The Development of Epistemic Relativism versus Social Relativism via Online Peer Assessment, and their Relations with Epistemological Beliefs and Internet Self-efficacy

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ABSTRACT

Online peer assessment has been advocated by numerous contemporary educators. This study interviewed forty students who had experienced an online peer assessment activity for learning. Each of these students was asked to complete a research proposal in an educational method course for peer assessment. Using the online peer assessment system, the students, who performed the roles of both authors and reviewers, submitted their proposals, reviewed their peers' work and obtained peers' comments. Based on the interview data, sixty percent of the students could gradually develop views of "epistemic relativism" and "social relativism" through the online peer assessment activity. "Epistemic relativism" refers to recognition of the diversity of knowledge perspectives involved in a research issue, while "social relativism" indicates an understanding of the multiplicity of peer perspectives. These two views, which are perceived as positive impacts of online peer assessment, have rarely been documented in the relevant literature. This study further found that students' epistemological beliefs were related to their views of "epistemic relativism," while their Internet self-efficacy was associated with their views of "social relativism." More sophisticated epistemological beliefs and higher Internet self-efficacy can likely facilitate the development of views regarding "epistemic relativism" and "social relativism."

Introduction

Online peer assessment (PA) has been advocated by numerous contemporary educators (Cathey, 2007; Chen & Tsai, 2009; Sitthiworachart & Joy, 2008). Online PA for learning requires the participating students to complete a learning task or assignment for peers to make evaluations of and give comments on, such as completing a research proposal (Wen & Tsai, 2008), or designing a detailed plan or activity (Tsai & Liang, 2009; Tseng & Tsai, 2007). The research literature has documented that PA in general, or online PA in particular, can improve the participants' understandings in the cognitive and metacognitive domains, and enhance their social and thinking skills (Topping, 1998; Tsai, Lin & Yuan, 2002).

However, this study attempted to explore some other benefits of using online PA. Research (e.g., Yang, Y. F. & Tsai, 2010) has indicated that online PA can help participants acquire a variety of perspectives, thus developing so-called "relativist" views. The relativist views in general support the diverse perspectives of other theories and other peers (Tsai, 2004). This study further differentiated two forms of relativist views, including "epistemic relativism" and "social relativism." "Epistemic relativism" refers to recognition of the diversity of knowledge perspectives involved in the online PA project, while "social relativism" indicates an understanding of the multiplicity of peer perspectives. "Epistemic relativism" asserts that the validity of each theoretical perspective is only relative to each other, whereas "social relativism" acknowledges the diversity of peers' ideas. Relatively speaking, the latter is likely more akin to the position of multiplism (Perry, 1970) while the former is a more developed critical stance regarding knowledge claims. In light of this interpretation based on Perry's study, "epistemic relativism" may be a more sophisticated position than "social relativism." In this paper, these two views were discussed by sharing some interview data derived from a PA study with higher education students. By doing this, additional strengths of implementing online PA were illustrated.

Moreover, this study explored two factors which may be related to the occurrence of these relativist views. The first factor is the students' epistemological beliefs, that is, their beliefs about the nature of knowledge and knowing (Hofer, 2001, 2010; Wong & Chai, 2010). Educators have concluded that learners' epistemological beliefs are associated with their learning strategies, reasoning modes and knowledge acquisition when processing or acquiring information

(Hofer & Pintrich, 1997; Liu, Lin & Tsai, 2011; Tsai, 1998). The findings from previous studies have revealed that students holding more sophisticated epistemological beliefs (highlighting the uncertainty, multiple sources of knowledge) tend to adopt better cognitive approaches and attain higher learning outcomes than those possessing more shallow views about the nature of knowledge and learning, such as emphasizing the absolute status of knowledge and the role of memorization in learning (Greene, Muis, & Pieschl, 2010; Tu, Shih, & Tsai, 2008). A recent study completed by Tsai and Liang (2009) revealed that students with more advanced epistemological beliefs tended to greatly improve their original work and provide more high-quality comments to their peers in online PA learning environments. Hence, it is expected that students' epistemological beliefs are related to their views of and gains in online PA.

The second factor considered in this study is the Internet self-efficacy possessed by the students. "Self-efficacy" refers to an individual's beliefs and expectations in his/her ability to perform a task, and it affects the individual's processing of the task, ways of completing it, efforts to be devoted, and how he or she will maintain effort in handling demanding situations (Bandura, 1977, 1996). Similarly, Internet self-efficacy indicates students' self-perceived confidence and expectations of using the Internet (Liang & Tsai, 2008; Tsai & Tsai, 2010). It has been proposed that learners with higher Internet self-efficacy may have better attitudes toward Internet and Internet-related learning activities, and they would have a greater chance of success in computer and Internet-related tasks (Peng, Tsai & Wu, 2006; Tsai & Tsai, 2003; Wu & Tsai, 2006). Consequently, it is believed that students' Internet self-efficacy may be associated with their views and gains derived from online PA learning environments.

In sum, this study, through gathering a group of students who experienced online peer assessment, attempted to explore:
1. Whether the students expressed relativist-oriented views when reflecting their experiences of online PA.
2. How the students' relativist views were associated with their epistemological beliefs and Internet self-efficacy.

Method

Participants

This study was conducted at a research-oriented university in North Taiwan, and included forty-five graduate students with a major in education. All of them were enrolled in an educational research method course. As required by the course, each of the students should complete a research proposal, which should be submitted to an online system for peer-review. All of them had relevant computer or Internet abilities to complete the online learning task.

Online PA learning activity

After eight weeks of the course, each of the students developed an initial educational research proposal, and submitted it to an online system. All proposals experienced three-round online PA treatment, and the assessment process was undertaken in an anonymous way. The online peer assessment procedure was based on a previous online PA model proposed by Tsai, Lin and Yuan (2002) and Tsai, Liu, Lin and Yuan (2001). Each proposal needed to be refined and submitted three times. The process of the online PA activity is as follows: The students submitted their original proposals; they reviewed their peers' work; they submitted their revised proposals; they reviewed their peers' work again, and finally, they submitted their final proposals, and completed the final peer reviews. Each participant acted both as an author and a peer reviewer. For each round of PA, each participant reviewed about five proposals drafted by their peers. The participants reviewed the same proposals assigned across different rounds of peer assessment. The on-line PA took about eight weeks.

Data Collection and Analysis

Interview. Each participant in this study was interviewed individually by a trained researcher *after* finishing the three-round online PA. As five students, for some unexpected reasons, could not contribute to the interviews, this study conducted individual interviews for a total of forty students. The interview questions mainly focused on the

experiences of taking part in the online PA learning activity, and their views as well as perceived gains from learning via online PA. In addition, the students' perceptions of their peers' comments were explored. Sample interview questions were: In any aspect, how did you learn from the online PA? What did you gain from the online PA? How did you perceive the peer comments from the online PA? What did you think about and how did you react to your peers' comments?

All of the interviews were audio-recorded. The interviews were conducted in Chinese and then fully transcribed for further analysis. The interview quotations presented later in this paper were those perceived as being the most representative or the most fruitful ideas expressed by the interviewed students. One researcher coded each student's interview responses to examine the possibility of showing relativist-oriented views. One additional independent researcher, who actually read all of the interview transcripts, validated the coding. The agreement of both researchers was around 0.90. The responses with disagreement were resolved upon discussion.

The assessment of epistemological beliefs. To assess the students' epistemological beliefs, this study utilized the questionnaire developed by Chan and Sachs (2001). The questionnaire, exploring students' epistemological beliefs about learning, included nine items, each with three options: two corresponding to a naïve, shallow view about learning, while one reflected a deep and more sophisticated view. A Chinese version of this questionnaire had been used in another study (Tu *et al.*, 2008). The following is a sample item from the questionnaire.

The most important thing you can do when you are trying to learn science is
        a. faithfully do the work the teacher tells you to do.
        b. try to see how the explanation makes sense.
        c. try to remember everything you are supposed to know.

Students' responses were scored 1 point if the answers responded to a more advanced position (e.g., the "b" option in the sample item), while those reflecting a naïve view of learning were given 0 points (e.g., the "a" and "c" options in the sample item). The reliability coefficient (KR20) was estimated around 0.68 for the nine items. Although the coefficient is not very high, it is still considered as satisfactory. Through using the questionnaire, this study acquired an Epistemological Belief Score (EBS) for each student (ranging from 0 to 9), with a higher score on the questionnaire indicating stronger agreement with the more advanced epistemological beliefs.

The measurement of Internet self-efficacy. The Internet Self-efficacy Survey (ISS) employed in this study was adapted from original items developed in previous studies (Peng *et al.*, 2006; Wu & Tsai, 2006). These studies have already proved the adequate validity and reliability of the ISS. The ISS included nine items. The items were presented with bipolar strongly confident/ strongly unconfident statements in a seven-point Likert mode. Sample items are: "I am good at searching for information on the Internet," and "I think I can talk to others in online chatrooms." Each student obtained an average score from the ISS items (ranging from 1 to 7), with a higher score indicating higher Internet self-efficacy.

Results

Epistemic relativism

First, it was found that the use of online PA can enhance students' epistemic awareness, acknowledging the relativist view about different theories. The relativist position asserts that there is no certainly right or wrong knowledge; rather, there are multiple interpretations of any issue studied. The validity of each theoretical perspective is only relative to each other (Perry, 1970). This view, called "epistemic relativism," was acknowledged by many students after experiencing the online PA in this study. For example, they gave the following responses during the individual interviews:
●   Through online peer assessment, the peer comments helped me find that knowledge or theories in various fields may be related to my work.
●   In the beginning, I thought the proposal I was working on was quite simple and straightforward. There was even no ambiguity about it. However, when I submitted it for online peer assessment, I surprisingly found that there were still numerous theoretical perspectives raised for debate.

- Through online peer assessment, I realized that I just think about one side of the conceptual viewpoint, and totally ignore the others.

It is clear that through online PA, the students gathered multiple/different knowledge perspectives of their work. However, they realized that each of these perspectives, though not certainly right or wrong, was relatively differently valid. Hence, critical thinking and careful judgment of peers' comments are quite important in the online PA process. For example, the students responded that:

- Different suggestions came from different peers. I gathered all the conceptual perspectives to be evaluated and finally improved my own proposal.
- By online peer assessment, my peers evaluated my work. But, when I got their evaluations, interestingly, I needed to carefully "evaluate" their evaluations. Then, I could know which one was more applicable.
- I learned a lesson from the online peer assessment; that is, do not treat everyone's comments as equally important. I needed to think over and over again about every peer comment.

Based on these responses, the students learned that not all of the comments were equally important. The participating students should have relative weights for considering peers' comments. The acquisition of multiple knowledge perspectives, and careful reflection on the relative importance as well as validity of these perspectives constitute the main ideas about "epistemic relativism" for online PA.

Social relativism

The other view derived from the online PA is the social acceptance of peers' opinions, personal preferences and subjective comments. This is called "social relativism," and recognizes that everyone has personal ideas concerning an issue, and everyone expresses ideas based on his/her preference according to the relative connection to the context of the issue concerned. By implementing online PA, it was gradually found that the students tended to socially accept the diversity of their peers' opinions. For example, the students responded that:
- I tried to make sense of what kind of peer comment was conveyed. Finally, I realized that not everyone has the same point of view.
- By reading the peer comments online, I learned that I need to accept that everyone has his/her own opinions.
- Through online peer assessment, I developed an appreciation of and respect for the diversity of peer comments. I think this may be quite useful for my future career. (Researcher: How?) In the future, I will also face quite different opinions from peers in the workplace.
- After experiencing the online PA, I suddenly found that I had become more open-minded to any piece of peer feedback.

It is clear that the students gained a better viewpoint from the variety of peer comments. In addition, in terms of the negative or unfair peer evaluations, the students gradually developed better attitudes toward and adaptations of them. For example, they stated that:
- To be honest, I once felt very frustrated about the online peer assessment. I found some comments were very useful, but still many of them were just personal preferences. But, now, I think this is just "individual difference"….. This is the real world.
- Online peer assessment has helped me to develop an adequate acceptance of negative comments. I need to adjust myself to these negative comments….. As the online peer assessment is anonymous, they are not so harmful.

In sum, by utilizing online PA, the students gained the social recognition of other opinions or others' individual preferences.

The distribution of epistemic relativism and social relativism

Table 1 shows the distribution of the participants who expressed ideas of "epistemic relativism" and "social relativism" during the individual interviews. As aforementioned, two researchers coded each student's interview responses, and examined if his/her responses demonstrated "epistemic relativist" and/or "social relativist" views. The coding results are presented in Table 1.

Table 1. The number of interviewed students showing the ideas of epistemic and social relativism

		Social relativism	
		Not shown	Shown
Epistemic relativism	Not shown	16	9
	Shown	4	11

Based on the results in Table 1, eleven among the forty interviewed students stated ideas of both "epistemic relativism" and "social relativism." Four displayed "epistemic relativism" only and nine displayed "social relativism" only. More students had ideas of "social relativism" (n = 20) than of "epistemic relativism" (n = 15). Forty percent of the students (n = 16) did not mention any idea related to "epistemic relativism" or "social relativism."

The role of epistemological beliefs

The interviewed students were divided into advanced epistemological beliefs and naïve beliefs according to their mean scores assessed by the Epistemological Belief questionnaire (mean = 4.37 for the total scores from 0 to 9). Consequently, 19 students were labeled as holding advanced epistemological beliefs (score 5-9 for the nine-item questionnaire), while the rest were classified as having naïve epistemological beliefs. The interplay between student epistemological beliefs and their views of "epistemic relativism" and "social relativism" is presented in Table 2.

*Table 2.*The role of epistemological beliefs in the views of epistemic relativism and social relativism

	Epistemic relativism (n)	Social relativism (n)
Advanced epistemological beliefs (n = 19)	11	11
Naïve epistemological beliefs (n = 21)	4	9

Based on the results in Table 2, by and large, the students with more sophisticated epistemological beliefs tended to have views of "epistemic relativism" and "social relativism." About a half of the students in the advanced epistemological belief group expressed ideas of "epistemic relativism" and "social relativism" (n = 11, 11 respectively). Still, approximately a half of the students in the naïve epistemological belief group possessed views of "social relativism" (n = 9). However, only less than a quarter of the students in the naïve epistemological belief group (n = 4) held views of "epistemic relativism." Therefore, it is concluded that epistemological beliefs may play a more important role in "epistemic relativism" than in "social relativism." More sophisticated epistemological beliefs can help the development of "epistemic relativism" views for those students who experience online PA.

The role of Internet self-efficacy

Similarly, the students were divided into high and low Internet self-efficacy groups by their mean scores on the ISS questionnaire (mean = 5.56 for the Likert scale of 1-7). Consequently, 20 students were labeled as having high Internet self-efficacy while 20 were categorized as having low Internet self-efficacy. The relationship between Internet self-efficacy and views of "epistemic relativism" and "social relativism" held by the students is presented in Table 3.

Table 3: The role of Internet self-efficacy in the views of epistemic relativism and social relativism

	Epistemic relativism (n)	Social relativism (n)
High Internet self-efficacy	8	13
Low Internet self-efficacy	7	7

According to Table 3, almost the same number of students in the different levels of Internet self-efficacy expressed views of "epistemic relativism" (n = 8 and 7, respectively). Nevertheless, many more students in the high Internet self-efficacy group displayed ideas of "social relativism" than those in the low Internet self-efficacy group (n = 13 versus n = 7). Thus, Internet self-efficacy seems to have an effect on "social relativism," but not on "epistemic

relativism." High Internet self-efficacy tends to facilitate the development of views regarding "social relativism."

Discussion

This study identified the views of "epistemic relativism" and "social relativism" expressed by the students who participated in the online PA activity. To develop views of "epistemic relativism" and "social relativism" by PA, the online technology plays an important role in achieving this. First, it ensures better anonymity for PA (Tsai, 2009). The anonymous PA environment assisted by online technology shapes a relatively neutral learning context in which peers can solely focus on evaluating the work, not on the person who did the work. As shown by one student earlier (i.e., the negative comments are not so harmful), this is especially useful for the development of "social relativism" because of the better anonymity and de-contextualized peers in the online environment (Tsai, 2001a). Second, by way of the online PA system, in a short period of time, the participants can gather a variety of peer comments without the constraints of time and location. Also, many "outside" peers can be easily invited to judge the work, and a variety of different knowledge perspectives and opinions can emerge. By exposure to such diversity, students' views of "epistemic relativism" and "social relativism" can be potentially triggered.

This study further suggests that sophisticated epistemological beliefs can help the development of "epistemic relativism" for those students engaged in online PA. Since the students with more mature epistemological beliefs tend to perceive knowledge as uncertain and coming from multiple sources (Hofer & Pintrich, 1997), they are likely to express the acknowledgement of various theoretical perspectives, the view of "epistemic relativism" proposed in this paper. Moreover, the analysis between Internet-self-efficacy and their views of social relativism indicated that high Internet self-efficacy seems to facilitate the development of "social relativism" during learning via online PA. Past research has indicated that high Internet self-efficacy mainly comes from the users' rich usage experiences and behaviors (Durndell & Haag, 2002; Peng *et al.* 2006; Wu & Tsai, 2006). These rich experiences may help the users recognize the diversity of viewpoints expressed by others in the world of the Internet. Thus, they are more likely to acquire the recognition of "social relativism" as defined in this study. The aforementioned findings have also provided evidence that "epistemic relativism" and "social relativism," though related to each other (Table 1), are still different, as they are associated with different factors (i.e., epistemological beliefs, Internet self-efficacy). These findings are also consistent with the perspective discussed previously that "epistemic relativism" may be more advanced than "social relativism." That is, "epistemic relativism" is more related to some underlying philosophical positions or higher-order thinking (such as epistemological beliefs, Tsai, 2001b; Yang, F.-Y. & Tsai, 2010) whereas "social relativism" is more associated with the students' perceived skill of using the Internet (i.e., Internet self-efficacy), considered as a more behavior-oriented and relatively less profound factor. However, this study provides evidence that "epistemic relativism" and "social relativism" may have reciprocal interactions with each other.

Concluding remarks

This paper presents empirical support that many students who participate in online PA could develop views of "epistemic relativism" and "social relativism." The diversity of ideas among peers cannot guarantee the achievement of "epistemic relativism" and "social relativism," but it is their prerequisite. Online PA provides a satisfactory learning environment for evoking the diversity of different perspectives. Then, the teacher is not the sole knowledge source for learning. The view of "relativism" is quite sophisticated in terms of epistemological development (Perry, 1970). The findings of this paper also concur with the assertion proposed by researchers (Mason & Boldrin, 2008; Mason, Boldrin & Ariasi, 2010; Tsai, 2004) that the Internet should not be regarded simply as a cognitive or metacognitive tool; rather, it should be utilized as an "epistemological" tool. The proper use of online learning environments can promote epistemological development for students. It is recommended that researchers interested in online PA elaborate the ideas of "epistemic relativism" and "social relativism" proposed in this paper to observe students' gains in online PA in a broader sense. Teachers who implement online peer assessment for learning may also monitor students' possible acquisition of these relativist views. If possible, the teachers may have explicit discussions of these views during the implementation of online peer assessment. By such discussion, either face-to-face or online, these views may be fostered.

This study also investigated the factors related to the views of "epistemic relativism" and "social relativism." Both

epistemological beliefs and Internet self-efficacy were identified as potential factors. If researchers agree that the acquisition of the views of "epistemic relativism" and "social relativism" is one of the important goals for learning via online PA, more studies are necessary to explore other factors that may be related to these views.

This study had certain limitations. First, it employed only a small sample size. A larger-sample study is recommended. Also, this study used questionnaires to assess students' epistemological beliefs and Internet self-efficacy. Other methods, such as interviews or observations may be needed for future research.

Future research should be conducted to carefully examine the views of "epistemic relativism" and "social relativism" during online peer assessment. For example, educational researchers can conduct in-depth analyses to appraise if these views are involved in peer feedback or the revision of students' original work. How to promote these views by other instructional strategies such as online argumentation or inquiry may also be a potential research issue for educators. More long-term study or instructional treatment may be required to document students' possible progression toward "epistemic relativism" and "social relativism."

Acknowledgments

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