Tan, S. C. et al. (Eds.) (2013). Workshop Proceedings of the 21st International Conference on Computers in Education. Indonesia: Asia-Pacific Society for Computers in Education

Exploring the differences of the Internet-specific epistemic beliefs between Taiwanese undergraduates and high school students

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Abstract: This paper aimed to compare the differences of Internet-specific epistemic beliefs (ISEB) between undergraduates and high school students. Furthermore, the influence of age and educational level as well as other variables on the ISEB were also examined. 299 participants including 150 undergraduates and 149 high school students were surveyed with the Inter-specific epistemic questionnaire (ISEQ). The exploratory factor analysis was executed to construct the ISEQ. Four dimensions of ISEB were indentified, namely Certainty, Simplicity, Source and Justification. Further, the t-test analysis and regression were administered. The results showed that there were differences of ISEB with regard to Certainty and Justification between undergraduates and high school students. However, the variables of age and educational level cannot significantly predict any dimension of ISEB. Interestingly, the gender and experience in using the Internet for academic information searching were significant predictors of Simplicity, Source and Justification.

Keywords: Online information searching, Internet-specific epistemic beliefs, Epistemology theory, Age, Education Guidelines, formatting instructions, author's kit, conference publications

1. Introduction

The role of Interne-specific epistemic beliefs has been widely concerned in the online information searching contexts (Bråten, Strømsø, & Samuelstuen, 2005; Cheng, Liang, & Tsai, 2013; Chiu, Liang, & Tsai, in press). Learners' beliefs about the Inter-based knowledge and knowing have been linked to their Internet-specific self-efficacy, online academic help seeking, self-regulated learning, and Internet-based learning activities (Cheng & Tsai, 2011; Chiu, Liang, & Tsai, in press; Strømsø & Bråten, 2010). However, the influence of age and education on the Internet-specific epistemic beliefs has not been investigated. According to Schomer's (1998) viewpoint, adults' education and age may predict their epistemic beliefs. Therefore, the aim of this study was to explore the role of age and educational level in high school students' and undergraduates' Internet-specific epistemic beliefs (ISEB). The differences of ISEB and Inter-based academic information searching behaviors between high school students and undergraduates were examined.

2. Methods

2.1 Participants

The participants of this study were 150 undergraduates and 149 high school students, of them 156 are males and 143 were females. The average age for high school students and undergraduates was 17.1 (SD = 0.87, ranged from 16 to 19) and 21.48 (SD = 1.75, ranged from 19 to 26). In all, 65.6% reported that they used the Internet for more than 10 hours per week. Most (64.5) of them also reported that they used the Internet for academic information searching at least once a week.

2.2 Measures

While administering the survey, all participants were requested to recall their experiences in doing their course-related assignments online and to respond the questionnaire by assessing their perceptions of academic information searching activities on the Internet. The Internet-Specific Epistemic Questionnaire (ISEQ) was utilized to assess the participants' beliefs relating to Internet-based knowledge and knowing. The original ISEQ was developed by Bråten and his colleagues (2005) and was translated into Chinese by Chiu and her colleagues (2013). Based on Hofer and Pintrich's (1997) 4-dimension model of epistemic beliefs, the ISEQ was validated and constructed as a 4-factor Internet-specific epistemic model, namely certainty of Internet-based knowledge, simplicity of Internet-based knowledge, source of Internet-based knowledge and justification for Internet-based knowing (Chiu et al., in press).

The ISEQ was evaluated with a 7-point Likert scale from strongly disagree to strongly agree. The higher scores for all of the four factors revealed more advanced beliefs regarding the Internet-based knowledge and knowing. Students with high scores on certainty of Internet-based knowledge were more likely to doubt the accurateness of course-related information found on the Internet. Respondents with high scores on simplicity of Internet-based knowledge intended to question that the knowledge located on the Internet is specific and simple. Participants who had higher scores on source of Internet-based knowledge were inclined to doubt that the Internet contains essential and correct information. Respondents holding high scores on justification for Internet-based knowing were more likely to believe that knowledge claims on the Internet should be justified with multiple sources.

2.3 Analysis procedure

The descriptive statistics were calculated to capture the characteristics of the participants. To validate the ISEB questionnaire, the exploratory factor analysis was conducted to eliminate the in appropriated measure items and to construct the factors of ISEB. Finally, the hypotheses were tested by administering the t-test and regression analysis.

3. Results

3.1 Results of exploratory factor analysis

While executing the EFA, the Kaiser-Meyer-Olkin (KMO) measure and the Bartlett's test of sphericity were examined to determine whether the sample was appropriate for such analysis. To construct the ISEQ, an EFA with the principle component analysis and a varimax rotation was administered to clarify its dimensionality. The eigen value larger than one was used as standard to identify the factors of ISEQ. To determine the appropriate items, items with a factor loading smaller than 0.40 or with cross-loadings were omitted

In this study, it was reported that the KMO measure had a value of 0.84 with a significant Bartlett's test (chi-square = 3012.73, $p < 0.001$). As a result, the items were grouped into four factors, namely Certainty, Simplicity, Source, and Justification. The Cronbach's alpha for these factors were 0.89, 0.81, 0.91 0.88, respectively, suggesting that these factors had high reliability. As shown in table 1, a total of 16 items are retained in the ISEQ, and the total variance explained is 74.17%, implying the ISEQ was appropriate for assessing the participant' Internet-specific epistemic beliefs.

Table 1: Factor loadings of ISEQ.

	Justification	Certainty	Simplicity	Source
JU1	0.89	0.04	-0.16	-0.03
JU2	0.88	0.07	-0.14	0.02
JU3	0.86	0.06	-0.20	-0.02
JU4	0.84	0.01	-0.14	-0.06

CE1	0.09	0.90	0.11	0.15
CE2	0.05	0.88	0.12	0.15
CE3	0.03	0.84	0.11	0.05
CE4	0.01	0.80	0.11	0.07
SP1	-0.10	0.15	0.86	0.22
SP2	-0.12	0.12	0.82	0.22
SP3	-0.28	0.13	0.79	0.21
SP4	-0.29	0.13	0.75	0.14
SO1	0.00	0.09	0.12	0.86
SO2	0.06	0.25	0.14	0.82
SO3	-0.19	-0.07	0.21	0.73
SO4	0.04	0.18	0.27	0.67

3.2 Results of t-test analysis

To compare the differences of ISEB between the high school students and undergraduates, the t-test analyses were executed. As presented in table 2, the high school students have significantly higher score on *Certainty* than the undergraduates do. On the contrary, comparing with high school students the undergraduates have significant higher score on *Justification*.

Table 2: Comparisons of ISEB between high school students and undergraduates.

Dimensions	high school		undergraduate		*t*	*p* value
	Mean	SD	Mean	SD		
Certainty	5.025	1.251	4.662	1.266	2.497	.013
Simplicity	3.545	1.100	3.368	1.055	1.420	.157
Source	3.574	0.987	3.475	1.082	.825	.410
Justification	5.295	1.011	5.628	0.796	-3.162	.002

3.3 Results of regression analysis

To explore the influence of age and educational level on the ISEB, the regression analyses were conducted. Table 3 shows the results of regression analysis for *Certainty*. As presented in table, the variables of age and educational level cannot significantly predict the tendency of Certainty, while gender significantly predicts the epistemic beliefs regarding Certainty.

Table 3: Regression results for Certainty.

Variables	Unstandardized Coefficients		Standardized Coefficients	*t*	*p*-value
	B	Std. Error	β		
(Constant)	6.10	0.93		6.53	.000
Group	-0.03	0.34	-0.01	-0.09	.926
gender	0.39	0.15	0.15	2.64	.009
Age	-0.15	0.08	-0.30	-1.83	.068
Educational years	0.04	0.11	0.08	0.42	.676
Hours	0.04	0.08	0.03	0.48	.634
Experience	0.03	0.11	0.02	0.32	.749
Frequency	0.04	0.09	0.03	0.42	.675

Note:
Group: 1 for high school student, 2 for undergraduates; Gender: 1 for male, 2 for female; Hours (weekly hours for Internet usage); Experience (experience in using the Internet for academic information searching); Frequency (frequency of using the Internet for course-related assignments)

Table 4 represents the results of regression analysis for *Simplicity*. As a result, the variable of age and educational level do not predict the Simplicity; however, the gender and experience in using the Internet for academic information do significantly predict the beliefs relating to Simplicity.

Table 4: Regression results for Simplicity.

Variables	Unstandardized Coefficients		Standardized Coefficients	*t*	*p*-value
	B	Std. Error	β		
(Constant)	3.70	0.79		4.67	.000
Group	0.32	0.29	0.15	1.12	.263
gender	0.35	0.12	0.16	2.83	.005
Age	0.06	0.07	0.15	0.94	.348
Educational years	-0.17	0.09	-0.36	-1.84	.066
Hours	0.02	0.06	0.03	0.35	.725
Experience	-0.23	0.09	-0.17	-2.49	.013
Frequency	0.07	0.08	0.06	0.86	.393
Note: Group: 1 for high school student, 2 for undergraduates; Gender: 1 for male, 2 for female; Hours (weekly hours for Internet usage); Experience (experience in using the Internet for academic information searching); Frequency (frequency of using the Internet for course-related assignments)					

The results of regression analysis for Source are presented in table 5. As shown in table 5, the variable of age and educational level do not predict the Source, while the gender is a significant predictor of the beliefs with regard to Source.

Table 5: Regression results for Source.

Variables	Unstandardized Coefficients		Standardized Coefficients	*t*	*p*-value
	B	Std. Error	β		
(Constant)	4.26	0.75		5.66	.000
Group	0.46	0.27	0.22	1.67	.096
gender	0.48	0.12	0.23	4.11	.000
Age	0.00	0.06	-0.01	-0.04	.967
Educational years	-0.14	0.09	-0.30	-1.58	.114
Hours	0.08	0.06	0.10	1.35	.179
Experience	-0.14	0.09	-0.11	-1.64	.101
Frequency	0.00	0.08	0.00	-0.03	.976
Note: Group: 1 for high school student, 2 for undergraduates; Gender: 1 for male, 2 for female; Hours (weekly hours for Internet usage); Experience (experience in using the Internet for academic information searching); Frequency (frequency of using the Internet for course-related assignments)					

Table 6 displays the regression results for Justification. As presented in table 6, the variable of age and educational level do not significantly predict the Justification but the experience significantly predict the beliefs regarding the Justification.

Table 6: Regression results for Justification.

Variables	Unstandardized Coefficients		Standardized Coefficients	*t*	*p*-value
	B	Std. Error	β		
(Constant)	4.61	0.67		6.85	.000
Group	0.16	0.24	0.09	0.68	.500
gender	0.05	0.11	0.03	0.48	.635
Age	-0.04	0.06	-0.12	-0.72	.471
Educational years	0.01	0.08	0.02	0.13	.897
Hours	0.06	0.06	0.07	1.03	.306
Experience	0.25	0.08	0.22	3.24	.001
Frequency	0.02	0.07	0.02	0.36	.721

Note:
Group: 1 for high school student, 2 for undergraduates; Gender: 1 for male, 2 for female; Hours (weekly hours for Internet usage); Experience (experience in using the Internet for academic information searching); Frequency (frequency of using the Internet for course-related assignments)

Acknowledgements

This study was supported by the National Science Council, Taiwan, under grant number NSC-99-2511-S-011-005-MY3 and NSC-100-2511-S-011-004-MY3.

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