGMIS Conference*, 87–97.

Davis, D., & Davis, D. (1990). The effect of training techniques and personal characteristics on training end users of information systems. *Journal of Management Information Systems*, *7*(2), 93–110.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Davis, S. A., & Bostrom, R. P. (1993). Training end users - an experimental investigation of the roles of the computer-interface and training methods. *MISQ Quarterly*, *17*(1), 61–85.

Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95.

Dezdar, S., & Ainin, S. (2011). The influence of organizational factors on successful ERP implementation. *Management Decision*, *49*(6), 911–926.

Dudhagundi, D. (2016). End-User Training (EUT) – An option or a must for successful ERP implementation? Retrieved from http://blog.commlabindia.com/training-solutions/erp-end-user-training

Eckhardt, A., Laumer, S., Maier, C., & Weitzel, T. (2016). The effect of personality on IT personnel's job-related attitudes: Establishing a dispositional model of turnover intention across IT job types. *Journal of Information Technology*, *31*(1), 48–66.

Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Palo Alto, CA: Stanford University Press.

Gargeya, V. B., & Brady, C. (2005). Success and failure factors of adopting SAP in ERP system implementation. *Business Process Management Journal*, *11*(5), 501–516.

Gefen, D., Rigdon, E. E., & Straub, D. (2011). An update and extension to SEM guidelines for administrative and social science research. *MIS Quarterly*, *35*(2), iii–xiv.

Ghosh, R. (2012). A comprehensive study on ERP failures stressing on reluctance to change as a cause of failure. *Journal of Marketing and Management*, *3*(1), 123.

Gordon, R. A. (2008). Attributional style and athletic performance: Strategic optimism and defensive pessimism. *Psychology of Sport and Exercise*, *9*(3), 336–350.

GrandView. (2015). *ERP software market analysis by deployment*. San Francisco, CA: GrandView.

Gravill, J., & Compeau, D. (2008). Self-regulated learning strategies and software training. *Information and Management*, *45*(5), 288–296.

Gupta, S., & Bostrom, R. (2012). An investigation of the appropriation of technology-mediated training methods incorporating enactive and collaborative learning. *Information Systems Research*, *24*(2), 454–469.

Hair, J. F., ., Jr, Hult, G., Ringle, T. M. C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice*, *19*(2), 139–152.

Hanrahan, S. J., & Cerin, E. (2009). Gender, level of participation, and type of sport: Differences in achievement goal orientation and attributional style. *Journal of Science and Medicine in Sport*, *12*(4), 508–512.

Heider, F. (1958). *The psychology of interpersonal relations*. New York, NY: Wiley.

Heider, F. (2013). *The psychology of interpersonal relations*. London, UK: Psychology Press.

Hess, T. (2009). Journal of the association for information systems designing interfaces with social presence: Using vividness and extraversion to create social recommendation agents. *Journal of the Association for Information Systems*, *10*(12), 889–919.

Hewitt, A. K., Foxcroft, D. R., & MacDonald, J. (2004). Multitrait-multimethod confirmatory factor analysis of the attributional style questionnaire. *Personality and Individual Differences*, *37*(7), 1483–1491.

Higgins, N. C., Zumbo, B. D., & Hay, J. L. (1999). Construct validity of attributional style: Modeling context-dependent item sets in the Attributional Style Questionnaire. *Educational and Psychological Measurement*, *59*(5), 804–820.

Hitt, L., Wu, D., & Zhou, X. (2002). Investment in enterprise resource planning: Business impact and productivity measures. *Journal of Management Information Systems*, *19*(1), 71–98.

Hoovers. (2015). *ELLUCIAN INC. Revenue and Financial Data*. Austin, TX: ELLUCIAN INC. Revenue and Financial Data. Retrieved from.

Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. (1997). Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, *21*(3), 279–305.

Ke, W., Tan, C.-H., Sia, C.-L., & Wei, -K.-K. (2012). Inducing intrinsic motivation to explore the enterprise system: The supremacy of organizational levers. *Journal of Management Information Systems*, *29*(3), 257–290.

Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist*, *28*(2), 107–128.

Kelley, H. H., & Michela, J. (1980). Attribution theory and research. *Annual Review of Psychology*, *31*, 457–501.

Khoumbati, K., Themistocleous, M., & Irani, Z. (2006). Evaluating the adoption of enterprise application integration in health-care organizations. *Journal of Management Information Systems*, *22*(4), 69–108.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, *43*(6), 740–755.

Laumer, S., Maier, C., Eckhardt, A., & Weitzel, T. (2016). User personality and resistance to mandatory information systems in organizations: A theoretical model and empirical test of dispositional resistance to change. *Journal of Information Technology*, *31*(1), 67–82.

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, *40*(3), 191–204.

Lim, E. T. K., Pan, S. L., & Tan, C. W. (2005). Managing user acceptance towards enterprise resource planning (ERP) systems – Understanding the dissonance between user expectations and managerial policies. *European Journal of Information Systems*, *14*(2), 135–149.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, *86*(1), 114.

Lounsbury, J. W., Moffitt, L., Gibson, L. W., Drost, A. W., & Stevens, M. (2007). An investigation of personality traits in relation to job and career satisfaction of information technology professionals. *Journal of Information Technology*, *22*(2), 174–183.

Magee, R. G., & Kalyanaraman, S. (2010). The perceived moral qualities of web sites: Implications for persuasion processes in human-computer interaction. *Ethics and Information Technology*, *12*(2), 109–125.

Marder, A. (2016). Five steps to avoid ERP failure. Retrieved from https://blog.capterra.com/steps-to-avoid-erp-failure/

Martin-Krumm, C. P., Sarrazin, P. G., Peterson, C., & Famose, J.-P. (2003). Explanatory style and resilience after sports failure. *Personality and Individual Differences*, *35*(7), 1685–1695.

McElroy, J., & Hendrickson, A. (2007). Dispositional factors in internet use: Personality versus cognitive style. *MIS Quarterly*, *31*(4), 809–820.

Nass, C., & Moon, Y. (2000). Machines and mindlessness: Social responses to computers. *Journal of Social Issues*, *56*(1), 81–103.

Nelson, R. R., & Cheney, P. H. (1987). Training end users - an exploratory-study. *MIS Quarterly*, *11*(4), 547–559.
Norman, P., Collins, S., Conner, M., Martin, R., & Rance, J. (1995). Attributions, cognitions, and coping styles: Teleworkers' reactions to work-related problems. *Journal of Applied Social Psychology*, *25*(2), 117–128.
Peterson, C., & Barrett, L. C. (1987). Explanatory style and academic performance among university freshman. *Journal of Personality and Social Psychology*, *53*(3), 603.
Peterson, C., Semmel, A., Von Baeyer, C., Abramson, L. Y., Metalsky, G. I., & Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research*, *6*(3), 287–299.
Petter, S., & McLean, E. R. (2009). A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management*, *46*(3), 159–166.
Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879.
Proudfoot, J. G., Corr, P. J., Guest, D. E., & Dunn, G. (2009). Cognitive-behavioural training to change attributional style improves employee well-being, job satisfaction, productivity, and turnover. *Personality and Individual Differences*, *46*(2), 147–153.
Proudfoot, J. G., Corr, P. J., Guest, D. E., & Gray, A. (2001). The development and evaluation of a scale to measure occupational attributional style in the financial services sector. *Personality and Individual Differences*, *30*(2), 259–270.
Qiu, L., & Benbasat, I. (2009). Evaluating anthropomorphic product recommendation agents: A social relationship perspective to designing information systems. *Journal of Management Information Systems*, *25*(4), 145–182.
Quinzio, L., Junger, A., Gottwald, B., Benson, M., Hartmann, B., Jost, A., … Hempelmann, G. (2003). User acceptance of an anaesthesia information management system. *European Journal of Anaesthesiology*, *20*(12), 967–972.
Reeves, B., & Nass, C. (1996). *How people treat computers, television, and new media like real people and places*. Cambridge, UK: CSLI Publications and Cambridge university press.
Ringle, C., & Sarstedt, M. (2012). A critical look at the use of pls-sem in mis quarterly. *MIS Quarterly*, *36*, 1.
Ruzich, C. M. (2008). Our deepest sympathy: An essay on computer crashes, grief, and loss. *Interaction Studies*, *9*(3), 504–517.
Sah, Y. J., & Peng, W. (2015). Effects of visual and linguistic anthropomorphic cues on social perception, self-awareness, and information disclosure in a health website. *Computers in Human Behavior*, *45*, 392–401.
Schneider, S., & Sunyaev, A. (2016). Determinant factors of cloud-sourcing decisions: Reflecting on the IT outsourcing literature in the era of cloud computing. *Journal of Information Technology*, *31*(1), 1–31.
Seligman, M. E., Abramson, L. Y., Semmel, A., & Von Baeyer, C. (1979). Depressive attributional style. *Journal of Abnormal Psychology*, *88*(3), 242.
Seligman, M. E., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., Ollove, M., & Downing, R. (1988). Explanatory style change during cognitive therapy for unipolar depression. *Journal of Abnormal Psychology*, *97*(1), 13.
Seligman, M. E., & Schulman, P. (1986). Explanatory style as a predictor of productivity and quitting among life insurance sales agents. *Journal of Personality and Social Psychology*, *50*(4), 832.
Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*, *30*(3), 679–704.
Straub, D. (2012). Does MIS have native theories? *MIS Quarterly*, *36*, 2.
Straumsheim, C. (2013). Workday enters SIS market. Retrieved from https://www.insidehighered.com/news/2013/09/11/workday-introduce-cloud-based-student-information-system-2014
Sweeney, P. D., Anderson, K., & Bailey, S. (1986). Attributional style in depression: A meta-analytic review. *Journal of Personality and Social Psychology*, *50*(5), 974.
Thatcher, J., & Perrewe, P. (2002). An empirical examination of individual traits as antecedents to computer anxiety and computer self-efficacy. *MIS Quarterly*, *26*(4), 381–396.
Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, *36*(1), 157–178.
Venkatesh, V., Venkatesh, V., Davis, F. D., Davis, F. D., Morris, M. G., & Morris, M. G. (2007). Dead or alive? the development, trajectory and future of technology adoption research. *Journal of the Association for Information Systems*, *8*(4), 267–286.
Venkatesh, & Speier. (1999). Computer technology training in the workplace: A longitudinal investigation of the effect of mood. *Organizational Behavior and Human Decision Processes*, *79*(1), 1–28.
Wagner, W. P., Najdawi, M. K., & Otto, J. (2000). An empirical investigation into the impact of ERP training on cross-functional education. *Journal of the Academy of Business Education*, *1*(January2000), 107. Retrieved from http://www.abe.villanova.edu/proc2000/n107.pdf
Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology*, *82*(2), 247.
Warkentin, M., & Beranek, P. M. (1999). Training to improve virtual team communication. *Information Systems Journal*, *9*(4), 271–289.
Weiner, B. (1974). *Achievement motivation and attribution theory*. New York, NY: General Learning Press.
Weiner, B. (1980). A cognitive (attribution)-emotion-action model of motivated behavior: An analysis of judgments of help-giving. *Journal of Personality and Social Psychology*, *39*(2), 186.
Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, *92*(4), 548.
Weiner, B. (2010). The development of an attribution-based theory of motivation: A history of ideas. *Educational Psychologist*, *45*(1), 28–36.
Welbourne, J. L., Eggerth, D., Hartley, T. A., Andrew, M. E., & Sanchez, F. (2007). Coping strategies in the workplace: Relationships with attributional style and job satisfaction. *Journal of Vocational Behavior*, *70*(2), 312–325.

Appendix

Survey instrument

Attributional style

The scale is modeled after (Gordon, 2008; Proudfoot et al., 2001).
Instructions:
Please try to vividly imagine yourself in the situations that follow. If such a situation happened to you, what would you feel would have caused it? Please answer questions about the possible causes.

You have been unable to connect to the internet at work.	
Please indicate below, the extent to which you believe that the cause of you being unable to connect to the internet is due to something about you, due to something about other people, or due to something about the technology.	
BlameSlf1	Due to me. 1–100 point slider.
BlameOth1	Due to other people. 1–100 point slider.
BlameIT1	Due to technology. 1–100 point slider.
You are unable to access your email account at work.	
Please indicate below, the extent to which you believe that the cause of you being unable to access your email account is due to something about you, due to something about other people, or due to something about the technology.	
BlameSlf2	Due to me. 1–100 point slider.
BlameOth2	Due to other people. 1–100 point slider.
BlameIT2	Due to technology. 1–100 point slider.
You are unable to access a web site at work.	
Please indicate below, the extent to which you believe that the cause of you being unable to access a web site is due to something about you, due to something about other people, or due to something about the technology.	
BlameSlf3	Due to me. 1–100 point slider.
BlameOth3	Due to other people. 1–100 point slider.
BlameIT3	Due to technology. 1–100 point slider.

Perceived quality of training

The scale is adapted from (Gupta & Bostrom, 2012).
How would you describe your expectations of CUNYFirst training on the scale below?

PQTrain_1	1—Inefficient, 7—Efficient
PQTrain_2	1—Uncoordinated, 7—Coordinated
PQTrain_3	1—Unfair, 7—Fair
PQTrain_4	1—Dissatisfying, 7—Satisfying

Computer self-efficacy

The scale is adapted from (Compeau & Higgins, 1995). It is a 7-point Likert scale anchored in 1—strongly disagree and 7—strongly agree.

CSE1	I could complete a task using a computer if there was no one around me to tell me what to do.
CSE2	I could complete a task using a computer even if there was not a lot of time to complete it.
CSE3	I could complete a task using a computer if I had just the built-in help facility for assistance.