Exploring Taiwanese undergraduates' perceptions of teacher authority toward Internet-based learning environments

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Abstract: Due to the scarcity of research regarding the issue of teacher authority under the context of Internet-based learning environments, the current study aimed to develop and validate an instrument named Revised-Teacher Authority Survey (Revised-TAS) to explore 282 Taiwanese undergraduates' perceptions of teacher authority toward Internet-based learning environments. The Revised-TAS instrument consists of three dimensions of teacher authority based on past theoretical and empirical literature including content authority, process authority, and intellectual authority. To establish and ensure the reliability and validity of Revised-TAS instrument, both exploratory factor analysis and confirmatory factor analysis were conducted. The results support our proposed three dimensions of teacher authority under the context of Internet-based learning environment and indicate the Revised-TAS instrument items have good reliability, convergent, and construct validity. In addition, according to the paired t-test results, it is found that the Taiwanese undergraduates perceived teacher authority as a student-centered oriented in the aspect of content authority; whereas, they perceived teacher authority as a teacher-centered oriented in terms of process authority. For the intellectual authority in the Internet-based learning environment, students perceived both student-centered and teacher-centered features. The Revised-TAS instrument can be a valid instrument to evaluate the extent of how students perceive teacher authority in the Internet-based learning environments from the perspectives of content authority, process authority, and intellectual authority.

Keywords: Perceptions, Teacher Authority, Internet-based learning environments,

1. Introduction

Since the last decade, the adoption of Internet-based learning and instruction has been burgeoning and has received a great deal of attention by educational researchers. Compared with traditional classroom settings that are mainly teacher-centered, several advantages of Internet-based learning environments that enable learners to be more active, engaging and reflective have been recognized [17]. For example, researchers [2][6][15] have suggested that the Internet technology can be served as a cognitive and/or metacognitive tool to facilitate students' conceptual understanding or develop better self-regulatory/directed skills. Tsai [16] further argued that the use of the Internet can be perceived and used as an "epistemological" tool. In other words, because of the richness of information in Internet-based resources, Internet-based environments provide ample

opportunities for learners to judge the diverse information and knowledge and develop their own evaluative standards. Under this circumstance, it seems that teachers, in Internet-based learning environments, might not be the major source and authority of making judgments on what knowledge or information should be learned and trusted. Therefore, it may be worthwhile to explore the issues such as teacher authority in the line of Internet-based learning environment research.

Oyler [12] proposed that teacher authority can be conceptualized as two interwoven dimensions of authority: content authority (e.g., what and who determine the learning content) and process authority (e.g., the control of classroom procedures and activities). Moreover, as suggested by several researchers [7][9], the "intellectual authority" is certainly a crucial aspect while exploring the issues in the technology-based (e.g., Internet), constructivist and student-centered learning environments. The intellectual authority, for instance, involves the ways of what counts as knowledge and who is validated as "knower." In the traditional classrooms settings, teachers dominate the intellectual authority of determining what is important for learners to know and how they should know and learn it. However, in the Internet-based learning environments, learners can easily access numerous online resources and teachers may not be the sole knowledge source As advocated by Jonassen et al. [7], teachers must relinquish their intellectual authority to facilitate learners to engage their own meaning-making process and become intentional and constructive learners when learning with technologies such as Internet. Although a handful studies have strived to explore students' perceptions or preferences toward Internet-based learning environment [3][10], the studies regarding students' perceptions of teacher authority toward Internet-based learning environments are still rare and worth exploring further. It is argued here that the transition of teacher authority that shifts from teachers to students did occur in the Internet-based learning environments. Therefore, in the current study, we aimed to expand on the dimensions of teacher authority based on the previous work [11][12][13] and develop a quantitative instrument in order to identify students' perceptions of teacher authority toward Internet-based learning environments. The development and validation of the targeted instrument may serve as an initial and critical step to provide feedback to educators and researchers in order to develop proper Internet-based instruction practices and craft better Internet-based learning environments.

2. Methods

2.1 Participants

The participants were 282 undergraduates with an average age of 21.37 year-old (202 male) from three universities located in northern and southern Taiwan. Among these participants, all of them were juniors and seniors from science-related departments such as Physics, Chemistry, Biology, Earth Science, and Engineering. The criterion of recruiting participants is that he/she had the experience of Internet-based learning before. The selected participants were asked to complete a survey regarding the teacher authority under the context of Internet-based learning.

Instrument assessing university students' perception of teacher authority toward Internet-based learning environments

In the present study, the Revised Teacher Authority Survey (Revised-TAS) instrument was utilized to understand university students' perceptions of teacher authority toward

Internet-based learning environment. Researchers [11][12] have contended that teacher authority can be conceptualized from both the process authority and content authority dimensions. Moreover, in the current study, a newly developed dimension named "Intellectual Authority" was added to the Revised-TAS. The Revised-TAS in this study consisted of two aspects, including the learner-centered aspect and the teacher-centered. For each aspect, it contains three dimensions regarding the process, content, and intellectual dimension of teacher authority, respectively. The development of survey items in the Revised-TAS was mainly modified from the TAS in the study of Lee et al. [11] regarding the process and content authority dimensions. The items of "Intellectual Authority" dimension were derived from the past literature [7][9]. As a result, the Revised-TAS was finalized with a total of 30 items (5 items for each dimension).

The first aspect of the Revised-TAS investigated participants' perceptions of the learner-centered aspect of the Internet-based learning environment. This aspect consists of three dimensions with respect to the learner-centered pedagogy, namely Autonomy (AU), Participative Management (PM), and Equity (EQ). In contrast, the other aspect explored students' perceptions of the teacher-centered aspect of the Internet-based learning environment, including Dependence (DE), Teacher Control (TC), and Sole Voice (SV). It is noted that, either in the learner or teacher-centered aspects, the content (i.e., AU, DE), process (i.e., PM, TC), and intellectual (EQ, SV) dimensions of teacher authority were embraced. After the item development process, the Revised-TAS items were evaluated, approved and verified by two experts. A detailed definition and description of the six scales is presented below:

- Autonomy scale (AU, 5 items): assessing perceptions of the extent to which students have opportunities to manage and control their learning process to acquire knowledge and concept. A sample item is "I can select to learn the concepts and knowledge which I am interesting in."
- Participative Management scale (PM, 5 items): measuring perceptions of the extent to which students have opportunities to design and organize their learning activities, and participate in determining what assessment criteria are. A sample item is "I can determine how much time we use for the learning activities."
- Equity scale (EQ, 5 items): evaluating perceptions of the extent to which students have opportunities to make judgment on what counts as knowledge and what knowledge is important. A sample item is "I can make my own judgment on what knowledge or information is important."
- Dependence scale (DE, 5 items): assessing perceptions of the extent to which students perceive the teacher's assistance and support and the teacher's arrangement of their learning content. A sample item is "The teacher decides which concepts and knowledge we need to be taught."
- Teacher Control scale (TC, 5 items): measuring perceptions of the extent to which students perceive the teacher's control of the learning activities and assessment criteria. A sample item is "The teacher decides the course work and the assessments."
- Sole Voice scale (SV, 5 items): evaluating perceptions of the extent to which students perceive the teacher' judgment of what information or knowledge is important for students to know and how the students should know and learn it. A sample item is "The teacher determines what information or knowledge is important."

Data analysis and procedure

The purpose of this study was to develop and validate a quantitative instrument to assess Taiwanese undergraduates' perceptions of teacher authority in Internet-based learning

environment. In order to explore the structure of the scales of the Revised-TAS, both exploratory and confirmatory factor analysis were employed. The purpose of exploratory factor analysis (EFA) was conducted to reduce the items. In an EFA, only those items with a factor loading of at least 0.40 within their own factor should be retained [14]. The reliability (Cronbach's alpha) coefficients were then calculated after the EFA result. Thus, the validity and reliability of the instrument were evaluated accordingly. In addition, confirmatory factor analysis was computed to ensure the construct validity of the Revised-TAS instrument and clarify their ensuing structures. The responses on the Revised-TAS obtained from the participants were analyzed with LISREL software package that can confirm the validity of instrument's scales [8]. To ensure the convergent validity, it is suggested in the literature [1][5] that all factor loadings should be at least 0.5 and ideally 0.7 or higher and statistically significant. Moreover, the reliability was represented as composite reliability (CR) and should be 0.7 or higher to be a sign of good reliability [4][5]. Furthermore, in order to compare the orientations (teacher- or student-centered) of the participants' perceptions toward Internet-based learning environments, a series of paired t-tests were conducted in terms of the content (AU/DE), process (PM/TC), and intellectual (EQ/SV) authority.

3. Results

3.1 Exploratory factor analysis for the Revised-TAS instrument

To validate the Revised-TAS, EFA with vairmax rotation was performed to initially clarify the structure of the instrument. As shown in Table 1, a total of 24 items were retained in the Revised-TAS instrument and all items weighted greater than 0.4 on the proposed six factors. The total variance explained for the Revised-TAS instrument was 68.04%. Besides, Table 1 also demonstrates the reliability (Cronbach's alpha) coefficients. That is, the reliabilities are 0.74, 0.87, 0.79, 0.80, 0.86, and 0.90, respectively, and the overall alpha value is 0.91, indicating that the proposed factors had high internal consistency and reliability in assessing the students' perceptions of teacher authority under the context of Internet-based learning environment. In addition, the mean correlation coefficient between the six factors is 0.37, suggesting good convergent and discriminant validity.

Table 1. Exploratory factor analysis (EFA) for the Revised-TAS factors (n = 282)

Revised-TAS Factor	Number of item	EFA Factor loading	Reliability coefficients	Mean (SD)
Autonomy (AU)	4	0.63-0.75	0.74	3.25(0.66)
Participative Management (PM)	4	0.77-0.84	0.87	2.44(0.92)
Equity (EQ)	3	0.69-0.81	0.79	3.30(0.83)
Dependence (DE)	5	0.60-0.71	0.80	2.86(0.74)
Teacher Control (TC)	3	0.49-0.64	0.86	3.31(1.01)
Sole Voice (SV)	5	0.78-0.84	0.90	3.21(0.88)

Note: Total variance explained is 68.04%. Overall alpha = 0.91.

3.2 Confirmatory factor analysis for the Revised-TAS

The confirmatory factor analysis further served as the purpose of confirming the structure of the Revised-TAS instrument based on the EFA results. As shown in Table 2, all of the factor loadings and the significance of the t-values of the 24 items on the six factors specify the relations of the items to their posited underlying factors. All the numbers of

CR are higher than the cutoff values of 0.7, indicating the measured items all consistently represent the proposed six latent constructs. Moreover, the ratio of chi-square per degree of freedom = 1.62, RMSEA = 0.045, GFI = 0.90, NFI = 0.95, NNFI = 0.98, CFI = 0.98. In sum, these results reflect an acceptable model fit which supports our hypothesized CFA model and indicate a reasonably good fit and also confirmed the convergent and construct validity of the Revised-TAS instrument.

Table 2. Confirmatory factor analysis (CFA) for the Revised-TAS factors (n = 282)

Revised-TAS Factor	Number of item	Factor loading	t- value	CR
Autonomy (AU)	4	0.61-0.70	9.95*-11.72*	0.74
Participative Management (PM)	4	0.81-0.86	13.22*-17.33*	0.87
Equity (EQ)	3	0.71-0.81	12.46*-14.89*	0.79
Dependence (DE)	5	0.60-0.74	10.25*-13.41*	0.80
Teacher Control (TC)	3	0.79-0.84	15.05*-16.63*	0.86
Sole Voice (SV)	5	0.75-0.84	14.32*-16.89*	0.91

3.3 The comparisons of students' mean scores on the teacher- and student-centered aspects of Revised-TAS instrument

A series of paired t-tests were then performed in order to further understand the Taiwanese undergraduates'' orientations and perceptions of teacher authority toward Internet-based learning environments. As shown in Table 3, regarding the content authority, there exists a significant difference (t = 8.41, $p < 0.001$) in the scores for Autonomy (M = 3.25) and Dependence (M = 2.86) factors. In contrast, with respect to the process authority, there is a significant difference (t = -12.05, $p < 0.001$) between Participative Management (M = 2.44) and Teacher Control (M = 2.86) factors. However, the scores between two intellectual authority (i.e., Equity and Sole Voice) did not reach a significant difference (t = 1.52, $p > 0.05$). In sum, according to the paired t-test results, it is found that, in the aspect of content authority, the Taiwanese undergraduates perceived teacher authority as a student-centered oriented; whereas, they perceived teacher authority as a teacher-centered oriented in terms of process authority. In other words, among the Taiwanese undergraduates, the teacher's authority in a typical Internet-based learning environment can be envisioned as learners have more opportunities to manage and control the course content themselves. On the contrary, in light of the paired t-test result on the process authority, it seems that the organization of students' Internet-based learning process and activities is mainly controlled by the teachers. For the intellectual authority in the Internet-based learning environment, students perceived both student-centered and teacher-centered features. That is, in the Internet-based learning environment, in addition to teachers' voice, students also have opportunities to determine what knowledge or concept is important, what knowledge should be learned and how learners acquire it.

Table 3. The paired t-tests results of the Taiwanese undergraduates' orientations of teacher authority toward Internet-based learning environments

	Revised-TAS Factor	Mean (SD)	t-value
Content authority	Autonomy (AU)	3.25 (0.66)	8.41***
	Dependence (DE)	2.86 (0.74)	
Process authority	Participative Management (PM)	2.44(0.92)	-12.05***
	Teacher Control (TC)	3.31(1.01)	
Intellectual authority	Equity (EQ)	3.30(0.83)	1.52
	Sole Voice (SV)	3.21(0.88)	

Note: *** $p < 0.001$

4. Conclusion

In conclusion, the abovementioned results suggested that the Revised-TAS instrument can be a valid instrument to evaluate the extent of how students perceive teacher authority in the Internet-based learning environments from the perspectives of content authority, process authority, and intellectual authority. Also, the common teacher authority in the Internet-based learning environments seems to be perceived by the Taiwanese undergraduates as teacher-centered process authority and student-centered content authority. Moreover, the student-centered intellectual authority is corresponding to one of the distinct characteristics of Internet-based learning environment and may reflect the importance of developing students' reflective judgments when encountering online information and resources [16]. The preliminary results obtained from the current study may provide feedback and future directions to educators and researchers to improve the quality of Internet-based learning environments.

References

[1] Bagozzi, R. P. (1980). *Causal models in marketing*. New York: Wiley.

[2] Chu, R. J., Chu, A. Z., Weng, C., Tsai, C.-C. & Lin, C. (2012). Transformation for adults in an Internet-based learning environment –Is it necessary to be self-directed? *British Journal of Educational Technology*, *43*(2), 205-216.

[3] Chuang, S.-C., & Tsai, C.-C. (2005). Preferences toward the constructivist Internet-based learning environments among high school students in Taiwan. *Computers in Human Behavior*, *21*, 255-272.

[4] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*, 39-50.

[5] Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Multivariate Data Analysis (7th ed.)*. Upper Saddle River, N.J.: Pearson Education Inc.

[6] Jonassen, D. H. (2000). *Computers as mindtools for schools*. Upper Saddle River, NJ: Merrill.

[7] Jonassen, D. H., Howland, J., Moore, J., & Marra, R. M. (2003). *Learning to solve problems with technology: A constructivist perspective (2nd ed.)*. Upper Saddle River, NJ: Prentice-Hall.

[8] Kelloway, E. K. (1998). *Using LISREL for structural equation modeling: A researcher's guide*. Newbury Park, CA: Sage.

[9] Knowlton, D. S. (2000). A theoretical framework for the online classroom: A defense and delineation of a student-centered pedagogy. *New Directions for Teaching and Learning*, *2000*(84), 5-14.

[10] Lee, M.-H., & Tsai, C.-C. (2005). Exploring high school students' and teachers' preferences toward the constructivist Internet-based learning environments in Taiwan. *Educational Studies*, *31*, 149-167.

[11] Lee, M.-H., Chang, C.-Y., & Tsai, C.-C. (2009). Exploring Taiwanese high school students' perceptions of and preferences for teacher authority in the earth science classroom with relation to their attitudes and achievement. *International Journal of Science Education*, *31*(13), 1811-1830.

[12] Oyler, C. (1996). Sharing authority: Student initiations during teacher-led read-alouds of information books. *Teaching and Teacher Education*, *12*, 149-160.

[13] Oyler, C., & Becker, J. (1997). Teaching beyond the progressive-traditional dichotomy: Sharing authority and sharing vulnerability. *Curriculum Inquiry*, *27*, 453-467.

[14] Stevenson, J. (1996). *Applied multivariate statistics for the social science (3rd ed.)*. Mahwah, NJ: Lawrence Erlbaum.

[15] Tsai, C.-C. (2001). A review and discussion of epistemological commitments, metacognition, and critical thinking skill with suggestions on their enhancement in Internet-assisted chemistry classrooms. *Journal of Chemical Education*, *78*, 970-974.

[16] Tsai, C.-C. (2004). Beyond cognitive and metacognitive tools: the use of the Internet as an "epistemological" tool for instruction. *British Journal of Educational Technology*, *35*, 525-536.

[17] Wang, Q. (2009). Designing a web-based constructivist learning environment. *Interactive Learning Environments*, *17*(1), 1-13.