Exploring Taiwanese pre-service fitness trainers' attitudes toward ICT and their teaching self-confidence

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Abstract: Learning by using Information and Communication Technology (ICT) is an important trend in the 21st century. In the field of physical education, ICT can extend teachers' instructional practice and enhance the effectiveness of their teaching. The main purpose of this study is to explore pre-service fitness trainers' attitudes toward ICT and the relationships with their teaching self-confidence in terms of fitness training. The participants of this study were 219 pre-service fitness trainers who had attended a ''training program for fitness trainers." All participants responded to two questionnaires: the Attitudes toward ICT (AICT) questionnaire and the Fitness Teaching Efficacy Beliefs Instrument (FTEBI). These two questionnaires are deemed to be sufficiently reliable to assess the two subjects by factor analysis. This study provides empirical evidence to verify the positive relationship between AICT and FTEBI in the domain of fitness training. This study also found a gender difference in teaching efficacy (TE) for fitness training, which seems to indicate that the male pre-service fitness trainers may teach better than the females. Overall, this study suggests that if we can add significantly more ICT materials and provide more experience of ICT use for pre-service fitness trainers in the training process, they would have more self-confidence in their professional career.

Keywords: Fitness training, Attitudes toward ICT, Teaching Confidence

1. Introduction

Learning by using Information and Communication Technology (ICT) is an important trend in the 21st century. In the field of e-learning research, there is much evidence of learner control in ICT environments, and the conditions under which it can effectively facilitate rather than impede learning (Jimoyiannis & Komis, 2007; Lin & Hsieh, 2001). In the field of physical education, teaching fitness through the use of ICT (e.g., virtual reality, network learning platforms) can not only provide learners with repeated visual action demonstration with a musical rhythm, but also has very good results in terms of boosting mental and concentration (Lan, Wang, & Chen, 2010). The architecture of hybrid learning platforms for physical education can extend teachers' instructional practice and improve learning outcomes (Pang, 2010).

A fitness trainer (or teacher) maintains health and fitness for a client or company by instituting exercise plans and diet strategies, each designed to teach students and patients the best ways to maintain a healthy lifestyle (Sam, 2012). Since fitness training involves a great deal of body demonstration, professional fitness trainers need to be familiar with the knowledge of fitness training and to know how to clearly present their body movements to their students. Accordingly, it is important to integrate ICT into the instructional practice of fitness training.

In Taiwan, people who want to be professional fitness trainers need to obtain a basic license which only requires attending a two or three day course for professional certification. As previously mentioned, since ICT can facilitate teaching practice and learning, we need to understand the pre-service fitness trainers' attitudes toward ICT. Moreover, teachers' self-confidence is an important factor influencing their teaching practice (Tschannen-Moran & Woolfolk-Hoy, 2001). In this study, teaching self-confidence is considered to consist of teaching efficacy and outcome expectancy (Bleicher, 2004). Accordingly, the main purpose of this study is to explore pre-service fitness trainers' attitudes toward ICT and the relationships with their teaching self-confidence.

2. Research Methodology

Participants

The participants of this study were 219 pre-service fitness trainers (110 females and 109 males) who attended a ''training program for fitness trainers." All participants responded to two questionnaires at the beginning of the program. Their ages ranged from 19 to 51 years old, with an average age of 24.3. In addition, their background information such as ICT-learning experience (e.g., Have you ever used online video (such as YouTube) to learn about fitness knowledge or technical skills?) was collected using a four-point Likert scale from 1, "never" to 4, "often."

Instruments

To explore these pre-service fitness trainers' attitudes toward ICT and their fitness teaching self-confidence, two instruments were used in this study. The details of the two instruments are as follows:

Attitudes toward ICT (AICT)

This questionnaire was modified from the "Attitudes toward e-learning" questionnaire (Liaw, Huang, & Chen, 2007). In this study, the original questionnaire had 15 items on a 5-point Likert scale (ranging from 1 for ''strongly disagree'' to 5 for ''strongly agree''). In order to understand the participants' attitudes toward ICT, we added two new items to the questionnaire, giving a final total of 17 items as the initial pool of items. The details of the two factors are as follows:

- Attitudes toward ICT-learning: measuring the extent of pre-service fitness trainers' agreement regarding learning attitudes towards using ICT, such as using Internet-related tools. A sample item is "I can find information actively in the e-learning environment."
- Attitudes toward ICT-teaching: measuring the extent of pre-service fitness trainers' agreement regarding their teaching attitudes towards using ICT, such as using video or online information to teach students. A sample item is "I like animated online instruction."

Fitness Teaching Efficacy Beliefs Instrument (FTEBI)

This questionnaire was modified from the Science Teaching Efficacy Beliefs Instrument (STEBI-B) (Enochs & Riggs, 1990; Bleicher, 2004), with the wording of items changed to

encompass pre-service fitness teaching. The original questionnaire has 25 questions on a 5-point Likert scale (from 1, ‘‘strongly disagree’’ to 5, ‘‘strongly agree’’). The details of the two factors are as follows:

- Teaching Efficacy (TE): measuring the fitness trainers’ teaching efficacy. A sample item of this scale is, “I know the steps necessary to teach fitness concepts effectively.”
- Outcome Expectancy (OE): measuring the fitness trainers’ outcome expectancy. A sample item of this scale is “Students’ achievement in fitness is directly related to their trainers' effectiveness in teaching.”

Data analysis

To fulfill the main purposes of this study, exploratory factor analysis (EFA), t-test, and correlation were adopted as the statistical analysis methods. EFA was utilized to reveal the scales of the AICT and FTEBI. Through the independent t-test, the fitness trainers’ AICT and FTEBI were compared by gender. Moreover, correlation analysis was employed to examine the relationship between the participants’ attitudes toward ICT and their teaching self-confidence.

3. Result

Factor analysis

To clarify the structure of the pre-service fitness trainers’ attitudes toward ICT (AICT), principle component analysis was utilized as the extraction method, with the varimax rotation method of exploratory factor analysis (EFA). The final version of the AICT consisted of 16 questionnaire items with two scales, attitudes toward ICT-learning, and attitudes toward ICT-teaching. The total variance of the factors was 70.90%. The reliability coefficients (alpha) of the scales, respectively, were 0.94 and 0.95, with an overall alpha of 0.96. The factor loadings for the retained items are shown in Table 1.

Table 1 Rotated factor loadings and Cronbach’s α values for Attitudes toward ICT (AICT)

Scale	Factor 1	Factor 2
Factor 1: Attitudes toward ICT-learning, α=0.94		
Attitudes toward ICT-learning1	.658	
Attitudes toward ICT-learning2	.813	
Attitudes toward ICT-learning3	.731	
Attitudes toward ICT-learning4	.643	
Attitudes toward ICT-learning5	.762	
Attitudes toward ICT-learning6	.744	
Attitudes toward ICT-learning7	.682	
Attitudes toward ICT-learning8	.681	
Attitudes toward ICT-learning9	.693	
Factor 2: Attitudes toward ICT-teaching, α=0.95		
Attitudes toward ICT-teaching 1		.705
Attitudes toward ICT-teaching 2		.688
Attitudes toward ICT-teaching 3		.795
Attitudes toward ICT-teaching 4		.842
Attitudes toward ICT-teaching 5		.852
Attitudes toward ICT-teaching 6		.793
Attitudes toward ICT-teaching 7		.712

Overall α=0.96, total variance explained: 70.90%.

Similarly, to clarify the structure of the pre-service fitness trainers' teaching self-efficacy, the same process of principle component analysis was utilized. The final version of the questionnaire consisted of 10 items. As a result, it also demonstrated good validities and reliabilities under the following two factors: Teaching Efficacy (TE), and Outcome Expectancy (OE). The factor loadings for the items of these two scales are shown in Table 2, and a total variance of 56.18% was explained by these two scales. In addition, the Cronbach's alpha values for these two scales were 0.80 and 0.77, respectively, with 0.85 for the whole teaching self-efficacy questionnaire.

Table 2 Rotated factor loadings and Cronbach's α values for the Fitness Teaching Efficacy Beliefs Instrument (FTEBI)

Scale	Factor 1	Factor 2
Factor 1: pre-service fitness trainers' teaching efficacy (TE), α=0.80		
TE1	.537	
TE2	.780	
TE3	.790	
TE4	.771	
TE5	.647	
Factor 2: pre-service fitness trainers' outcome expectancy (OE), α=0.77		
OE1		.750
OE2		.796
OE3		.661
OE4		.540
OE5		.523

Overall α=0.85, total variance explained: 56.18%.

Gender difference

Furthermore, the differences between male and female pre-service fitness trainers' scores on the four factors of the questionnaire were also explored. Table 3 revealed that these two groups of fitness trainers had significant differences on the "Teaching Efficacy" scale ($t=2.47$, $p<0.5$). It seems that the males attained higher scores for their fitness teaching efficacy than the females. Regarding attitudes toward ICT, no gender difference was identified for the pre-service fitness trainers in this study.

Table 3 Gender comparisons on the scales of pre-service fitness trainers' AICT and FTEBI

Scale	Male (n =109)		Female (n =110)		
	M	SD	M	SD	T
Attitudes toward ICT (AICT)					
Attitudes toward ICT-learning	3.88	.65	3.79	.64	1.06
Attitudes toward ICT-teaching	4.01	.72	3.86	.71	1.63
Fitness Teaching Efficacy Beliefs Instrument (FTEBI)					
Teaching Efficacy (TE)	3.69	.51	3.53	.44	2.47*
Outcome Expectancy (OE)	3.97	.47	3.85	.50	1.88

** p <0.05

Correlation between AICT and FTEBI

The Pearson correlation coefficients among the AICT and FTEBI are presented in Table 4. The correlation between the attitudes toward ICT and teaching self-confidence indicated that all of the variables were significantly positively correlated with each other. These results, in general, suggest that pre-service fitness trainers who express more positive

attitudes toward ICT tend to have greater confidence in their ability to teach fitness (i.e., teaching efficacy and outcome expectancy).

Table 4 Correlation analysis of AICT and FTEBI

Scale	Attitudes toward ICT-learning	Attitudes toward ICT-teaching
Teaching Efficacy	.49***	.40***
Outcome Expectancy	.49***	.44***

***p<0.001

This study also examines the relationships of participants' age and ICT experience based on their responses to the AICT and FTEBI (see Table 5). The participants' fitness teaching confidence (i.e., teaching efficacy and outcome expectancy) was significantly positively correlated with their age and ICT experience. Except for the correlation between age and attitudes toward the use of ICT in teaching, significant correlations in the trainers' AICT and their age and ICT experience were found.

Table 5 Correlation analysis of AICT, FTEBI with pre-service fitness trainers' age and experience

Scale	Attitudes toward ICT-learning	Attitudes toward ICT-teaching	Teaching Efficacy	Outcome Expectancy
Age	.16*	.09	.27***	.19**
Experience of ICT	.21**	.15*	.30***	.17*

*p<0.05、**<0.01、***<0.001

4. Findings

In this study, the two questionnaires were found to be sufficiently reliable to assess pre-service fitness trainers' teaching confidence and attitudes toward ICT. The correlation results, which were similar to those of previous studies (e.g., Kao & Tsai, 2009; Peng, Tsai, & Wu, 2006) support the positive correlation between attitudes toward ICT and self-confidence regarding fitness training.

The scales of the AICT were no different between males and females. This result is different from that of previous studies (e.g., Heemskerk, Volman, Admiraal, & Dam, 2012; Young, 2000) which found a gender difference in attitudes toward ICT. Additionally, research suggests that teachers' efficacy can positively influence the effectiveness of their teaching (Rich, Lev, & Fischer, 1996). This study found a gender difference in teaching efficacy (TE) for fitness training which seems to indicate that the male pre-service fitness trainers may teach better than the females.

This study provides further empirical evidence to verify the relationship between AICT and FTEBI in the domain of fitness training. Overall, this study suggests that if we can add significantly more ICT materials and provides more experience of ICT use for pre-service fitness trainers in the training process, these trainers would have more self-confidence in their professional career.

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References

[1] Bleicher, R. E. (2004). Revisiting the STEBI-B: Measuring self-efficacy in pre-service elementary teachers, *School Science and Mathematics*, 104(8), 383-391.

[2] Enochs, L. G., & Riggs, I. M. (1990). Further development if an elementary science teaching efficacy belief instrument: A pre-service elementary scale. *School Science and Mathematics*, 90 (8), 694-706.

[3] Heemskerk, I., Volman, M., Admiraal, W., & Dam, G. ten. (2012). Inclusiveness of ICT in secondary education: Students' appreciation of ICT tools. *International Journal of Inclusive Education*, 16(2), 155-170.

[4] Jimoyiannis, A., & Komis, V. (2007). Examining teachers' beliefs about ICT in education: implications of a teacher preparation programme, *Teacher Development*, 11(2), 149-173. doi: 10.1080/13664530701414779.

[5] Lin, B. and Hsieh, C. (2001). Web-based teaching and learner control: a research review. *Computers & Education*, 37 (3–4), 377-386. doi: 10.1016/s0360-1315(01)00060-4.

[6] Liaw, S. S., Huang, H. M., & Chen, G.D. (2007). Surveying instructor and learner attitudes towards e-learning. *Computers & Education*, 49(4), 1066-1080.

[7] Pang, Y. (2010). Improving Hybrid Learning of Physical Education by Video Review Advances in Web-Based Learning, *Lecture Notes in Computer Science*, 6483, 230-239. doi: 10.1007/978-3-642-17407-0_24.

[8] Kao, C. P. & Tsai, C. C. (2009). Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computers & Education*, 53(1), 66-73.

[9] Lan, S. C., Wang, H. C. & Chen, W. C. (2010). Investigation of multimedia-assisted instruction on 8-movement Taijiquan's learning effects for the college students. *Physical Education Journal(R.O.C)*, 43(3), 109-126.

[10] Peng, H., Tsai, C., & Wu, Y. (2006). University students' self-efficacy and their attitudes towards the Internet: the role of students' perceptions of the Internet. *Educational Studies*, 32(1), 73-86.

[11] Rich, Y., Lev, S. & Fischer, S. (1996). Extending the concept and assessment of teacher efficacy. *Educational and Psychological Measurement*, 56(6), 1015-1030.

[12] Sam A. (2012) Fitness Trainer Definition, site from http://www.ehow.com/about_6364947_ definition-fitness-trainer.html.

[13] Tschannen-Moran, M., & Woolfolk-Hoy, A. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.

[14] Young, B.J. (2000) Gender differences in student attitudes toward computers. *Journal of Research on Computing in Education*. 33(2), 204 -216.