2006

Mindfulness in the Domain of Information Systems

Nicholas Roberts
Clemson University, nhrober@CLEMSON.EDU

Jason Bennett Thatcher
Clemson University, jthatch@clemson.edu

Richard Klein
Clemson University, rklein@clemson.edu

Mindfulness in the Domain of Information Systems

Nicholas H. Roberts[1]
Ph.D. Student
Department of Management
College of Business and Behavioral Science
Clemson University
nhrober@clemson.edu

Jason Bennett Thatcher
Assistant Professor
Department of Management
College of Business and Behavioral Science
Clemson University
jthatch@clemson.edu

Richard Klein
Assistant Professor
Department of Management
College of Business and Behavioral Science
Clemson University
rklein@clemson.edu

[1] Please address correspondence to Nicholas Roberts, 101 Sirrine Hall, Clemson University, Clemson, SC 29634. Fax (864) 656-2015 Telephone (864) 656-3775 E-mail: nhrober@clemson.edu

Mindfulness in the Domain of Information Systems

Abstract

Although there are numerous explanations of why users behave in specific ways toward information technologies, recent work in social psychology suggests that holistic traits such as awareness and openness are potentially important explanatory variables in technology behavior theories. In this paper, we examine the multi-dimensional construct of mindfulness and its applicability to the domain of IS research. We discuss the theory of mindfulness as developed in the social psychology literature. Specifically, we adapt the notion of mindfulness and its dimensions – alertness to distinction, openness to novelty, orientation in the present, and awareness of multiple perspectives – to the domain of information systems. In doing so, we place mindfulness within the broader nomological net related to individual level decisions about information technology. Also, we present preliminary explanations for how mindfulness converges with and discriminates from existing constructs in the innovation diffusion literature. Finally, we present an initial domain-specific measure of mindfulness and outline a study designed to assess the psychometric properties of the proposed measure. Using data collected from 238 subjects with Internet Applications as the target technology, preliminary analysis indicates that the operational measures have acceptable psychometric properties and confirmatory factor analysis supports the proposed multi-dimensional structure. Implications for practice and research are offered.

Keywords: mindfulness, user behavior, IT use, instrument development

Mindfulness in the Domain of Information Systems

Introduction

Why, when, and how do individuals interact with information technology? Information systems researchers have proposed many answers to these questions. In doing so, numerous theoretical perspectives have been employed to investigate IT-use, such as expectation-confirmation theory (Oliver, 1980), theory of planned behavior (Ajzen, 1991), and the theory of reasoned action (Ajzen and Fishbein, 1973). Such perspectives are helpful in explaining intent to accept (Davis et al., 1989; Taylor and Todd, 1995) and continue using IT (Bhattacherjee, 2001), as well as post-adoption behaviors associated with IT (Jasperson et al., 2005). Recent work calls for the utilization of the concept of mindfulness in IS research (Butler and Gray, 2006; Fichman, 2004). In response, we conceptualize and operationalize individual-level mindfulness in the domain of information systems. Specifically, we ask, *what are the effects of mindfulness on behavior associated with IT-enabled work systems?* In exploring this question we adapt concepts of mindfulness (Langer, 1989), a well-established construct in the social psychology literature, to the domain of information systems.

Theoretical Background

Mindfulness refers to continuous scrutiny and refinement of expectations based on new experiences, appreciation of the subtleties of context, and identification of novel aspects of context that can improve foresight and functioning (Langer, 1989). When mindful, an individual experiences a heightened state of involvement or being in the present moment (Langer and Moldoveanu, 2000). A mindful individual interprets the world by continuously creating and using new categories to understand phenomenon (Langer, 1997). Mindlessness is the absence of

mindfulness (Sternberg, 2000). Individuals engaged in mindless behavior do not actively construct their environment; instead, these individuals respond to an already constructed environment (Chanowitz and Langer, 1980). Mindless activity does not imply the absence of all cognitive processing – just the absence of flexible cognitive processing (Langer et al., 1985). When individuals succumb to automatic thought processes and act mindlessly, they often miss vital information or a mind-expanding opportunity. Staying open to new experiences enables individuals to draw new distinctions and rethink old categories when encountering novel situations.

Scholars have investigated a variety of phenomena using the theoretical lens of mindfulness. For instance, researchers have found that mindfulness has a positive effect on learning and creative thinking (Langer, 1997; Langer and Piper, 1987). Individuals mindlessly apply social rules and expectations to computers, going so far as to demonstrate politeness and reciprocity toward computers (Nass and Moon, 2000). Work examining communications explores ways in which mindless and mindful behavior may possibly facilitate or inhibit socially relevant transactions (Burgoon et al., 2000). Specifically, although mindless acceptance of messages at face value can lead to negative consequences, multiple interpretations of these messages may help prepare for potentially invalid information (Schul et al., 1996). Finally, by creating an atmosphere of open-mindedness, engagement and flexibility, mindfulness has a significant effect on marital satisfaction (Burpee and Langer, 2005).

Mindfulness consists of four dimensions: alertness to distinction, openness to novelty, orientation in the present, and awareness of multiple perspectives (Langer, 1997). Alertness to distinction involves developing new ideas and ways of looking at things. Specifically, mindful individuals can distinguish how things are the same or different. Mindfulness also involves an

openness to novelty, i.e. the active pursuit of new and various kinds of stimuli. Orientation in the present refers to a heightened level of awareness and involvement in whatever particular situation an individual faces. Finally, mindful individuals invoke multiple perspectives and recognize that each perspective holds value. Thus, they are flexible and open-minded when approaching any particular situation. Figure 1 depicts the dimensions of mindfulness.

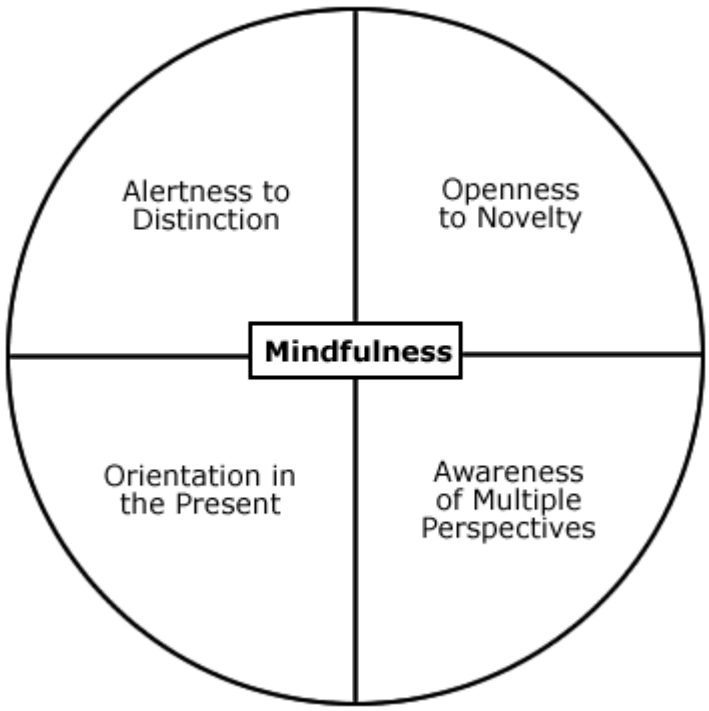

Figure 1. Dimensions of Mindfulness

The dimensions of mindfulness can each apply to the domains within IS. Alertness to distinction is defined as the degree to which an individual develops novel ideas and ways of looking at things. Specifically, individuals alert to distinction exhibit creativity in generating new and effective ideas. Just as mindlessness is the firm reliance on old or present categories, mindfulness is the continual creation of new ones (Langer, 1989). Interestingly enough, these

new categories become available for mindless use (Langer and Piper, 1987). Thus, a vicious cycle of mindful and mindless behavior exists around the concept of categorization.

A second dimension of mindfulness is openness to novelty, defined as the extent to which an individual explores and engages novel stimuli. Individuals open to novel ideas and ways of doing things are characterized by curiosity, experimentation, and openness to intellectually challenging ideas. Conceptually, curiosity overlaps with models of cognitive absorption (Agarwal and Karahanna, 2000). Within cognitive absorption, curiosity is defined as the extent to which a specific experience arouses an individual's sensory and cognitive curiosity (Malone, 1981). Cognitive absorption is also characterized by temporal dissociation and focused immersion, or a state of deep involvement with IT. While mindful individuals may be curious and open to novel experiences, they often do not lose track of time or their focus of stimuli outside the immediate IT or task at hand. Thus, dimensions central to cognitive absorption (e.g., temporal dissociation, focused immersion) do not constitute core elements of mindfulness.

Another closely related construct to openness to novelty is personal innovativeness in the domain of information technology (PIIT) (Agarwal and Prasad, 1998). Specifically, both PIIT and openness to novelty share aspects of mindfulness through the notion of experimentation. Yet there is a greater difference between the two constructs than overlap. PIIT is defined as "the willingness of an individual to try out any new information technology" (Agarwal and Prasad, 1998, p. 206). As innovators, individuals who score high on PIIT are also perceived as risk-takers. While mindful behavior is characterized as open to new ways of doing things, mindful individuals are not necessarily prone to risk. Rather, a mindful individual is sensitive to context (Langer and Moldoveanu, 2000). Thus, while such individuals are willing to explore and experiment with IT, they are also constantly aware of how their actions may lead to potential

consequences. Finally, PIIT is primarily concerned with the adoption of IT. While early adopters may be willing to try out new information technologies, we do not yet understand their behavior in post-adoption environments. However, when mindfulness drives IT use, theory suggests that it should influence individuals' perceptions and beliefs at all stages of an innovation's diffusion.

Orientation in the present is defined as the degree to which an individual becomes involved in any given situation. Sensitive to their context, mindful individuals attend to the "big picture" and stay aware of new developments. Consider software upgrades. Mindful individuals, potentially engaged and aware of new features of an application (Griffith, 1999), may selectively apply those new features in the optimal manner to the task at hand. Given mindful individuals' sensitivity to the context, their selection of upgrades to implement may vary from one context to another (Sternberg, 2000). Hence, when using IT in general, mindful people may seek to identify applications of information technologies germane to the specific task at hand. In doing so, we anticipate that they would be more likely to appropriately adapt technologies to a specific context and realize synergies derived from a good task-technology fit (Goodhue and Thompson, 1995).

A fourth dimension of mindfulness is awareness of multiple perspectives, which refers to the extent to which an individual can analyze a situation from multiple perspectives and identify the value of each. Processing information from diverse perspectives enables individuals to apply such information in new ways as well as alternative contexts (Chanowitz and Langer, 1980). Individuals who employ multiple perspectives possess the ability to create innovative solutions to problems and adapt their behavior to take advantage of shifting environments (Langer, 1989). Within the domain of IS, mindful individuals may create multiple uses of a specific application, even uses unintended by the original designer (Orlikowski et al., 1995). For instance, researchers

find that users often implement “workarounds” to achieve greater synergy between technology and task (Boudreau and Robey, 2005).

Operationalizing Mindfulness

Study Context and Sample

The approach taken to empirically test the psychometric properties of mindfulness was a field study using a survey methodology for data collection. We collected data from student subjects enrolled at a large state university. Given the nature of the sample, we chose Internet Applications as the target information technology. Internet Applications are defined as a suite of applications that support learning. Specifically, Internet Applications consist of the World Wide Web, Email, and Instant Messenger. Besides being widely used by students, these technologies are appropriate for at least two reasons: one, they are optional technologies that students use of their own accord and not from any mandate, and two, the technologies as a suite exemplify the characteristics of contemporary IT that underscore the importance of the concept of mindfulness. Finally, the technologies are widely available; thus, access is not an inhibitor to technology usage.

Students enrolled in upper-level undergraduate business classes were surveyed. Students were instructed to respond to the survey as candidly as possible, that there were no right or wrong answers, and that we were primarily interested in their use of Internet Applications. A total of 238 surveys were returned. Approximately 20% of our data was missing. To avoid the loss of a large fraction of the sample due to missing data, we implemented maximum likelihood imputation methods. Maximum likelihood methods have much better statistical properties than conventional methods (e.g., listwise deletion, pairwise deletion, and regression imputation) have

under considerably weaker assumptions (Allison, 2003). So long as data are not missing completely at random (MCAR; missing values on variable X are related to missing values on variables X), the data may be imputed without violating the assumption of MCAR (Allison, 2003). After testing to ensure that data are not MCAR, we imputed missing data using the direct maximum likelihood imputation method in EQS.

In order to establish alternate forms of construct validity for the measure, we identify a number of existing measures for related yet distinct constructs that demonstrate desirable psychometric properties. These measures include cognitive absorption (CA) (Agarwal and Karahanna, 2000) and personal innovativeness in the domain of information technology (PIIT) (Agarwal and Prasad, 1998). The conceptual distinctions among the measures were discussed earlier. Because these conceptual considerations would lead us to expect differences among the measures, the choice of CA and PIIT as alternate scales to assess convergent and discriminant validity is appropriate.

Data on mindfulness, CA, and PIIT were collected as part of a larger instrument that measured several other constructs. The items for all measures were distributed randomly throughout the instrument.

Content Validity

We operationalize mindfulness as a formative second-order construct that is made up of four reflective dimensions: alertness to distinction, openness to novelty, orientation in the present, and awareness of multiple perspectives. Development of the scale for mindfulness was initiated by adapting Langer's (2004) 21-item validated mindfulness scale. Sample items include, "I try to think of new ways of using Internet Applications" and "I have an open mind about new ways of using Internet Applications." Items comprising the scales for establishing validity were taken

from the literature; specifically, the 20-item cognitive absorption scale from Agarwal and Karahanna (2000) and the 4-item personal innovativeness in IT scale from Agarwal and Prasad (1998). All items were scored on a 1-7 Likert scale with "Strongly Disagree" and "Strongly Agree" as the two anchors for the end points of the scale, and "Neutral" was the anchor for the mid-point of the scale. Table 1 provides the number of items, means, and standard deviations for each construct.

Table 1. Descriptive Statistics

	# Items	Mean	Std. Dev.
1. MI: Alertness to Distinction	4	4.30	1.11
2. MI: Orientation in the Present	3	4.15	1.31
3. MI: Openness to Novelty	3	5.53	1.00
4. MI: Awareness of Multiple Perspectives	3	5.53	1.00
5. CA: Temporal Dissociation	5	5.54	1.30
6. CA: Focused Immersion	5	4.64	1.05
7. CA: Heightened Enjoyment	4	5.42	1.09
8. CA: Control	3	5.08	0.96
9. CA: Curiosity	3	4.82	1.17
10. Personal Innovativeness in IT	4	4.42	1.08

Analysis and Results

The analysis was performed with Visual PLS 1.04b. Partial Least Squares (PLS) allows for the specification of formative constructs (Barclay et al., 1995; Chin, 1998). Item loadings are reported in Table 2. All items except for one item in PIIT (PIIT02), one item in focused immersion (FI04), and one item in control (CO02) exhibit high loadings (> .65) on their respective constructs.

Table 2. Results of Factor Analysis										
	AD	**MP**	**OP**	**ON**	**PIIT**	**TD**	**FI**	**HE**	**CO**	**CU**
AD02	**.92**	.45	.32	.59	.57	.28	.32	.42	.24	.41
AD03	**.83**	.41	.27	.50	.47	.11	.24	.29	.28	.37
AD04	**.85**	.51	.31	.56	.58	.19	.27	.39	.45	.44
AD05	**.67**	.54	.19	.45	.43	.35	.25	.35	.36	.36
MP01	.43	**.90**	.17	.43	.41	.32	.30	.45	.44	.37
MP02	.44	**.91**	.14	.39	.40	.31	.29	.44	.44	.33
MP03	.57	**.73**	.19	.39	.43	.29	.22	.35	.40	.26
OP01	.28	.16	**.90**	.39	.32	.04	.12	.29	.21	.20
OP02	.26	.15	**.89**	.39	.28	.02	.11	.31	.19	.20
OP05	.36	.21	**.86**	.48	.39	.09	.20	.42	.26	.32
ON01	.53	.37	.37	**.90**	.64	.25	.41	.45	.40	.56
ON02	.60	.44	.39	**.92**	.64	.29	.40	.49	.33	.58
ON04	.64	.46	.32	**.89**	.65	.27	.36	.46	.35	.64
ON05	.42	.35	.58	**.71**	.45	.15	.20	.35	.27	.33
PIIT01	.53	.52	.27	.58	**.86**	.28	.28	.52	.56	.52
PIIT02	.16	.21	.34	.32	**.34**	.10	.17	.17	.28	.11
PIIT03	.55	.29	.22	.53	**.83**	.11	.20	.24	.31	.39
PIIT04	.58	.41	.36	.66	**.93**	.17	.31	.43	.41	.51
TD01	.32	.39	.12	.31	.26	**.90**	.51	.63	.34	.38
TD02	.26	.32	.07	.29	.21	**.93**	.46	.57	.33	.31
TD03	.28	.35	.09	.31	.24	**.92**	.47	.61	.37	.36
TD04	.22	.29	-.01	.22	.15	**.94**	.38	.53	.31	.30
TD05	.23	.30	.00	.20	.17	**.92**	.40	.51	.28	.26
FI01	.28	.29	.12	.28	.24	.44	**.86**	.44	.33	.29
FI02	.31	.32	.15	.41	.32	.54	**.89**	.52	.32	.42
FI03	.34	.30	.18	.43	.36	.46	**.87**	.50	.33	.39
FI04	.06	.10	.17	.12	.04	.11	**.48**	.18	.13	.03
FI05	.23	.22	.04	.29	.20	.23	**.74**	.26	.18	.22
HE01	.43	.49	.30	.46	.43	.64	.50	**.94**	.50	.55
HE02	.46	.46	.38	.52	.51	.56	.46	**.95**	.51	.61
HE03	.47	.46	.35	.48	.47	.60	.47	**.93**	.49	.57
HE04	.16	.25	.36	.31	.15	.33	.31	**.65**	.24	.32

Table 2. Continued										
CO01	.36	.48	.17	.33	.47	.37	.30	.49	**.91**	.45
CO02	.04	.17	.37	.13	.18	.04	.10	.20	**.49**	.12
CO03	.38	.45	.14	.40	.48	.33	.35	.44	**.87**	.53
CU01	.44	.35	.27	.59	.53	.31	.36	.57	.50	**.95**
CU02	.40	.34	.22	.56	.47	.35	.35	.58	.44	**.96**
CU03	.49	.39	.29	.62	.52	.33	.35	.55	.50	**.93**

AD = Alertness to Distinction; MP = Awareness of Multiple Perspectives; OP = Orientation in the Present; ON = Openness to Novelty; PIIT = Personal Innovativeness in IT; TD = Temporal Dissociation; FI = Focused Immersion; HE = Heightened Enjoyment; CO = Control; CU = Curiosity

Table 3 reports findings related to reliability and validity analysis. Our measures for PIIT, four dimensions of CA, and dimensions of mindfulness exceed the prescribed 0.7 threshold for Cronbach's α (Nunnally and Bernstein, 1994). One exception to the reliability threshold was the control dimension of CA, which had a Cronbach's α value of .65. To assess discriminant validity, we compared inter-construct correlations with the Average Variance Extracted (AVE), which measures the percentage of overall variance in indicators captured by the latent construct (Hair et al., 1998). Sufficient discriminant validity exists when the square root of the AVE of a measure exceeds the correlations between the measure and all other measures (Gefen et al., 2000). As detailed in Table 3, the inter-correlations and square roots of AVEs reflect no problems with discriminant validity. The results support both conditions, providing evidence of convergent validity.

Table 3. Correlation Matrix, Reliabilities, and AVEs											
		Correlation Matrix and Square Root of AVEs (reported on diagonal)									
Study Constructs	**Cronbach's α**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. MI: Alertness to Distinction	.84	.87									
2. MI: Orientation in the Present	.86	.45	.84								
3. MI: Openness to Novelty	.88	.27	.19	.88							
4. MI: Awareness of Multiple Perspectives	.79	.50	.47	.47	.86						
5. CA: Temporal Dissociation	.96	.42	.47	.35	.69	.77					
6. CA: Focused Immersion	.83	.18	.36	.06	.29	.22	.92				
7. CA: Heightened Enjoyment	.88	.21	.33	.16	.41	.31	.48	.79			
8. CA: Control	.65	.29	.49	.39	.51	.46	.62	.50	.88		
9. CA: Curiosity	.94	.28	.50	.25	.40	.50	.35	.34	.51	.78	
10. Personal Innovativeness in IT	.73	.26	.38	.27	.62	.54	.35	.37	.60	.51	.95

Conclusion

We hope to place mindfulness in the greater nomological network of IS research. Specifically, we are interested in how mindfulness is related to post-adoption behaviors. By doing so we can explore how mindfulness relates to IT adoption, usage, reliability, post-adoption behaviors, and other IT-related phenomena.

Individual mindfulness in the domain of information systems has implications for both theory and practice. From a theoretical perspective, concepts of mindfulness can be applied to a variety of research areas, such as technology adoption, post-adoption, usage, and abandonment. For example, scholars propose using mindfulness as a theoretical lens to investigate reliability of information systems (Butler and Gray, 2006).

For the practicing professional, understanding mindfulness may help managers identify individuals likely to carefully consider technology adoption as well as reflectively engage in post-adoption activities. Different intervention types in the workplace may have varying impacts on mindful versus mindless people in the application of IT (Jasperson et al., 2005). Moreover, mindfulness may help explain why users abandon specific types of information technologies. Namely, a mindful individual may realize that a particular information system is no longer applicable to a specific task or work environment. Thus, technology “abandonment” may be a positive behavior.

References

Agarwal, R. and E. Karahanna (2000) "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage," *MIS Quarterly* (24) 4, pp. 665-695.

Agarwal, R. and J. Prasad (1998) "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology," *Information Systems Research* (9) 2, pp. 204-215.

Ajzen, I. (1991) "The Theory of Planned Behavior," *Organizational Behavior and Human Decision Processes* (50) 2, pp. 179-211.
Ajzen, I. and M. Fishbein (1973) "Attitudinal and Normative Variables as Predictors of Specific Behavior," *Journal of Personality and Social Psychology* (27) 1, pp. 41-57.
Allison, P. D. (2003) "Missing Data Techniques for Structural Equation Modeling," *Journal of Abnormal Psychology* (112) 4, pp. 545-557.
Barclay, D., C. Higgins, and R. Thomson (1995) "The Partial Least Squares Approach (PLS) To Causal Modeling, Personal Computer Adoption and Use As An Illustration," *Technology Studies* (2) 2, pp. 285-309.
Bhattacherjee, A. (2001) "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly* (25) 3, pp. 351-370.
Boudreau, M.-C. and D. Robey (2005) "Enacting Integrated Information Technology: A Human Agency Perspective," *Organization Science* (16) 1, pp. 3-18.
Burgoon, J. K., C. R. Berger, and V. R. Waldron (2000) "Mindfulness and Interpersonal Communication," *Journal of Social Issues* (56) 1, pp. 105-127.
Burpee, L. C. and E. J. Langer (2005) "Mindfulness and Marital Satisfaction," *Journal of Adult Development* (12) 1, pp. 43-51.
Butler, B. S. and P. H. Gray (2006) "Reliability, Mindfulness, and Information Systems," *MIS Quarterly* (30) 2, pp. 211-224.
Chanowitz, B. and E. J. Langer (1980) “Knowing More (or Less) Than You Can Show: Understanding Control Through the Mindlessness/Mindfulness Distinction,” in M. E. Seligman and J. Garber (Eds.) *Human Helplessness*, New York: Academic Press.
Chin, W. W. (1998) "Issues and Opinion on Structural Equation Modeling," *MIS Quarterly* (22) 1, pp. vii-xvi.
Davis, F. D., R. P. Bagozzi, and P. R. Warshaw (1989) "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science* (35) 8, pp. 982-1003.
Fichman, R. G. (2004) "Going Beyond the Dominant Paradigm for Information Technology Innovation Research: Emerging Concepts and Methods," *Journal of Association for Information Systems* (5) 8, pp. 314-355.
Gefen, D., D. W. Straub, and M.-C. Boudreau (2000) "Structural Equation Modeling and Regression: Guidelines for Research Practice," *Communications of the Association Information Systems* (4) 7, pp. 1-77.
Goodhue, D. L. and R. L. Thompson (1995) "Task-Technology Fit and Individual Performance," *MIS Quarterly* (19) 2, pp. 213.
Griffith, T. L. (1999) "Technology Features as Triggers for Sensemaking," *Academy of Management Review* (24) 3, pp. 472-488.
Hair, J. F., R. E. Anderson, R. L. Tathem, and W. C. Black (1998) *Multivariate Data Analysis*, Fifth edition. Upper Saddle River, New Jersey, U.S.A.: Prentice Hall.
Jasperson, J. S., P. E. Carter, and R. W. Zmud (2005) "A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology Enabled Work Systems," *MIS Quarterly* (29) 3, pp. 525-557.
Langer, E. J. (1989) *Mindfulness*. Reading, MA: Addison-Wesley.
Langer, E. J. (1997) *The Power of Mindful Learning*. Reading, MA: Addison-Wesley.
Langer, E. J. (2004) “Langer Mindfulness Scale,”.

Langer, E. J., B. Chanowitz, and A. Blank (1985) "Mindlessness–Mindfulness in Perspective : A Reply to Valerie Folkes," *Journal of Personality and Social Psychology* (48) 3, pp. 605-607.

Langer, E. J. and M. Moldoveanu (2000) "The Construct of Mindfulness," *Journal of Social Issues* (56) 1, pp. 1-9.

Langer, E. J. and A. Piper (1987) "The Prevention of Mindlessness," *Journal of Personality and Social Psychology* (53pp. 280-287.

Malone, T. W. (1981) "What Makes Computer Games Fun?," *Byte* (6) 12, pp. 258-277.

Nass, C. and Y. Moon (2000) "Machines and Mindlessness: Social Responses to Computers," *Journal of Social Issues* (56) 1, pp. 81-103.

Nunnally, J. C. and I. H. Bernstein (1994) *Psychometric Theory*, 3rd edition. New York, New York, U.S.A.: McGraw-Hill, Inc.

Oliver, R. L. (1980) "A Cognitive Model for the Antecedents and Consequences of Satisfaction," *Journal of Marketing Research* (17) 4, pp. 460-469.

Orlikowski, W. J., J. Yates, K. Okamura, and M. Fujimoto (1995) "Shaping Electronic Communication: The Metastructuring of Technology in the Context of Use," *Organization Science* (6) 4, pp. 423-444.

Schul, Y., E. Burnstein, and A. Bardi (1996) "Dealing with Deceptions that are Difficult to Detect: Encoding and Judgment as a Function of Preparing to Receive Invalid Information," *Journal of Experimental Social Psychology* (32pp. 228-253.

Sternberg, R. J. (2000) "Images of Mindfulness," *Journal of Social Issues* (56) 1, pp. 11-26.

Taylor, S. and P. A. Todd (1995) "Understanding Information Technology Usage: A Test of Competing Models," *Information Systems Research* (6) 2, pp. 144-176.