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FACULTY READINESS FOR DIGITAL LEARNING ENVIRONMENTS: A RESEARCH ON ONLINE ATTENDANCE MANAGEMENT SYSTEMS

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ABSTRACT

Purpose- The purpose of this study is to investigate the readiness of the faculty towards digital learning management tools. Online attendance management systems are investigated as a part of the digitalized education environment. The statistical relations among technology readiness factors and technology acceptance variables are investigated.
Methodology- The study adopted a quantitative research method, and the survey is used as the data gathering tool. The survey consisted of items from the Technology Readiness Index (TRI) and Technology Acceptance Model (TAM). Across Turkey, 317 faculty from seven universities participated in the final survey.
Findings- The analysis reveals that there is a statistically significant yet weak relationship among technology readiness variables and acceptance of online attendance management systems. In addition, descriptive statistics presents some valuable insight regarding technology readiness situation of the faculty members.
Conclusion- Education environments are enhanced with technological tools and supported with online platforms. The most critical point is that the usage of these technological advancements is limited by technology acceptance, and this study reveals that technology readiness is a key component of technology acceptance.

Keywords: Technology readiness, technology acceptance, educational technology, online attendance system, faculty members
JEL Codes: O33, I23, L86

1. INTRODUCTION

Information technologies, which affect a wide range of aspects of life, ranging from space research to online shopping, economics to scientific software, are also widely employed in the education sector. An application used in education is called online attendance management system. It is developed for students' daily participation (or non-continuance) in any courses in educational institutions. This system is mostly generated as a module in student information system software. It can be managed from a web interface. The system also helps in reporting and assessing student eligibility. It does not only enhance work efficiency but also provides a study and development environment for the students.

In Turkey, the online attendance management systems are generally used as a part of web-based academic information systems; a recent tendency has emerged to use attendance system for managing lecture attendance. This study aims to provide answers whether the online attendance system is adopted by using both Technology Readiness Index (TRI) developed by Parasaruman (2000) and Davis's (1989) Technology Acceptance Model (TAM).

In the context of this phenomenon, this study aims to provide the structural and socio-psychometric criteria for both of the two theories. It is also a preliminary study aiming to provide descriptive statistics of the research.

2. LITERATURE REVIEW

In the literature, there are many studies about creation of students absence and attendance system that some of which includes mobile-based attendance system, fingerprint based attendance system, iris-based attendance system, face recognition based attendance system, RFID (Radio Frequency Identification) based attendance system, Bluetooth based attendance system, NFC (Near Field Communication) based attendance system (Patel and Priya, 2014; Jacksi, 2015; Jacksi, Ibrahim and Zebari, 2018; Bhudke, Bhutekar, Horambe and Naik, 2016). Besides these technical studies, there are also some studies in the context of online attendance system adoption in the literature as well. While some of these studies use TRI and Tam combination to measure adoption of mandatory web-based attendance system (Nughoro and Fajar, 2017), some define requirements for integrated attendance monitoring system (Nwokeji, Olagunju, Apoorva, Frezza and Tang, 2017).

3. DATA AND METHODOLOGY

The study adopted a quantitative research method, and the survey is used as the data-gathering tool. The survey consisted of 10 demographic indicators and 29 items from the Technology Readiness Index (TRI) and Technology Acceptance Model (TAM). Across Turkey, 317 faculty and vocational school members from seven universities (6 state university and 1 private) have participated in the study. Six of the universities are located in the western part of Turkey, and the one is from the northeast part of the country. TRI was modified from Parasuraman's study (2000), and TAM components (perceived of usefulness, perceived ease of use, and behavior intention) was modified from Davis (1989).

In the study, 5-point Likert scales were used from the range of 1-Strongly Agree to 5-Strongly Disagree. A number of respondents based on gender consisted of 175 (55,2%) male and 142 (44,8%) female. According to descriptive analysis, the study has five age ranges that consist of 20-30, 31-40, 41-50, 51-60, and 60+. 70 respondents (22,1%) belong to 20-30 age range; 164 respondents (51,7%) belong to 31-40; 52 respondents (16,4%) belong to 41-50; 20 respondents (6,3%) belong to 51-60 and 11 respondents (3,5%) belong to 60+.

Table 1: Demographics

Variables	Categories	N	(%)	Variables	Catergories	N	(%)
Gender	Male	175	55,2	Usage of IT Apps (Hours)	1-2 per Week	37	11,6
	Female	142	44,8		3-4 per Week	57	18,0
Age	20-30	70	22,1		1-2 per Day	88	27,8
	31-40	164	51,7		3-4 per Day	57	18,0
	41-50	52	16,4		4+ per Day	78	24,6
	51-60	20	6,3	IT Usage Level	Very Few	11	3,5
	60+	11	3,5		Enough	117	36,9
Title	Instructor	82	25,9		Good	136	42,9
	Research Assistant	109	34,4		Very Good	53	16,7
	Assistant Professor	84	26,5	Using OAS Since When	Less Than 1 Month	92	29,0
	Associate Professor	22	6,9		Between 1-3 Months	23	7,3
	Professor	20	6,3		Between 4-6 Months	15	4,7
Graduation	Bachelor	17	5,4		Between 7-12 Months	34	10,7
	Master	92	29,0		Longer Than 1 Year	153	48,3
	Doctor of Philosophy	208	65,6	Usage of OAS Level	Very Few	167	52,7
Experience	0-3 Years	61	19,2		Once a Week	46	14,5
	4-6 Years	57	18,0		Several a Week	72	22,7
	7-9 Years	75	23,7		Once a Day	6	1,9
	10-12 Years	33	10,4		Several a Day	26	8,2
	13+ Years	91	28,7				
	Total	317	100		Total	317	100

As seen in Table 1, 109 respondents are research assistants (%34,4). 208 participants have a Ph.D. degree (%65,6). 91 participants have 13+ years' work experience (%28,7). It can be observed that also, 78 participants use IT applications most (4+ hours per day). 136 participants (%42,9) are good at using IT components. It seems that 153 participants (%48,3) are using the online attendance system for 1+ year. On the contrast, even 153 participants use online attendance system for 1+ year, only 26 of them (%8,2) are using it several times per day. 167 of them (%52,7) use it very few. This indicator indicates that the online attendance system does not be used frequently, and participants started to use systems quite recently.

4. FINDINGS

In this study, descriptive statistics (as above), inter-correlations, independent samples T-test, and One-Way ANOVA tests were used to examine if there were differences in between TRI and TAM variables among defined groups. Below the tables, we explained some interrelationships among variables.

Table 2: TRI and TAM Variables Descriptive

TRI Variables	Mean	Std. Deviation
Optimism	1,813	,511
Innovativeness	2,067	,638
Discomfort	2,649	,749
Insecurity	2,138	,681
TRI	2,166	,644
TAM Variables		
Perceived Usefulness	2,106	,857
Perceived Ease of Use	2,037	,735
Behavioural Intention	2,305	,872
TAM	2,149	,821

In Table 2, there are presented both TRI and TAM variables in addition to overall TRI and TAM means and standard deviations.

Table 3: Variables Inter-Correlations

		OPT	INN	DIS	INS	PU	PEoU	INT
Optimism	Pearson Correlation	1	,696**	-,011	,025	,425**	,479**	,385**
	Sig. (2-tailed)		,000	,841	,662	,000	,000	,000
Innovatiness	Pearson Correlation	,696**	1	,042	-,048	,334**	,422**	,336**
	Sig. (2-tailed)	,000		,461	,398	,000	,000	,000
Discomfort	Pearson Correlation	-,011	,042	1	,402**	,081	,027	,128*
	Sig. (2-tailed)	,841	,461		,000	,150	,636	,022
Insecurity	Pearson Correlation	,025	-,048	,402**	1	,140*	,054	,110
	Sig. (2-tailed)	,662	,398	,000		,013	,336	,051
Perceived Usefulness	Pearson Correlation	,425**	,334**	,081	,140*	1	,493**	,769**
	Sig. (2-tailed)	,000	,000	,150	,013		,000	,000
Perceived Ease of Use	Pearson Correlation	,479**	,422**	,027	,054	,493**	1	,443**
	Sig. (2-tailed)	,000	,000	,636	,336	,000		,000
Behavioural Intention	Pearson Correlation	,385**	,336**	,128*	,110	,769**	,443**	1
	Sig. (2-tailed)	,000	,000	,022	,051	,000	,000	

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

In Table 3, the Pearson correlation test has been used to test the inter-correlation for the main variables. It can be easily seen that most variables are inter-correlated positively between them, but optimism & discomfort and innovativeness & insecurity variables are negatively correlated.

Table 4: Gender T-test Results

TRI Variables	Levene's Test for Equality of Variances (F/Sig.)	Male (Mean)	Female (Mean)	t Value	Sig. (2-tailed)
Optimism	2,793/0,96	1,807	1,812	-,252	,801
Innovativeness	,493/,483	1,997	2,153	-2,172	,031
Discomfort	,353/,553	2,567	2,751	-2,180	,030
Insecurity	,017/,895	2,124	2,154	-,398	,691
TAM Variables					
Perceived Usefulness	,652/,420	2,093	2,122	-,296	,767
Perceived Ease of Use	,385/,535	2,000	2,084	-1,017	,310
Behavioural Intention	,859/,355	2,287	2,327	-,408	,683

As can be seen from Table 4, all variables distributed homogeneously, and there are no statistically significant relationships between gender and TAM/TRI variables.

Table 5: IT Usage Level One-Way ANOVA

IT Usage Levels	TRI Variables	Test of Homogeneity of Variances (Sig.)	F	Sig.
Very Few	Optimism	,725	9,673	,000
	Innovatiness	,080	17,699	,000
Enough	Discomfort	,026	,825	,481
	Insecurity	,419	1,868	,135
Good	**TAM Variables**			
	Perceived Usefulness	,005	1,891	,131
Very Good	Perceived Ease of Use	,595	7,737	,000
	Behavioural Intention	,003	2,531	,057

As can be seen from Table 5, all TRI variables and TAM variable Perceived Ease of Use are distributed homogeneously (p>0,05). However, Perceived Usefulness and Behavioural Intention variables do not have homogenous distribution. There is a significant correlation in the group of IT usage level for Optimism, Innovativeness, and Perceived Ease of Use. In order to understand which IT usage level groups differ significantly, the Post-Hoc test is examined for each group. For the two variables of TRI (Optimism and Innovativeness), the Tukey test is run due to homogeneous distribution. For the TAM variable (Perceived Ease of Use), the Games-Howell test is performed due to unequal variances.

Table 6: IT Usage Level Post Hoc

Dependent Variables	Test Type	(I) IT Usage Level	(J) IT Usage Level	Mean Difference (I-J)	Sig.
Optimisim	Tukey	Enough	Good	,21215*	,004
			Very Good	,37724*	,000
Innovativeness	Tukey	Very Few	Very Good	,89503*	,000
		Enough	Good	,34005*	,000
			Very Good	,62090*	,000
Perceived Ease of Use	Games-Howell	Enough	Very Good	,44079*	,001

*The variables Discomfort, Insecurity, Perceived Ease of Use, and Behavioural Intention have no significant mean differences.

According to Table 6, individuals with enough IT usage level tend to be more optimistic than individuals with good and very good IT usage level. People who have very few IT usage level are also more innovative than people with very good IT usage level. People who have enough IT usage level also tend to be more innovative than people with good and very good IT usage level. In addition, people who have enough IT usage level experience more PEoU than people who have a very good IT usage level.

Users' optimism seems to be decreasing with their experience. They may see that they can't find what they look for. The individuals who use the OAS very few, their innovation levels seem to be more than expert users. The people who use the OAS very few take less risk and name themselves as innovative. On the use of new technologies, likewise, the more

experienced usage of OAS cause less useful expectation. They may be confused with finding OAS useful, or if the usage of OAS did not reach enough expectation levels, the survey might have been answered with a disappointment.

Table 7: OAS Usage Level One-Way ANOVA

OAS Usage Level	TRI Variables	Test of Homogeneity of Variances (Sig.)	F	Sig.
Very Few	Optimism	,334	2,197	,069
	Innovatiness	,090	3,002	,019
Once a Week	Discomfort	,128	2,758	,028
Several a Week	Insecurity	,063	,723	,577
	TAM Variables			
Once a Day	Perceived Usefulness	,003	10,272	,000
Several a Day	Perceived Ease of Use	,419	4,769	,001
	Behavioural Intention	,000	11,663	,000

As can be seen from Table 7, all TRI variables are distributed homogeneously (p>0,05). However, Perceived Usefulness and Behavioural Intention variables do not have homogenous distribution. On the other hand, Perceived Ease of Use variable has homogenous distribution. As ANOVA results present, there is no significant correlation between OAS usage level and TRI variables. However, there are significant relationship and differences between OAS usage level and TAM variables. The Post-Hoc tests are examined for each group, in order to understand which OAS usage level groups differ according to the variables. For the two variables of TAM (PU and BI), the Tukey test is performed due to homogeneous distribution. For other TAM variable Perceived Ease of Use, the Games-Howell test is performed due to variances, not equal distribution.

Table 8: OAS Usage Level Post Hoc

Dependent Variables	Test Type	(I) OAS Usage Level	(J) OAS Usage Level	Mean Difference (I-J)	Sig.
Perceived Usefulness	Games-Howell	Very Few	Once a Week	,63486*	,000
			Several a Week	,57105*	,000
Perceived Ease of Use	Tukey	Very Few	Once a Week	,42224*	,001
Behavioral Intention	Games Howell	Very Few	Once a Week	,56375*	,001
			Several a Week	,65735*	,000

*The variables Optimism, Innovativeness, Discomfort, and Insecurity have no significant mean differences.

According to Table 8, those who have very few OAS usage level differ significantly in the context of perceived usefulness from those with once and several in a week OAS usage. In addition, individuals who have very few OAS usage level have more feeling of ease of use and those who have very few OAS usage level, have more intention to use OAS than once and several a week OAS usage.

It seems that as the number of usage increases, perceived usefulness increases, too, since users appreciate the value of the software more. That's why people find the software easier to use as they are more involved in it. They gain experience and intend to use them as they enhance their experience. They are also more satisfied with the software, and they understand the value of it.

5. CONCLUSION

Education environments are enhanced with technological tools and supported by online platforms. The most critical point is that the usage of these technological advancements is limited by technology acceptance, and this study reveals that technology readiness is a key component of technology acceptance. This study explains the TAM model using technology readiness constructs for online attendance system. In addition, descriptive statistics present a valuable insight regarding technology readiness situation of users. Unexpectedly, the descriptive data of the online attendance system shows that there is a weak relationship between IT usage level and OAS usage frequency. In addition, there is no significant relationship between gender and TAM/TRI variables. This result indicates that OAS cannot be adopted in the circle of good and very good IT applications users. However, the strong IT usage level should have supported the use & adoption of OAS in the context of technology readiness. On the other hand, it is seen that individuals with enough IT usage level tend to be more optimistic than individuals with good and very good IT usage level. Individuals who have very few OAS usage level differ significantly in the context of perceived usefulness from users with once and several in a week of OAS usage. We can say that both IT and

OAS usage level might be affected by some TRI and TAM variables as especially optimism and innovativeness; perceived ease of use, perceived usefulness, and behavioral intention.

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