

2005

# A Research Agenda toward Assessing Perceived Affective Quality of IT

Na Li

*Syracuse University*, nli@syr.edu

Ping Zhang

*Syracuse University*, pzhang@syr.edu

Follow this and additional works at: <http://aisel.aisnet.org/amcis2005>

---

## Recommended Citation

Li, Na and Zhang, Ping, "A Research Agenda toward Assessing Perceived Affective Quality of IT" (2005). *AMCIS 2005 Proceedings*. 381.

<http://aisel.aisnet.org/amcis2005/381>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2005 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# A Research Agenda toward Assessing Perceived Affective Quality of IT

**Na Li**  
Syracuse University  
nli@syr.edu

**Ping Zhang**  
Syracuse University  
pzhang@syr.edu

## ABSTRACT

Most IT evaluation and usage studies emphasize cognition or high-order affective reactions that come from more deliberate cognitive processing. A primitive concept, perceived affective quality (PAQ) of IT, has not yet attracted much attention. PAQ refers to an individual's perception of IT's ability to change his/her affective state. IS and psychology literature shows that PAQ has significant impacts on higher-order affect, cognition, and behaviors. Thus understanding the nature and measurement of PAQ is of great importance. However, there is no PAQ instrument specifically designed for IT. This study intends to develop and validate such an instrument based on literature review and surveys. This scale will provide researchers with a useful tool to identify favorable affective quality of IT. It will also help IT managers and designers to provide better products and enhance profits.

## Keywords

IT evaluation, perceived affective quality, affect, emotion.

## INTRODUCTION

Information technology (IT) is experiencing a transition from what is available to what users want. Nowadays many ITs demonstrate satisfactory functionalities and usability. Under these conditions, what may make an IT stand out is its ability to engender favorable user emotions and experience (Tractinsky, 2004). Thus understanding users' affective evaluation of IT is important and necessary. Perceived affective quality (PAQ) is a potential tool for such evaluations.

PAQ can predict higher-order affect, cognition and behavior (Russell, 2003). Based on psychology research, Zhang and Li (2004) proposed a model in which a user's PAQ of an IT influences his/her perceptions of usefulness (PU) as well as ease of use (PEOU) and behavioral intention to use it. The model was validated by two sequential field studies in a mandatory IT use context. The results indicate that PAQ has significant impacts on PU, PEOU, and intention to use when users start using the system and in later continuous periods of use. In another study on voluntary IT use, Zhang and Li (forthcoming) empirically confirmed that PAQ has significant influences on PU and PEOU, while PAQ's impact on users' intention to use IT is mediated by PU and PEOU.

In both studies, Zhang and Li (2004; forthcoming) adopted the PAQ measurement from environmental psychology (Russell and Pratt, 1980). This instrument contains four dimensions: perceived pleasant, unpleasant, arousal, and sleepy qualities. The former two form the valence aspect of PAQ, while the latter two outline the arousal aspect of PAQ. Each dimension consists of 5 adjectives that describe a user's perception of an IT. In both studies, two items of arousal quality ("intense" and "forceful") and one item of sleepy quality ("slow") showed unacceptable item loadings (Zhang and Li, 2004, forthcoming). These findings call for development and validation of appropriate PAQ instruments specifically designed for IT.

The need to develop a PAQ instrument for IT also comes from the state of the art of affective constructs' instruments in MIS. Sun and Zhang (to be published) revealed that there is little consistency among either the terms referring to affective concepts or their measures. Further, the meanings of these concepts do not always belong to the affective category. Some mix affective and cognitive reactions. In addition, the measures of certain concepts do not balance among the two commonly referred to dimensions of affective constructs, valence and arousal.

Therefore the objective of this study is to develop and validate an instrument for Perceived Affective Quality (PAQ) of IT. Such a scale would be helpful for identifying favorable affective quality of IT thus improving IT quality, enhancing user's experience, encouraging IT usage, and improving organizations' productivity and profit.

## LITERATURE REVIEW

### IT Evaluation

Over the last several decades, a large number of studies in MIS and HCI have been dedicated to subjective evaluations of IT and their impacts on user's cognition, attitude, usage behavior, performance, and satisfaction. A review of these studies reveals four dominant types of constructs employed to evaluate IT: (1) usefulness (Davis, 1989); (2) ease of use (Davis, 1989) and complexity (Geissler, 2001); (3) fit between system and user's tasks, needs, experience, expectations, and values (Venkatesh and Davis, 2000); and (4) hedonic values of IT. Each type is reflected by various constructs in various contexts. The first three types of evaluations mainly come from a cognitive perspective; while the last has to do with affect and emotion.

Perceived enjoyment, playfulness, fun, affect, affective reward, flow, involvement, computer liking, visual aesthetics, perceived attractiveness, attitude, and satisfaction are good examples of the last category (Compeau, Higgins and Huff, 1999; Csikszentmihalyi, 1990; Griffith, Krampf and Palmer, 2001; Igbaria, Parasuraman and Baroudi, 1996; Lavie and Tractinsky, 2004; Moon and Kim, 2001; van der Heijden, 2003; 2004, etc.). Most of these constructs are attributed affect, which is the affect or emotion directed at an object. For example, perceived enjoyment is the affect that a user attributes to the action of "using a microcomputer" (Igbaria, et al., 1996). Certain constructs (e.g., attitude, satisfaction) even come from more deliberate cognitive processing (Berkowitz, 1993). Primitive concepts are less studied, although perceived visual aesthetics and/or attractiveness have drawn some attention in recent years. Perceived visual aesthetics have an emphasis on valence. However, being interesting or intriguing can have an impact on a user's affect as well. Is it possible that certain primitive factors underlie the attributed affective and cognitive reactions users have toward an IT? We propose that PAQ is such a factor.

### Perceived Affective Quality

Perception of affective quality (PAQ) is an individual's perception of a stimulus' ability to change one's affective state (Russell, 2003). In MIS/HCI context, the stimulus is an IT. PAQ can be described with two orthogonal dimensions, valence (pleasant-unpleasant) and activation (sleepy-arousing). Interestingly, both dimensions have been found to be fundamental components of affective constructs in IT evaluation and usage studies, although most constructs are not primitive or balanced in representing the two dimensions (e.g., Huang, 2003; Lavie and Tractinsky, 2004; van der Heijden, 2004).

Russell's (2003) prototypical emotional episode illustrates that PAQ of a stimulus may dramatically alter one's affective state; then he/she attributes the affect to the stimulus. In turn, his/her cognition, behavior, and emotional meta-experience are changed. Other researchers also argue that immediate affective reactions occur very rapidly, and thus precede and may influence cognitive processes (e.g., Tractinsky, 2004). Therefore it would be plausible to hypothesize that PAQ is one of the causal sources of attributed affect, cognitive evaluation, and behaviors. This has been supported by limited empirical evidence in the MIS/HCI literature. Besides the two studies by Zhang and Li (2004; forthcoming), van der Heijden (2003) found that perceived visual attractiveness (similar to the valence dimension of PAQ) has significant positive impact on PU, PEOU, and perceived enjoyment in a portal website usage. Tractinsky, Katz and Ikar (2000) also discovered a strong correlation between a system's perceived aesthetics (very similar to the valence dimension of PAQ) and perceived usability (equivalent to PEOU).

## RESEARCH METHODOLOGY

Five approaches to measure affect, emotion, and other affective constructs are identified: neurological responses, autonomic activity, facial expression, voice, and self-report measures (Brave and Nass, 2003). In this study, a self-report approach is chosen to measure PAQ due to the subjective nature of PAQ.

Early studies found differences in PAQ's effect in mandatory and voluntary IT use (Zhang and Li, 2004, forthcoming). Realizing this voluntariness sensitivity, we plan to conduct our study first in a voluntary IT use context. To be more specific, we are going to conduct this study in a B2C e-commerce context because online purchasing is a voluntary behavior and affect has been found to play an important role in customers' decisions (Huang, 2003). The following is our anticipated procedure to conduct this research.

### Stage 1: Initial Item Generation

The PAQ instrument will be a list of adjectives or adjectival phrases. Candidate items will be collected from two sources. One is from extensive literature review in MIS, HCI, and psychology (Igbaria, et al., 1996; Kim and Moon, 1998; Lavie and Tractinsky, 2004; Moon and Kim, 2001; Russell and Pratt, 1980; Teo, Lim and Lai, 1999; van der Heijden, 2004, etc.). The

other source will be surveys using a questionnaire comprising open-ended questions (Kim and Moon, 1998; Lavie and Tractinsky, 2004; Russell and Pratt, 1980). Students and online customers will be targeted as potential subjects.

### Stage 2: Item Reduction through Expert Judgment

Following the procedures used by Bearden, Netemeyer and Teel (1989) and Zaichkowsky (1985), we will use faculty and Ph.D. students from a major American university as judges in an evaluation of the content validity of the items. This will include two steps. First, five judges will be exposed to the definition of each dimension of PAQ plus a related explanation and an example item. They will then be asked to allocate the original items generated in the previous stage to each dimension or to a “not applicable” category. Second, an additional four judges will be given each dimension’s definition and asked to rate each item as “clearly representative of the dimension”, “somewhat representative”, or “not representative”. Inappropriate items will be removed from the list.

### Stage 3: Instrument Development and Refinement

Questionnaire-based online surveys will be conducted in this phase. The list of items obtained in Stage 2 will form the PAQ measures in the questionnaire. A group of electronic stores’ websites will be evaluated. To control for his/her interest in the products, a subject will be guided to take a quick look at certain website without exploring its content and then mark his/her impression of the website’s PAQ on a 7-point Likert scale. There will be 3 – 5 versions of the questionnaires. All the versions will present the same list of items but in different random orders to eliminate ordering effect (Kim, Lee and Choi, 2003).

Principle component analysis or exploratory factor analysis will be conducted to examine the dimensionality, item reliability, and internal consistency reliability of the instrument. Next confirmatory factor analysis (CFA) will be conducted to assess the discriminant and convergent validities of the measures. Based on the analysis results, the original PAQ instrument will be refined.

### Stage 4: Validation of Instrument

The refined PAQ instrument obtained from Stage 3 will be validated in another round of questionnaire-based online surveys targeting another group of e-stores’ websites. The survey procedure will be the same as that in Stage 3. CFA will be conducted to examine if the factor structure ascertained in Stage 3 will hold in this study. Reliability, discriminant validity and convergent validity will be assessed. Necessary refinement of the instrument might be conducted based on the analysis results.

## POTENTIAL CONTRIBUTIONS

A PAQ instrument specifically developed for IT will provide IS researchers a tool to identify favorable IT features that would stimulate positive evaluation and use experience. It will be useful for synthesizing and comparing results of similar studies and accumulating knowledge in IT evaluations. Results of such studies will help IT designers, project managers, website owners, and other stockholders to provide better IT and to enhance their profits.

## REFERENCES

1. Bearden, W. O., Netemeyer, R. G. and Teel, J. E. (1989) Measurement of consumer susceptibility to interpersonal influence, *Journal of Consumer Research*, 15, 4, 473-481.
2. Berkowitz, L. (1993) Towards a general theory of anger and emotional aggression: Implications of the cognitive-neoassociationistic perspective for the analysis of anger and other emotions, in T. K. Srull (ed.) *Advances in social cognition*, Erlbaum, Hillsdale, NJ, 1-46.
3. Brave, S. and Nass, C. (2003) Emotion in human--computer interaction, in J. A. Jacko and A. Sears (eds.) *The human-computer interaction handbook: Fundamentals, evolving technologies and emerging applications*, Lawrence Erlbaum Associates, Mahwah, NJ; London.
4. Compeau, D., Higgins, C. A. and Huff, S. (1999) Social cognitive theory and individual reactions to computing technology: A longitudinal study, *MIS Quarterly*, 23, 2, 145.
5. Csikszentmihalyi, M. (1990) *Flow: The psychology of optimal experience*. Harpers Perennial, New York.
6. Davis, F. D. (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly*, 13, 3, 319-340.
7. Geissler, G. (2001) Web home page complexity and communication effectiveness, *Journal of the Association for Information Systems*, 2, April, Article 2.
8. Griffith, D. A., Krampf, R. F. and Palmer, J. W. (2001) The role of interface in electronic commerce: Consumer involvement with print versus on-line catalogs, *International Journal of Electronic Commerce*, 5, 4, 135-153.

9. Huang, M. H. (2003) Modeling virtual exploratory and shopping dynamics: An environmental psychology approach, *Information and Management*, 41, 39-47.
10. Igarria, M., Parasuraman, S. and Baroudi, J. J. (1996) A motivational model of microcomputer usage, *Journal of Management Information Systems*, 13, 1, 127-143.
11. Kim, J., Lee, J. and Choi, D. (2003) Designing emotionally evocative homepages: An empirical study of the quantitative relations between design factors and emotional dimensions, *International Journal of Human-Computer Studies*, 59, 6, 899-940.
12. Kim, J. and Moon, J. Y. (1998) Designing towards emotional usability in customer interfaces--trustworthiness of cyber-banking system interfaces, *Interacting with Computers*, 10, 1, 1-29.
13. Lavie, T. and Tractinsky, N. (2004) Assessing dimensions of perceived visual aesthetics of web sites, *International Journal of Human Computer Studies*, 60, 269-298.
14. Moon, J.-W. and Kim, Y.-G. (2001) Extending the TAM for a world-wide-web context, *Information & Management*, 38, 4, 217-230.
15. Russell, J. A. (2003) Core affect and the psychological construction of emotion, *Psychological Review*, 110, 1, 145-172.
16. Russell, J. A. and Pratt, G. (1980) A description of the affective quality attributed to environments, *Journal of Personality and Social Psychology*, 38, 2, 311-322.
17. Sun, H. and Zhang, P. (to be published) The role of affect in information systems research: A critical survey and a research model, in P. Zhang and D. Galletta (eds.) *Human-Computer Interaction in Management Information Systems - Foundations*, M. E. Sharpe, Inc.
18. Teo, T. S. H., Lim, V. K. G. and Lai, R. Y. C. (1999) Intrinsic and extrinsic motivation in internet usage, *Omega*, 27, 1, 25-37.
19. Tractinsky, N. (2004) Toward the study of aesthetics in information technology, in *Proceedings of the 25th International Conference on Information Systems*, Dec. 13-16, 2004, 2004, Washington D.C., USA.
20. Tractinsky, N., Katz, A. S. and Ikar, D. (2000) What is beautiful is usable, *Interacting with Computers*, 13, 127-145.
21. van der Heijden, H. (2003) Factors influencing the usage of websites - the case of a generic portal in the Netherlands, *Information & Management*, 40, 6, 541-549.
22. van der Heijden, H. (2004) User acceptance of hedonic information systems, *MIS Quarterly*, 28, 4, 695-704.
23. Venkatesh, V. and Davis, F. (2000) A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies, *Management Science*, 46, 2, 186-204.
24. Zaichkowsky, J. L. (1985) Measuring the involvement construct, *Journal of Consumer Research*, 12, 341-352.
25. Zhang, P. and Li, N. (2004) Love at first sight or sustained effect? The role of perceived affective quality on users' cognitive reactions toward IT, in *Proceedings of the International Conference on Information Systems*, Dec. 12-15, 2004, Washington D. C.
26. Zhang, P. and Li, N. (forthcoming) The importance of affective quality, *Communications of the ACM*.