

**Derslerde Teknolojinin Kullanılmasına Yönelik Farkındalık
Ölçeği Geliştirme Çalışması ***

**Development Of An Awareness Scale Regarding Technology Use
In Courses**

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Extended Summary

Introduction

Enrichment of learning environments with technological tools is reported to provide students with great benefits in the learning process (Tosun, 2006). In traditional understanding of education, students are in passive position in in-class activities, while with the use of technology in courses, students have taken more active roles in learning environment instead of just listening to the teacher in class (Şaşan, 2002; Demirci, 2008). In this respect, technology use in education and organization of learning environments accordingly will raise students' awareness and increase the quality of education. This is thought to be made possible only when educational environments are created involving students who are knowledgeable about technology and trained well on technology usage (Özden and Çağıltay 1997). In other words, revealing secondary school students' awareness of technology usage in courses is of great significance in terms of making more productive of technology usage in courses. Depending on this, the present study aimed at determining secondary school students' awareness of technology use in courses.

Method

In the study, quantitative methods were used.

Sample

The research sample included a total of 1008 6th, 7th and 8th grade students from secondary schools in the city of Van. In the study, Exploratory Factor Analysis

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(EFA) and Confirmatory Factor Analysis (CFA) were used. In this respect, EFA was applied to 700 students, and CFA was applied to 308 students.

Data Collection Tool

In the study, in order to collect the research data, the “Awareness Scale for Technology Use in Courses” was used. While developing the scale items, the literature related to technology use in education was reviewed. The results of the related studies and the measurement tools were examined, and a pool of 40 items was formed. The scale included positive and negative items. The statements found in the scale were prepared in a way to reveal the students’ awareness of technology use in courses. The scale was designed in a way to include five-point Likert-type: “I Completely Agree”, “I Agree”, “I am Neutral”, “I Disagree” and “I Completely Disagree”.

Analysis of Data

In order to determine the reliability of the scale, the Cronbach’s Alpha internal consistency coefficient was calculated (0.85). In order to examine the construct validity of the scale, EFA and CFA were conducted. Regarding the scale developed in the study, EFA was applied. For the purpose of testing the factor structure obtained, CFA was conducted. For EFA, SPSS 21.0™ was used, and for CFA, Lisrel 8.8 was used.

Findings

In order to provide evidence regarding the construct validity of the awareness scale, Factor Analysis (Rotated Basic Components Analysis) was conducted (Tabachnick & Fidell, 2007). Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett Sphericity test were used to examine whether the data were appropriate to factor analysis (Büyüköztürk, 2010). As a result of this test, which demonstrated that the scale was appropriate to factor analysis, the Chi-Square value and the significance value were found to be 0.000. Table 1 presents the data regarding the results of KMO and Bartlett Tests.

Table 1. KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.87
	Approx. Chi-Square	4269.620
Bartlett's Test of Sphericity	Df	231
	Sig.	.000

According to Table 1, the KMO value was calculated as .87, and Bartlett value was calculated as 4269.620 (p= .000).

Findings Regarding Exploratory Factor Analysis (EFA)

As a result of the factor analysis conducted, the items inappropriate to the structure of the scale and those with similar loadings for more than one factor were excluded, and the scale was finalized. The final version of the scale included two factors and 22 items. Table 2 presents the findings regarding the total variance for the 22 items found in the final scale.

Table 2. Exploratory Total Variance and Eigenvalues

Component	Initial Eigenvalues			Load Values			Load Values after Rotation		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	5.79	26.34	26.34	5.79	26.34	26.34	5.18	23.5	23.54
2	2.56	11.63	37.98	2.56	11.63	37.98	3.17	14.43	37.98

When Table 2 is examined, it is seen that the total variance explained regarding the two factors of the rotated scale to which varimax technique was applied was 37.980% and that the first factor explained 23.545% of the scale and the second explained 14.435% of the scale.

Findings Regarding Confirmatory Factor Analysis (CFA)

Table 3 presents the fit indices obtained regarding CFA.

Table 3. Descriptive Statistics Regarding Demographic Variables

Fit Index	Values
Degree of Freedom (df)	208
Chi-Square (X^2)	554.03
X^2/df (Chi-Square/ Degree of Freedom)	2.66
P (p-value)	0.00
CFI (Comparative Fit Index)	0.93
GFI (Goodness of Fit Index)	0.86
AGFI (Adjusted Goodness of Fit Index)	0.93
IFI (Incremental Fit Index)	0.93
NFI (Normed Fit Index)	0.89
NNFI (Non-Normed Fit Index)	0.93
RMSEA (Root Mean Square Error Approximation)	0.073

The two-factor structure with 22 items obtained via EFA was tested with CFA. The fit of the model regarding the factor structure obtained via EFA was examined with CFA. According to the results, the RMSEA value was calculated as 0.073; NFI value as 0.89; NNFI value as 0.93; CFI value as 0.93; IFI value as 0.93; GFI value as 0.86, and AGFI value was calculated as 0.93. Based on the principle that values of CFI and GFI closer to 0.90 predict an excellent model, these values in the study were in good ranges.

Discussion And Results

In the study, in order to determine secondary school students' levels of awareness of technology use in courses, a scale was developed. The "Awareness Scale for Technology Use in Courses", whose validity and reliability studies were conducted, was applied to secondary school students. The findings obtained in relation to the validity and reliability of the scale demonstrated that the scale could be used to determine individuals' awareness of technology usage. For the purpose of testing whether the final version of the 22-item scale was appropriate to factor analysis, Kaiser-Meyer Olkin (KMO) coefficient was calculated, and Bartlett's Sphericity test was applied. The results revealed that factor analysis could be applied to the scale. The results of EFA showed that the scale included two factors and explained 37.980% of the total variance. The factors obtained were called "F₁: Advantages of Technology Use" and "F₂: Disadvantages of Technology Use". The Cronbach's Alpha internal coefficient of the whole scale was calculated as 0.85. Following EFA, the fit of the model was tested with CFA. According to the fit values obtained, the fit of the model was statistically acceptable. The scale developed could be used to determine students' awareness from different sample groups. In addition, the validity and reliability studies of the scale could be replicated using data to be collected from different research samples.

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