

The role of System Sociability Factor in Modeling Learning Management System Success in University Education

Sharif Omar Salem^{1*}, Younis Abdalmalek Hammouda², Suha Fouad Salem³

¹ *University Malaysia Sarawak (UNIMAS) - Malaysia*

² *Hedef Akaemileri Uluslararası - Turkey*

³ *Faculty of Business Management and Professional Studies, Management & Science University - Malaysia*

Article Info

Article history:

Received 20 August 2020

Received in revised form 20 September 2020

Accepted 01 October 2020

Published 20 October 2020

Abstract

Integration of the Information and Communication Technologies into the education process has become vital especially by the universities and the higher education institutions. Measuring the e-learning system impact is the only method to ensure the quality of the implementation. Therefore, developing theories, models and standards for judging the quality of e-learning practice become important. This study aims to extend the understanding of the e-learning success from different perspectives by considering the e-learning system as a mixed discipline between technology and community interaction. This study proposes a revised conceptual model for E-learning System Success based on two known information system and interaction assessing theories. D&M IS success model and Preece's sociability and usability framework are the two major theories used to build the revised model. In order to validate the proposed model, content validity, face validity and reliability tests were applied to the survey to check the overall consistency. Research are in proceeding for testing the factors and relations in the model using different content management system. Quantitative analysis using sequential equation modelling are used.

Keywords: E-learning, Information systems, Information System Success, E-learning System Success, Sociability

1. Introduction

The use of the e-learning system needs to interactions between two types of users: academics as the information provider and students as the information receiver. E-learning help to apply information technologies/systems to facilitate student learning, enhance instructor-teaching performance and reduce educational costs (Mason 2020). The successful implementation of an e-learning environment based on suitable infrastructure to enhance the educational environment are vital (Milakovich & Wise 2019). The proper combination and integration of different software, tools and techniques help to implement e-learning.

The appropriate e-learning system success model is a questionable issue in research and for sure play a major role in designing the system and choosing the effective tools. Many direct recommendations announced by many authors as a future research trends in this field. Some recommend adding specific factors based on their findings while others proposed new model based on literature and ask for validating.

The exploration of the Information system success, ISS, model is a constant goal for researchers to extend the factors and accurate the assessment of E-learning environment. The latest advances in e-learning technologies and e-learning field propose a different approach for the system success, motivate the need for adding other dimensions, extend the information system success model and assess the relationships among the model dimensions (DeLone and McLean 2016). System success dimensions are not technology only, the revolution of web 2.0 and the uniqueness of e-learning environment especially the different stakeholders guide the researchers to seek for new revised model (Chen, 2010; Cheng, 2012; Hassanzadeh, Kanaani, & Elahi, 2012; Keramati, Afshari-Mofrad, & Kamrani, 2011; Lee, Yoon, & Lee, 2009; Sun, Tsai, Finger, Chen, & Yeh, 2008; H. C. Wang & Chiu, 2011).

This research aims to extend the understanding of the e-learning success from different perspectives by considering the e-learning system as a mixed discipline between information technology and community interaction. The research introduces a new revised e-learning success model developed from different known information system and interaction assessing tools. The objective of this study is to propose a revised conceptual model to enhance the assessment of the success of the learning-related information system with respect to learners' perspective. Moreover, an additional objective of this study is to contribute for the continuing research of blended-based learning.

2. Background and Literature Review

This section contains the theoretical background related directly to the proposed model in addition to some review of previous studies.

2.1. D&M Information System Success Model

In 1980, Peter Keen denoted to the absence of a systematic basis in IS research and called researchers to investigate what the dependent variable in IS research should be (Keen, 1980). Encouraged by his call for clearing up the dependent variable, many researchers have guided different studies to understand the dimensions contributing to IS success. Many studies contribute to many concepts and findings, DeLone & McLean (1992) organized the hug results from the literature and proposed their first IS Success Model (Bakhri, 2020).

Butting together the information-related concepts from Shannon and Weaver (1949) and Mason’s expansion of the effectiveness or influence level (Mason, 1978), DeLone and McLean differentiate between six different factors of IS success: system quality, information quality, user satisfaction, user, individual impact, and organizational impact. Empirically, they validate the proposed framework by the findings of related-studies published in the period between 1981 and 1988 in 7 highly ranked information system journals. Their investigation satisfies with their original assumption about the six major dimensions they present. Figure 1 shows the original D&M information system success model (Fernando, 2020).

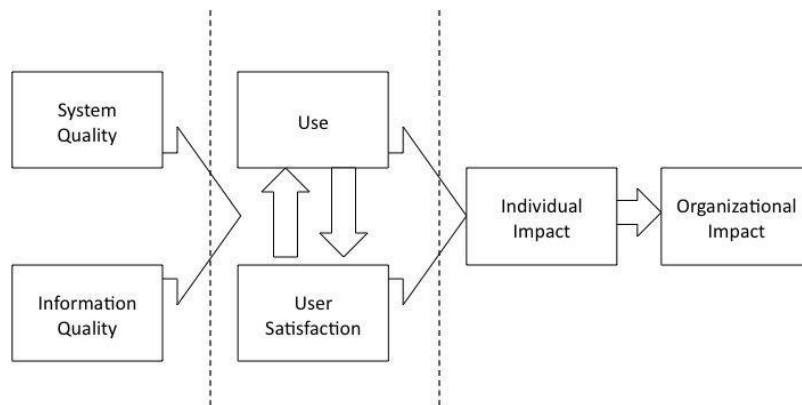


Fig. 1. Information Systems Success Model (DeLone & McLean 1992)

Motivated by DeLone and McLean’s request for additional improvement and validation of the IS Success model, many researchers have guided extensive studies to update the original model. Some researchers find that the D&M IS Success model is incomplete; they claim that more categories should be counted in the framework; some others propose another success models (e.g. Ballantine et al., 1996; Seddon, 1997). Many other researchers focus on the application and validation of the model.

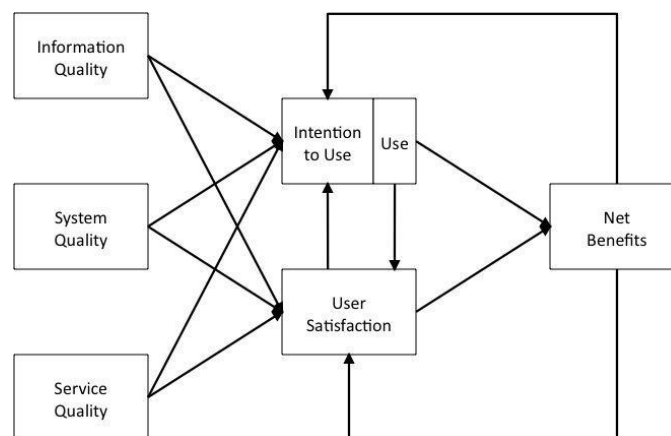


Fig. 2. Updated Information Systems Success Model (DeLone & McLean 2002, 2003)

The findings of 10 years studies concluded by DeLone and McLean (2002, 2003) which resulted in proposing of an updated IS success model. The updated model consists of six interrelated categories of IS success: information quality, system quality, service quality; (intention to) use; user satisfaction; and net benefits. The arrows in the diagram demonstrate proposed relations between the composed factors. DeLone and McLean announce a continuous encouragement for other researchers to do further enhancement and help to continue the evolution process. Figure 2 shows the updated D&M information system success model (Bakhri 2020; Stefanovic et al., 2020).

2.2. Preece's Sociability and Usability Framework

Preece (2001) proposed system usability and system sociability as determinants of the online community success. Preece's theory known as "the sociability and usability framework". While, many studies have investigated different attributes of the online community that may attract its members, Preece (2001) offered a broad catalogue of online community characteristics for both functional and hedonic dimensions. Figure 1 shows the Preece's proposed model.

Sociability dimension covers the indicators related to purpose, people, and policies. Purpose factor refers to the interaction and involvement levels of community participants. Indicators for this factor is the level of interactivity, level of mutuality, and value of involvement (Salam & Farooq 2020). The factor people refer to the amount of participants within the online community. The level of involvement and individual attributes classify the members into different types. The factor policy refers to the treatment and regulations that are applied to prevent unfriendly and non-civil actions and motivate the trust between participants. A clear of announced codes of conduct or registration policies are examples (Preece, 2001; Preece & Maloney-Krichmar, 2003).



Fig. 3. The two key dimensions of online communities (Preece 2000)

Usability dimension covers the indicators related to dialogue and social interaction support, information design, navigation and access. Dialogue and social interaction support factor refers to the system quality indicators of the ease of use and efficient use of the web environment command and utilities composed the online community system (Stefanovic et al. 2020). Information design factor refers to the information quality indicators of the ease of understanding information acquired from the online community system (Aldholay, Isaac, Abdullah, & Ramayah, 2018; Isaac, Abdullah, Ramayah, & Mutahar, 2017). Navigation factor is another information quality indicators refers to the ease of search and finding required information. Access factor refers to another system quality dimension of ease of accessibility, open or download information (Preece, 2001; de Souza & Preece, 2004).

Success definition of the online community differs based on the perspective of whom. As example, a sales-manager of an online market website will measure success of the community system in terms of the number of participants, duration of system navigation, reusability and the customers purchase power. In the other hand, a university student may judge the success of the online community based on the level of enhancement and support of the students education activities (Preece 2001; Kim et al. 2008).

The impact of determinants and its various measures in the success of online community system vary depending on the communities' goals, purpose, and functions. For example, educational communities may affected more by the usability determinant especially the quality of exchanged information. In the other hand, patient support communities may have a higher need for sociability determinant (de Souza & Preece, 2004; Preece & Maloney-Krichmar, 2003; Preece, 2001). Figure 4 represents a simple model of Preece's sociability and usability framework.

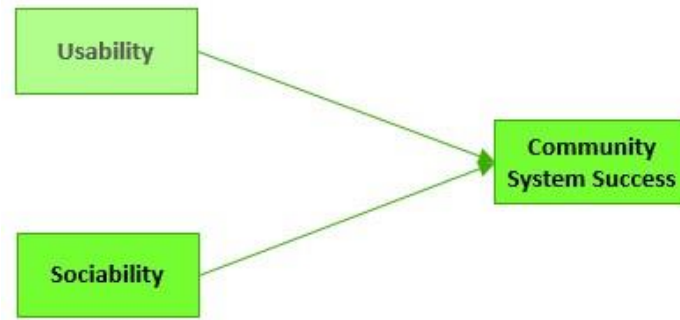


Fig. 4. The two key dimensions of online communities (Preece 2000)

Phang et al., (2009) studied the Preece’s sociability and usability framework dimensions by surveying users of a learning focused community system. The results confirmed the significance of usability to knowledge seeking and knowledge contribution in online communities. The results provided further support for the importance of sociability in influencing participation in online communities to both knowledge seeking and knowledge contribution activities(A. Aldholay, Isaac, Abdullah, Abdulsalam, & Al-Shibami, 2018; Isaac, Abdullah, Aldholay, & Ameen, 2019).

Kim et al. (2008) assessed the online community attributes of Preece’s sociability and usability framework on online communities hosted by retailers or national brand companies from the perspective of consumers. Results partially supported Preece’s sociability and usability framework. Results show that the sociability dimension represented with its attributes purpose, people, and policy while usability dimension to be represented by two attributes dialogue and social interaction and navigation. The relationship between sociability and social benefits was confirmed and the relationship between usability and functional benefits was confirmed. The results provide confirmation that Preece’s online community framework is suitable to measure online community success from the consumer perspective.

Vatrapu et al. (2008) studied a framework consists of learnability, usability and sociability to evaluate a prior results related to three online community systems. Results show the validity of the three dimensions in the acquired system design.

3. Conceptual Model of E-learning System Success

The revised system success model is a conceptual e-learning success assessment model for predicting learner’s benefits with any technology-mixed learning whether it is online-based LMS and blended-based LMS. The model has been developed for evaluating the e-learning success according to seven factors:

- Information Quality.
- System Quality.
- Service Quality.
- System Sociability.
- Intension to (Use).
- User Satisfaction.
- Learner benefits.

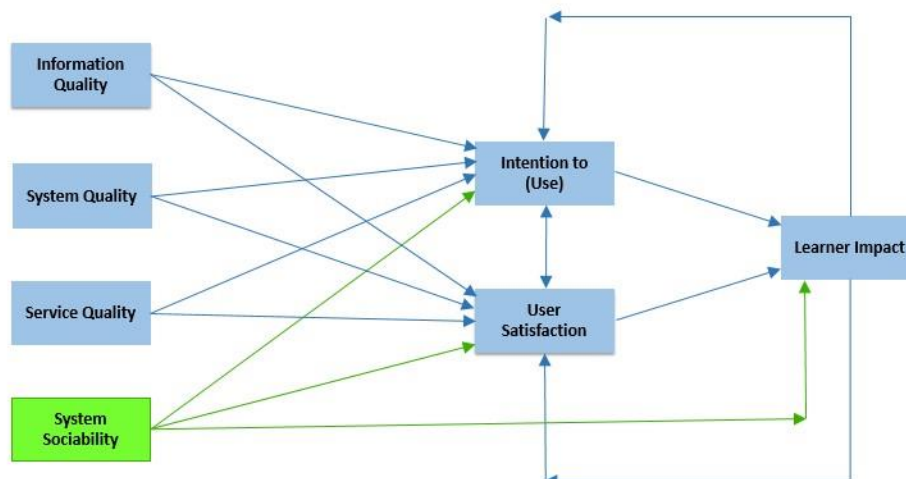


Fig. 5. Proposed model for E-learning system success

Learner benefits is the dependent variable and the main point of the evaluation. Most of the previous models in related to the e-learning miss the mixed-discipline paradigm of e-learning environment. Information quality, system quality and service quality were inherited from D&M IS model and it is clear that it represents the system usability dimension in the Preece’s online community framework. System sociability were inherited from the Preece’s online community framework and it is not exist before in the D&M IS model. The learner impact variable measures are mixed from the two theories which is clear in the survey questions (see appendices).

4. Methodology and Pilot Study Results

As the research is in proceeding, this section describes the questionnaire, pilot study and validity tests. The final extensive results of the real sampling and population are not included.

4.1. Questionnaire

A survey questionnaire is the main instrument used in this study to assess the learners’ perspective about the e-learning system success. The survey instrument used to collect data from learners about their opinions of the effect of the blended learning environment in terms of their benefits. The questionnaire has been conducted from the literature after a broad integration of many validated previous models as described in Table 1.

Table 1. Reference models and their associated dimensions

References	IQ	SQ	SrQ	SS	SU	US	LB
IS success model by Delone and McLean (2003)	x	x	x		x	x	x
E-Learning system model by Freeze et al. (2010)	x	x			x	x	x
E-Learning system model by Wang et al. (2007)	x	x	x		x	x	x
Hexagonal e-learning assessment model by Ozkan et al. (2009)	x	x	x				
Hierarchical model for e-learning CSFs in developing countries by Bhuasiri et al. (2012)	x	x	x				
Model of online community attributes and benefit by Kim & Park (2008)				x			x
Sociability and Usability Framework by Lambropoulos (2005)				x			x
Online Community framework by Preece et al. (2004)				x			x

IQ = Information Quality
 SU = System Use
 SQ = System Quality
 US = User Satisfaction
 SrQ = Service Quality
 LB = Learner Benefits
 SS = System Sociability

Excluding the demographics questions, the core body of the survey have 32 questions grouped into seven categories, which mapped with the proposed model variables. Appendices include a list of the proposed questions.

4.2. Pilot Sample

The pilot sample size used to validate the proposed model were 63 students participated in the study. After data cleaning the sample data are 60 cases. The sample consisted of 38 males and 22 females. All of the sampled students indicated that they had a good computer and Internet experience, with over 80 percent said that they had high levels of experience.

4.3. Validity Tests.

Content validity is achieved via consulting experts’ panel of five experts. The panel were asked to review and comment on the 1st draft survey items. “Measure what is intended to measure”; is the point of view for the feedback from the panel. The five expert’s panel were different experts from many disciplines, pedagogy, high education, training and

management. Comments related to wording; phrasing; sequencing and relevance were fed from the panel to clarify the 2nd draft to be applied to the test group.

Face validity relates to whether the 2nd draft of the survey test appears to be a good measure or not. Face validity was done by a field test among 10 students from different universities in Malaysia. This testing group will not be part of the real sampling of the study. The following conditions were applied: (1) The test was done at the same time and students asked to fill up the survey. (2) Actions; answering time; difficulty encountered were monitored. (3) Informal discussion was made after the survey. Comments and observations were registered to clarify the 3rd draft to be applied to the pilot study.

5. Conclusion

The main motivation of this research is to response to the calls for a modified information system success covers the e-learning environment. Primary contribution of this research study is to identify the dimensions of the e-learning system success. In this context, this research proposed a conceptual framework to measure learner's benefits from the system via the two mediating factors, user satisfaction and system use. The proposed model identifies success factors affect learners' benefits. The proposed assessment model is applicable to any technology-education mixed environments.

The proposed model is a new model, which need further tests and validation. This study performed some validity and reliability tests (i.e. content validity, face validity and reliability). Since it is a new developed model, it can evolve in parallel with technological improvements and other studies in e-learning. Therefore, validation of the model in different environments is needed and this point is recommended for future research. In addition, future studies may explore other dimensions or Factors for measuring the success of e-learning systems.

REFERENCES

- Aldholay, A., Isaac, O., Abdullah, Z., Abdulsalam, R., & Al-Shibami, A. H. (2018). An extension of Delone and McLean IS success model with self-efficacy: Online learning usage in Yemen. *The International Journal of Information and Learning Technology*.
- Aldholay, A. H., Isaac, O., Abdullah, Z., & Ramayah, T. (2018). The role of transformational leadership as a mediating variable in DeLone and McLean information system success model: The context of online learning usage in Yemen. *Telematics and Informatics*, 35(5), 1421-1437. Bakhri, Syaiful. 2020. "Assessing Information System Success in E-Learning." P. 307 in *ICON-ISHIC 2020: Proceedings of the First International Conference on Islamic History and Civilization, ICON-ISHIC 2020*, 14 October, Semarang, Indonesia. European Alliance for Innovation.
- Ballantine, J., Bonner, M., Levy, M., Martin, A., Munro, I., & Powell, P. L. 1996. The 3-D model of information systems success: the search for the dependent variable continues. *Information Resources Management Journal (IRMJ)*, 9(4): 5-15.
- Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J. J., & Ciganek, A. P. 2012. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education*, 58(2): 843-855. <http://linkinghub.elsevier.com/retrieve/pii/S0360131511002545>, September 17, 2013.
- Chen, H.-J. 2010. Linking employees' e-learning system use to their overall job outcomes: An empirical study based on the IS success model. *Computers & Education*, 55(4): 1628-1639. <http://linkinghub.elsevier.com/retrieve/pii/S0360131510001880>, September 16, 2013.
- Cheng, Y. 2012. Effects of quality antecedents on e-learning acceptance. *Internet Research*, 22(3): 361-390. <http://www.emeraldinsight.com/journals.htm?articleid=17036359&show=abstract>, December 29, 2013.
- De Souza, C. S., & Preece, J. 2004. A framework for analyzing and understanding online communities. *Interacting with Computers*, 16(3): 579-610. <http://iwc.oxfordjournals.org/cgi/doi/10.1016/j.intcom.2003.12.006>, December 15, 2013.
- Delone, W. H., & McLean, E. R. 1992. Information systems success: The quest for the dependent variable. *Information systems research*, 3(1): 60-95.
- Delone, W. H., & McLean, E. R. 2002. Information systems success revisited. In *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference. IEEE*.
- 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. <http://mesharpe.metapress.com/index/PEQDJK46VY52V4Q6.pdf>, September 22, 2013.
- DeLone, William H. and Ephraim R. McLean. 2016. "Information Systems Success Measurement." *Foundations and Trends in Information Systems* 2(1):1-116.
- Fernando, Erick. 2020. "Factors Influence the Success of E-Learning Systems for Distance Learning at the University." Pp. 294-99 in *2020 International Conference on Information Management and Technology (ICIMTech)*. IEEE.
- Hassanzadeh, A., Kanaani, F., & Elahi, S. 2012. A model for measuring e-learning systems success in universities. *Expert Systems with Applications*, 39(12): 10959-10966. <http://linkinghub.elsevier.com/retrieve/pii/S0957417412004988>, September 17, 2013.
- Isaac, O., Abdullah, Z., Aldholay, A. H., & Ameen, A. A. (2019). Antecedents and outcomes of internet usage within organisations in Yemen: An extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. *Asia Pacific Management Review*, 24(4), 335-354.
- Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017). Internet usage within government institutions in Yemen: An extended technology acceptance model (TAM) with internet self-efficacy and performance impact. *Science International*, 29(4), 737-747.
- Keen, P. G. W. 1980. Reference disciplines and a cumulative tradition. In *Proceedings of the 1st international conference on information systems (ICIS 80)*, Philadelphia, PA.
- Keramati, A., Afshari-Mofrad, M., & Kamrani, A. 2011. The role of readiness factors in E-learning outcomes: An empirical study. *Computers & Education*, 57(3): 1919-1929. <http://linkinghub.elsevier.com/retrieve/pii/S0360131511000868>, September 17, 2013.
- Kim, H., Park, J. Y., & Jin, B. 2008. Dimensions of online community attributes Examination of online communities hosted by companies in Korea. *International Journal of Retail & Distribution Management*, 35(10): 812-830.
- Lambropoulos, N. 2005. Sociability and Usability for Contribution based on Situated Informal Learning and Consensus Knowledge Building in Online Communities, 22-27.
- Lee, B.-C., Yoon, J.-O., & Lee, I. 2009. Learners' acceptance of e-learning in South Korea: Theories and results. *Computers & Education*, 53(4): 1320-1329. <http://linkinghub.elsevier.com/retrieve/pii/S0360131509001614>, September 17, 2013.
- Mason, Monica E. 2020. "Design and Delivery of Online Learning for Employees."
- Mason, R. O. 1978. Measuring information output: A communication systems approach. *Information Management*, 1(5): 219-234.

- Milakovich, Michael E. and Jean-Marc Wise. 2019. "Improving the Quality of Online Programs." in Digital Learning. Edward Elgar Publishing.
- Ozkan, S., & Koseler, R. 2009. Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers & Education*, 53(4): 1285–1296. <http://linkinghub.elsevier.com/retrieve/pii/S0360131509001584>, September 16, 2013.
- Ozkan, S., Koseler, R., & Baykal, N. 2009. Evaluating learning management systems: Adoption of hexagonal e-learning assessment model in higher education. *Transforming Government: People, Process and Policy*, 3(2): 111–130. <http://www.emeraldinsight.com/10.1108/17506160910960522>, September 16, 2013.
- Pandey, S. R., & Pandey, S. 2009. Developing a More Effective and Flexible Learning Management System (LMS) for the Academic Institutions using Moodle. *TECHNOLOGY, POLICY AND INNOVATION*.
- Phang, C. W., Kankanhalli, A., & Sabherwal, R. 2009. Usability and Sociability in Online Communities : A Comparative Study of Knowledge Seeking and Contribution * A Comparative Study of Knowledge Seeking and Contribution. *Journal of the Association for Information Systems*, 10(10): 721–747.
- Preece, J. 2001. Sociability and usability in online communities: Determining and measuring success. *Behaviour & Information Technology*, 20(5): 347–356. <http://www.tandfonline.com/doi/abs/10.1080/01449290110084683>.
- Preece, J., & Maloney-Krichmar, D. 2003. Online communities: focusing on sociability and usability. *Handbook of human-computer interaction*, 1–63. http://www.ee.oulu.fi/~vassilis/courses/socialweb10F/reading_material/1/Preece_03-OnlineCommunities-HandbookChapt.pdf, January 2, 2014.
- Salam, Maimoona and Muhammad Shoaib Farooq. 2020. "Does Sociability Quality of Web-Based Collaborative Learning Information System Influence Students' Satisfaction and System Usage?" *International Journal of Educational Technology in Higher Education* 17:1–39.
- Seddon, P. B. 1997. A respecification and extension of the DeLone and McLean model of IS success. *Information systems research*, 8(3): 240–253.
- Shannon, C. E. (1949). Communication in the presence of noise. *Proceedings of the IRE*, 37(1): 10–21.
- Stefanovic, Darko, Ivana Spasojevic, Sara Havzi, Teodora Lolic, and Sonja Ristic. 2020. "Information Systems Success Models in the E-Learning Context: A Systematic Literature Review." Pp. 555–64 in *Annals of DAAAM and Proceedings of the International DAAAM Symposium*. Vol. 31.
- Sun, P.-C., Tsai, R. J., Finger, G., Chen, Y.-Y., & Yeh, D. 2008. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4): 1183–1202. <http://linkinghub.elsevier.com/retrieve/pii/S0360131506001874>, September 16, 2013.
- Vatrapu, R., Suthers, D., & Medina, R. 2008. Usability, sociability, and learnability: A CSCL design evaluation framework. *Proceedings - ICCE 2008: 16th International Conference on Computers in Education*, 369–373. <http://www.scopus.com/inward/record.url?eid=2-s2.0-84856954568&partnerID=40&md5=3d0c029f296cc617d7f365d671985cd2>.
- Wang, H. C., & Chiu, Y. F. 2011. Assessing e-learning 2.0 system success. *Computers & Education*, 57(2): 1790–1800. <http://linkinghub.elsevier.com/retrieve/pii/S0360131511000704>, September 17, 2013.
- Wang, W. song, & Wang, C. C. 2009. An empirical study of instructor adoption of web-based learning systems. *Computers & Education*, 53(3): 761–774.

APPENDIX

Questions list of the survey.

Information Quality

- The system always provides up to date information.
- The system provides relevant information to learning
- The system provides accurate information
- The system provides sufficient information
- The system provides well formatted information.

System Quality

- The system is always available
- The system information access is fast (high speed)
- The system appeal users for its attractive features
- The system is user friendly to deal with.

Service Quality

- It is easy to become familiar with the system.
- The team provides good enough support to the system
- The system online-assistance is in a proper level
- Communicating with instructor is always available
- Instructor shows a friendly attitudes towards learners
- Instructor is knowledgeable enough about content.

System Sociability

- The system enables interactive communication among learners
- Learners actively interact with each other in the system
- Many learners participate in the discussed topics
- Learners' knowledge in regards to the discussion is good.

Intention to Use

- I frequently use the system.
- I will reuse the system for its valuable.
- I depend upon the system.
- I will strongly recommend others to use the system.

User Satisfaction

- I feel that the system is useful.

- I feel motivated to use the system.
- I feel that this course served my needs well.
- Overall, I am satisfied with the system.

Learner Outcome

- The system increase my studying productivity
- The system improve my studying performance
- The system activities helps my think through problems
- The system are valuable in helping me appreciate different perspectives.
- Overall, the system has a positive impact on my learning.