

STUDENTS' PERSPECTIVES ON THE PROCESS AND EFFECTIVENESS OF A SELF- AND PEER- ASSESSMENT STRATEGY IN LEARNING WEB DESIGN WITHIN A WIKI ENVIRONMENT

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Abstract

The complicated process of web design demands knowledge and skills in various domains. Even though web design criteria, guidelines and principles were suggested in the literature, few studies were found on how to enhance the effectiveness for a web design learning process. This study introduces a self- and peer- assessment strategy on learning web design. Students expressed that they became more active, serious, independent, critical and confident in the web design process. They also stated that they learned more and found the strategy beneficial. This paper also reports the effectiveness of the strategy in learning the application of web design principles in designing high quality website.

Introduction

With the development of web design software, it is no longer a difficult task to create a website. A *website* is an electronic medium to convey information. Whether the presentation of information and the design of a website can enhance users' comprehension is a challenging and important issue in web design. To improve the quality of web design, quality checkers, criteria, guidelines and principles on web design were suggested in the literature (Zaphiris, Ghiawadwala, & Mughal, 2005; Ivory & Hearst, 2002; Farkas & Farkas, 2000). However, the integrated application of web design principles in producing high quality website is not a straightforward issue. In the literature, few studies can be found to address the learning process for creating a high quality website.

The paradigm shift on the purposes of assessment from mainly summative to more emphasize on formative has gained support from advocates especially after the literature review conducted by Black and Wiliam (1998) that confirmed beneficial evidences in learning. Self- and peer- assessments are commonly used formative assessment strategies for enhancing learning effectiveness with underpinning rationales to transform students into reflective learners (Dochy, Segers, & Sluijsmans, 1999). In order to enhance the effectiveness in the learning process of integrated application of web design principles in designing high quality websites, this study introduces a self- and peer- assessment strategy in learning web design within a Wiki environment. This paper also reports students' perspectives on the process and effectiveness of the learning strategy.

Literature Review

A review of previous literature is the foundation of knowledge advancement. In this section, research related to the difficulties with web design and suggested web design principles are reviewed for obtaining an understanding of the challenge of web design. The possibilities brought from self- and peer- assessments are discussed afterwards. The discussion of websites as assessed objects and the advantages of implementing assessment for learning in a wiki environment are also included.

Difficulties with Web Design

The process of web design demands knowledge and skills in various domains. From a communication point of view, a website is an electronic medium to convey information. Web designers are required to appropriately integrate words, graphics and other multimedia elements for creating effective communication with target users. Research (Burch, 2001; Geissler, Zinkhan, & Watson, 2001) can be found to address the communication issues in web design. From an aesthetic point of view, a website is required to be appealing so as to attract target users to explore the website. This includes the use of color style, texture, graphics and the design of page layout. A number of studies have been conducted on the impact of web aesthetics (Chiang & Chen, 2012; Bonnardel, Piolat, & Bigot, 2011; Hall & Hanna, 2004). From a human computer interaction point of view, a website has to be designed in a user-friendly format that involves considerations on web navigation, web usability and web accessibility (Harper & Yesilada, 2008; Farkas & Farkas, 2000). If a website serves an educational purpose, the complexity is magnified further with the considerations on the usage of multimedia elements in education (Mayer, 2009; Stemler, 1997) and the TPACK-W framework, which is namely the Technological Pedagogical Content Knowledge-Web (Lee & Tsai, 2010). In addition, a good web designer is also expected to have sound knowledge of multimedia technology so as to appropriately manipulate multimedia elements in web design. Based on these analyses, a competent web designer is expected to provide knowledge and skills in a lot of domains so as to develop a high quality website. Even though web design software has been developed to simplify the web design technical process in recent years, it is still a challenging task to develop a high quality website.

Web Design Principles

In order to help web designers to develop high quality websites, quality-checkers, criteria, guidelines and principles on web design were suggested in the literature. For example, Ivory and Hearst (2002) developed a quality-checker that was similar to grammar-checkers in word processors to help web designers in creating high quality websites. Zaphiris et al. (2005) introduced a set of age-centered research-based web design guidelines. The U.S. Department of Health and Human Services (2006) published the *Research-Based Web Design & Usability Guidelines* with 209 guidelines on different web design aspects. In addition, guidelines for web navigation (Farkas & Farkas, 2000) and accessibility (W3C, 2008) were also published to improve the quality of web design. Lots of guidelines with suggestions in different aspects clearly reflect that web design is a complicated process.

Even though many guidelines or principles have been suggested, integrated application of these principles in web design is not a straightforward issue. In the literature, few studies can be found to focus on the learning process of creating a high quality website. To tackle the difficulty, self- and peer-assessment strategies may be a possible solution.

Self- and Peer-assessment

Increasing emphasis has been placed in recent years on the significance of assessment for learning, especially after the contribution of Black and Wiliam (1998), which conducted extensive review on related researches and confirmed beneficial evidences in learning. Among various strategies, self- and peer- assessments have been used in a number of studies to enhance the effectiveness in the learning process (Chen, 2010; Orsmond, 2004).

Self-assessment refers to the involvement of learners in making judgments about their own learning (Boud & Falchikov, 1989) while *peer- assessment* is defined by Topping (Topping, 1998, p. 250) as “an arrangement in which individuals consider the amount, level, value, worth, quality, or success of the products or outcomes of learning of peers of similar status.” The benefit of self- and peer- assessment pedagogy in enhancing learning effectiveness of students in higher education has been well documented (Topping, 1998; Dochy, Segers, & Sluijsmans, 1999). Peer-assessment with constructive feedback can serve the purposes of activating students as instructional resources for one another and activating students as the owners of their own learning (Leahy et al., 2005). Self- and peer- assessment strategies can also encourage students to become more reflective in their own learning (Dochy, Segers, & Sluijsmans, 1999). In the process of learning web design, students are normally required to demonstrate the integrated application of web design principles by creating a high quality website. To better master knowledge and skills in web design, it is beneficial to provide opportunities for students to evaluate the appropriateness of the integrated application of web design principles. In this connection, self- and peer- assessment could be regarded as strategies to enhance the effectiveness of learning process.

Assessed Objects

In previous studies, essays or reports are prevailing types of target-assessed objects in self- and peer- assessment and feedback processes (Ng, 2011; Lai & Ng, 2011; Cartney, 2010; Xiao & Lucking, 2008). Oral presentations (Cheng & Warren, 1999; Falchikov, 1995), web-based projects (Li & Steckelberg, 2004) and computer programs (Ng, 2012) are some other target-assessed objects for peer assessment and feedback. Few studies can be found to use self- and peer- assessment strategies in learning the integrated application of web design principles in designing high quality websites.

Wiki Environment

As mentioned by Topping (1998), computer-assisted assessment is an emerging growth area due to the rapid development of Internet technologies. Since the primary purposes of wiki technology are to facilitate generation, collaboration and distribution of contents in a quick and easy way (O'Leary, 2008), it can be regarded as an effective tool for online collaboration and discussion. Among various Internet technologies, the wiki has been used in a

number of studies as an environment for implementing peer-assessment strategies (Ng, 2011; Lai & Ng, 2011; Xiao & Lucking, 2008). This study also echoed Stodberg's (2012) point of view that more research is recommended to expand the knowledge of e-assessment, including the application of Web 2.0 technologies in assessment.

Research Question

Based on the literature review, this study attempted to apply a self- and peer-assessment strategy to enhance the learning effectiveness in the process of learning web design. It aimed at researching the following question. "What are the students' perspectives on the process and effectiveness of applying self and peer assessment strategy in learning web design?"

Research Setting

The researcher is a teacher trainer in The Hong Kong Institute of Education. A course entitled Principles and Practice of Web Design, taught by the researcher, was offered to a class of first-year undergraduates of a science and web technology bachelor programme. The course provided students with principles and concepts for visual design of modern website. It also explored the criteria of web design for meeting specific needs of different target users. Students had opportunities to critically evaluate websites and to develop high quality websites with underpinning principles and concepts. There were 31 students in the class with 21 males and 10 females. Thirteen students had completed secondary education, while 16 students had obtained post-secondary qualifications, such as a higher diploma and associate degree qualifications. Amongst all students in the class, 4 students had taken information technology related courses in post-secondary education. The course was offered from January to April in 2012. Upon graduation, students were expected to work in different educational sectors in Hong Kong.

Research Design

In the first nine lessons of the course, lectures were given to students in different aspects of web design principles. Students were also given hands-on practice to create an educational website. In this stage, students formed 8 groups by themselves with 3-4 students each to create educational websites on any topics. They were required to create a first draft website for use in the self- and peer- assessment learning activity, which was held in lesson 10. In this stage, students were expected to learn related web design principles and to practice the integrated application of principles in the creation of a website.

In lesson 10, students were instructed to carry out self- and peer- assessments in the class that focused on the first draft educational website created by each group. Three aspects of web design principles were chosen for evaluation, namely text and typography, color, and multimedia learning principles. As mentioned by Reichenstein (2006), the proportion of written language is as high as 95% of web information. It is important for web designers to get acquainted with the discipline of shaping written information. On the other hand, color is an important ingredient for aesthetic appearance. Research

found that most users' first impression of a website was that of beauty (Shenkman & Jonsson, 2000). Lindgaard et al. (2006) further stated that these first impressions are constructed in about 50 minutes and remain stable over time. They also influences website users' subsequent navigation. In addition, as students were required to create an educational website comprised of various multimedia elements, the multimedia learning principles developed by Mayer (2009) were considered significant in educational web design.

Self-Assessment

Lesson 10 was divided into two sessions. In the first session, students in each group were required to carry out a self-assessment on the educational website created by their group. Students had to justify whether the website fulfilled principles in different aspects. They had to provide justifications and to give improvement suggestions if web design principles could not be fulfilled. All feedback given in self-assessment was posted on a wiki platform prepared by the researcher. The self-assessment learning activity aimed at giving an opportunity for them to reflect on their own work. They had to critically discuss and evaluate the quality of website accordingly to different web design principles. This strategy also allowed students to develop a better understanding of web design principles to prepare for the peer-assessment activity in the following session.

Peer-Assessment

In the second session of lesson 10, students in a group were arranged to carry out a reciprocal peer-assessment on the website developed by another group. The same set of web design principles were given to students for evaluation. The procedure of peer-assessment was similar to that in self-assessment except that students were instructed to assess the educational website created by peers. Through being engaged in peer-assessment, students were expected to learn from the strengths and weaknesses of peers and thereby reflect on their own work on the integrated application of web design principles. They were also expected to provide constructive feedback to peer.

At the end of lesson 10 in the class, students were invited to fill out a questionnaire on the self- and peer- assessment strategy. The questionnaire was adapted from that developed by Falchikov (1986). It attempted to collect students' opinions on the impacts of the self- and peer- assessment strategy. Students expressed their opinions on the strategy's effects (see Table 1 and Table 3) by giving ratings in the range 1 to 10. After the self- and peer- assessment in lesson 10, they were encouraged to revise the educational website by reviewing comments from the self- and peer- assessment strategy. The final website had to be submitted at the end of the course. They were required to report revisions on the first draft for the production of the final website in a Website Revisions Record prepared by the researcher.

Data Collection and Analysis

Data in this study was collected from the questionnaires and the Website Revisions Records filled out by students. A total of 24 questionnaires were returned which constituted about a 83% response rate given that 29 students attended the class.

Learning Process

To analyze the impact of self-assessment strategy from students’ perspectives, one sample t-test on mid value 5.5 in the scale from 1 to 10 was executed on different effects of the strategy. It attempted to analyze whether there were significant differences that deviated from neutral stands. Also executed was a K-S test on the 24 questionnaires returned, which confirmed that the normal distribution hypothesis of all items related to the effects of the strategy could be retained (see Table 1 and Table 2). The code “Self Active” means “The self-assessment strategy made me more active in the learning process.”

Table 1

One-Sample T-Test Descriptive Statistics of the Effects of Self-Assessment Strategy on Learning Web Design

	N	Mean	Std. Deviation	Std. Error Mean
Self Active	24	6.00	1.414	.289
Self Serious	24	6.17	1.373	.280
Self Independent	24	6.21	1.250	.255
Self Think	24	6.42	1.613	.329
Self Learn More	24	6.38	1.813	.370
Self Confident	24	6.50	1.351	.276
Self Critical	24	6.38	1.377	.281
Self Time Saving	24	5.54	1.865	.381
Self Enjoyable	24	5.08	1.840	.376
Self Easy	24	5.67	1.579	.322
Self Challenging	24	6.25	2.005	.409
Self Helpful	24	5.92	1.501	.306
Self Beneficial	24	6.13	1.424	.291

Table 2

One-Sample T-test Results of the Effects of Self Assessment Strategy on Learning Web Design

	Test Value = 5.5					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Self Active	1.732	23	.097	.500	-.10	1.10
Self Serious	2.379	23	.026	.667	.09	1.25
Self Independent	2.775	23	.011	.708	.18	1.24
Self Think	2.784	23	.011	.917	.24	1.60
Self Learn More	2.364	23	.027	.875	.11	1.64
Self Confident	3.625	23	.001	1.000	.43	1.57
Self Critical	3.113	23	.005	.875	.29	1.46
Self Time Saving	.109	23	.914	.042	-.75	.83
Self Enjoyable	-1.110	23	.279	-.417	-1.19	.36
Self Easy	.517	23	.610	.167	-.50	.83
Self Challenging	1.832	23	.080	.750	-.10	1.60
Self Helpful	1.360	23	.187	.417	-.22	1.05
Self Beneficial	2.151	23	.042	.625	.02	1.23

In Table 2, some aspects, including serious, independent, think, learn more, confident, critical and beneficial, showed significant values with 95% confidence interval. In addition, the means of all these values fell in the

range 6.13 to 6.50, which were higher than the mid value 5.5. Results showed students’ opinions that the self-assessment strategy made them more serious, critical and independent in the web design learning process. They also thought more and learned more. In addition, they became more confident in the integrated application of web design principles in designing website and considered the self-assessment strategy as beneficial for learning web design.

Similar analysis was conducted for the impacts of peer-assessment strategy in the web design learning process. Results were shown in Table 3 and Table 4. In the tables, the code “Peer Active” means “The peer assessment strategy made me more active in the learning process.”

Table 3

One-Sample T-Test Descriptive Statistics of the Effects of Peer-Assessment Strategy on Learning Web Design

	N	Mean	Std. Deviation	Std. Error Mean
Peer Active	24	6.46	1.668	.340
Peer Serious	24	6.33	1.465	.299
Peer Independent	24	6.29	1.488	.304
Peer Think	23	6.57	1.409	.294
Peer Learn More	24	6.50	1.588	.324
Peer Confident	24	5.92	1.558	.318
Peer Critical	24	6.17	1.685	.344
Peer Time Saving	23	5.70	2.512	.524
Peer Enjoyable	23	5.04	2.078	.433
Peer Easy	23	5.70	1.663	.347
Peer Challenging	23	5.91	1.474	.307
Peer Helpful	23	6.04	1.665	.347
Peer Beneficial	23	6.09	1.593	.332

Table 4

One-Sample T-Test Results of the Effects of Peer-Assessment Strategy on Learning Web Design

	Test Value = 5.5					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Peer Active	2.815	23	.010	.958	.25	1.66
Peer Serious	2.788	23	.010	.833	.21	1.45
Peer Independent	2.606	23	.016	.792	.16	1.42
Peer Think	3.627	22	.001	1.065	.46	1.67
Peer Learn More	3.085	23	.005	1.000	.33	1.67
Peer Confident	1.310	23	.203	.417	-.24	1.07
Peer Critical	1.938	23	.065	.667	-.05	1.38
Peer Time Saving	.373	22	.712	.196	-.89	1.28
Peer Enjoyable	-1.054	22	.303	-.457	-1.35	.44
Peer Easy	.564	22	.578	.196	-.52	.91
Peer Challenging	1.344	22	.193	.413	-.22	1.05
Peer Helpful	1.566	22	.132	.543	-.18	1.26
Peer Beneficial	1.767	22	.091	.587	-.10	1.28

In Table 4, some aspects, including active, serious, independent, think and learn more, showed significant values with 95% confidence intervals. In

addition, the means of all these values fell in the range 6.29 to 6.57, which were higher than the mid value 5.5. Results showed students' opinions that the peer-assessment strategy made them more active, serious and independent in the web design learning process. They also reported that they thought more and learned more in the process.

Learning Effectiveness

Students were required to report their revisions on the draft educational website for the production of the final website by completing the Website Revisions Records. In the record, they had to indicate under which principles the revisions were made to improve the quality of website. They also had to mention the source of revisions by indicating whether the revisions were based on feedback from self, peer or both. According to received Website Revision Records from 8 groups, a total of 100 revisions were made in three aspects of web design principles in which 56% of revisions were made according to feedback from self-assessment, 19% of revisions were made based on feedback from peers and 25% of revisions were made according to feedback from both self- and peer- assessment.

As to revisions in different categories of principles, 60.7% of revisions were made amongst principles in the aspect of text and typography, 62.5% of revisions were made amongst principles in the aspect of color, and 63.5% of revisions were made amongst principles in the aspect of multimedia learning principles. For principles in all three aspects, the overall percentage was 62.5%.

Discussion and Conclusion

According to the results obtained in this study, students reported that they were more active, more serious, more independent and more critical in the web design learning process. They also thought more about the appropriateness of integrated application of web design principles. This echoed previous findings (Dochy, Segers, & Sluijsmans, 1999) that self- and peer- assessment strategy with the effect of transforming students into reflective learners. Students were also satisfied with the self- and peer-assessment strategy as they expressed that they found it beneficial, had learned more and were more confident in applying web design principles in creating high quality website. The high percentage of revisions reported in the Website Revisions Records for improving the quality of website also served as a triangulation on the effectiveness of the self- and peer- assessment strategy in learning the application of web design principles. Since self-reported data was obtained to investigate the effectiveness of self- and peer- assessment in this study from students' perspective, future studies can be conducted to further look into the quality of websites for exploring the actual improvement brought by the self- and peer- assessment strategy in learning web design.

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