Assessing User Satisfaction with e-Learning Blog Systems

Yi-Shun Wang, Ying-Wei Shih, and Ci-Rong Li

***Abstract*—With the proliferation of educational use of blogs, measuring user satisfaction with blog-based learning systems has become an important issue for academics and practitioners. Although previous research has developed various instruments for measuring user satisfaction with asynchronous e-learning systems, none of the literature has addressed the measurement of user satisfaction with blog-based learning systems. Thus, the main purpose of this study is to develop and validate a multi-dimensional instrument for measuring e-learning blog satisfaction (ELBS) based on previous research. This study introduces and defines the construct of e-learning blog satisfaction, provides an empirical validation of the construct and its underlying dimensionality develops a generic e-learning blog satisfaction instrument with desirable psychometric properties, and investigates the instrument's theoretical and practical applications. By analyzing data from a sample of 238 respondents, this study proposes a 5-factor, 20-item ELBS instrument. This empirically validated instrument will be useful to researchers in developing and testing blog-based learning theories, as well as to educators in understanding students' ELBS and promoting the use of blog-based learning systems.**

***Index Terms*—Collaborative learning, e-learning, IT-use, assessment.**

I. INTRODUCTION

Because of the rapid development of Web 2.0 technology, blogging has the potential to be a transformational technology for teaching and learning [1]. A blog (a contraction of the term weblog) is a type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. The activity of updating a blog is known as 'blogging' and someone who keeps a blog is a 'blogger.' Prior studies also suggest that blogging is a useful practice for the development of higher order learning skills, active, learner centered pedagogy, authentic learning, associative thinking, and interactive learning communities [2]-[4]. With the use of blogs, a community of student bloggers can create an interactive social learning environment where they can learn from the ideas of others, share knowledge resources, and compare/compete with each others' work [5].

Prior studies have suggested several advantages for using blogs in educational settings [1], [5]-[9]. For example, Maag (2005) argues that students can express their thoughts and share their learning experiences to the teacher and peers through course blogs. Thus, many educators have recently attempted to implement blog-based learning systems to enhance the communication environment among students and teachers [7]. Kim [7] further advocates that traditional computer-mediated communication applications should be replaced with blogs, and thus develops a model for the use of blogs in educational contexts by taking into account the socio-technical systems theory.

With the proliferation of educational use of blogs [1], [5]-[10], how to evaluate the effectiveness of blog-based learning systems has become an important issue for e-learning academics and practitioners. While several prior studies have investigated the measures of system effectiveness or user satisfaction with information systems/asynchronous e-learning systems [11]-[14], few studies have addressed the measures of e-learning blog satisfaction. Further, traditional measures of system effectiveness or user satisfaction are perceived as being inapplicable in the context of e-learning blog since the environment and characteristics of blog-based learning systems are different from those of traditional information systems and asynchronous e-learning systems. Therefore, there is a need for research to develop and validate a multi-dimensional instrument for measuring student satisfaction with e-learning blog systems.

The main purpose of this study is to develop and validate an instrument for assessing user satisfaction with blog-based learning systems. To assess the extent and specific nature of e-learning blog satisfaction (ELBS), different dimensions of ELBS must be defined both conceptually and operationally. Developing such an instrument can: (1) capture multiple aspects of ELBS that may be subsumed within single instrument; (2) provide insights into the nature of interrelationships among ELBS dimensions; (3) provide a more accurate diagnostic tool to assess learner satisfaction with blog-based learning systems; and (4) provide several important theoretical and practical implications for blog-based learning. The remainder of this paper is organized as follows. In the next section, this study establishes the theoretical foundation for conceptualizing an ELBS construct. It is followed by descriptions of research methods used in the scale item generation and data collection. This study then presents the results of purifying the ELBS scale, identifying the factor structure of the scale and examining the scale's psychometric properties, such as content validity, criterion-related validity, convergent validity, discriminant validity, and nomological validity. Finally, this study discusses the theoretical and practical implications of the findings for blog-based learning.

II. E-LEARNING BLOG SATISFACTION

Defining a construct's theoretical meaning and conceptual domain is a necessary step for developing appropriate

measures and obtaining valid results [15]. Based on prior studies on information systems user satisfaction and e-learner satisfaction [11], [13], e-learning blog satisfaction (ELBS) can be defined as a summary affective response of varying intensity that follows blog-based learning activities, and is stimulated by several attributes, such as learning interactivity, learner interface, personal learning log, content, and linkage. As such, ELBS can be operationally considered as a summation of satisfactions with various attributes. Additionally, ELBS in this study emphasizes the construct itself rather than the evaluative process or model through which the response is determined, facilitating the operationalization of ELBS as a single construct, unencumbered by various antecedents or consequences.

III. RESEARCH METHODS

A. Generation of Scale Items

Operationally, ELBS can be considered as a summation of satisfaction towards different attributes of a blog-based learning system. There are several potential measuring items for the ELBS construct. A review of the literature on user information satisfaction, end-user computing satisfaction, Web user satisfaction, e-learner satisfaction [11], [13], [16]-[19] obtained 31 items representing the various dimensions underlying the ELBS construct, and these were used to form the initial pool of items for the ELBS scale. To make sure that no important attributes or items were omitted, this study conducted experience surveys and personal interviews regarding ELBS with the assistance of two professionals, two university teachers and five e-learning blog users. They were asked to review the initial item list of the ELBS scale, and they recommended eliminating 11 items because of redundancy. After careful examination of the result of the experience surveys and interviews, the remaining 20 items were further adjusted to make their wording as precise as possible, and could be considered to constitute a complete scale for the ELBS measurement.

An initial ELBS instrument involving 22 items (as shown in the Appendix), with the two global measures (i.e., perceived overall satisfaction and reuse intention), was developed using a seven-point Likert-type scale, ranging from "strongly disagree" to "strongly agree". In addition to the ELBS measuring items, the questionnaire contains demographic questions.

B. Sample and Procedure

Data used to test the research model will be gathered from a sample of experienced users of e-learning blogs in the field of university commerce education. Students will first be asked whether they have ever used e-learning blogs during their commerce education courses; if they reply in the affirmative, they will be asked to participate in the survey. The questionnaire will request the respondents to relate to the last time they used a commerce education course blog and to answer the remaining questions accordingly. That is, respondents will be asked to write down the name of an e-learning blog they have ever used during their commerce education courses. The respondents will then be instructed in

the questionnaire to answer the questions by assessing the e-learning blog. For each question of the instrument, respondents will be asked to circle the response which best describes their level of agreement.

IV. SCALE DEVELOPMENT PROCEDURE

A. Item Analysis and Reliability Estimates

The 20-item instrument (with the two global items excluded) will then be refined by analyzing the pooled data; that is, the data collected from experienced users across different universities and e-learning blog systems will be considered together. Because the primary purpose of this study is to develop a general instrument capable of reliably and accurately measuring ELBS in various contexts of e-learning blog systems, the pooling of the sample data is considered appropriate.

The first step in purifying the instrument is to calculate the coefficient alpha and item-to-total correlations that are used to delete garbage items [20]. To avoid spurious part-whole correlation, the criterion used in this study for determining whether to delete an item is the item's corrected item-to-total correlation. An iterative sequence of computing Cronbach's alpha coefficients and item-to-total correlations will be executed for each ELBS dimension. The corrected item-to-total correlations will be plotted in descending order, and items with item-to-total correlations below 0.4 or whose correlations produce a substantial or sudden drop in the plotted pattern will be eliminated.

B. Identifying the Factor Structure of the ELBS Instrument

An exploratory factor analysis will be conducted to further examine the factor structure of the instrument. Before identifying the factor structure of the ELBS construct using factor analysis, a chi-square test of Bartlett's sphericity test will be conducted, which suggests whether the intercorrelation matrix contains sufficient common variance to make factor analysis worthwhile. The sample data will be examined using a principal components factor analysis as the extraction technique, and varimax as the orthogonal rotation method. To improve the unidimensionality/convergent validity and discriminant validity [21] of the instrument through exploratory factor analysis, four commonly employed decision rules [22]-[23] will be applied to identify the factors underlying the ELBS construct: (1) using a minimum eigenvalue of 1 as a cutoff value for extraction; (2) deleting items with factor loadings less than 0.5 on all factors or greater than .5 on two or more factors; (3) a simple factor structure; and (4) exclusion of single item factors from the standpoint of parsimony.

V. CONCLUSIONS

A primary contribution of this work is to have started a stream of work to develop a generic instrument for measuring the success of blog-based learning systems given that user satisfaction is a critical success surrogate of information systems/e-learning systems [13], [24]. The development and validation of an ELBS instrument also represent an important

step in the development of the theories concerning blog-based learning and its usage. The proposed ELBS instrument will be of value not only to educators and systems developers responsible for the implementation and utilization of blog-based learning systems, but also to researchers interested in developing theories concerning blog-based learning.

APPENDIX

Q1. The knowledge/information provided by blog-based learning system is correct.

Q2. The content representation provided by blog-based learning system is logical and fits.

Q3. The knowledge/information provided by blog-based learning system is meaningful, understandable, and practicable.

Q4. The knowledge/information provided by blog-based learning system is important and helpful for my work.

Q5. The blog-based learning system provides sufficient content.

Q6. The blog-based learning system provides useful content.

Q7. The blog-based learning system provides contextual knowledge/information so that I can truly understand what is being accessed and easily apply it to work.

Q8. The blog-based learning system provides accurate expert directories (permalinks, blogroll) so that I can link to the right people and to their know-how.

Q9. The blog-based learning system provides helpful expert directories (permalinks, blogroll) for my work.

Q10. The blog-based learning system provides a complete knowledge portal so that I can link to knowledge/information sources for more detailed inquiries.

Q11. The blog-based learning system is easy to use.

Q12. The blog-based learning system is user-friendly.

Q13. The blog-based learning system makes it easy for you to find the content you need.

Q14. The blog-based learning system makes it easy for you to discuss questions with other students.

Q15. The blog-based learning system makes it easy for you to access the shared content from the learning community.

Q16. The blog-based learning system makes it easy for you to discuss questions with your teachers.

Q17. The blog-based learning system makes it easy for you to share what you learn with the learning community.

Q18. The blog-based learning system enables you to learn the content you need.

Q19. The blog-based learning system enables you to control your learning progress.

Q20. The blog-based learning system records your learning progress and performance.

Q21. As a whole, you are satisfied with blog-based learning system

Q22. As a whole, you will frequently use the blog-based learning system in the future

REFERENCES

[1] J. B. Williams and J. Jacobs, "Exploring the use of blogs as learning spaces in the higher education sector," *Australasian Journal of Educational Technology*, vol. 20, pp. 232-247, 2004.

[2] M. O'Donnell, "Blogging as pedagogic practice: Artefact and ecology," *Asia Pacific Media Educator*, vol. 17, pp. 5-19, 2006.

[3] J. Farmer, "Blogging to basics: How blogs are bringing online education back from the brink," in: A. Bruns and J. Jacobs (Eds.), *Uses of blogs*. New York: Peter Lang, 2006.

[4] B. Farmer, A. Yue, and C. Brooks, "Using blogging for higher order learning in large cohort university teaching: A case study," *Australasian Journal of Educational Technology*, vol. 24, pp. 123-136, 2008.

[5] H. S. Du and C. Wagner, "Learning with weblogs: enhancing cognitive and social knowledge construction," *IEEE Transactions on Professional Communication*, vol. 50, pp. 1-16, 2007.

[6] C. P. Coutinho, "Cooperative learning in higher education using weblogs: a study with undergraduate students of education in Portugal," *in Paper presented at the World Multi-Conference on Systemics, Cybernetic and informatics*, Orlando, USA, 2007.

[7] H. N. Kim, "The phenomenon of blogs and theoretical model of blog use in educational contexts," *Computers & Education*, vol. 51, pp. 1342-1352, 2008.

[8] M. Maag, "The potential use of 'blogs' in nursing education," *CIN: Computers, Information, Nursing*, vol. 23, pp. 16-24, 2005.

[9] W. Richardson, "Blog revolution: expanding classroom horizons with web logs," *Technology & Learning*, vol. 26, pp. 48, 2005.

[10] Y.-S. Wang, H.-H. Lin, and Y.-W. Liao, "Investigating the individual difference antecedents of perceived enjoyment in students' use of blogging," *British Journal of Educational Technology*, vol. 43, pp. 139-152, 2012.

[11] W. J. Doll and G. Torkzadeh, "The measurement of end-user computing satisfaction," *MIS Quarterly*, vol. 12, pp. 258-274, 1988.

[12] W. J. Doll, W. Xia, and G. Torkzadeh, "A confirmatory factor analysis of the end-user computing satisfaction instrument," *MIS Quarterly*, vol. 18, pp. 453-461, 1994.

[13] Y.-S. Wang, "Assessment of learner satisfaction with asynchronous electronic learning systems," *Information & Management*, vol. 41, pp. 75-86, 2003.

[14] Y. S. Wang, H. Y. Wang, and D. Y. Shee, "Measuring e-learning systems success in an organizational context: scale development and validation," *Computers in Human Behavior*, vol. 23, pp. 1792-1808, 2007.

[15] D. W. Gerbing and J. C. Anderson, "An updated paradigm of scale development incorporating unidimensionslity and its assessment," *Journal of Marketing Research*, vol. 25, pp. 186-192, 1988.

[16] W. J. Baroudi, and W. J. Orlikowski, "A short-form measure of user information satisfaction: a psychometric evaluation and notes on use," *Journal of Management Information Systems*, vol. 4, pp. 44-59, 1988.

[17] P. C. Palvia, "A model and instrument for measuring small business user satisfaction with information technology," *Information & Management*, vol. 31, pp. 151-163, 1996.

[18] G. Piccoli, R. Ahmad, and B. Ives, "Web-based virtual learning environments: a research framework and a preliminary assessment of effectiveness on basic IT skills training," *MIS Quarterly*, vol. 25, pp. 401-426, 2001.

[19] Y.-M. Wang and Y.-S. Wang, "Examining the dimensionality and measurement of user-perceived knowledge and information quality in the KMS context," *Journal of Information Science*, vol. 35, pp. 94-109, 2009.

[20] L. J. Cronbach, "Coefficient alpha and the internal structure of tests," *Psychometrika*, vol. 16, pp. 297-334, 1951.

[21] J. L. Price and C. W. Mueller, *Handbook of organizational measurement*. Marshfield, MA: Pitman Publishing, Inc, 1986.

[22] J. E. Hair, R. E. Anderson, R. L. Tatham, and W. C. Black, *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall, 1998.

[23] D. W. Straub, "Validating instruments in MIS research," *MIS Quarterly*, vol. 13, pp. 147-169, 1989.

[24] W. H. DeLone and E. R. McLean, "The DeLone and McLean model of information systems success: a ten-year update," *Journal of Management Information Systems*, vol. 19, pp. 9-30, 2003.
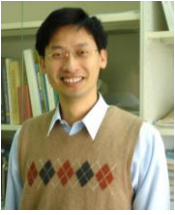
Yi-Shun Wang is Distinguished Professor in the Department of Information Management at National Changhua University of Education, Taiwan. He received his Ph.D. in MIS from National Chengchi University, Taiwan. His current research interests include IT/IS adoption strategies, IS success models, customer relationship management, and e-learning. He has published in journals such as Information Systems Journal, International Journal of Information Management, Information & Management, Government Information Quarterly, Journal of Information Science, Journal of Global Information Management, Computers & Education, British Journal of Educational Technology, CyberPsychology & Behavior, Computers in Human Behavior, Service Industries Journal, Managing Service Quality, among others. He has served as a Project Reexamination Committee Member for both research areas of Information Management and Applied Science Education in the National Science Council of Taiwan.

Ying-Wei Shih is an associate professor in the Department of Information Management at National Changhua University of Education, Taiwan. He received his Ph.D. in Management Information Systems from National Chengchi University, Taiwan. His current research interests focus mainly on e-commerce, e-learning, and virtual community. He has published papers in International Journal of Information Management, Computers & Education, Computers in Human Behavior, Journal of Computer Information Systems, Total Quality Management & Business Excellence, Journal of Global IT Management, Journal of Electronic Commerce Research, International Journal of Services Technology & Management, and a number of national and international conference proceedings.

Ci-Rong Li is a postdoctoral fellow in the Department of Information Management at National Changhua University of Education, Taiwan. He received his Ph.D. in Business Administration from National Dong Hwa University, Taiwan. His current research interests focuses on market orientation, product quality and innovativeness, competitive strategy and product development team. He has published in such journals as Industrial Marketing Management, European Journal of Marketing, Management Decision, and Quality & Quantity.