

Embedding the Social Features into E-learning System: A Review

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Abstract. E-learning has received considerable attentions in both universities and enterprises. However, a few related studies have advocated the benefits of social features as an important factor of E-learning but have not explored much further. In this work, we utilize social support theory to argue that embedding the social features into e-learning system is necessary and appropriate. Collectively, potential direction of e-learning has been simple summarized from theoretical and practical prospect. We hope our reviews on current literatures can benefit both scholars and practitioners.

Keywords: E-learning · Collaborative learning · Social support

1 Introduction

With the emergence of internet and explosive growth of knowledge, more and more people would like to use online tools or resources for further learning and knowledge sharing, one of these areas is known as E-learning. E-learning system refers to a web-based system that users or learners can obtain information or knowledge through digital activities [1]. A good example of this is MOOC (massive open online courses). This new tool has changed the way people learn, work and live. In this regard, E-learning system has been widely adopted by both universities and enterprises. An E-learning Market Trends & Forecast report made by Docebo, predicted that worldwide E-learning market will reach 51.5 billion of dollars by 2016 [2]. In particular, the enterprises are found as the largest customers for the E-learning systems in order to train or continue educating their staff. According to the report published by ASTD on 2016, 95% U.S. enterprises with more than 500 employees use e-learning system for staff training, with the highest amount being spent on information technology (IT) training.

Differing from traditional face-to-face learning approach, E-learning is characterized by several advantages, such as convenience, efficiency, and site openness [3, 4]. For example, staff can seamlessly learn and receive education by using electronic systems. Nowadays, with the fast development of web 2.0, more and more social features, such as social bookmarking or feedback mechanism, are considered in designing an e-learning system. Such findings sufficiently indicate that e-learning system has been shifted from a conventional web-based system to an IT artifact featured with dynamic and interactive features, namely, a collaborative learning system.

Collaborative learning denotes a learning approach that students and teachers collaborate to accomplish a specific learning goal in order to promote learning outcomes, which emphasizes the teamwork and more proactive participation. Considerable works have proved the significance of collaborative learning [5] from various perspectives. For instance, by employing cognitive psychology, cooperative learning and social practice theory, Stahl [6] conceptualized a collaborative learning model with the combination of personal knowledge and social knowledge construction. Besides, Coll [7] and his colleagues (2014) emphasized that teacher's participation could improve learning outcomes when students engaged in online collaborative learning. In summary, collaborative learning can be more benefit to construction of knowledge and more efficient for learning.

In the studies of collaborative learning, interaction has been widely proved as a positive factor, which can be understood by the social support theory. As we know, learning is a process with the involvement of human factors and personal interactions [8]. People need social interaction to satisfy their social needs for support, and this psychology need can be reflected in the E-learning activity. For instance, by investigating 200 students' Facebook profiles, Bosch [9] investigated the role of social factors in community-based learning, where the users are found to like sharing and discussing with their friends. Detailed argument will be introduced in Sect. 3 subsequently.

For the remainder of this study, a literature review on E-learning is given. Next, we introduce social support theory to argue that embedding social features into E-learning is necessary. Finally, the future prospect and conclusion are presented.

2 Literature Reviews

Rather than a simple combination of Internet and learning materials, E-learning denotes "an environment in which the learners' interaction with learning materials, and/or instructors are mediated through advanced information technology" ([10], p. 2). In the past decades, many scholars from psychology, computer science and information system disciplines have identified the factors relating to E-learning systems. Among them, evaluating E-learning is an essential work. In order to enable managers to achieve optimum investment and allow learners to learn efficiency [11], several approaches have been introduced to evaluate the effectiveness of E-learning. A typical method for evaluating the e-learning system is the AHP (Analytical Hierarchy Process) method. For example, by conducting AHP methods' basic theory, Chen and Yang [12] established a set of indexes used to evaluating the intelligence of online learning system. Then, they used AHP to determine the weight of each index. Similar method has been used in Colace [13] and Alice [14] work. In addition, Matsatsinis et al. [15] argued that the evaluation process completely depends on the users' judgment. Thus, they applied Linear Programming (LP) for measuring satisfaction indexes and determining the weights of criteria. Besides, other scholars utilized different methods [16–18] to present an evaluation framework with multi-criteria design. We summarized the most significant criteria used in the evaluation of E-learning performance in Table 1 below. As we can see, most indexes focus on the technology aspect. However, the

Table 1. Summary of the significant criteria in E-learning evaluation

Author	Main criteria	Focus
Zhang et al. (2010) [19]	Usability, Response time, Interactivity, Accessibility, Security	Establishing the hierarchical structural model in order to assess the affecting factors of e-learning adoption in China
Munkhtsetseg et al. (2014) [20]	Usability, Accessibility, Stability	Identifying 13 criteria which can be divided into 4 groups. Then, AHP, as a technique, was used to evaluate open-source e-learning systems and edunet system
Shee and Wang (2008) [21]	Usability, Web and course design, Accessibility, Stability	Comparing and evaluating the user behaviors between pre-adoption and post-adoption of e-learning systems
Bhuasiri et al. (2012) [22]	Usability, Response time, Interactivity, Accessibility, Reliability, Functionality	Utilizing the AHP method to explore the key affecting factors of e-learning system in developing countries, and comparing the crucial success factors between experts and faculty
Jie (2010) [23]	Response time, Interactivity, Web and course design, Accessibility, Reliability	Evaluating the online course quality and considering more about factors like course content and system design
Hwang (2004) [24]	Usability, Functionality, Web and course design, Reliability, Security, Functionality	Proposing a combined group-decision method which includes AHP, fuzzy theory, and group decision method for evaluating educational website
Lo et al. (2011) [25]	Usability, Response time, Interactivity, Functionality, Stability	Identifying the crucial factors regarding to the successful implementation of customized e-learning system
Wang and Lin (2012) [26]	Functionality, Stability	Examining the interactive learning process from an integrated approach composed of fuzzy AHP and AR (associate rule)
Cobo et al. (2014) [43]	Interactivity	Developing a new model combined the AHP and data mining to evaluate the students' interactivity on online learning systems
Büyüközkan et al. (2010) [44]	Security, Web & Course design, Interactivity	Proposing a fuzzy TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) methodology which based on the axiomatic design method, then it has been used to analyze the quality of e-learning systems

(continued)

Table 1. (continued)

Author	Main criteria	Focus
Alptekin and Karsak (2011) [46]	Usability, Cost-Effectiveness	Presenting an e-learning evaluation/selection framework which includes QFD (Quality Function Development), fuzzy linear regression and optimization
Jeong and Yeo (2014) [47]	Usability, response-time	Identifying nine major criteria and establishing a quality model in accordance with multimedia factors. After that, adopting pairwise comparison approach to evaluate the model

human factor is the key role in the whole learning process. Thus, researchers gradually reshaped the view from advanced technology to human behavior.

As opposed to understanding e-learning from technological perspective [27, 28], more and more researchers interest in investigating factors that drive a successful E-learning from behavior perspective. For instance, Selim [29] proved that teacher characteristics (attitude and control techniques, teaching style), student characteristics (computer skills, interactive cooperation, e-learning content and design), technology (Easy access and infrastructure) and support served as determinant variables influencing the effectiveness of E-learning system. Besides, the learner's loyalty was found as another determinant influencing users' behaviors in Chiu's work [30]. In addition, Rodriguez-Ardura et al. [31] constructed a comprehensive model to explore the role of interactional features impacting learning outcomes. The result showed that interactivity was positively related to learner's response, but such effect was mediated by imagery, spatial and co-presence, and flow. Moreover, in order to understand the human psychological factors in e-learning systems, Eligio et al. [32] argued that emotion understanding could facilitate the effectiveness of online learning. Except technology, the factors affecting e-learning satisfaction proposed by previous scholars can be concluded into the following five dimensions, including learner dimension, teacher dimension, course dimension, design dimension and environment dimension.

In summary, existing researches largely focus on e-learning system design from following perspectives: E-learning effectiveness evaluation, affecting factors, instructional programming and other technological issues, and course design etc. A few related studies have advocated the benefits of social features as an important factor of collaborative learning but have not explored much further. With this in mind, in order to increase the successful rate of online learning implementations, these social features deserved attention from management and system designers. This work can be replenishment for this.

3 Social Support

E-learning is an adaptive learning activity relates to the interaction between users, the user interactivity has been proved as one of the most essential features in previous studies [33, 34]. Traditional E-learning system essentially neglects these social factors, which can no longer satisfy the needs of learner. Interactive system, which is based on the collaborative learning, is the emergence pattern. Current E-learning systems provide basic collaborative learning, learner can discuss with other students or teachers when they have questions. However, this interaction is deficient, the complex interaction activity still can't be achieved. The existing problems are concluded as follow:

- Lack of participation.
- Lack of specificity.
- Inconvenient to Knowledge sharing.

With the rapid development of social media, aggregating several Web 2.0 tools (et al. wiki, blog, and media sharing tools) and integrating the social features into e-learning systems can solve the above problems, which can be supported by social support theory. Social support refers to a perception that people feel about being responded to friends in their supportive social network. It builds a well-established foundation for understanding the social behavior of individual. Currently, online community has been found as a powerful channel for users to enhance their well-being [38–40]. In other words, more and more people will hang out on online communities to search warmth or belonging in order to satisfy their social needs. Compared to face-to-face communication, online social activities are more conducive to individual's social support [42]. Generally, online social support is virtual and intangible [45], which can mainly divide into information support and emotional support [35]. Information support refers to providing useful messages and advice during the learning process. Emotional support refers to giving emotional concerns such as understanding, caring and stimulating.

Since social support on the online learning activity is intangible in nature and is often relied-on interaction between users, the role of social factor in the practical application of collaborative learning systems is gaining much interest from recent scholars. For instance, Chatti and his colleagues (2007) [51] argued that web 2.0 technologies can help contribute to knowledge sharing and learning performance, and presented a social software which can benefit to online knowledge/learning management. Besides, Johnson [48] added the factor "social presence" into e-learning environment and found that social presence relating to satisfaction and interaction had a positive impact on performance and satisfaction. In addition, Yujong Hwang [49] introduced "social influence" concept in exploring the shaping attitudes toward knowledge sharing through email in online learning context, and the result indicated that all social influence factors are found to positive influence users' sharing attitude.

The role of social support in collaborative learning system can be described as follow. Since social support could enable individual obtain warmth and care, as a feedback, it would be natural for learners to collaborate and share information. Knowledge sharing is an important construct in e-learning context, on which

incorporating social features [10, p. 2], [36, 50]. E-learners are interested in interacting with their friends such as sharing learning experiences or consulting learning questions in their learning process, through which their relationship can be enhanced. Learners' intentions to share knowledge in the online community often influence the success of E-learning systems [37]. In brief, E-learners are more willing to use the system that with a well social support [41]. Thus, the frequency interactivity may further increase the motivation to continue online learning, which in turn decides the outcomes of E-learning system.

In line with the above understandings, we believed that social support could be treated as an important theory in understanding the collaborative learning in current information system (IS) research. Therefore, considering more social factors in designing and exploring E-learning system is in accord with social support theory.

4 Conclusion

Collectively, the topics of E-learning have been received considerable attentions. Given the importance of social factors in online collaborative learning, this work explained that the social support theory helps contribute to a better online learning outcome. We hope our reviews on current literatures can benefit both scholars and practitioners. From the theoretical perspective, the feature of interactivity should be conceptualized into the emerging model of e-learning research. Besides, some scholars proceed from a social theory perspective with a more cross-cultural, Interdisciplinary engaged look at E-learning. Moreover, other factors like cognitive psychology, personalization and intelligent features, would have potential contribution to further shape the design of e-learning artifact. From the practical perspective, emerging services that can integrate face-to-face learning and online learning will be adoptive to increasing the learning effectiveness. In addition, aggregating e-learning features into mobile devices will be a crucial application in future.

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