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Evaluation of Factors Affecting Technological Developments in Schools According to the Views of Administrators and Teachers

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Abstract
The major focus of this research is to investigate and specify the views and thoughts of teachers and directors in primary education about the factors affecting technological developments in schools. Directors and teachers in primary schools. The research was carried out in four stages; specifying the items on the Scale, preparing the Scale, implementing the Scale, and assuring reliability and validity. A 22-item Scale was formed in the light of the data obtained at the end of the analysis.
Keywords: Education, educational programs, director, technology, Scale development

Introduction

Inevitable changes in today's world bring people face to face with innovations and developments (Drucker, 2011). While even trifle issues are considered as complicated matters, rapid organizational developmentscome up in complex structures. Developments in technology due to the fastest changes necessitate organizational knowledge and skills and bring about more needs and expectations. This, undoubtedly, indicates the significance of organizational culture. Systems with strong organizational culture are aware of interior and exterior improvements and changes, make necessary preparations andmap out their targets (Şahin, 2010; Schein, 2010).

Nothing is like before in today's developing and changing world. Compared to the previous years, technological improvements can easily be noticed. Technology today has become a determining factor in every stage of our life. Technological tools are changing every day and are used either by teachers and Directors in teaching and learning environments to respond to several needs (Kenar, 2008). By force of the information society, we are faced with some crucial questions; "To what extent are the changes applied in our schools?", "To what extent do teachers adapt to the changes?", "To what extent are educational programs and in-service courses, prepared by the Ministry, put into practice to contribute to raising conscious individuals?" (Creighton, Papa, Mullen ve English, 2012).

Educational targets should not be assessing to find out how much students have mastered after teaching them some realities and loading them with information. The aim is not to raise individuals as moving encyclopedias, but an educational system to increase self-confidence and the capacity of perceiving. The aim should also be to help learners to understand the subject well and know when and where to practice the information rather than memorizing in a traditional learning method. This is why technology should properly be integrated into education. In order to achieve this, technological tools and methods need to be brought in education. This is also a requirement for adapting to rapid changes in the future, familiarize learners with the use of technology and form technical infrastructure (Anderson ve Dexter, 2005). As Kenar and Balcı (2013) state, new technological tools have been introduced into educational environments each day.

In order to raise conscious individuals expected by the society, we have to accommodate ourselves with societal changes. At this point, the Ministry of National Education, school Directors, teachers, students, and families are the determining parties. The more the involved work collaboratively to perform their duties, the more success is reached in raising individuals to respond to the needs of the community by introducing technology in schools. Technological tools in education attract learners' attention and make the subject more interesting compared to traditional teaching methods (Kenar,

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2008). As Sarıtaş and Süral (2008) argue, the basic aim of today's education is to equip students with skills in how to have access to information rather than transferring it. Through technological tools, students become aware of how to have access to information.

Among the responsibilities of the Ministry of national Education are to design teaching programs to fit new technology, to allocate sufficient budget for technological developments in schools and provide necessary support to equip schools to follow the developments and innovations and organize in-service training for teachers to inform them about the issue.

School Directors should welcome new technology and try their best to equip their schools with developed technology. They should be models for teachers and encourage them to use technology while they teach. A teacher's guidance is of vital importance in education to raise and shape individuals and the society for today and for the future (Sarıtaş & Süral, 2008; Hayytov, 2013).

Teachers need to be equipped with the basic skills in using new technology provided. They can develop themselves in using technology through in-service training to be organized by the Ministry.

Technology, today, has become an inevitable part in students' life, which enable them to have access to fast and effective information. I n information community, it is very important that students focus on correct and r4liable information. The major aim should be on provide students with correct information. At this stage, teachers are to guide students where to use which tool and make them aware of reliable and correct information. Parent-Teacher Associations can cont4ibute to the use of new technology in schools. They can also encourage their children to use technology at home by providing the necessary infrastructure(Krueger ve Lindahl, 2001).

All the factors mentioned above for the use of new technology in schools are directly connected with each other. While the lack of some of these factors can be made up for, some cannot. For example, if the Ministry fails to provide the required technology to support teaching, Parent-Teacher Associations can provide the equipment. However, schools need competent users of new technology to reach the aim.

Significance of the Study

The role of developing technology all around the world is indisputable. It facilitates teaching and ensures permanent learning. Undoubtedly, teachers are the most important factors in application of new technology in class. A questionnaire was conducted to specify to what extent technology is used and the factors hindering the process and report back o the Ministry of National Education for sound solutions.

Aim of the Study

The major aim of this study is to investigate and specify how effective primary school teachers are in the use of technology and the factors negatively affecting the process.

Methodology

Research Method

A descriptive scanning model, which aims to describe a past or current case, (Karasar, 2012) was conducted in this research.

Population and Sample

599 primary school Directors and teachers, 106 of them the sample, in Gazimağusa and İskele districts composed the population of this study.

Data Collection

The participant Directors, subject and form teachers were asked personal questions and questions related to the use of technology in class. The distribution of the questionnaires in terms of districts and schools are as in the Table 1 below.

The Participants

A total of 106 (n=106) Directors and teachers in State primary schools in Gazimağusa and İskele districts participated in this study. Their demographic characteristics are as in Table 1.

In term of their gender, %64.4 (n=64) of the participants are female and %39 (n=42) are male. %64.1 (n=68) graduated from Atatürk Teacher Academy, %17 (n=18) graduated from university, and %18.9 (n=20) are post-graduates. %34.9 (n=37) have between 1-10 years, %34 (n=36) between 11-20 years, and %31.1 (n=33) over 21 years experience.

As for their positions in their schools, %9.4 (n=10) are Directors, %26.4 (n=28) are subject-teachers, and %64.2 (n=68) are form teachers. %72.6 (n=77) are from Gazimağusa and %27.4 (n=29) are from İskele district

Data Collection Tool

A preliminary form, a Scale to specify the factors affecting technological developments in schools, designed by the researchers was used in this research. A 5-Likert type Scale with five options as "Strongly Disagree", "Disagree", "Have No Idea",

"Agree", and "Strongly Agree" was subjected to confirmation by three evaluation and assessment experts for content and technological aspects.

In the light of the experts' views, some items were excluded and some were included and a 22-item Scale was designed.

A factor analysis was done for structural validity and to specfy factor-loads of the items on the Scale. The suitability of date to factor analysis was determined through Kaiser- Meyer Olkin (KMO) and Barlett test. The result of Barlett test and KMO value are as in Table 2.

Table 1. **Demographic Characteristics of the Participants**

Demographic Characteristics	F	%
Gender		
Female	64	60,4
Male	42	39,6
Latest graduation		
ATA (Atatürk Teacher Academy)	68	64,1
Undergraduate	18	17,0
Post-graduate	20	18,9
Experience		
1 – 10 yrs	37	34,9
11 – 20 yrs	36	34,0
Over 21 yrs	33	31,1
Position		
Director	10	9,4
Subject teacher (Music, Drawing, P.E, English)	28	26,4
Form teacher	68	64,2
Place of work		
Gazimağusa	77	72,6
İskele	29	27,4

Table 2. **The suitability of the data to factor analysis**

Kaiser-Mayer-Olkin (KMO) Sample Measurement Value sufficiency		**0.827**
Barlett Test	Chi-square value	1354,103
	Df	231
	Sig	0,00

The 0,827 KMO value indicates that the sample-size is sufficient for factor analysis. The Chi-square value of the Barlett test is considered meaningful (x=1354,103; df= 231; p<0.01). In order to determine the number of factors showing the connection in small numbers in the most effective way, the line-chart was examined (Karagöz & Kösterelioğlu, 2008). Figure 1 shows the factor Scale affecting technological developments in schools.

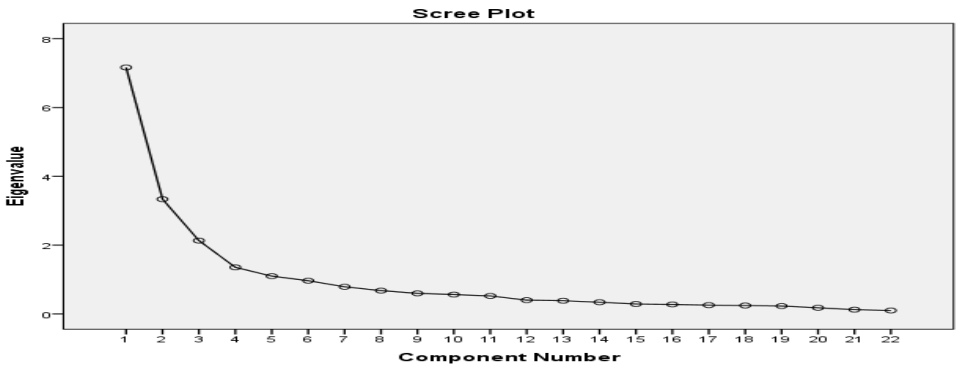

Figure 1. **The Scree Plot Figure**

According to Büyüköztürk (2007), the line-chart is designed through combining the dropping Eigen-values of the items and the breaking points on the chart show the factor numbers. As it can be observed in Figure 1, the components with drops are factors 1, 2, and 3. From factor 4, the Figure reveals a horizontal view, which indicates that the meaningful factor is 3.

In a later stage, the Varimax rotation technique was used, which revealed that the eigenvalue of the Scale was in here factors bigger than 1.

Table 3 shows the variance value of each factor and their effect on cumulative values

Table 3. **Factor Analysis Results**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7,165	32,567	32,567	7,165	32,567	32,567	5,214	23,701	23,701
2	3,335	15,161	47,728	3,335	47,728	54,728	4,065	18,476	42,177
3	2,130	9,683	57,412	2,130	57,412	57,412	3,352	15,234	57,412
4	1,354	6,152	63,564						
5	1,098	4,989	68,553						
6	0,964	4,383	72,936						
7	0,788	3,580	76,516						
8	0,677	3,076	79,592						
9	0,597	2,715	82,307						
10	0,562	2,555	84,863						
11	0,522	2,372	87,234						
12	0,400	1,820	89,054						
13	0,383	1,741	90,796						
14	0,339	1,541	92,336						
15	0,287	1,305	93,641						
16	0,274	1,247	94,887						
17	0,254	1,156	96,043						
18	0,243	1,104	97,147						
19	0,229	1,039	98,187						
20	0,178	0,807	98,994						
21	0,123	0,560	99,554						
22	0,098	0,446	100,000						

Extraction Method: Principal Component Analysis.

As in Table 3, the variance description of the first factor is %23.701, the second is %18.476, and the third is % 25.234. The total variance of the three is stated as 57,412. The rotated factor load following the Varimax rotation procedure is as in Table 4.

When the factor load values of the Scale items are considered, it is not5ed that under the first factor there are ten items with factor loads ranging between 0,581 and 0,791. There are seven items with factor loads ranging between 0,496 and 0,851 under the second factor. The third factor has five items with factor loads ranging between 0,666 and 0,809. The first of the three components is titled as “Director and Teacher Behavior”, the second “Technological equipment”, and the third “The rapport of the teaching programs with technology”.

Data Analysis

The data obtained from the participants about the subject question were analyzed through SPSS program. The answers are categorized as “Strongly Agree” (5pts.), “Agree” (4pts.), “Not Sure” (3pts), “Don’t Agree” (2pts), and “Strongly Disagree” (1pt.). The data are presented in Table 5 in percentages (%), Average (x2), Frequency (f), and Standard Deviation (SD).

The results of the questionnaire examining the factors affecting technological developments in schools are as in Table 6.

The average results of the subject question are as “Schools are equipped with technological tools (computers, e-boards, projection etc.) adequately.

Table 4. **Load values of the Items in terms of factors resulting from the rotated process**

Rotated Component Matrix[a]			
Items	**Rotated Factors Load values**		
	Factor 1	**Factor 2**	**Factor 3**
Teachers use technology effectively in classroom.	,791		
Teachers keep pace with technology	,749		
Teachers are interested in new technology	,721		
Teachers accord with technological developments	,714		
Teachers integrate technology into teaching	,687		
Teachers are for the use of technology in schools	,683		
Teachers are equipped with technological information	,670		
Teachers are willing to receive in-service training in new technology	,661		
Directors are interested in technological developments	,592		
Directors are willing to participate in in-service training in technology	,581		
Directors do their best to introduce technology in schools		,851	
Directors coordinate with the Ministry to provide new technology for schools		,835	
Directors are highly motivated with the use of new t4echnology in schools.		,807	
Directors are interested in new technology		,774	
Directors encourage the use of new technology in schools		,617	
The current technology (computers, e-boards, projections etc) are sufficient in schools		,573	
Software units are in classrooms are sufficient		,496	
Use of technology raises learning levels			,809
Programs need to be redesigned and updated			,772
Use of technology helps more participation			,752
College entrance-exams hinder the use of technology in classrooms			,744
Intensive curriculum is a negative factor in the use of technology			,666

Table 5. **Score Intervals of a Likert-type Scale**

Option	Option Weight	Limits
Strongly Agree	5	4.21-5.00
Agree	4	3.41-4.20
Not Sure	3	2.61-3.40
Disagree	2	1.81-2.60
Strongly Disagree	1	1.00-1.80

The (x=2.02) statement that the participants mostly responded as “Disagree”.

- The results from the questionnaire came out as follows;
- Teachers use technology while teaching (x= 2,82)
- Teachers keep pace with technological developments easily (x = 3.30)
- Teachers interact technology effectively in teaching (x = 2.97)
- Teachers are well informed about new technologies (x = 2.87)
- Teachers are willing to receive in-service training in new technologies (x = 2.80)
- Teachers are interested in new technologies (x = 3.08)
- Teachers are willing to introduce new technologies in schools (x = 3.38)
- Directors encourage new technologies in schools (x = 3.01)
- Directors try their best to introduce new technologies in schools (x = 3.01)
- Directors are open to new technologies (x = 3.16)
- Directors collaborate with the Ministry to introduce new technologies in schools (x = 2.98)
- Directors are highly motivated with the use of technology in schools (x = 2.98)
- Classrooms are equipped with software (x = 2.38)
- Intensive curriculum is a handicap in the use of technology in class (x = 3.25)

In this respect, the participants mostly responded as “Not Sure”.

The participants agreed in the following;

- Teaching programs need to be redesigned to respond to new technologies in teaching (x = 3,83)
- Teachers are open to new technologies (x = 3.42)
- College entrance-exams are a handicap for the use of new technologies (x = 3.56)
- Technology helps improve in-class learning levels (x = 4.14)
- Technology helps participation in in-class activities (x = 4.11)

Table 6. **Factors affecting the use of technology in schools**

Factors	Strongly Agree		Agree		uncertain		Disagree		Strongly Disagree		$\overline{X}$	S.S
	F	%	F	%	F	%	F	%	F	%		
1. Teachers use technology in class	2	1,9	34	32,1	24	22,6	35	33,0	11	10,4	2,82	1,058
2. Teachers are open to new technologies	13	12,3	49	46,2	17	16,0	23	21,7	4	3,8	3,42	1,077
3. Teacher adapt to new technology	8	7,5	49	46,2	18	17,0	29	27,4	2	1,9	3,30	1,016
4. Teachers use technology effectively	6	5,7	30	28,3	31	29,2	33	31,1	6	5,7	2,97	1,028
5. Teachers are well informed about tech	2	1,9	34	32,1	24	22,6	40	37,7	6	5,7	2,87	0,996
6. Teachers are willing to receive in-service training in technology	1	0,9	30	28,3	32	30,2	32	30,2	11	10,4	2,79	1,002
7. Directors are willing to receive in-service training in technology	2	1,9	25	23,6	39	36,8	30	28,3	10	9,4	2,80	0,970
8. Teachers are willing to follow technology	8	7,5	46	43,4	26	24,5	24	22,6	2	1,9	3,32	0,971
9. Directors are willing to follow technology	7	6,6	31	29,2	39	36,8	22	20,8	7	6,6	3,08	1,015
10. Teachers are willing to use technology	10	9,4	50	47,2	23	21,7	16	15,1	7	6,6	3,38	1,064
11. Directors encourage the use of technology	8	7,5	37	34,9	22	20,8	26	24,5	13	12,3	3,01	1,183
12. Directors do their best to equip schools with new technology	6	5,7	40	37,7	22	20,8	25	23,6	13	12,3	3,01	1,159
13. Directors are open to new technology	9	8,5	42	39,6	20	18,9	27	25,5	8	7,5	3,16	1,131
14. Directors collaborate with the Ministry in new technology	5	4,7	36	34,0	29	27,4	24	22,6	12	11,3	2,98	1,104
15. Directors are motivated with the use of technology in schools	6	5,7	30	28,3	36	34,0	24	22,6	10	9,4	2,98	1,060
16. Sufficient software are provided	2	1,9	24	22,6	12	11,3	42	39,6	26	24,5	2,38	1,142
17. Intensive curriculum is a handicap in the use of technology	23	21,7	34	32,1	12	11,3	21	19,8	16	15,1	3,25	1,394
18. Teaching programs need to be redesigned	30	28,3	48	45,3	10	9,4	16	15,1	2	1,9	3,83	1,064
19. College entrance exams are a handicap in the use of technology	34	32,1	27	25,5	19	17,9	16	15,1	10	9,4	3,56	1,332
20. Technology in class raises learning levels	54	50,9	30	28,3	9	8,5	9	8,5	4	3,8	4,14	1,125
21. Technology in class increases participation	53	50,0	32	30,2	5	4,7	12	11,3	4	3,8	4,11	1,157
22. Schools are equipped with sufficient technology	1	0,9	16	15,1	8	7,5	40	37,7	41	38,7	2,02	1,078

Table 7. **T-test results**

Factors	Gender	n	$\overline{X}$	SS	Sd	t	p	level of significance
Taching programs	Female	64	3,8938	0,84	104	1,582	0,117	P>.05
	Male	42	3,6048	1,03				Insignificant difference
Technological Infrastructure	Female	64	2,8705	0,92	104	-0,098	0,922	P>.05
	Male	42	2,8778	0,82				Insignificant difference
Attitude	Female	64	3,1094	0,72	104	0,589	0,557	P>.05
	Male	42	3,0238	0,74				Insignificant difference

Table 7 reveals the results of a t-test examining any possible effects in terms of gender on technological developments in schools.

Among the 106 participant Directors and teachers, females' points average was calculated as x=3.8938 and males' points average as x=6048. In terms of gender, females' point averages for technological infrastructure factor was calculated as x=2.8705 and males' point averages as X=2.8778. In attitude factor, the average for females was x=3.1094 and for males as x=3.0238. This result did not indicate a significant difference affecting technological development. In dealing with the participants' length of experience, ANOVA analysis was conducted to specify any statistical significance among their scores in teaching programs, technological developments and problem solving factors. The results are as in Table 8.

Table 8. **The ANOVA analysis results**

Factors		Sum of Squares	sd	Mean Averages	F	P	Sufficient Difference
Teaching programs	Inter-groups	2,035	2	1,018	1,189	0,309	
	in groups	88,119	103	0,856			----
	Total	90,154	105				
Technological Developments	Inter-groups	3,188	2	1,594	2,088	0,129	----
	in groups	78,626	103	0,763			
	Total	81,814	105				
Attitude	Inter-groups	0,890	2	0,445	0,834	0,437	----
	in groups	54,926	103	0,553			
	Total	55,816	105				

In terms of length of experience, the ANOVCA analysis did not reveal a significant difference when teaching programs factor (F(2-105)=1,108; p=0.309>0.05); technological development factor (F(2-105)=2,088; p=0.129>0.05), and attitude factor (F(2-105) = 0.834; p=0.473>0.05) are considered.

In terms of their position, the Kruskal-Wallis test results revealing the participants' views about any connection among the factors affecting technical developments are as in Table 9.

Table 9. **Kruskal-Wallis Results on Factors Affecting Technological Development According to School Positions**

Factors	Position	N	Mean Rank	sd	$\overline{X}$	P	Difference
Teaching Programs	Director	10	44,50	2	1,090	0,58	P>.05
	Branch	28	52,64				Insignificant
	Form teacher	68	55,18				
Technological Infrastructure	Director	10	72,00	2	4,305	0,11	P>.05
	Branch	28	54,21				Insignificant
	Form teacher	68	50,49				
Attitude	Director	10	47,60	2	0,940	0,62	P>.05
	Branch	28	50,55				Insignificant
	Form teacher	68	55,58				

According to the results of the Kruskal-Wallis test, a significant difference was not observed in terms of teaching program factors (X(2)=1.090, p>0.05), technological infrastructure factors (X(2) =4.305, p>0.05) and attitude factors (X(2)=0.940, p>0.05). In terms of their latest graduation, the participants' views about any connections among the factors affecting technological developments were specified through Kruskal-Wallis test. The results are as in Table 10.

Table 10. **The Kruskal-Wallis test results**

Groups	Position	N	Mean Rank	sd	$\overline{X}$	p	Difference
Teaching Programs	ATA (Atatürk Teacher Academy)	68	51,27	2	1,125	0,57	P>.05
	Undergraduate	18	55,67				
	Post-graduate	20	59,13				
Technological Infrastructure	ATA (Atatürk Teacher Academy)	68	49,07	2	4,242	0,12	P>.05
	Undergraduate	18	64,22				
	Post-graduate	20	58,92				
Attitude	ATA (Atatürk Teacher Academy)	68	51,78	2	0,617	0,73	P>.05
	Undergraduate	18	55,81				
	Post-graduate	20	57,28				

When teaching programs factor ((X(2)=1.125, p>0.05), technological infrastructure factor (X(2)=4.242, pA0.05), and attitude factor (X(2)=0.617, p>0.05) are overviewed, a significant difference is not observed among the factors affecting technological development n schools.

Discussion

Overwhelming fast changes and developments in technology day by day is affecting every stage of

our lives and urging reorganization and innovation in education in general. Thus, integrating technology into education has become a must. In this regard, it has become inevitable to develop Scales to examine the effects on Directors and teachers. In order to specify the participants' views about the subject matter, a Likert - type Scale was developed for this study. The validity of the Scale was controlled through a factor analysis and 22 items were agreed on. At the end of the analyses, the items on the Scale were categorized under three factors. Ten of the 22 items were in the first, seven were in the second, and five were in the third factor.

Conclusion and Suggestions

The results of the validity and reliability analyses proved that the developed Scale was applicable to examine the views by the participants about the factors affecting technological developments. The results obtained through the questionnaires are as follows:

- When the influencing factors (teaching programs, technological developments, and attitude) are considered, a significant difference is not observed between male and female teachers in terms of their latest graduation, experience, and position
- Technology cannot change the teaching and learning environment by itself. Therfore, it should be integrated into sound educational programs, approaches, and the environment. In addition, projects should be done to specify the need for technological tools to help raise individuals to respond to the community.

It is hoped that, the developed Scale to specify views and thoughts about the influencing factors in technological developments will contribute to literature.

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