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Modeling Teachers' Use of Information Technologies during the Covid-19 Pandemic by the Technology Acceptance Model

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Abstract

Countries that attach importance to education make great investments in the field of educational technologies by reforming their education systems in this direction in order to raise dynamic individuals who can meet the needs of society, just like technology. It is undoubtedly teachers who will use these technologies in educational environments and transfer them to new generations. It is very important to reveal the factors that encourage or limit the use of these technologies in schools. The purpose of this research is to try to explain teachers' use of information technologies with the Technology Acceptance Model for Teachers (TAMT), which is an extended version of the Technology Acceptance Model (TAM). The sample of the study consists of 501 teachers working in public schools in Van, Turkey. Data analysis was performed using the IBM AMOS V24 (Chicago, USA) program. Various statistical techniques such as descriptive statistics, multivariate statistical techniques and structural equation modeling were used in this study. The tested TAMT explained 54.6% of teachers' behavioral intentions to use information technologies, 49.2% of their attitudes towards use, 27.7% of perceived usefulness, and 39.8% of perceived ease of use. Of the 32 hypotheses defined in TAMT, 9 were accepted as meaningless and 23 as significant. The results obtained showed parallelism with the results in the literature and it was determined that the TAMT was sufficient to explain the actual usage behavior.

Key words: COVID-19 Pandemic, Technology Acceptance Model, Technology Acceptance and Use Model for Teachers, Structural Equation Model

JEL Code: C12, C13, C44

1. Introduction

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Countries that attach importance to education are making investments with great costs in the field of educational technologies by reforming their education systems in this direction due to reasons such as the continuous change and increase in knowledge, the increasing importance of individual differences, the increasing role of technology in education and training, and the continuous updating of technology and its entry into all areas of life (Drossel, Eickelmann and Gerick, 2017; Vanderlinde, Aesaert and Van Braak, 2014). Technology policies are being developed in the field of education in order to ensure the effective use of information technologies in education and the integration of these technologies into education in Turkey. In this direction, National Education Councils, Turkish Informatics Councils, Increasing Opportunities and Improving Technology Movement (FATİH) Project and Vision 2023 Strategy Document projects were carried out. Within the scope of the FATIH project, which is being implemented in 47,722 schools in Turkey, fiber optic network connection was provided for internet connection to schools, electronic boards were installed in all classes, tablets were distributed to students and teachers were trained for this purpose. Again, in this context, continuous education content has been prepared and made available to students and teachers over the education and informatics network connected to national education. These studies, which are carried out in order to benefit more from technology, bring with them problems such as the adaptation, acceptance and use of technology by the personnel. Most studies have found that schools spend a lot of money on technology and although they are technologically adequately equipped, they fail to make adequate use of educational outcomes and technology (Flanagan and Jacobsen, 2003). It is an important issue that all the investments made to benefit more from the technology, which is almost integrated with education, should not be wasted and that the technology should be adapted to institutions for effective use (Ursavaş, 2014: Alkan, 1995).

In the age we live in, technology is constantly updated and causes changes in every aspect of our lives in many different ways. As a result of this change, we need to use information technologies in many parts of our lives. Having the self-sufficiency to use technology has become a necessity in the current period we are in. While technology creates differences even in the genetics of the new generation of children, it has been inevitable that it will change in the current education system in which children are located (Metin, 2018). Since one of the aims of education is to raise individuals according to the needs of society, the educational structure must also keep up with this technological change (Akkoyunlu, 1995). Civilized societies are trying to use computers in many areas, especially in education, in order to have a say in a new order called "Information Society" (İmer, 2000). Teachers are indispensable and vital in a successful technology adaptation. Using and adapting Information Technologies in schools depends largely on the motivation, knowledge and skills of teachers (Ursavaş, 2014).

The World Health Organization has declared the COVID-19 virus, which spread almost all over the world in a short period of time that emerged on December 1, 2019 in Wuhan, China, as a pandemic as of March 11, 2020. The

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Coronavirus (Covid-19) pandemic has caused very important changes and effects on the economy, social life and education, especially on health, which have been seen at the global level. With the pandemic process, the normal flow and rhythm of life have been affected and changed all over the world (Zhao, 2020). With the closure of schools due to the pandemic, the education of approximately 1.6 billion students from all levels of education has been interrupted in more than 190 countries around the world (UNESCO, 2020; UNICEF, 2020). Approximately 25 million students in Turkey have been affected by the interruption of education (Table 1). With the beginning of the pandemic in Turkey, schools were suspended and distance education was started on March 23, 2020 through the Education Information Network, Turkish Radio and Television Corporation (TRT) and free platforms, which were previously established under the control of the Ministry of National Education. During the pandemic period, teachers' technology use behaviors have become even more important. In this process, by using TAM in this study, the factors affecting the use of technology by teachers were tried to be revealed by using the structural equation model (SEM).

Table 1. Number of students affected by the interruption of education with COVID-19 in Turkey

Total affected students:		24.901.925	
Total affected female students:		11.817.880	
Total affected male students:		13.084.045	
Education Level	Females	Male	Sum
Preschool	632.944	693.179	1.326.123
Elementary School	2.421.515	2.550.915	4.972.430
Secondary	5.450.541	5.953.844	11.404.385
Higher Education	3.312.880	3.886.107	7.198.987

(UNESCO, 2020).

The aim of the research is to examine the factors affecting the behaviors of teachers to accept and use information technologies that they use in teaching during the COVID-19 pandemic process, within the framework of the Technology Acceptance Model for Teachers. In this direction, the acceptance status of information technologies is examined with perceived usefulness, perceived ease of use, attitude towards use and some external variables. External variables discussed in the research, teachers' computer skills, experience and general expectations.

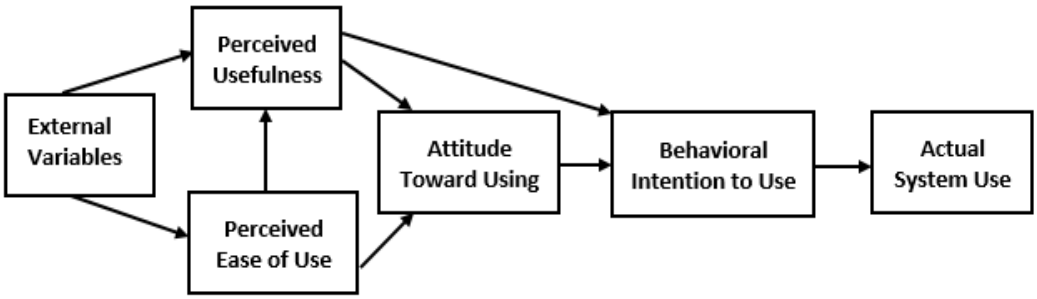
2. Methodology

Technology Acceptance Model

TAM, developed by Davis (1989), is a model based on the Theory of Causal Behavior, previously created by Fishbein and Ajzen (1975), which is

designed to explain the causes of human behavior in a very general way and which attempts to determine the causes of behavior using information technologies (Davis, Bagozzi and Warshaw, 1989). According to TAM, the behavior of the use of information technologies involves a four-stage process (Figure 1). In the first stage, there are external variables, and the external variables affect the Perceived Ease of Use and Perceived Usefulness in the second stage. Perceived Ease of Use and Perceived Usefulness affect the Attitude to Use in the third stage. Attitude to Use affects the Intention to Act in the fourth and final stage, as well as the intention to act in Perceived Usefulness. External variables; demographic characteristics of the individual, technical characteristics of the system, organizational factors, technical skills of the users and work experience (Aras, 2012).

Figure 1. Technology Acceptance Model



(Davis, Bagozzi and Warshaw, 1989).

Structural Equation Model

The SEM is a multivariate statistical method that models the relationships between theoretical structures that can deal systematically and comprehensively with the relationships between many dependent and independent observed or unobservable variables at once, including the measurement errors of the structures and the relationships between these errors, which has recently become widespread in many fields. It is a multivariate statistical approach formed by combining many analysis methods such as variance, covariance, regression, multiple regression analysis and factor analysis for the estimation of dependency relationships (Anderson and Gerbing, 1988; Dursun and Kocagöz, 2010; Çelik, Arslan and Yilmaz ,2012; Arslan, T., Yılmaz, V. and Aksoy, H., 2012; Şehribanoğlu, S. and Okut, H., 2013).

Research Model

The model of the research was developed by Ursavaş (2014) by adding the variables Perceived Fun, Anxiety, Relevance, Subjective Norms, Facilitating

Situations, Self-efficacy and Technological Complexity. This TTAM model is based on TAM.

Perceived Usefulness (PU): It is defined as the degree of personal perception of the individual about the increase in job performance when he uses a certain system.

Perceived Ease of Use (PEU): It is the degree of personal perception that the individual does not require effort in using a certain system.

Attitude Towards Using (ATU): The attitude towards the use of a technology is the person's positive or negative assessment of the occurrence of that behavior.

Behavioral Intent (BI): It has been defined as a measure of the likelihood that a person will perform a given behavior.

Subjective Norms (SN): It shows the belief in the opinions of those he considers important to him in terms of whether or not a person should perform a behavior.

Self-Efficacy (SE): Self-efficacy is defined as the individual's own thoughts about the capacity to perform that task for a certain performance.

Facilitating Situations (FS): It has been defined as environmental factors that affect the effort, willingness and intention of the individual to complete a task.

Technological Complexity (TC): He defined it as the perception of an innovation as difficult to use and understand.

Anxiety (A): It has been defined as feeling fear and anxiety when an individual is likely to use technology or when using technology.

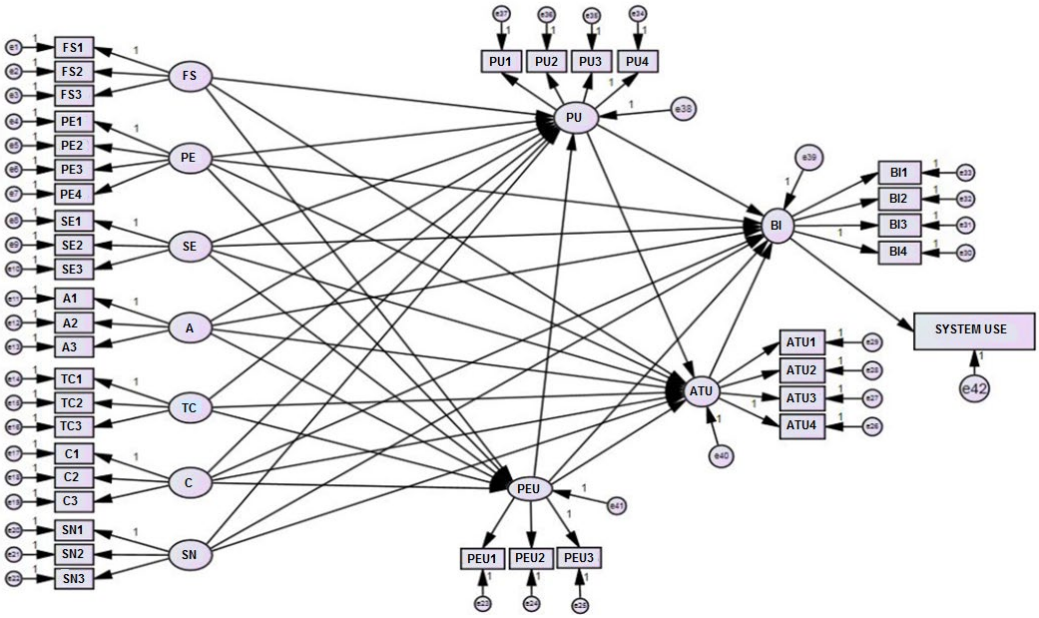
Conformity (C): It is defined as the degree of perception of innovation in relation to the adaptation of users to their existing values and past experiences.

Perceived Entertainment (PE): It is defined as the measure of an individual's prejudices or tastes towards the use of a technology (Ursavaş, 2014).

Actual Use (ASU): Actual system usage described by the model.

In the research model, a dependent variable and 10 independent variables were used that reveal the intentions of the participants to use the technologies they are using. Three of the independent variables (PU, PEU, and ATU) come from the original TAM and the other seven variables (FS, PE, SE, A, TC, C, and SN) Theories of planned behavior (Ajzen, 1991), Social cognition (Bandura, 1986) and the diffusion of Innovation (Rogers, 1962) (Ursavaş, 2014).

Figure 2. Structural model



(Ursavaş, 2014).

Hypotheses of the Research

H1: Perceived usefulness has a meaningful effect on behavioral intent.
H2: Perceived usefulness has a significant impact on attitudes toward computer use.
H3: Perceived ease of use has a significant impact on perceived usability.
H4: Perceived ease of use has a significant impact on computer usage attitude.
H5: Perceived ease of use has a significant effect on behavioral intent.
H6: Attitude toward use has a meaningful effect on behavioral intent.
H7: Behavioral intent has a meaningful effect on actual use.
H8: Subjective norms have a meaningful effect on perceived usefulness.
H9: Subjective norms have a meaningful effect on the attitude to use.
H10: Subjective norms have a meaningful effect on behavioral intention.
H11: Self-efficacy has a significant effect on perceived usefulness.
H12: Self-efficacy has a significant impact on perceived ease of use.
H13: Self-efficacy has a meaningful effect on attitude.
H14: Self-efficacy has a meaningful effect on behavioral intent.
H15: Facilitating situations have a meaningful effect on perceived usefulness.
H16: Facilitating situations have a meaningful effect on perceived ease of use.
H17: Facilitating situations have a meaningful effect on attitude.
H18: Technological complexity has a meaningful effect on perceived usefulness.
H19: Technological complexity has a meaningful impact on perceived ease of use.
H20: Technological complexity has a meaningful effect on attitude.

H21: Anxiety has a significant impact on perceived ease of use.
H22: Anxiety has a meaningful effect on perceived usefulness.
H23: Anxiety has a meaningful effect on attitude toward use.
H24: Anxiety has a meaningful effect on behavioral intent.
H25: Perceived entertainment has a meaningful effect on perceived ease of use.
H26: Perceived entertainment has a meaningful effect on perceived usefulness.
H27: The perceived entertainment variable has a significant effect on attitude.
H28: Perceived fun has a meaningful effect on behavioral intent.
H29: Relevance has a significant impact on perceived usefulness.
H30: Convenience has a meaningful effect on perceived ease of use.
H31: Conformity has a meaningful effect on attitude.
H32: Conformance has a meaningful effect on behavioral intent.

Data Collection Tool and Analysis

In this study, as a data collection tool, the Technology Acceptance and Use Scale for Teachers (T-TAMS) prepared by Ursavaş (2014) was used without any changes. This scale basically consists of 2 parts. In the first part, there are questions covering the personal and professional information of the participants. In the second part, a total of 11 factors were examined: Perceived Usefulness (4 items), Perceived Ease of Use (3 items), Perceived Fun (4 items), Behavioral Intent (4 items), Conformity (3 items), Technological Complexity (3 items), Subjective Norms (3 items), Facilitating Situations (3 items), Attitude to Use (4 items) and Self-efficacy (3 items). The items are rated in five Likert types (1=Strongly Disagree and 5=Strongly agree). IBM SPSS 21 and IBM AMOS 24 software were used for the analysis of the data.

Participants of the Research and Collection of Data

After the necessary permissions for the research were obtained due to the closure of schools during the COVID-19 pandemic process, the scale was applied online. In the research, It is assumed that the teachers voluntarily responded to the assessment package of their own accord, since the researcher, scale practitioners, and the content of the scale do not pose any risk to the participants and the participation is on a voluntary basis.

The universe of the research consists of teachers working in primary, secondary and high schools affiliated to the Ministry of National Education in the center and districts of Van in the spring term of 2020-2021. The sample of the study consisted of 501 randomly selected teachers who filled out the scale forms.

It was determined that 51.1% (256) of the 501 participants participating in the study were female and 48.9% (245) were male. The data set was divided into six groups in terms of age groups. Of the 501 participants, 2.6% (13) were between the ages of 20-24, 34.7% (174) were between the ages of 25-29, 26% (131) were between the ages of 30-34, 45.8% (79) were between the ages of 35-

39, 14.8% (74) were between the ages of 40-44 and 6% (30) were over the age of 45. In addition, if we present descriptive information about the ages of the participants, the mean age of the participants is ($\bar{X}$)=33.09, the standard deviation (S.S.) =6.61, the youngest age is 22 and the oldest age is 58.

3. Findings and Discussion

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is performed to test the validity of a predetermined structure (Şimşek, 2007). It allows us to test predetermined structures during the scale development or adaptation phase. Although the number of samples is important for confirmatory factor analysis in the field literature, there are no clear findings on how CFA will respond (Ursavaş, 2014; Song and Lee, 2012). In cases where the maximum likelihood method is used, the assumption of normality is important and therefore the sample must be at least 5 times the number of parameters. As a result, since there are 37 items for our research in CFA, where the number of samples is important, it was thought that 501 samples would be sufficient.

Table 2. Data on measuring items

Data on measuring items		Number of samples	Lost Data	Average	Standard deviation	Skewnes	Kurtosis
Perceived Usefulness	PU1	501	0	4.33	0.871	-1.226	0.887
	PU2	501	0	4.31	0.860	-1.200	0.937
	PU3	501	0	4.29	0.850	-1.164	0.962
	PU4	501	0	4.29	0.858	-1.080	0.527
Perceived Ease of Use	PEU1	501	0	3.99	0.924	-0.621	-0.261
	PEU2	501	0	3.95	0.939	-0.508	-0.497
	PEU3	501	0	3.99	0.913	-0.581	-0.364
Attitude Towards Using	ATU1	501	0	4.20	0.932	-1.214	1.159
	ATU2	501	0	4.15	0.937	-1.057	0.684
	ATU3	501	0	4.21	0.918	-1.191	1.114
	ATU4	501	0	4.17	0.919	-1.100	0.908
Behavioral Intent	BI1	501	0	4.18	0.879	-1.054	0.794
	BI2	501	0	4.18	0.889	-1.037	0.671
	BI3	501	0	4.11	0.894	-0.879	0.325
	BI4	501	0	4.15	0.880	-0.959	0.560
Facilitating Situations	FS1	501	0	3.77	1.029	-0.658	-0.052
	FS2	501	0	3.87	0.988	-0.666	-0.066
	FS3	501	0	3.81	0.994	-0.591	-0.199
Perceived Entertainment	PE1	501	0	4.10	0.938	-0.896	0.209
	PE2	501	0	4.04	0.922	-0.825	0.202
	PE3	501	0	4.06	0.928	-0.805	0.105
	PE4	501	0	4.07	0.917	-0.849	0.257
Self-Efficacy	SE1	501	0	3.95	0.879	-0.519	-0.265
	SE2	501	0	4.06	0.879	-0.676	-0.091

	SE3	501	0	3.99	0.883	-0.554	-0.274
Technological Complexity	TC1	501	0	1.89	0.841	0.668	-0.105
	TC2	501	0	1.92	0.868	0.661	-0.133
	TC3	501	0	1.92	0.846	0.555	-0.386
Conformity	C1	501	0	4.00	0.912	-0.587	-0.433
	C2	501	0	4.03	0.924	-0.632	-0.430
	C3	501	0	4.04	0.937	-0.709	-0.274
Anxiety	A1	501	0	1.93	0.886	0.856	0.539
	A2	501	0	1.90	0.865	0.860	0.574
	A3	501	0	1.92	0.834	0.820	0.627
Subjective Norms	SN1	501	0	3.82	0.954	-0.582	-0.113
	SN2	501	0	3.93	0.970	-0.671	-0.090
	SN3	501	0	3.94	0.964	-0.675	-0.059

When Table 2. is examined, when we look at the standard deviation values obtained from the measurement items in the CFA model, it is seen that all deviations except for the FS1 (1.029) variable are lower than 1.00. This indicates that the measurements of the groups are around the average values. The averages for the items appear to be above 3.5 for the positive ones and below 2.5 for the two negative items Anxiety and Technological Chaos. In addition, the skewness value is -1.22 to 0.85, and the flatness value is in the range of -0.49 to 1.15. Skewness and flatness values are accepted to be normal distribution in the -1.5 to +1.5 range (Tabachnick and Fidell, 2013).

As a result of confirmatory factor analysis, model compliance criteria were examined and CMIN=1184.847, DF=574, p<0.001, CMIN/DF=2.064, RMSA=0.046, CFI=0.975, GFI=0.887 were obtained. Since the GFI value from the obtained model compliance criteria is not within the desired limits, the modification indices were examined. As a result of the modification indices examination, high covariance was detected between the e10 and e11 error variables in the Perceived Entertainment dimension and the proposed modification process was performed.

Table 3. Standard compliance goodness criteria

Compliance Indexes	Perfect Fit	Acceptable	Value
$\chi 2/df$	$0 \leq \chi 2/sd \leq 2$	$2 \leq \chi 2/sd \leq 5$	1.781
GFI	$0.95 \leq GFI \leq 1.00$	$0.90 \leq GFI \leq 0.95$	0.982
CFI	$0.95 \leq CFI \leq 1.00$	$0.90 \leq CFI \leq 0.95$	0.982
RMSEA	$0.00 \leq RMSEA \leq 0.05$	$.05 \leq RMSEA \leq 0.08$	0.040
TLI	$0.95 \leq NNFI\ (TLI) \leq 1.00$	$0.90 \leq NNFI\ (TLI) \leq 0.95$	0.979

When Table 3. is examined, after the recommended modifications of the high covariance detected between the e10 and e11 error variables in the perceived Entertainment dimension, CMIN=999.016, DF=561, p<0.001, CMIN/DF=1.781,

RMSA=0.040, CFI=0.982, GFI=0.904, TLI=0.979 values were found within the given limits. This means that it is perfect in terms of the applied model fit.

Table 4. Data on measuring items

Item	Path	Factor	B_0	B_1	S.E.	C.R.	p
PE4	←	PE	0.954	1			
PE3	←	PE	0.953	1.01	0.018	55.703	<0.001
PE2	←	PE	0.942	0.993	0.024	42.022	<0.001
PE1	←	PE	0.915	0.982	0.026	37.516	<0.001
PU4	←	PU	0.937	1			
PU3	←	PU	0.957	1.012	0.022	44.995	<0.001
PU2	←	PU	0.953	1.019	0.023	44.163	<0.001
PU1	←	PU	0.907	0.983	0.027	36.499	<0.001
PEU3	←	PEU	0.926	1			
PEU2	←	PEU	0.908	1.008	0.032	31.236	<0.001
PEU1	←	PEU	0.922	1.008	0.033	30.625	<0.001
BI4	←	BI	0.945	1			
BI3	←	BI	0.922	0.991	0.026	38.092	<0.001
BI2	←	BI	0.933	0.997	0.025	39.313	<0.001
BI1	←	BI	0.898	0.949	0.027	34.625	<0.001
A3	←	A	0.904	1			
A2	←	A	0.955	1.096	0.03	36.042	<0.001
A1	←	A	0.904	1.062	0.033	31.973	<0.001
FS3	←	FS	0.921	1			
FS1	←	FS	0.84	0.945	0.035	26.843	<0.001
FS2	←	FS	0.916	0.99	0.031	32.105	<0.001
ATU4	←	ATU	0.923	1			
ATU3	←	ATU	0.935	1.012	0.022	45.09	<0.001
ATU2	←	ATU	0.935	1.033	0.028	36.876	<0.001
ATU1	←	ATU	0.912	1.003	0.029	34.108	<0.001
SN3	←	SN	0.925	1			
SN2	←	SN	0.938	1.021	0.028	37.098	<0.001
SN1	←	SN	0.903	0.967	0.029	33.549	<0.001
SE3	←	SE	0.906	1			
SE2	←	SE	0.909	0.999	0.03	33.129	<0.001
SE1	←	SE	0.937	1.03	0.032	32.487	<0.001
TC3	←	TC	0.897	1			
TC1	←	TC	0.909	1.007	0.033	30.558	<0.001
TC2	←	TC	0.912	1.044	0.034	30.784	<0.001
C3	←	C	0.961	1			
C2	←	C	0.97	0.995	0.018	55.122	<0.001
C1	←	C	0.927	0.939	0.021	43.768	<0.001

B_0: Standard road coefficients. B_1: Non-standard road coefficients

Hair et al. (2005) accepted the road coefficient as 0.60. When Table 4 is examined, the path coefficients for all factors were found to be statistically significant in the confirmatory factor analysis.

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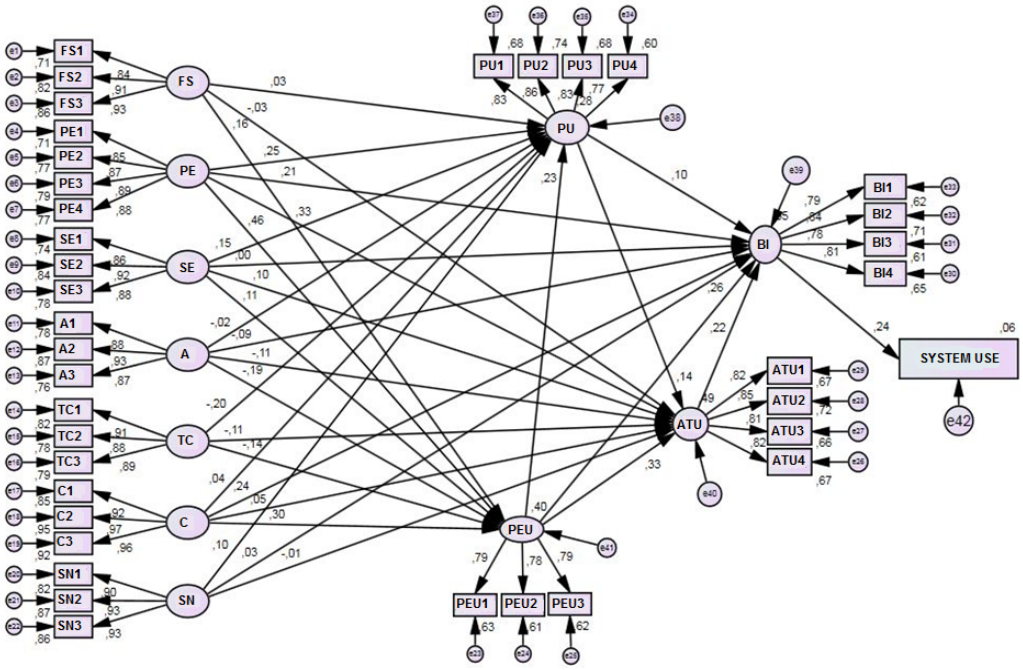
Results of Structural Equation Modeling

According to the results of the analysis, CMIN/DF=3.293, RMSA=0.068, CFI=0.923, TLI=0.915 were found within the acceptable limits and GFI=0.858 was not in the acceptable value range. These indices are acceptable according to McDonald and Ho (2002) and Gefen, Karahanna and Straub (2003).

Figure 3. Structural model.



Structural Model Hypothesis Test Results

Of the 32 hypotheses designed for the structural model tested, 8 were rejected. All of the intervariantly defined hypotheses related to the original TAM have been accepted.

The effect of PU on BI (β0=0.096, p<0.05) and its effect on ATU (β0=0.136, p<0.05) were calculated as positive and significant, and the H1 and H2 hypotheses were accepted. The effects of PEU on PU (β0=0.232, p<0.001), ATU (β0=0.326, p<0.001) and BI (β0=0.264, p<0.001) were calculated positively and significantly and the H3, H4 and H5 hypotheses were accepted. The effect of the ATU variable on BI (β0=0.223, p<0.001) was calculated as positive and significant and the H6 hypothesis was accepted. The effect of BI on the actual usage variable (β0=0.241, p<0.001) was calculated as positive and significant, and the H7 hypothesis was accepted. Among the external variables, the effect of SN on PU (β0=0.103, p<0.05) was positive and significant, its effect on ATU (β0=-0.012, p>0.05) was negative and insignificant, and its effect on behavioral

intention (β0=0.031, p >0.05) were calculated as positive and insignificant. Here, the H8 hypothesis is accepted, while the H9 and H10 hypotheses are rejected. SE variable had a positive and significant effect on PU (β0=0.153, p<0.001), had a positive and significant effect on PEU (β0= 0.114, p < 0.05), had a positive and significant effect on ATU (β0=0.104, p<0.05). The effect on BI (β0=-0.002, p>0.05) was calculated as negative and insignificant. Therefore, the H11, H12 and H13 hypotheses were accepted and the H14 hypothesis was rejected. The effect of the FS variable on PU (β0=0.026, p>0.05) and ATU (β0=-0.032, p>0.05) was found to be insignificant and H15 and H17 hypotheses were rejected, while its effect on PEU was positive (β0=0.162, p<0.001). was found to be significant and H16 hypothesis was accepted. The effect of TC variable on PU (β0=-0.197, p<0.001), PEU (β0=-0.142, p<0.001) and ATU (β0=-0.110, p<0.05) was determined as negative and significant and the H18, H19 and H20 hypotheses were accepted. The effect of variable A on PU (β0=-0.021, p>0.05), effect on ATU (β0=-0.108, p<0.05) and effect on BI (β0=-0.085, p<0.05) were found to be negative and significant, and the hypotheses H23 and H24 were accepted while H22 hypothesis was rejected. PE variable has been observed to have a positive and significant effect on PEU (β0=0.458, p<0.001), PU (β0=0.458, p<0.001), ATU (β0=0.329, p<0.001) and BI (β0=0.212, p<0.001). Therefore, the hypotheses H25, H26, H27 and H28 have been accepted. The effect on the C variable PU (β0=0.033, p>0.05) meaningless, the effect on PEU (β0=0.305, p<0.001) positive and significant, the effect on ATU (β0=0.055, p>0.05) meaningless and the effect on BI (β0=0.186, p<0.001) was positive and significant. Therefore, while the H29 and H31 hypotheses were rejected, the H30 and H32 hypotheses were accepted.

Standardized Direct, Indirect and Total Effects

As a result of structural model analysis, a total of 11 variables affecting ASU were able to explain 5.8% of the variance on ASU. Only BI directly affected ASU. Other variables influenced it indirectly. When the variables were evaluated in terms of their total effects BI d=0.241, PE d=0.117, C d=0.089, PEU d=0.088, A d=-0.044, TC d=-0.025, ATU d=0.054, PU d=0.030, FS d=0.013 had an effect on ASU, respectively. In addition, the total impact values of the SN and SE variables were determined as meaningless. In line with these results, the H10 and H14 hypotheses defined on BI were rejected. The remaining 6 defined hypotheses were accepted.

When the variables affecting the BI variable, which is in the second place as a result of the structural model analysis, were examined it is seen that the SN variable is found to be meaningless while the remaining 9 variables have a significant effect. These 9 variables were able to account for 54.6% of BI. In our research, there are 8 hypotheses defined in the structural model related to the effects on BI. In line with these results, the H10 and H14 hypotheses defined on BI were rejected. The remaining 6 defined hypotheses were accepted.

When the variables affecting the ATU variable, which ranks third as a result of structural model analysis, were examined, it is seen that the SN and FS

variables are found to be meaningless in terms of total effect, while the remaining 7 variables have a significant effect in terms of total effect. These 7 variables were able to explain the ATU variable by 49.2%. The variables affecting ATU were PE d=0.527, PEU d=357, C d=0.169, SE d=0.166, PU d=0.136 respectively in terms of positive total effect. In addition, TC d=-0.188 and A d=-0.178 were found to be the negative total effect variables, respectively. In our research, there are 8 hypotheses defined in the structural model regarding the effects on ATU. In line with these results, the H9 and H17 hypotheses defined on ATU were rejected. The remaining 6 defined hypotheses were accepted.

When the variables affecting the PU, which is in the fourth place, were examined, the variables SN, C, A and FS were found to be meaningless in terms of total effect. The remaining 4 variables appear to have a significant effect in terms of total effect. 4 variables that were found to be significant in terms of total effect were able to explain the PU by 27.7%. The variables affecting the PU variable were determined as PE d=0.358, PEU d=0.232, SE d=0.180 respectively in terms of positive total effect. In addition, the negative total effect of the TC variable was found to be d=-0.230. In our research, there are 8 hypotheses defined in the structural model related to the effects on PU. In line with these results, the H8, H15, H22 and H29 hypotheses defined on PU were rejected. The remaining 4 defined hypotheses were accepted.

When the variables affecting the PEU, which is in the fifth place, were examined, it is seen that the SE variable is found to be meaningless in terms of total effect, while the remaining 5 variables have a significant effect in terms of total effect. These 5 variables were able to explain PEU 39.8%. The variables affecting PEU were determined as PE d=0.458, C d=0.305, FS d=0.116, SE d=0.114 in terms of positive total effect, respectively. In addition, the variables in terms of negative total effect were found as A d=-0.188 and TC d=-0.142, respectively. In our research, there are 6 hypotheses defined in the structural model related to the effects on PEU. In line with these results, the H12 hypotheses defined on PEU was rejected. The remaining 5 defined hypotheses were accepted.

In summary; Of the 32 hypotheses defined in TAMT, 9 were rejected as meaningless and 23 hypotheses were accepted as meaningful. The findings obtained from the study are similar to some studies in the literature. Below, these findings and some studies in the literature are compared.

The effect of the PU variable on the BI and ATU variables was determined positively and significantly and the H1 and H2 hypotheses were accepted. Similar results have been identified in the literature (Ma, Andersson and Streith, 2005; Turan and Çolakoğlu, 2008; Teo, 2009; Özer, Özcan and Aktaş,2010; Teo, 2011; Teo, Ursavaş and Bahçekapılı, 2011; Teo and Ursavaş, 2012; Teo, Ursavaş and Bahçekapılı, 2012; Ursavaş, 2014; Ursavaş, 2015; Yıldırır and Kaplan, 2019; Seyhun and Kurtuldu, 2020). As a result of the findings obtained, it can be said

that the individual's understanding that a technology will benefit him positively affects the individual's intention to use and attitude towards use. This leads to the conclusion that the technologies to be used in schools are an important issue to be emphasized in terms of the benefit to job performance.

The effect of PEU variable on PU, ATU and BI variables was determined as positive and significant and the H3, H4 and H5 hypotheses were accepted. Similar results have been found in literature studies (Davis, Bagozzi and Warshaw, 1989; Turan and Çolakoğlu, 2008; Teo, 2009; Lu and Su, 2009; Teo, Ursavaş and Bahçekapılı, 2011; Teo, Ursavaş and Bahçekapılı, 2012; Ursavaş, 2014; Agrebi and Jallais, 2015; Yıldırır and Kaplan, 2019; Özer, Özcan and Aktaş, 2010; Ursavaş, 2015; Seyhun and Kurtuldu, 2020). As a result of the acceptance of the H1 hypothesis, it can be concluded that the easy perception of the use of the technology to be used is an effective factor in the intention to use the technology. As a matter of fact, it has been observed that the use of technology by teachers has increased with the increase in computer applications that can be used easily in schools. As a result of the acceptance of the H2 hypothesis, it can be said that the individual's attitude towards using the technology in question will positively affect the fact that the technology to be used is easy to use. However, Teo (2009) and Ursavaş (2014) stated that simply using the technology to be used does not mean that the individual will use that technology. As a result of the acceptance of the H3 hypothesis, individuals see the technology in question as more useful when they perceive the use of the technology they will use easily. In their study, Yıldırır and Kaplan (2019) identified the effect of PEU on PU as meaningless. It has been determined that the strong effects of PEU on PU, which will be weak in individuals who are experienced in the use of technology to be used, may be caused by inexperienced users (Taylor and Todd, 1995). In line with the findings obtained, it would be useful to pay attention to the ease of use of these technologies, especially in the design of technologies to be used in education and training environments.

The effect of ATU variable on BI was determined as positive and significant and the H6 hypothesis was accepted. Teo, Ursavaş and Bahçekapılı (2012), Ursavaş (2014) and Özer, Özcan and Aktaş (2010) found similar results to our study, while in other studies Teo and Ursavaş (2012), Teo, Ursavaş and Bahçekapılı (2011) did not find a significant effect of ATU on BI. A positive or negative attitude of the individual towards any innovation or technology influences intentions, and intention influences behavior (Fishbein and Ajzen, 1980).

A total of 11 variables affecting ASU explained 5.8% of the variance in ASU. Only BI directly affected ASU. Other variables are indirectly affected. Ursavaş (2014) found that the variables affecting ASU explained 3% of the variance in ASU. In addition, while the effects of FS and TC were found to be significant in terms of total effect in our study, the effects of SN and SE variables were found to be insignificant in terms of total effect.

The effect of the SN variable on the PU, ATU and BI variables was determined as positive and meaningless, and the H8, H9 and H10 hypotheses were rejected. When the studies conducted in the literature are examined, it is seen that the role of the SN variable in TAM is controversial and different results are obtained (Ursavaş, 2014). According to the Theory of Causalal Behavior (Davis, 1989), normative beliefs influence subjective norms, and subjective norms influence intention. Some studies have shown that the SN variable has an effect on BI (Cheon et al., 2012; Ursavaş, 2014) and in some studies it has meaningless effects (Teo, 2011; Turan and Çolakoğlu, 2008). In the literature, the effect of the SN variable on ATU was usually found to be meaningless or positive weak effect (Teo, 2010; Ursavaş, 2014). Similarly, Teo (2010) found the effect of the SN variable on ATU positively and significantly in his study. Ursavaş (2014) attributed this situation to the fact that individuals volunteer for the technology they will use. In our study, the effect of the SN variable on PU was found to be similar in Ursavaş (2014), while Teo (2010) found this effect to be significant and positive. Peers and supervisors may have an impact on an individual's view of a technology as beneficial. If individuals are inexperienced in the use of technology and the technology to be used is new, this effect remains very weak (Ursavaş, 2014).

The effect of SE variable on ATU and PU variables was found to be positive and significant. Therefore, the H11 and H13 hypotheses have been accepted. The effect of SE variable on BI and PEU variables was determined as positive and meaningless. Therefore, the H12 and H14 hypotheses have been rejected. Just because an individual sees the ability to use a technology in himself may not mean that he will use that technology. However, it can use this ability as an intention to use it in the transition to another technology (Ursavaş, 2014). In some previous researches, the effect of SE variable on the BI variable has been found in similar ways, although it has been found to be as different significant and weak effect (Teo, Ursavaş and Bahçekapılı, 2012; Teo and Ursavaş, 2012; Ursavaş, 2014) has been found to be significant and strong in some studies on the effect of SE on BI (Ursavaş, 2015). Similar results were found in studies conducted in the literature on the effect of SE on the ATU variable (Teo and Ursavaş, 2012; Ursavaş, 2014; Teo, Ursavaş and Bahçekapılı, 2011). As a result of these findings, the fact that the individual considers himself sufficient in the use of a technology positively affects his attitude towards using the technology in question. The effect of SE on the PU variable Similar results were found with studies from field literature (Teo, 2009; Teo, Ursavaş and Bahçekapılı, 2012; Ursavaş, 2014; Ursavaş, 2015). The belief in the potential of the individual to use the technology in question positively affects the benefit he perceives. The effect of SE on PEU was found to be positive and significant in studies conducted in the field literature. (Venkatesh, 2000; Teo, 2009; Teo and Ursavaş, 2012; Ursavaş, 2014).

The effect of PE variable on PEU, PU, ATU and BI variables was determined positively and significantly and the hypotheses H25, H26, H27 and

H28 were accepted. Similar results have been found in research conducted in the field literature (Vankatesh and Bala, 2008; Teo and Noyes, 2011; Uravaş, 2014; Agrebi and Jallais, 2015; Seyhun and Kurtuldu, 2020). As a result of these findings, it is seen that the satisfaction and pleasure that the individual has received while using a technology, seeing the technology he / she has used as useful, perceiving it easy to use, developing an attitude towards use and having a strong effect on the intention to use. In this direction, it will be important that the technologies to be adapted to schools are designed in a way that allows teachers to have fun and enjoy while using them. In particular, it will be important to get teachers' opinions about the selection of technologies to be taken into schools.

The effect of the A variable on the PEU, ATU and BI variables was found to be negative and significant, and the effect on the PU variable was negative and meaningless. Therefore, while the H21, H23 and H24 hypotheses were accepted, the H22 hypothesis was rejected. The effect of the A variable, which is defined as the individual's fear and anxiety when using or likely to use a new technology, on BI and PEU was found to be similar to our research in the literature (Ursavaş, 2014; Venkatesh 2000; Park, Son and Kim 2012). In his study, Ursavaş (2014) determined the effect of the A variable on ATU as meaningless, while the effect on PU was significantly determined. He stated that this situation could be caused by the difference in culture, sample and technology used. As a result of the findings, the individual's concern for the technology to be used negatively affects the easy perception of the use of the technology in question. In this case, it is understood that the information technology guidance teachers working in schools will play an important role in the adoption of the technologies to be used by the teachers to work to reduce the anxiety levels of other teachers working in the school.

The effect of FS variable on ATU and PU variables was found to be positive and meaningless, and the effect on PEU variable was found to be positive and significant. Therefore, while the H16 hypothesis was accepted, the H17 and H18 hypotheses were rejected. Ursavaş (2014) found a similar result to our study of the effect of FS on the ATU variable in the TAMT study. He stated that the reason for this was that teachers experienced the existing technologies for a long time within the scope of the FATİH project, which was implemented in almost all schools. In previous studies, the effect of FS on ATU has been positive and significant (Ngai, Poon and Chan, 2007). In the studies conducted in the literature, the effect of the FS variable on PU was found to be similar to this study (Teo, Ursavaş and Bahçekapılı, 2012; Ursavaş, 2014). However, Teo (2009) found in his study that FS has a significant effect on the PU variable. Based on the effect of FS on the PU variable, we can say that the benefit of the use of technology to the individual is not related to the facilitating situations provided for the use of that technology (Ursavaş, 2014). Although Venkatesh (2000) emphasized that the FS variable is important in the formation of perception of PEU, the total effect of FS on the PEU variable that we have obtained here is a weak effect.

The effect of TC variable on PU, PEU and ATU variables was found to be negative and significant. Therefore, the H18, H19 and H20 hypotheses were accepted. As a result of these findings, it is concluded that the complexity in the technology to be used negatively affects the attitude towards the use of the technology in question, the perception of the technology to be used as useful and the easy perception of the use of technology. Ursavaş (2014) In its study, TAMT determined the effect of TC on PU and ATU as meaningless and the effect on PEU as negative and significant.

The effect of C variable on PEU, ATU and BI variables was found to be positive and significant, and the effect on PU variable was found to be positive and meaningless. Therefore, the H30, H31 and H32 hypotheses were accepted and the H29 hypothesis was rejected. Variable C has been identified as the variable with high impact on BI. This means that individuals will be more comfortable to use or tend to use technologies that are compatible and useful in their work (Ursavaş, 2014). Variable C is the level of harmony between innovation and past experiences. The more the innovation in question coincides with past experiences, the greater the adaptation to the innovation (Straub, 2009). The effect of the C variable on the ATU variable was similar to the studies in the literature were obtained (Venkatesh and Davis, 2000; Ursavaş, 2014). The appropriateness and performance-enhancing effect of the technology used by the individual positively affects the attitude. In the studies conducted in the field literature, the effect of the C variable on PU was found to be positive and significant contrary to our study (Chen, Gillenson and Sherrell, 2002; Karahanna, Agarwal and Angst, 2006; Ursavaş, 2014).

5. Conclusion

In this study, TAMT, which was established to determine teachers' intention to accept and use technology during the COVID-19 pandemic period, was tested. The tested TAMT explained the teachers' behavioral intentions to use information technologies by 54.6%, their attitude towards use by 49.2%, perceived usefulness by 27.7% and perceived ease of use by 39.8%. A total of 11 variables affecting actual usage were able to account for 5.8% of the variance on ASU. Only BI directly affected ASU. Other variables influenced it indirectly. Of the 32 hypotheses defined in the TAMT, 9 were rejected as meaningless and 23 hypotheses were accepted as meaningful.

Consequently, the fact that the individual sees the technology to be used as appropriate for his / her job allows him to perceive the use of the technology in question easy perception. A teacher's high self-efficacy towards a technology may not affect their intention to use that technology. The compatibility of the technology to be used with the experience of the individual has a significant effect on the intention to use the technology in question. The ease of use of technology and the benefit of the individual while using that technology have a significant effect on the intention to use that technology. The complexity of the technology to

be used and the anxiety of using that technology negatively affect the intention to use that technology.

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