

Full Length Research Paper

Efficiency in reading comprehension: A comparison of students' competency in reading printed and digital texts

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In this study, survey model was used, for investigating the effect of printed and electronic texts on the reading comprehension levels of teacher candidates. While dependent variable of the research comprises the levels of understanding of the teacher candidates, independent variable comprises the departments of the teacher candidates, types of the texts being read and types of printing. Working group of this research comprises 207 randomly-elected teacher candidates, of the Classroom and Social Studies Teaching and Turkish Teaching Departments, Faculty of Education, Uşak University. The result of the research shows that the variables including departments of the teacher candidates and their computer utilization levels are seen not to significantly affect their reading comprehension levels in poetry, narrative, article and newsletter. But there is a stastical significant difference of their reading comprehension levels in printed type of text among the variables for all text types.

Key words: Reading, comprehension, on-screen reading, digital texts.

INTRODUCTION

Indisputably, the most important element of change in our times comprises the developments in the communication technologies. The said element not only affects the lives of people as a whole, but also has impact on readers mostly. In parallel to the technological developments of our times, part of the readers prefer reading from digital texts, and not printed texts. Information being disseminated in the past via printed products, such as books, magazines, newspapers is disseminated nowadays via information and communication technologies. In the present, many people prefer digital texts to printed ones. Such a situation has therefore given rise to a type of reading, called "on-screen reading" (Güneş, 2010). In order to understand the on-screen reading phenomenon, it is necessary to examine the components of the process, to re-conceptualize the concept of reader-text-author, and to discuss the general features of this concept (Shetzer and Warschauer, 2000). On-screen reading varies in comparison to reading printed texts in

terms of skill and process. Reading rate and variance in understanding during on-screen reading should be researched and discussed. This study is therefore important with its intent to determine how understanding varies in on-screen reading.

On-screen reading comprehension

Reading, being the most important and effective medium in learning and obtaining knowledge (Bamberger, 1990; Güneş, 2000; Özbay, 2007), is a process in which writing, a form of special symbols priorly agreed on by a set of people, is seen, perceived, understood, interpreted (Harris and Sipay, 1980; Biemiller and Siegel, 1997; Aytas, 2005; Arıcı, 2008), articulated (Öz, 2006) and given meaning as well (Güneş, 2007; Akyol, 2008a). Reading is a skill of procession in which symbols are interpreted on the basis of vision-hearing-word, through

which knowledge, development and recreation are brought along (Gönen et al., 2004); activated by a psychological operating system and become integrated with the purposes of the reader (Kimmel and Segel, 1983). Requiring an active and effective communication between the author and reader, reading is the skill that contributes the most to the mental development of the student (Akyol, 2008b). While Gönen et al. (2004) describe reading as an intellectual process, maintaining an effective communication between the author and reader, Kayalan (2007) discusses and judges the ideas and feelings of the author. Having the definitions on reading reviewed, comprehension is seen as an outcome of reading, and that a pointless reading is not deemed as a true reading. Reading and comprehension are dependent on each other with cause and effect relations. It is essential throughout reading to draw a conclusion from the ideas which the author wishes to disseminate (Göğüş, 1978).

The most distinctive feature of human beings which separates them from other beings is the skill of comprehension (Demir, 2010). The purpose of reading comprehension is to solve the ideas being introduced in the texts by means of preliminary knowledge, and to attribute meaning thereon. Readers solve the written code by articulating the word, and thereafter comprehend the articulated word in their minds (Yılmaz, 2008). Readers make detailed implications on both intra- textual and extra-textual concepts during comprehension (Mcnamara and O' Reilly, 2009).

On-screen reading process is made of the components of "reader, text and screen". E-reading, also known as on-screen reading, is not limited with the skill of text comprehension, or with that of resolving the images and graphics; it may enrich the text via various types of media. In this circumstance, readers may find the chance to choose their own way between the issues and media they want (Altun, 2002).

There are certain differences between reading from paper and on-screen reading (Turkle, 1995; Chen, 2003; Chu, 2003; Kress, 2003; Rao, 2003; Merchant, 2007a; Carden, 2008; Muir et al., 2009). Texts being read on-screen and those written on the screen are digital texts, which are the electronic versions of printed texts:

1. Digital texts, unlike printed texts, are not limited to alphabetical symbols.
2. Digital texts may avoid waste of paper.
3. Reading digital texts can strain the eyes, and cause back, and spine aches.
4. Comprehensibility of digital texts may be lower.
5. It may be difficult for those having become accustomed to reading from paper to begin on-screen reading.
6. On-screen texts may be enriched by images, videos, sounds, animations, etc.
7. Texts written on-screen may be designed more effectively than those being written on paper.

Aims of the study

The aim of this study is to find out the effect of printed and digital texts on the reading comprehension of teacher candidates. Answers to the following questions were sought for in an depth review of this issue:

1. Do their levels of comprehension vary based on the text, printing type, their levels of computer use or their departments?
2. Do their levels of comprehension in narrative type of texts vary depending on the text, printing type, their levels of computer use or their departments?
3. Do their levels of comprehension in informative type of texts vary depending on the text, printing type, their levels of computer use or their departments?
4. Do their levels of comprehension in article type of texts vary depending on the text, printing type, their levels of computer use or their departments?
5. Do their levels of comprehension in newsletter type of texts vary depending on the text, printing type, their levels of computer use or on their departments?

METHOD

In this section, the titles, namely research model, working group, data collection tool and process and data analysis are included.

Research model

Survey model was used in the study. In this model, an attempt was made to describe a situation as it is (Karasar, 2009). While the dependent variable of the study comprised the levels of comprehension of the teacher candidates, independent variable thereof consisted of the departments of the candidates, types of the texts being read, and of the printing types of the texts as well.

Study group

Working group of this research comprised 207 randomly-elected teacher candidates, of the Classroom and Social Studies Teaching and Turkish Teaching Departments, Faculty of Education, Uşak University. Among the said students, 95 (46%) were males and 102 (54%) were females. Among the students who participated in this study, 76 (37%) of the participants went to Classroom Teaching, 66 (32%) to the Turkish Teaching, and the remaining 65 (32%) went to Social Studies Teaching.

Data collection tool and data collection process

Data collection process comprised three stages. In the first stage, an assessment instrument of four questions were applied to the students within the study group, so as to determine their levels of using information technologies. In the second stage, 20 texts of 5 different types were determined for the 4th grade students going to Turkish Classroom and Social Studies Teaching Departments of the Education Faculty. In the third stage, students were asked to read two digital, and two printed texts from each text type, amounting to a total of ten texts per each; then they were asked to answer four comprehension questions in each text.

Table 1. Tests of between-subjects effects. Dependent variable: comprehension scores for poetry comprehension.

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	13178.009(a)	17	775.177	6.294	.000
Intercept	822955.428	1	822955.428	6681.576	.000
Department	483.115	2	241.558	1.961	.144
Computer utilization level	441.101	2	220.551	1.791	.170
Printing type of poetry text	9540.920	1	9540.920	77.463	.000
Department * computer utilization level	522.627	4	130.657	1.061	.377
Department * printing type of poetry text	618.648	2	309.324	2.511	.084
Computer utilization level * printing type of poetry text	160.618	2	80.309	.652	.522
Department * computer utilization level * printing type of poetry text	51.221	4	12.805	.104	.981
Error	23278.725	189	123.168		
Total	997164.000	207			
Corrected total	36456.734	206			

aRSquared = .361 (Adjusted R Squared = .304).

Data analysis

Data analysis was conducted basically in two stages. In the first stage, data transferred to computer environment were reviewed in terms of deficient or defective value, contradictory value and multiple variation; and in the second stage, sub-problems of the study were resolved. In the defective value analysis, the values thought to be entered defectively were corrected. In the deficient value analysis, assignment was made in place of blank articles via EM algorithm. 11 data among the total 218 within the data set were excluded from the analysis process, due to being found as filled carelessly and haphazardly. Teacher candidates were asked to read two digital, and two printed texts from each text type. The averages of the scores given for the students' answers in response to the aforementioned questions were written down as the score of the respective text type. All data having been collected within the scope of this study were assessed via bidirectional variance analysis separately per each sub-problem.

FINDINGS AND INTERPRETATIONS

Findings were attained from the analyses of the study via the aforementioned methods and techniques, and the interpretations regarding these findings were introduced in consideration of the order of the study's sub-problems.

First sub-problem

Analyses of the data were collected in response to the first sub-problem of the study: "*Do the teacher candidates' levels of comprehension in the genre of poetry vary based on printing type, their levels of computer utilization and their departments?*" (Tables 1-2).

In Table 1, the variables, including the departments of the teacher candidates, their computer utilization levels and types of printing do not significantly affect their reading comprehension levels in texts of poetry (F:0.104, $p > .05$). But their reading comprehension levels vary significantly in printing text among the said variables (F: 77,463. $p < .01$). Averages of the comprehension levels of

the study group as per their departments, their levels of computer utilization and the types of texts they are reading are given in Table 2.

Second sub-problem

Analyses of the data were collected in response to the second sub-problem of the study: "*Do the teacher candidates' levels of comprehension in the genre of narration vary depending on the text printing type, their levels of computer utilization and their departments?*" (Tables 3-4).

In the data given in Table 3, the variables, including the departments of the teacher candidates, their computer utilization levels and printing types of the texts they read are seen not to significantly affect their reading comprehension levels in narrative type of texts (F:0.942, $p > .05$). But their reading comprehension levels vary significantly in printing text among the said variables (F: 62,471. $p < .01$). Averages of the comprehension levels of the study group as per their departments, their levels of computer utilization and the types of texts they are reading are given in Table 4.

Third sub-problem

Analyses of the data were collected in response to the third sub-problem of the study: "*Do the teacher candidates' levels of comprehension in the genre of information vary depending on the text printing type, their levels of computer utilization and their departments?*" (Tables 5-6).

In the data given in Table 5, the variables, including the departments of the teacher candidates, their computer utilization levels and printing types of the texts they read are seen not to significantly affect their reading comprehension levels in informative type of texts

Table 2. Descriptive statistics. Dependent variable: comprehension scores for poetry texts.

Department	Computer utilization level	Printing type of poetry text	Mean	Std. Deviation	N	
Classroom Teaching	Medium	Printed	75.00	14.56022	6	
		Digital	65.71	15.27213	7	
		Total	70.00	15.10519	13	
	Good	Printed	72.83	10.04256	18	
		Digital	61.59	10.65985	17	
		Total	67.37	11.67976	35	
	Very Good	Printed	74.22	11.07491	18	
		Digital	57.60	12.04805	10	
		Total	68.29	13.83462	28	
	Total	Printed	73.74	10.91890	42	
		Digital	61.26	12.05872	34	
		Total	68.16	12.96668	76	
	Turkish Teaching	Medium	Printed	82.73	4.81852	11
			Digital	65.17	13.76975	12
			Total	73.57	13.63093	23
Good		Printed	80.73	5.68792	15	
		Digital	60.13	10.56860	15	
		Total	70.43	13.38987	30	
Very Good		Printed	76.33	9.64711	6	
		Digital	54.67	6.08824	6	
		Total	65.50	13.68144	12	
Total		Printed	80.59	6.49992	32	
		Digital	60.97	11.58524	33	
		Total	70.63	13.61361	65	
Social studies teaching Total		Medium	Printed	71.54	11.12516	13
			Digital	60.75	11.17729	12
			Total	66.36	12.22320	25
	Good	Printed	68.43	13.76011	14	
		Digital	58.62	11.23639	13	
		Total	63.70	13.33825	27	
	Very Good	Printed	75.00	14.18920	7	
		Digital	61.00	12.01388	7	
		Total	68.00	14.57078	14	
	Total	Printed	70.97	12.74811	34	
		Digital	59.94	11.06269	32	
		Total	65.62	13.10521	66	
	Medium	Printed	76.33	11.04328	30	
		Digital	63.58	12.93258	31	
		Total	69.85	13.56077	61	

Table 2. Contd.

Good	Printed	74.04	11.19774	47
	Digital	60.24	10.61978	45
	Total	67.29	12.88456	92
Very Good	Printed	74.81	11.22325	31
	Digital	57.87	10.63572	23
	Total	67.59	13.77380	54
Total	Printed	74.90	11.09849	108
	Digital	60.74	11.48165	99
	Total	68.13	13.30317	207

Table 3. Tests of between-subjects effects. Dependent variable: comprehension scores for narrative texts.

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	11730.259(a)	17	690.015	6.251	.000
Intercept	750294.677	1	750294.677	6796.976	.000
Department	525.208	2	262.604	2.379	.095
Computer utilization level	191.400	2	95.700	.867	.422
Printing type of narrative texts	6895.990	1	6895.990	62.471	.000
Department * computer utilization level	469.635	4	117.409	1.064	.376
Department * printing type of narrative texts	1292.215	2	646.108	5.853	.003
Computer utilization level * printing type of narrative text	149.050	2	74.525	.675	.510
Department * computer utilization level * printing type of narrative text	415.764	4	103.941	.942	.441
Error	20863.055	189	110.387		
Total	915900.000	207			
Corrected Total	32593.314	206			

a R Squared = .360 (Adjusted R Squared = .302).

Table 4. Descriptive statistics. Dependent variable: ccomprehension scores for narrative texts.

Department	Computer utilization level	Printing type of narrative texts	Mean	Std. Deviation	N
Classroom Teaching	medium	Printed	64.17	14.00595	6
		Digital	63.71	12.52616	7
		Total	63.92	12.65874	13
	good	Printed	68.61	9.50009	18
		Digital	58.94	9.94026	17
		Total	63.91	10.75495	35
	very good	Printed	71.78	10.56941	18
		Digital	57.30	12.30221	10
		Total	66.61	13.06491	28
	Total	Printed	69.33	10.69686	42
		Digital	59.44	11.09516	34
		Total	64.98	11.88408	76
Turkish Teaching	medium	Printed	80.45	4.41279	11
		Digital	62.58	12.43498	12

Table 4. Contd.

		Total	71.13	13.01853	23
	Good	Printed	78.60	5.84074	15
		Digital	56.40	7.65133	15
		Total	67.50	13.12211	30
	very good	Printed	72.83	8.63520	6
		Digital	52.50	6.05805	6
		Total	62.67	12.78019	12
	Total	Printed	78.16	6.41626	32
		Digital	57.94	9.96224	33
		Total	67.89	13.16497	65
Social Studies Teaching	medium	Printed	68.85	12.84423	13
		Digital	57.58	9.14985	12
		Total	63.44	12.40323	25
	Good	Printed	66.36	14.51581	14
		Digital	59.62	9.86187	13
		Total	63.11	12.72893	27
	very good	Printed	67.71	15.20651	7
		Digital	58.86	10.17232	7
		Total	63.29	13.25158	14
	Total	Printed	67.59	13.64955	34
		Digital	58.69	9.39264	32
		Total	63.27	12.52019	66
Total	medium	Printed	72.17	12.37094	30
		Digital	60.90	11.23196	31
		Total	66.44	13.01092	61
	good	Printed	71.13	11.44100	47
		Digital	58.29	9.10949	45
		Total	64.85	12.16276	92
	very good	Printed	71.07	11.20397	31
		Digital	56.52	10.24194	23
		Total	64.87	12.93386	54
	Total	Printed	71.40	11.54021	108
		Digital	58.70	10.10703	99
		Total	65.32	12.57855	207

Table 5. Tests of between-subject effects. Dependent variable: comprehension scores for informative texts.

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	12459.781(a)	17	732.928	6.098	.000
Intercept	619502.277	1	619502.277	5153.992	.000
Department	221.252	2	110.626	.920	.400
Computer utilization level	66.465	2	33.233	.276	.759
Printing type of informative texts	7842.964	1	7842.964	65.250	.000
Department * computer utilization level	692.264	4	173.066	1.440	.222
Department * printing type of informative texts	1076.329	2	538.165	4.477	.013
Computer utilization level * printing type of informative text	111.023	2	55.511	.462	.631
Department * computer utilization level * printing type of informative text	297.910	4	74.478	.620	.649
Error	22717.524	189	120.199		
Total	765334.000	207			
Corrected total	35177.304	206			

a RSquared = .354 (Adjusted R Squared = .296).

Table 6. Descriptive statistics. Dependent variable: comprehension scores for informative texts.

Department	Computer utilization level	Printing type of informative Texts	Mean	Std. Deviation	N
Classroom Teaching	Medium	Printed	60.67	14.62418	6
		Digital	57.29	14.40734	7
		Total	58.85	13.99908	13
	Good	Printed	65.33	11.29810	18
		Digital	55.24	9.38436	17
		Total	60.43	11.46680	35
	very good	Printed	65.50	11.81848	18
		Digital	51.40	12.30357	10
		Total	60.46	13.62862	28
	Total	Printed	64.74	11.82197	42
		Digital	54.53	11.24988	34
		Total	60.17	12.57764	76
Turkish Teaching	Medium	Printed	73.00	6.16441	11
		Digital	54.33	12.19786	12
		Total	63.26	13.51167	23
	Good	Printed	73.13	5.27618	15
		Digital	49.00	6.83478	15
		Total	61.07	13.66075	30
	very good	Printed	64.50	11.13104	6
		Digital	46.50	6.56506	6
		Total	55.50	12.81689	12
	Total	Printed	71.47	7.50907	32
		Digital	50.48	9.37457	33
		Total	60.82	13.52878	65
Social Studies Teaching	Medium	Printed	61.23	13.74866	13
		Digital	50.17	7.38344	12
		Total	55.92	12.30149	25
	Good	Printed	61.00	14.61296	14
		Digital	52.00	9.67815	13
		Total	56.67	13.07670	27
	very good	Printed	65.43	15.32816	7
		Digital	54.57	12.99817	7
		Total	60.00	14.77003	14
	Total	Printed	62.00	14.09707	34
		Digital	51.88	9.54362	32
		Total	57.10	13.05106	66
Total	Medium	Printed	65.43	12.74872	30
		Digital	53.39	11.14055	31
		Total	59.31	13.32234	61
	Good	Printed	66.53	11.83556	47
		Digital	52.22	8.91599	45
		Total	59.53	12.68767	92
	very good	Printed	65.29	12.12214	31
		Digital	51.09	11.28923	23
		Total	59.24	13.65054	54
	Total	Printed	65.87	12.07538	108
		Digital	52.32	10.14972	99
		Total	59.39	13.06766	207

(F:0.620, $p>.05$). But their reading comprehension levels vary significantly in printing text among the said variables (F: 65,250. $p< .01$). Averages of the comprehension

levels of the study group as per their departments, their levels of computer utilization and the types of texts they are reading are given in Table 6.

Table 7. Tests of between-subject effects. Dependent variable: comprehension scores for article texts.

Source	Type III sum of squares	Df	Mean square	F	Sig.
Corrected model	11821.418(a)	17	695.378	6.533	.000
Intercept	605962.957	1	605962.957	5692.623	.000
Department	102.914	2	51.457	.483	.617
Computer utilization level	2.410	2	1.205	.011	.989
Printing type of article	7559.650	1	7559.650	71.018	.000
Department * computer utilization level	963.715	4	240.929	2.263	.064
Department * printing type of article	836.272	2	418.136	3.928	.021
Computer utilization level * printing type of article	56.975	2	28.488	.268	.765
Department * computer utilization level * printing type of article	407.866	4	101.967	.958	.432
Error	20118.495	189	106.447		
Total	742629.000	207			
Corrected total	31939.913	206			

a RSquared = .370 (Adjusted R Squared = .313).

Fourth sub-problem

Analyses of the data were collected in response to the third sub-problem of the study: *“Do the teacher candidates’ levels of comprehension in the genre of article vary depending on the text printing type, their levels of computer utilization and their departments?”* (Tables 7-8).

In the data given in Table 7, the variables, including the departments of the teacher candidates, their computer utilization levels and printing types of the texts they read are seen not to significantly affect their reading comprehension levels in article texts ($F:0.958, p>.05$). But their reading comprehension levels vary significantly in printing text among the said variables ($F: 71,018, p< .01$). Averages of the comprehension levels of the study group as per their departments, their levels of computer utilization and the types of texts they are reading are given in Table 8.

Fifth sub-problem

Analyses of the data were collected in response to the third sub-problem of the study: *“Do the teacher candidates’ levels of comprehension in the genre of newsletter vary depending on the text printing type, their levels of computer utilization and their departments?”* (Tables 9-10).

In the data given in Table 9, the variables, including the departments of the teacher candidates, their computer utilization levels and printing types of the texts they read are seen not to significantly affect their reading comprehension levels in newsletter texts ($F:2,027, p>.05$). But their reading comprehension levels vary significantly in printing text among the said variables ($F: 90,175, p< .01$). Averages of the comprehension levels of the study group

as per their departments, their levels of computer utilization and the types of texts they are reading are given in Table 10.

DISCUSSION, CONCLUSION AND SUGGESTIONS

The aim of this study is to find out the effect of printed and digital texts on the reading comprehension of teacher candidates. For this purpose, randomly-elected sample of 207 teacher candidates, of the Classroom and Social Studies Teaching and Turkish Teaching Departments, Faculty of Education, Uşak University, participated in the current study. The research variables including departments of the teacher candidates, their computer utilization levels and the printing type were found not to significantly affect the candidates’ reading comprehension levels in text of poetry, narrative text, informative text, article and newsletter. But their reading comprehension levels vary significantly in printing text among the said variables.

Reading as an activity is supposed to make sense out of a text. In some cases, one can read and fail to comprehend the text. Learning to comprehend matters no less than the reading itself. For a century in Turkey, called information age, comprehending the information matters no less than the information itself. While coming into the center of people’s daily lives nowadays, internet and digital media is also to come into the center of people’s educational lives in a short time (Sefton, 1998; Skelton and Valentine, 1998; Buckingham, 2000; Holloway and Valentine, 2002; Nixon, 2003; Merchant, 2007b). Under the circumstances, educational process in general and reading education in particular, are to differ accordingly. This is so because of the significant differences between reading from papers and on-screen

Table 8. Descriptive statistics. Dependent variable: comprehension scores for article texts.

Department	Computer utilization level	Printing type of article	Mean	Std. Deviation	N
Classroom Teaching	medium	Printed	60.17	13.77558	6
		Digital	57.00	13.36663	7
		Total	58.46	13.08062	13
	good	Printed	64.33	11.33449	18
		Digital	54.94	9.14105	17
		Total	59.77	11.23567	35
	very good	Printed	64.94	10.97308	18
		Digital	51.20	9.69307	10
		Total	60.04	12.33328	28
	Total	Printed	64.00	11.35460	42
		Digital	54.26	10.16324	34
		Total	59.64	11.81830	76
Turkish Teaching	Medium	Printed	70.82	6.25809	11
		Digital	54.17	9.75922	12
		Total	62.13	11.73691	23
	Good	Printed	69.87	5.56605	15
		Digital	47.40	6.51153	15
		Total	58.63	12.88272	30
	very good	Printed	64.33	11.32549	6
		Digital	46.33	6.15359	6
		Total	55.33	12.80152	12
	Total	Printed	69.16	7.28281	32
		Digital	49.67	8.32416	33
		Total	59.27	12.52033	65
Social Studies Teaching	medium	Printed	60.85	12.87663	13
		Digital	46.41	4.92597	12
		Total	53.92	12.17210	25
	good	Printed	61.71	13.88651	14
		Digital	52.15	11.08186	13
		Total	57.11	13.29642	27
	very good	Printed	65.86	13.84953	7
		Digital	56.14	12.90257	7
		Total	61.00	13.81192	14
	Total	Printed	62.24	13.22087	34
		Digital	50.88	10.14969	32
		Total	56.73	13.06145	66
Total	Medium	Printed	64.37	11.82482	30
		Digital	51.81	9.98472	31
		Total	57.98	12.55055	61
	Good	Printed	65.32	11.06720	47
		Digital	51.62	9.36941	45
		Total	58.62	12.31888	92
	very good	Printed	65.03	11.32397	31
		Digital	51.43	10.32572	23
		Total	59.24	12.76335	54
	Total	Printed	64.97	11.25446	108
		Digital	51.64	9.68952	99
		Total	58.59	12.45183	207

Table 9. Tests of between-subject effects. Dependent variable: comprehension scores for newsletter texts.

Source	Type III sum of squares	Df	Mean square	F	Sig.
Corrected model	20776.871(a)	17	1222.169	9.210	.000
Intercept	861484.722	1	861484.722	6491.703	.000
Department	665.355	2	332.678	2.507	.084
Computer utilization level	330.006	2	165.003	1.243	.291
Printing type of newsletter	11966.727	1	11966.727	90.175	.000
Department * computer utilization level	887.429	4	221.857	1.672	.158
Department * printing type of newsletter	1324.835	2	662.417	4.992	.008
Computer utilization level * printing type of newsletter	380.455	2	190.227	1.433	.241
Department * computer utilization level * printing type of newsletter	1076.178	4	269.044	2.027	.092
Error	25081.342	189	132.706		
Total	1069138.000	207			
Corrected total	45858.213	206			

a RSquared = .453 (Adjusted R Squared = .404).

Table 10. Descriptive statistics. Dependent variable: comprehension scores for newsletter texts.

Department	Computer utilization level	Printing type of newsletter	Mean	Std. Deviation	N
Classroom Teaching	medium	Printed	67.50	15.29379	6
		Digital	66.86	9.29926	7
		Total	67.15	11.86624	13
	Good	Printed	76.22	9.04600	18
		Digital	61.41	9.86825	17
		Total	69.03	11.96437	35
	very good	Printed	80.22	12.61444	18
		Digital	56.80	10.71655	10
		Total	71.86	16.40396	28
	Total	Printed	76.69	12.09815	42
		Digital	61.18	10.34106	34
		Total	69.75	13.68807	76
Turkish Teaching	Medium	Printed	90.09	8.00568	11
		Digital	66.17	10.75203	12
		Total	77.60	15.37039	23
	Good	Printed	86.53	10.11976	15
		Digital	57.60	7.17934	15
		Total	72.07	17.05353	30
	very good	Printed	76.33	9.58471	6
		Digital	56.67	5.78504	6
		Total	66.50	12.74577	12
	Total	Printed	85.84	10.28970	32
		Digital	60.54	9.28739	33
		Total	73.00	16.02732	65
Social Studies Teaching	medium	Printed	74.23	15.25972	13
		Digital	61.33	9.28668	12
		Total	68.04	14.11406	25
	Good	Printed	75.43	17.24357	14

Table 10. Contd.

		Digital	62.08	11.08649	13
		Total	69.00	15.86239	27
	very good	Printed	72.29	19.72067	7
		Digital	62.57	9.94748	7
		Total	67.43	15.82945	14
	Total	Printed	74.32	16.55060	34
		Digital	61.91	9.87783	32
		Total	68.30	14.99022	66
Total	medium	Printed	78.70	15.58547	30
		Digital	64.46	9.88547	31
		Total	71.46	14.75983	61
	Good	Printed	79.28	13.06789	47
		Digital	60.33	9.44602	45
		Total	70.01	14.83647	92
	very good	Printed	77.68	13.93888	31
		Digital	58.52	9.43817	23
		Total	69.52	15.43916	54
	Total	Printed	78.66	13.93453	108
		Digital	61.20	9.76455	99
		Total	70.31	14.92021	207

reading. Interactions of digital texts with the reader are different from those between the printed materials and the reader (Harris, 2000; Mackey, 2003). That is why educating on-screen reading skills is to be different from the current reading education.

Contribution in creating intertextual meaning by way of establishing connections from the on-screen texts to other texts, visuals, etc. of digital type may be seen as the most important opportunity. Texts of digital type may avoid loss of paper, and provide opportunity to establish digital libraries. However, on-screen reading may strain the eyes, and the difficulty in the shift to on-screen reading may cause back and vertebral aches. Noorhidawati and Gibb (2008) and Jamali et al. (2009) have come to similar conclusions in their studies regarding e-books. Inadequacy in the positive opinions and attitudes being delivered by individuals towards on-screen reading may be suggested among the causes of lower levels of comprehension in on-screen reading. Besides, inadequacies of digital texts being presented via the current technology, inadequate level of on-screen reading skills of individuals, and overall inadequacy in the handiness thereto may further be suggested respectively (Abdullah and Gibb, 2008; Woody et al., 2010). Güneş (2010) remarks the followings regarding the difficulties in on-screen reading: "Text is not fully visible in on-screen reading like it is so in reading from paper. Texts of half the page's size are displayed successively on the screen. Readers read the text in fragments, and are forced to comprehend them as a whole. This situation affects the eye's movements and the reading rate negatively. On-

screen may free the hands, but inflicts extra burden on the eyes". A study conducted in Ohio State University concluded that it was more difficult for the readers to comprehend the texts they were reading on-screen (Atabek et al., 2003).

Brown (2001) and Mercieca (2004) stated that, on-screen reading skill was different from the skill of reading printed materials. Methods and skills being used in reading printed texts may become ineffective during on-screen reading. That is why methods and skills that affect on-screen reading comprehension positively are needed. Technological developments are to change the forms and features of the screens. This is an inevitable situation. It may be said that the current technology of the screens lowers the level of comprehension. However, in the future, when the screens take a flexible, foldable, and portable forms like papers, and the screens are to have surfaces avoiding the strain of eyes, the situation of lower level of comprehension, as being mentioned in the said study, may become avoidable.

According to the outcomes of the study, the followings may be listed as the suggestions addressing the field and practitioners in question:

1. Initiating pilot education via tablets, and its expansion throughout Turkey in the coming years may be seen as a positive step being taken in Turkish National Education system. However, according to the findings obtained from this study, educational faculty students have been found as lacking the adequate level of skill in on-screen reading. It is possible to determine the levels of such

students' skill in on-screen reading by means of a similar study.

2. Opinions and attitudes of educational faculty students towards on-screen reading may be reviewed.

3. Nielsen (2000) and Krug (2000) point to the fact that, reading from the screens being introduced by today's technologies is at a rate lower by 25-40% than that of reading printed materials. It is worthy of studying whether this situation has varied among Turkish students, or not.

4. Studies may be conducted for investigating the effect of on-screen writing on the rate of writing and on the written expression capacity.

5. Educational faculty students should generally be trained in teaching via tablets in mental and academic dimensions, and their skills in on-screen reading and writing should particularly be developed throughout their undergraduate education.

6. Increase in the activities of reading digital texts brings along the necessity for developing the on-screen reading skills of teachers, and those of the students going to educational faculties (Lankshear and Knobel, 2003). Just like in the processes of adaptation to such other innovations, positive attitudes being developed by the teachers and educational faculty students towards on-screen reading, and the thorough and adequate education they are to receive for developing such skills of them as well are to bring along declination of the negativities of such innovations. Otherwise, it is impossible to yield adequate efficiency from this innovation. It is therefore an important issue to improve the on-screen reading skills of the stakeholders of education, including not only the teachers, parents, and education managers, but also the students in particular as well.

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