The Effects of Learners' Aptitude and Transformation of Social Web Activity Experiences on Online Learning: An Exploratory Study

Tzy-Ling Chen [a], Hsiu-Ping Yueh [b]
[a]*Dept. of Bio-Industry Extension and Management, National Chung Hsing University, Taiwan*
[b]*Dept. of Bio-Industry Communication and Development, National Taiwan University, Taiwan*
yueh@ntu.edu.tw

Abstract: One of the facts of online learning is when learners engage in such learning, the rest of the Web is merely a click away. While many studies have identified an association between learners' personal attributes and online learning experiences, few have explored the linkages among learners' aptitude, experiences of daily social web activities, and perception of online learning. The purpose of this exploratory study was to examine the relative effects of learners' personal aptitude and transformation of social web activity experiences on their perceptions of online learning. A total of 95 university-bound undergraduate students participated in the study by completing two sets of questionnaires administrated at the beginning and the end of semester respectively. The participants were divided into four groups based on the degree of experiential learning transformation and were compared across the variables of learner aptitude and perception of online learning. Data were analyzed using frequency analysis, correlation analysis, and multivariate and univariate analysis of variance. Result revealed the significant main effect of experiential learning transformation of social web activities on changes in learner perception of online learning. In addition, one significant interaction effect deriving from experiential learning transformation and learner autonomy pertaining to the variable of personal aptitude was further identified. Finally, our finding has implications for the inclusive instructional design of online social technology resources.

Keywords: learner aptitude, social web activity, online learning, learner perception

Introduction

The concept of Web of the life indicates that changes in our thoughts are related to the connectedness with interwoven social activities of one's daily life [1]. Such argument is in line with the findings suggested by many recent studies based on the perspective of sociocultural learning theory. It is asserted that one's mind is constantly evolving in accordance with the changes brought by new products and services coexisting in an environment. It is also impossible to understand one's behavior outside a social and cultural context. Moreover, this point of view has offered an alternative to guide a study involved the new learning method or approach, such as e-learning.

Similar to other countless "e-"related social activities, e-learning pertaining to one representation of the current state of "e-"society, "e-"culture, and "e-"phenomenon is an inevitable result of "e-"revolution on the one hand. On the other hand, e-learning is possessed of more social attributes and actions closely interlocking with the changes of various social and cultural phenomena in comparison with the rest of technology-assisted learning. Such characteristics clearly unfold the nature of social technologies utilized in any e-learning practice. In addition, e-learning practices are spreading out within and outside the

traditional learning setting, which emerges more important research variables from this dynamic “e-”enabled social activity necessary to take into account [2]. However, the mainstream of current e-learning studies that failed to consider variables rooted in broader social and culture context dooms to ill illustrate learners’ changes in the participation of e-learning.

Many learners engaging in online learning are also using these similar online social technologies in their daily lives for different purposes, whose such experiences with “e-”activities can be expected to have some relevance to their learning online. When learning online, it is further observed that learners who are more effective actually integrate skills learned from their previous engagements according to a systematic perspective. Therefore, e-learning is extended and expanded to incorporate experiential learning events of every aspect of daily life [3] [4]. As such, there is a need to examine the relative effects of learners with different personal attributes and involvement in social “e-”activities to better understand the meaning of e-learning in various contexts. Consequently, the present study aimed at understanding the changes of learner perception towards to e-learning based on the sociocultural learning theory. In particular, specific objectives for this study were to determine: (1) the extent to which transformation of social web activity experiences is effected by learners’ aptitude, and (2) the effect of learners’ aptitude and transformation of social web activity experiences on their perceptions of online learning.

Literature Review

As early as in 1990s, through a vigorous advertising campaign by IBM, the “e-” phenomenon has sprawled rapidly, and in less a decade, many new “e-“related applications have been infused deeply in every aspect of the society [5][6]. With an ever-increased prominence of “e-“phenomena, “e-“verything or “e-“verywhere is not exaggerated at all. Thus, the concern has come to what an individual needs to know and an organization needs to change in order to make sense of this quickly evolving “e-”phenomenon. Amid of these “e-“related social changes, the present study targeted at e-learning practice.

What distinguishes e-learning from other technology-mediated learning is the utilization of Internet and many Internet-facilitated applications that have become the most important means of communication in the modern world [7]. It is further suggests that the Web architecture revolution is realizing the pioneering vision of the Internet as the true kernel of community, knowledge, and learning [8][9]. In fact, application of various Internet or Web-based technologies, such as discussion board, instant messaging, blog, etc has gradually replaced telephony as a popular means to maintain social networks among young people. Similarly, more and more e-learning designers also take advantage of these applications and inexplicitly make learning online closely knitted into many social web activities. Moreover, e-learning not only provides people with an opportunity for individual growth or lifelong learning pursuit, but the basic condition for manifesting significant social changes is also led by all sorts of network-based learning practices [6]. Accordingly, for the first time in the human history, the technological innovations commence blurring and eliminating the boundaries between formal and informal learning and invoking a drastic educational and training transformation in today’s society [10].

A review of literature found that many studies often focused on discussions on use of instructional technology within a traditional learning context [11] [12] [13] and less concerned the related impacts these Web technologies have on participants’ individual behaviors as online learners. It has been overlooked how learners’ experiences of using the same Web technologies in everyday social activities interact with their behavioral patterns, attitudes, perceptions of online learning. As it is suggested that it is pivotal to take into account social and organizational context in which innovations will be integrated, the

omission of this regard can lead to poor match of user's needs with design and often very poor level of technology uptake and use in practice [14]. Therefore, the interest of the present study is to explore whether individuals' experiences of immersing in social web activities are significantly related to changing individuals' beliefs and perceptions towards e-learning and subsequently reflecting on the behavioral change of participation.

The research framework is constructed on sociocultural learning perspective that suggests learning is a context-based process involving a higher order of cognitive development, which is conceptualized as the transformation of socially shared activities into appropriate process based on Vygotsky's sociocultural theory [15]. As such, this attribute is also identified as "learning by expanding" [16], and personal experiences are just as important as factual knowledge of the world [17]. Basically, experiences are considered as the result of varied social practices that occur in everyday life either through direct participation or vicarious observations [18] [19]. In consequence, "e-"experiences are not only integrated into the situated context to mediate interactions, but also capable of shaping a person's beliefs and attitudes towards coping with the emergent challenges within a broader sociocultural context [20] [21]. These assertions coincide with standpoint of social technology attributing perception and behavioral changes to the result of social interactions between an individual and intangible aspect of social transformation [22] [23]. Specifically, the importance of ones' experiences in a social practice is established as a necessary ingredient for individuals to shape personal beliefs and develop strategic attitudes towards successfully coping with different issues derived from the external world [24] [22] [25] [23]. Furthermore, transformation of experiential learning stemming from involvement in such social "e-"activities to strategically sustaining an e-learning practice is critical and also different among individuals. Even the importance of focusing on these relationships, the extant literature seems yet to provide empirical evidence linking transformation of social web activity experiences with individual differences.

Against this backdrop, the research reported in this paper empirically investigates: how can an e-learning phenomenon best understood in the context of individual differences? Are different personal characteristics related to experiential transformation of involvement in social web activities into an e-learning practice? What are the determinant personal characteristics in relation to transforming experiences of engaging in social web activities into an e-learning practice?

Method

1. Study Context and Participants

A quantitative survey design employing structured self-reported questionnaires as the research instrument was used to answer the research questions. This study used two undergraduate courses taught by the same instructor, using the same learning management system (eCampus 3.0) where online learning took place as a supplement to classroom instruction at the National Chung Hsing University (NCHU) in Taiwan. The student group that took these two courses in 2006-2007 was aimed for investigation.

A total of 95 college students (57% female) participated in this study by completing two sets of questionnaires administrated at the beginning and end of semester respectively. The participants ranged in age from 20 to 35, but most were of traditional college age. Students had declared majors in seven colleges at NCHU, representing the liberal arts, social sciences and management, engineering, veterinary medicine, life sciences, science, and agriculture and natural resources. All students surveyed are with prior experiences of using the Internet. The distribution of experiential learning transfer behavior of social web activities for the final sample consisted of 23 regular users, 43 occasional users, 24 rare users, and 5 non-users,

classified on a basis of evaluating participants' actual incorporation of social web activities' experiences into online learning of the course they took at the semester when this study carried out.

2. Instrument and data analysis

Two questionnaires were developed for this study. One examined learners aptitude, including learner autonomy, competencies of use of varied information technologies, and perceptions of e-phenomena as well as participants' viewpoint of online learning at the beginning and end of semester, and at the end of semester, variables of the experiential learning transfer behavior of social web activities, and perceptions towards experiential learning transformation of social web activities were explored. Students in the sample were classified according to the learner autonomy (LA: active versus passive), competencies of use of varied information technologies (CIT: high-, medium-, and low-competent group), and experiential learning transfer behavior of social web activities (LTB: regular users, occasional users, rare users, and non-users). The measure of LA was operationalized with one categorical variable: "active" for very active and active learner and "passive" for passive and very passive learner. As for measure of CIT, it was operationalized with 10 ordinal variables. The mean score of these 10 variables was calculated, and participants were then separated into low-, medium-, and high-competent group based on their CIT average. The measure of LTB was also operationalized with one categorical variable in reference to behavioral frequency of incorporation of what has been learned from social web activities into their online learning in a particular class. The response format for this measure was labeled and coded: "frequently" for "regular users," "sometimes" for "occasional users," "seldom" for "rare users," and "never" for "non-users." Perception measures in this study include three sets of questions scored on a 6-point Likert scale, ranging from "strongly agree (1 point) to "strongly disagree" (6 points). All variables were operationalized with scales that were carefully constructed for the study and pretested by a group of educational experts and college students through personal interviews. Feedbacks pertaining to measurement clarity or appropriateness were provided as a base for improving and modifying questionnaires until they were satisfied with it through a recursive process. Content validity was also established through the evaluation by experts in the field of instructional technology and online learning. The reliability of each perception dimension as measured by Cronbach's alpha was ranging from 0.77 to 0.91 as illustrated in Table 1. These reliability coefficients are high and well above the cutoff rate of 0.7 recommended by [26], meaning the measures were acceptable reliable. Throughout this process, questionnaires were confirmed suitable for the purposes of this study.

Data collected from two questionnaire surveys were analyzed using multivariate analysis of variances (MANOVA), correlation analysis, and descriptive statistics. All statistical analyses applied in this study were performed using SPSS.

Result

Means and standard deviations of perception towards experiential learning transformation of social web activities and perception change of online learning for the 95 learners by LA, CIT, and LTB are reported in Table 2.

In addition, Pearson correlation analysis was conducted to determine the relationships among variables in this study. The results, including correlation coefficients are presented in Table 3.

Table 1 Perception measures and scale reliability

Perception measures and question items	Cronbach's α
Perception toward experiential learning transformation of social web activities	
1. My experiences in using the Internet in everyday life are helpful to me when taking this web-based course (supplemented with web-based instruction)	
2. When classmates have trouble using the online learning system, I would provide them with help based on my own experiences learned from using the Internet in everyday life	
3. I am willing to apply my experiences learned from using the Internet in everyday life to this web-based course (supplemented with web-based instruction)	
4. Having experiences in using the Internet in everyday life makes me feel less reluctant to sign up a class that is taught in an online context (or a web-based course)	
5. Having experiences in using the Internet in everyday life is beneficial to taking any web-based course (supplemented with web-based instruction)	.91
6. I feel great when I can use my experiences learned from using the Internet in everyday life in this class (supplemented with web-based instruction)	
7. My experiences in using the Internet in everyday life make me have little trouble engaging in the online learning activities required by this class	
8. I am capable of applying my experiences learned from using the Internet in everyday life to this web-based course (supplemented with web-based instruction)	
9. Having experiences in using the Internet in everyday life makes me less worry about having trouble using online learning system in this class (supplemented with web-based instruction)	
Perception of online learning at the beginning of semester	
1. To me pursuing learning online is acceptable	
2. Learning online is easy to me	.77
3. I think learning online is effective	
Perception of online learning at the end of semester	
1. Now I believe online learning is effective	
2. Now I think online learning is acceptable	.77
3. Now I feel learning online is easy	
Perception of e-phenomena	
1. Using the Internet is easy to me	
2. Communicating with others via the email is important to me	
3. Searing the needed information on the Internet is important to me	
4. Using the Internet and emailing have become my daily routine	
5. I am with certain online discussion groups or online communities	
6. Chatting with the people I know via the Internet is something I will do	.88
7. The Internet is full of useful resources	
8. I frequently communicate or exchange information with others via the Internet	
9. Shopping online or online trading is something I will do	
10. Learning via the Internet, such as submitting assignments online, asking questions online and so on is something I will do	

Table 2 Learners' distribution and descriptive statistics by LA, CIT, and LTB

	Perception towards experiential learning transformation of social web activities	Perception of online learning	
		Beginning of Semester	End of Semester
Learner autonomy (LA)			
Active (n=57)	Mean=2.73 (S.D.= .86)	Mean=1.96 (.41)	Mean=2.09 (.41)
Passive (n=38)	Mean=2.69 (S.D.= .58)	Mean=2.06 (.51)	Mean=1.96 (.44)
Competence of use of various information technologies (CIT)			
High-competent (n=37)	Mean=2.75 (S.D.= .78)	Mean=1.82 (.41)	Mean=2.11 (.42)
Medium-competent (n=46)	Mean=2.61 (S.D.= .79)	Mean=2.10 (.43)	Mean=1.96 (.46)
Low-competent (n=12)	Mean=3.03 (S.D.= .56)	Mean=2.17 (.48)	Mean=2.14 (.26)
Transfer behavior of experiential learning of social web activities (LTB)			
Regular user (n=23)	Mean=2.32 (S.D.= .95)	Mean=2.04 (.56)	Mean=1.86 (.52)
Occasional user (n=43)	Mean=2.70 (S.D.= .52)	Mean=1.99 (.40)	Mean=2.05 (.30)
Rare user (n=24)	Mean=3.05 (S.D.= .82)	Mean=1.99 (.49)	Mean=2.17 (.43)
None user (n=5)	Mean=3.13 (S.D.= .14)	Mean=1.93 (.15)	Mean=2.27 (.64)

Table 3 The relationship among variables

	PT	PC	PE	LA	CIT
PC	0.36**				
PE	0.13	-0.33**			
LA	- 0.03	-0.18	0.31**		
CIT	- 0.05	0.24*	-0.59**	-0.32**	
LTB	0.36**	0.23*	-0.08	-0.01	-0.07

*p<0.05 **p<0.01

PT: Perception towards experiential learning transformation of social web activities

PC: Perception change of online learning

PE: Perception of e-phenomena

LA: Learner autonomy

CIT: Competence of use of various information technologies

LTB: Transfer behavior of experiential learning of social web activities

Prior to examining the interaction effects, the univariate main effects were interpreted using one-way ANOVA. Based on the results of analysis, there existed a significant effect of transfer behavior ($F_{(3, 91)}$=4.616, p< .01) predicting their view on transformation of experiential learning stemming from participation in social web activities. In other words, the more frequently students incorporated what has been learned from social web activities into their online learning in class, the more positive perception toward experiential learning transformation of social web activities was confirmed. There also was a significant effect of competence of use of various information technologies on students' perception change of online learning ($F_{(2, 92)}$=4.895, p< .01). In this case, students who are with different competent in using various information technologies demonstrated significant variance in perception change in online learning over time.

For perception change of online learning over time, Repeated Measures MANOVA was performed to test if there was a significant difference in the means of perception change (which was measured by the perception scores of the end of semester comparing with the perception scores investigated at the beginning of semester) among students of each personal aptitude and four types of transfer behavior. Table 4 presents the test results.

Table 4 Repeated Measures MANOVA of PC by interaction variables

Dependent variable: Perception change of online learning (PC)						
Source	TypeIII SS	df	MS	F	Sig.	Wilks' Lambda
LA-LTB effects						
LA	0.420	1	0.420	1.135	.290	0.978
LTB	3.316	3	1.105	2.985*	.036	0.940
LA×LTB	3.686	3	1.229	3.318*	.024	0.922
Error	32.213	87	0.370			
R^2=0.182						
CIT-LTB effects						
CIT	0.738	2	0.369	0.960	.387	0.874
LTB	0.731	3	0.244	0.634	.595	0.956
CIT×LTB	1.525	6	0.254	0.661	.681	0.923
Error	31.912	83	0.384			
R^2=0.190						
PE-LTB effects						
PE	19.249	30	0.642	1.228	.297	0.934
LTB	7.107	3	2.369	4.533*	.011	0.943
PE×LTB	15.231	34	0.448	0.857	.668	0.949
Error	14.112	27	0.523			
R^2=0.739						

As shown in Table 4, only main effect for transfer behavior ($F_{(3, 87)}$=2.985, p< .05) and the interaction effect involving learner autonomy and transfer behavior ($F_{(3, 87)}$=3.318, p< .05) were found statistically significant. This implies the differences in the means of perception change of online learning over time between the two types of learners in terms of active and passive learner autonomy did vary as a function of students' transfer behaviors of incorporating what they learned from social web activities into online learning in a particular class. The interaction effect on perception change of online learning actually depended on the types of transfer behaviors for main effect due to the personal attribute of learner autonomy yielded no significant influence. These findings corroborate those of [21], suggesting that "e-"experiences are capable of shaping personal beliefs and attitudes towards coping with emergent challenges in a different context.

In other words, for learner's online learning experience, the effects of learner attribute in terms of active or passive learner were proven dependent upon learner's transfer behaviors of making use of social web activity experiences in the online learning class. This further reveals that for those active learners prone to taking advantage of prior social web activity experiences they engage in daily lives more frequently, they were possessed of a better or greater online learning experience.

Conclusion

This study supported what has been found in the vast majority of research into e-learning in higher education learner's competences of use of various information technologies is related to and demonstrates having the significant impact on learner perception towards online learning. This study also provided evidence that transfer of experiences originating from e-activities learners involve in daily lives in combination with certain learner attribute, the learner autonomy in this case, can fully describe the online learning experience to a greater extent. From an educational point of view, findings of the current study provide evidence on the emergence of so-called "social interaction" phenomena of e-learning, which are founded upon experiential learning transformation related to the human act of learner transfer behavior and cognitive development. In this sense, the search for a better learning mechanism taking into account social interaction aspect has fertile ground for future research in instructional design.

References

[1] Capra, F. (1996). *The Web of life: A new scientific understanding of living systems*. New York, NY: Anchor Books.

[2] Walker, S. (2003). *Development and validation of an instrument for assessing distance education learning environments in higher education: The distance education learning environments survey*. Unpublished Doctor of Science Education Thesis, Curtin University of Technology, Perth.

[3] Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age.* New York, NY: McGraw-Hill.

[4] McKay, E., & Martin, B. (2002). The scope of e-learning: Expanded horizons for life-long learning, *InSITE-"Where Parallels Intersect"* (pp.1017-1029). Melbourne, Australia: Informing Science.

[5] Hemetsberger, A. (2002). Fostering cooperation on the Internet: Social exchange processes in innovative virtual consumer communities. *Advances in Consumer Research*, 29, 354-356.

[6] Trentin G. (2004). Networked Collaborative Learning in the Study of Modern History and Literature**,** *Computers and the Humanities* , 38, 299-315.

[7] Risco, S. & Naaji, A. (2003). *IT infrastructure optimization regarding the e-Learning implementation* (pp. 210-213). Retrieved December 19, 2005 from

http://conference.iasi.roedu.net/site/conference/papers/RISCO_S-IT_Infrastructure_Optimization_Regarding_the_e-Lea..pdf

[8] Kay, David. (2002*) E-Learning Market Insight Report. Drivers, Developments, Decisions.* FD Learning Ltd. Retrieved December 19, 2005 from http://www.fdlearning.com/fdlearning/html/company/papers/FD%20Learning_e-Learning_Report.pdf

[9] Zota, R. D. & Oancea, B. (2003). *E-learning in the academic context: Toward a new economy of education* (pp. 282-286). Retrieved December 19, 2005 from http://193.226.6.174/roedunet2003/site/conference/papers/ZOTA_R-E-learning_in_the_Academic_Context.pdf

[10] Derrick, M. G. (2003). Creating environments conducive for lifelong learning. *New Directions for Adult and Continuing Education*, 100, 5-17.

[11] Clark, R. E. (1983) Reconsidering the research on learning from media. *Review of Educational Research*, 53(4), 445-459.

[12] Croft, R. S. (1994). What is a computer in the classroom? A Deweyan philosophy for technology in education. *Journal of educational technology system*s, 22(4): 301-308.

[13] Denk, J., Martin, J., & Sarangarm, S. (1993). Not yet comfortable in the classroom: A study of academic computing at three land-grant universities. *Journal of Educational Technology Systems*, 22(1), 39-55.

[14] Dobson, M., LeBlanc, D., & Burgoyne, D. (2003). Transforming tension in learning technology design: Operationalizing activity theory. *Canadian Journal of Learning and Technology*, 29 (3). Retrieved December 19, 2005 from http://www.cjlt.ca/cpntent/vl30.1/cjlt30-1_art2.html

[15] Vygotsky, L. (1978). *Mind in Society: the Development of Higher Psychological Processes*. Cambridge : Harvard University Press.

[16] Engestrom, Y. and Middleton, D. (eds) (1998) *Cognition and Communication at work.* New York, NY: Cambridge UP.

[17] Lave J., & Wenger E., (1991). *Situated Learning. Legitimate Peripheral Participation*. England, Cambridge: Cambridge University Press. Retrieved December 19, 2005 from http://www.sloan-c.org/publications/magazine/v4n2/burdenson.asp

[18] Csikszentmihalyi, M. 1997. *Finding flow: The psychology of engagement with everyday life*. New York, NY: Basic Books.

[19] Jain (2001)

[20] Prawat, R.S. (1996). Constructivism, modern and postmodern. *Educational Psychologist, 31*(3-4), p. 215-225. Lawrence Erlbaum Associates, Inc.

[21] Wenger, E. (2000). Communities of practice and social learning system. *Organization, 7* (2), 225-246.

[22] Helmer, O. (1996). *Social technology*. New York, NY: Basic Books.

[23] Skovsmose, O. (1994). *Towards a philosophy of critical mathematics education.* Norwell, MA: Kluwer Academic Publishers.

[24] Gauvain, M. (2001). *The social context of cognitive development.* New York, NY: The Guilford Press.

[25] Hill, R. (2002). *Activity theory: A framework for analyzing the learning processes of New Zealand sheep farmers relating to decision-support software*. A paper presented in the Fifth European Symposium on European Farming and Rural Systems Research and Extension, in Florence, Italy, 7-11 April, 2002. Retrieved December 19, 2005 from http://www.webresearch.co.nz/docs_public/IFSAPaper.pdf

[26] Nunnally, J. (1978). *Psychometric theory*. New York, NY: McGraw Hill.