Relational analysis of medical students' Internet attitudes and online Information commitments

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Abstract: The Internet has become the most widely used resource of information, it influenced the mediation of teaching and learning .Therefore, this study attempted to investigate whether Internet attitude affect the university medical students' Information commitments. Furthermore, the relationships between Internet attitudes and medical students' Information commitments were examined as well. This paper explored 405 medical university students (148 males and 311 females) from 6 medical universities in Taiwan. This study utilized two questionnaires to respectively survey the medical students' information attitudes and their online information commitment. Exploratory factor analyses revealed that both the questionnaires are adequately reliable and valid for medical students. In addition, the regression analyses revealed that medical students' Internet attitudes were viewed as predictors to explain their standards of judging online information and their search strategies on the Web.

Keywords: Internet attitudes, Information commitments

1. Introduction

Over the two decades, due to the rapid development of Internet, it influenced the mediation of teaching and learning (Havick, 2000). According to previous studies, it was found that the acceptance and the usage of a new technology for the students are very important, so some researchers began to explore the students' attitudes of the computers, and then to study their Internet attitudes. Tsai, Lin and Tsai (2001) developed the Internet Attitude Survey (IAS) to assess students' 'affection,' 'usefulness, ' 'control' and ' behavior' of using the Internet. Researchers found that the Internet is commonly used in students' life, so their perception of the Internet is positively correlated with the usefulness of the Internet. Therefore, the Internet also provides many methods to help students find the accurate and reliable resources. (Peng, Tsai & Wu, 2006)

To judge the information on the Web is getting important in our daily life. How web users to judge the information accessibility on web sites has became an important issue. In the process of the information searching, web users may use various types of searching strategies to get what they need on the Internet (Tsai & Tsai, 2003). In 2004, Tsai proposed a theoretical framework for web user's information commitments, which included three aspects: standards for accuracy, standards for usefulness, and searching strategy, and also it can be consisted of six factors of representing of information

commitments, including ‘multiple sources as accuracy,’ ‘authority as accuracy,’ ‘content as usefulness,’ ‘technical issues as usefulness,’ ‘elaboration as searching strategy,’ and ‘match as searching strategy.’ It was concluded that ‘Multiple sources,’ ‘Content,’ and ‘Elaboration’ were advanced information commitments, while the others were viewed as less sophisticated by Tsai (2004). Furthermore, Wu and Tsai (2005, 2007) focused on the sufficient reliabilities of the instrument for assessing web users’ information commitments on the Web. In addition, Liang and Tsai (2009) concluded that medical students in Taiwan with more Internet experiences are inclined to use ‘elaboration’ as searching strategy, and also employ ‘multiple sources’ and ‘authority’ as accuracy standards and ‘content’ and ‘technical’ as usefulness standards.

In this study, we attempted to investigate whether Internet attitude affect the university medical students’ Information commitments. Furthermore, we also examined the relationships between the medical students’ Internet attitudes and their Information commitments. In sum, by gathering questionnaire outcomes from 405 medical students, the main purposes in this study were:

- What are the university medical students’ Internet attitudes?
- What are the university medical students’ Information commitments?
- What are the relationships between university medical students’ Internet attitudes and their Information commitments?
- Can the medical students’ Internet attitudes be predictors of their Information commitments?

2. Method

2.1Sample

The samples of this study included 405 medical university students (148 males and 257 females) from 6 medical universities in Taiwan. There were 288 in juniors and seniors, and the rest of them, 117 students, were freshmen and sophomores.

2.2 Instrument

To assess medical students’ Internet attitudes and their information commitments, two instruments were employed in this study. The first questionnaire, Information Attitudes Survey (IAS) developed by Tsai, Lin and Tsai (2001), was revised to assess medical students’ Internet attitudes for this study. The second questionnaire, Information Commitments Survey (ICS), was revised to assess the students’ standards of judging online information and their search strategies on the Web.

2.2.1 IAS development

The IAS instrument consisted of 32 questionnaire items with four factors, including ‘Affective,’ ‘Usefulness,’ ‘Control,’ and ‘Behavior’ (consisting of, respectively, 8, 9, 8 and 7 items). All of the 32 items were presented in a six-point Likert scale, ranging from ‘1 – very disagree’ to ‘6 - very agree.’ The four factors detailed descriptions are presented below:

- Affective: measuring a student’s feeling for using the Internet. A sample item of this factor is: The Internet makes me feel uncomfortable.

- Usefulness: assessing a student using the Internet to make the positive impacts of the individuals and society. A sample item of this factor is: The Internet can allow me to do more interesting and imaginative work.
- Control: investigating a student's independence on the control of using the Internet. A sample item of this factor is: I could probably teach myself most of the things I need to know about the Internet.
- Behavior: measuring a student's how frequency he uses the Internet to solve problem. A sample item of this factor is: I use the Internet regularly throughout school.

2.2.2. *ICS development*

The ICS instrument developed by Wu and Tsai (2005) was utilized to investigate the medical students' evaluative standards of judging online information and searching strategies on the Web. It consisted of 38 questionnaire items with six factors: 'multiple sources as accuracy' (Multiple Sources), 'authority as accuracy' (Authority), 'content as usefulness' (Content), 'technical issues as usefulness' (Technical), 'elaboration as searching strategy' (Elaboration), and 'match as searching strategy' (Match), consisting of 5, 7, 5, 7, 7, and 7 items, respectively. According to the propositions of Tsai (2004), 'Multiple Sources,' 'Content,' and 'Elaboration' were more advanced information commitments while the others are considered less sophisticated ones. All items of ICS were presented in a six-point scale such as the '1-6 Likert scale, ranging from '1 – very disagree' to '6 - very agree.' The six factors detailed descriptions are presented below:

- Multiple Sources: measuring whether a student validates the correctness of unknown information on the Web by referring to other websites, peers, or printed texts. A sample item of this factor is: I retrieve relevant resources from more websites to evaluate whether the information is correct.
- Authority: assessing whether a student examines the correctness of unknown information on the Web by the 'authority' of the websites or sources. A sample item of this factor is: I agree with its correctness if the information appears on professional (official) websites.
- Content: measuring whether a student evaluates the usefulness of the information viewed on the Web by the relevancy of its content. A sample item of this factor is: I consider the information useful to me if it can help me retrieve further relevant information.
- Technical: assessing whether a student evaluates the usefulness of the information viewed on the Web by the ease of retrieving, searching, and obtaining information. A sample item of this factor is: I think the information is useful to me if it does not take much time to be retrieved.
- Elaboration: measuring whether a student has purposeful thinking or integrate information from several websites to fulfill their purposes. A sample item of this factor is: I can integrate the information obtained from a variety of websites.
- Match: investigating whether a student uses only a set of keywords to find a few websites that contain the most fruitful and relevant information. A sample item of this factor is: I usually try to find a best-fit website (or web page).

2.3. Data Analysis

There were three statistical analyses employed for this study. First the exploratory factor analysis was used to clarify the factor structures of IAS and ICS questionnaires respectively. And then, correlation analysis was utilized to examine the relationships between medical students' IAS and ICS. Finally, through a stepwise multiple regression

analysis, the medical students' Internet attitudes were viewed as predictors to explain their standards of judging online information and their search strategies on the Web.

3. Result and Discussion

3.1. Factor analysis

3.1.1. Internet Attitude Survey (IAS)

To validate the Internet attitude, factor analysis of principle component with varimax rotation was conducted to clarify the medical students' attitudes on the Web. The factor analysis extracted Internet Attitude Survey (IAS) were grouped into four factors with a total of 14 items is summarized in Table 1. The four factors yielded an explained variance of 60.53%. Four factors of items correspond to 'Affection,' 'Usefulness,' 'Control,' and 'Behavior.' The reliability (Cronbach's alpha) coefficients for four factors were 0.68, 0.79, 0.67, and 0.57, and the overall alpha was 0.79, suggesting that IAS has high validity and reliability in assessing colleges medical students' attitude towards the Internet.

Table 1: Rotated factor loadings and Cronbach's alpha values for the four factors of the IAS (n=405)

Item	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: Affective, $\alpha = 0.68$				
Affective 1	0.59			
Affective 2	0.79			
Affective 3	0.75			
Factor 2: Usefulness, $\alpha = 0.79$				
Usefulness1		0.73		
Usefulness 2		0.75		
Usefulness 3		0.74		
Usefulness 4		0.80		
Factor 3: Control, $\alpha = 0.67$				
Control 1			0.75	
Control 2			0.55	
Control 3			0.76	
Control 4			0.65	
Factor 4: Behavior, $\alpha = 0.57$				
Behavior 1				0.65
Behavior 2				0.69
Behavior 3				0.74

Overall alpha: 0.79. Total variance explained: 60.53%.

In addition, Table 2 shows students' average scores and standard deviations on four factors of the IAS. According to the result, all of the means of the items were higher than 4. It was found that students scored most highly on the 'Usefulness' factor (an average of 5.03 per item), followed by 'Affective' factor (an average of 4.89 per item) and then the 'Behavior' factor (an average of = 4.63 per item). The result revealed that the 'Usefulness' factor was the most significant positive attitudes for using the Internet, and the lowest was the 'Control' factor for students' Internet attitude.

Table 2: Students' scores on each factor of the IAS (n=405)

Factor	mean	S.D.	range
Affective	4.89	0.96	1-6
Usefulness	5.03	0.77	1-6
Control	4.34	0.82	1.50-6
Behavior	4.63	0.93	1.67-6

3.1.2. Information Commitment Survey (ICS)

To validate the structure of the Information Commitment survey, we used the exploratory factor analysis by principle component method. The results of the factor analysis revealed that students' responses in the Information Commitment Survey (ICS) were grouped into six factors which were 'Multiple Sources,' 'Authority,' 'Content,' 'Technical,' 'Elaboration,' and 'Match,' in accordance with those factors identified by Tsai(2004). The initial 38 items were reduced to 25, and there were, respectively, 3, 6, 5, 4, 4, and 3 items retained in these six scales of ICS as shown in Table 3. The six factors accounted for 65.86% of the variance totally. The reliability (Cronbach's alpha) coefficients for the six factors respectively were 0.75, 0.86, 0.89, 0.80, 0.72, and 0.75, and the overall alpha was 0.89. Therefore, in this study, these scales were deemed to be sufficiently reliable for assessing medical students' information commitments toward Web-based information.
Table 4 shows the factors means and standard deviation on the six scales of the ICS. As shown in Table 4, the medical students' scored the highest on the 'Content' factor (an average of 4.91 per item), followed by the 'Elaboration' factor (an average of 4.68 per item), the 'Multiple Source' factor (an average of 4.62 per item), the 'Authorit'y factor (an average of 4.36 per item). The lowest was the 'Match' factor (an average of 3.32 per item). The result revealed that medical students were more preference for 'Multiple Source' in the accuracy standard, 'Content' in the usefulness standard, 'Elaboration' in searching strategies, meanwhile, it was found that 'Multiple Source,' 'Content,' and 'Elaboration' which were the more advanced information commitments used by the students to judge the information on the Web.

Table 4: Students' scores on each factor of the ICS (n=405)

Factor	mean	S.D.	range
Multiple Source	4.62	0.81	1.67-6
Authority	4.36	0.85	1-6
Content	4.91	0.72	1-6
Technical	4.26	0.99	1.5-6
Elaboration	4.68	0.83	1.75-6
Match	3.32	1.19	1-6

Table 3: Rotated factor loadings and Cronbach's alpha values for the six factors of the ICS (n=405)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Factor 1 : Multiple Sources, α=0.75						
Multiple Sources 1	0.76					
Multiple Sources 2	0.87					
Multiple Sources 3	0.67					
Factor 2 : Authority, α=0.86						
Authority 1		0.70				
Authority 2		0.76				
Authority 3		0.64				
Authority 4		0.76				
Authority 5		0.72				
Authority 6		0.67				
Factor 3 : Content, α=0.89						
Content 1			0.80			
Content 2			0.79			
Content 3			0.72			
Content 4			0.78			
Content 5			0.67			
Factor 4 : Technical, α=0.80						
Technical 1				0.75		
Technical 2				0.73		
Technical 3				0.63		
Technical 4				0.66		
Factor 5 : Elaboration, α=0.72						
Elaboration1					0.57	
Elaboration2					0.80	
Elaboration3					0.57	
Elaboration4					0.59	
Factor 6 : Match, α=0.75						
Match 1						0.78
Match 2						0.80
Match 3						0.74

Overall alpha: 0.89. Total variance explained: 65.84%.

3.2. Correlations between IAS and ICS

In this study, it was further examined the relationships between medical students' Internet attitudes and their information commitments (as shown in Table 5). There are positive correlations with statistical significance between 'Affective' of the IAS and 'Content' ($r=0.28$, $p<0.001$), and 'Elaboration' ($r=0.27$, $p<0.001$) of the ICS, and negative correlation between 'Affective' and 'Match' ($r= -0.15$, $p<0.01$) of the ICS. And there are significant positive correlations between 'Usefulness' of the IAS and five factors of the ICS, such as 'Multiple Sources' ($r=0.38$, $p<0.001$), 'Authority' ($r=0.46$, $p<0.001$), 'Content' ($r=0.56$, $p<0.001$), 'Technical' ($r=0.36$, $p<0.001$) and 'Elaboration' ($r= 0.45$, $p<0.001$). The 'Control' of the IAS is as well as 'Usefulness,' significantly positively correlated with five factors of ICS, 'Multiple Sources' ($r=0.40$, $p<0.001$), 'Authority' ($r=0.35$, $p<0.001$), 'Content' ($r=0.32$, $p<0.001$), 'Technical' ($r=0.22$, $p<0.001$) and 'Elaboration' ($r= 0.33$, $p<0.001$). Moreover, 'Behavior' of the IAS is significantly positively correlated with 'Authority' ($r=0.15$, $p<0.01$), 'Content' ($r=0.24$, $p<0.001$),

'Elaboration' (r= 0.24, p<0.001), and negatively correlated with 'Match' (r= -0.13, p<0.01) of the ICS. It was found that the Content factor and the Elaboration factor played important roles in the ICS because there were all positively significant correlations with all factors of the IAS. On the other hand, the Match factor of the ICS was the only negatively significant correlations with the 'Affective' and 'Behavior' factors of IAS.

Table 5: The correlations among the factors between the IAS and ICS (n=405)

	Affective	Usefulness	Control	Behavior	
Multiple sources	0.04	0.38***	0.40***	0.09	
Authority	0.04	0.46***	0.35***	0.15**	
Content	0.28***	0.56***	0.32***	0.24***	
Technical	-0.05	0.36***	0.22***	0.04	
Elaboration	0.27***	0.45***	0.33***	0.24***	
Match	-0.15**	0.01	0.09	-0.13**	

Notes: *p<.05, **p<.01, ***p<.001

3.3. *Stepwise regression analysis for predicting students' ICS by the IAS factors*

This study further conducted stepwise regression analysis which used students' Internet attitudes to predict their information commitments (as shown in Table 6). The regression analysis revealed that 'Usefulness' (t=5.33, p<0.001) and 'Control' (t=5.84, p<0.001) were the predictors of the 'Multiple Sources' of the ICS, and 'Usefulness' (t=7.88, p<0.001) and 'Control' (t=4.01, p<0.001) were the predictors of the 'Authority' of the ICS. 'Usefulness' (t=12.44, p<0.001) and 'Behavior' (t=2.33, p<0.05) were the predictors of the 'Content' of the ICS, and 'Usefulness' (t=7.69, p<0.001) and 'Control' (t=6.44, p<0.001) were the predictors of the 'Technical' of the ICS. 'Usefulness' (t=6.71, p<0.001), 'Control' (t=3.49, p<0.01) and 'Affective' (t=2.64, p<0.01) were the predictors of the 'Elaboration' of the ICS, and 'Affective' (t=-2.98, p<0.05) was the predictors of the 'Match' of the ICS. Based on the analysis of the data in Table 6, it is found that medical students' 'Usefulness' factor for the Internet attitudes could predict all the factors of the ICS except for the 'Match' factor. In addition, the Control factor of the IAS could predict the 'Multiple Sources, ' the 'Authority, ' and the 'Elaboration' factors of the ICS.

Table 6: Stepwise regression model for predicting students' information commitment (n=405)

Information Commitment		B	S.E.	β	T	R^2
Multiple Sources						
	Usefulness	0.27	0.05	0.26	5.33***	0.21
	Control	0.28	0.05	0.29	5.84***	
	Constant	2.04	0.26		8.02***	
Authority						
	Usefulness	0.42	0.05	0.38	7.88***	0.24
	Control	0.20	0.05	0.19	4.01***	
	Constant	1.40	0.27		5.29***	
Content						
	Usefulness	0.50	0.04	0.53	12.44***	0.32
	Behavior	0.08	0.03	0.10	2.33*	
	Constant	2.06	0.22		9.41***	
Technical						
	Usefulness	0.46	0.06	0.36	7.69***	0.13
	Constant	1.96	0.30		6.44***	
Elaboration						
	Usefulness	0.36	0.05	0.34	6.71***	0.24
	Control	0.17	0.05	0.17	3.49**	
	Affective	0.11	0.04	0.12	2.64**	
	Constant	1.61	0.28		5.80***	
Match						
	Affective	-0.18	0.06	-0.15	-2.98*	0.02
	Constant	4.22	0.31		13.82***	

Notes: *p<.05, **p<.01, ***p<.001

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