TEACHERS' ATTITUDE TOWARDS ICT USE IN SECONDARY SCHOOLS: A SCALE DEVELOPMENT STUDY

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ABSTRACT

The current study aims to develop a valid and reliable instrument that measures secondary school teachers' attitudes towards ICT use in teaching and learning process. A cross-sectional survey design was employed with a group of 173 teachers. Based on the literature review, a pool of 21 items was proposed and reviewed by a board of experts. As to psychometric quality of the scale, the Cronbach's Alpha coefficient, item total variance and item distinctiveness indices were estimated. The results illustrated that Teachers' ICT Attitudes Scale (TICTAS) has a high level reliability standard (α = .898) and also Exploratory and Confirmatory Factor Analyses indicated good goodness of fit estimates. As a result, a reliable and valid scale comprising of 16 items loaded in two factors (ICT willingness and ICT anxiety) was developed.

KEYWORDS

Teachers' ICT attitude, scale development, ICT in education

1. INTRODUCTION

For the last two decades, the integration of ICT in education has been of increasing concern in both developed and developing countries. For example, in the Education and Training 2020 strategy framework, the European Commission strongly emphasized the innovative use of ICT and identified it as a priority and catalyst for achieving transformation in education (Vanderlinde & van Braak, 2010). More recently, with the announcement of large-scale ICT roll outs, not only educational goals of a country, but also many interrelated political, social and economic outcomes have gained currency. In line with this, effective use of ICT in educational context has become closely associated with achieving these interrelated strategic outcomes. In this vein, many countries have been allocating huge budgets on improving ICT infrastructure in schools.

Despite this increasing public spending on ICT tools and ICT infrastructure, Afshari, Bakar, Luan, Samah, & Fooi (2009) argued that "most teachers neither use technology as an instructional delivery system nor integrate technology into their curriculum" (p. 77). Likewise, Yildirim (2007) noted that "most teachers do not use ICT to promote pupils attainment in areas across the curriculum, but they use computers frequently for preparing handouts and tests" (p. 171). In a similar vein, a significant number of research studies illustrate that teachers do not use ICT in teaching and learning process as a mediator of achieving educational outcomes. This leads to a gap between current use of ICT in class and its potential, which signals the teachers' central role in effective use of ICT in teaching and learning. Thus, the teachers ICT attitudes, pedagogical beliefs, ICT skills and training have gained currency and under scrutiny in today's educational settings. As part of this kind research initiative, the current study aimed to measure teachers' attitudes towards ICT use in teaching and learning process.

2. METHODS

2.1 Study Group and Procedure

The current study employed a cross-sectional design to measure teachers' attitudes towards ICT use in class. The Instrument development procedure has been framed by the 8 step scale development procedure proposed by Anderson (1981). In the first step, 18 positive and 18 negative scale items have been formed based on the literature review. Secondly, this pool of 36 items have been reviewed by a board of experts comprising of 2 language expert, 2 ICT in education expert, and 2 scale development and measurement expert. Then, 21-item draft scale has been agreed up on the expert revision. The co-agreed 21-item form was administered to 200 secondary school teachers selected by employing a convenience sampling technique (Creswell, 2012). After eliminating incomplete and faulty responses, the final participating group comprised of 173 teachers, 53% males, 61% younger than 40 years, 60% with less than 15 years of teaching experience.

Prior to statistical analyses, Kaiser-Meyer Olkin (KMO) measure and Barlett Sphericity test have been administered in order to test if the data set is suitable for Factor Analysis. Results illustrated that the data well suits for Factor Analysis (KMO= 0.911, Barlett= [X^2=1245,293, p< .05]).

3. FINDINGS

3.1 Exploratory Factor Analysis

As a preliminary analysis, the draft Likert type scale with 21 items has been administered to 105 participating teachers from the target sample. Prior to Principal Components Analaysis (PCA), factor loads with a higher eigenvalues than 1.00 have been explored as well as examining scree plot and explained variance by each factor. The results illustrated that the items have loaded in three factors and total variance explained by these factors are 58,41%. Yet, the Varimax rotated PCA results showed that 5 items have been loaded more than one factor. These 5 items have been omitted and the analysis re-run. The re-run PCA results proposed a two factor solution and total variance explained by these two factors is 53,54%. These two factors are labeled as ICT willingness (11 item) and ICT anxiety (5 item).

3.2 Confirmatory Factor Analysis

The two factor model proposed by the EFA results have been tested employing Confirmatory Factor Analysis along with examining RMSEA, NFI, CFI, IFI indices.

Table 1. Model Fitness Indices

Model	X^2	*df*	*p*	X^2/df	**RMSEA**	**CFI**	**IFI**	**NFI**
Two Factor Model	186.676	103	.00	1.812	.069	.929	.930	.855
Modified Model	146.880	101	.00	1.454	.051	.961	.961	.886

p< .05

The CFA results illustrated that two factor modified model have better fitness values with modifications. The modifications included correlating the residual error values of items 1 and 19; 5 and 7. Considering that those items are signaling the importance of ICT use in teaching and learning, these modifications have been theoretically confirmed. Table 2 below illustrates the t and R^2 values of the items after CFA.

Table 2. CFA Results and t and R^2 Values for items

Items (ICT willingness)	*t*	*R2*	*Items (ICT anxiety)*	*t*	*R2*
1	4.27	.63	2	4.14	.75
5	4.17	.63	4	4.16	.73
7	4.33	.59	20	4.12	.63
11	4.32	.67	22	4.33	.56
19	4.08	.83	30	3.77	.56
21	4.05	.67			
23	4.08	.83			
27	4.06	.67			
29	3.76	.64			
31	3.05	.42			
35	3.76	.81			

Table 2 illustrates that items 19 and 23 in factor 1, 2 and 4 in factor 2 have made the strongest contribution in measurement of teachers ICT attitude, conversely item 31 in factor 1 and items 22 and 30 in factor 2 have made the weakest contribution in the same endeavor. These results strongly concurred with the EFA and illustrated a high level construct validity of the scale.

As to the psychometric quality of TICTAS, the Cronbach's Alpha coefficient has been estimated for the scale total and factors separately. In line with this, for ICT willingness (11 item) estimated $\alpha = .903$, and for ICT anxiety (5 items) $\alpha = .781$, and for the scale total (16 items) $\alpha = .898$. As a result, TICTAS has showed a high level of reliability standard.

4. CONCLUSION AND IMPLICATIONS

The current study aimed to develop a valid and reliable scale that measures teachers' attitudes towards ICT use in teaching and learning. In this regard, a valid and reliable scale, TICTAS, which measures teachers' attitudes towards ICT use have been developed after administering EFA, CFA and Reliability analysis. The results illustrated that TICTAS have two factors namely ICT willingness and ICT anxiety. TICTAS can be effectively used by researchers who would like to explore the determinants of teachers' ICT use in class.

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