Analysis of Scientific Attitude, Computer Anxiety, Educational Internet Use, Problematic Internet Use, and Academic Achievement of Middle School Students According to Demographic Variables

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Abstract—In this research, students' scientific attitude, computer anxiety, educational use of the Internet, academic achievement, and problematic use of the Internet are analyzed based on different variables (gender, parents' educational level and daily access to the Internet). The research group involves 361 students from two middle schools which are located in the center of Konya. The "general survey method" is adopted in the research. In accordance with the purpose of the study, percentage, mean, standard deviation, independent samples t---test, ANOVA (variance) are employed in the study. A total of four scales are implemented. These four scales include a total of 13 sub-dimensions. The scores from these scales and their subscales are studied in terms of various variables. In the research, students' scientific attitude, computer anxiety, educational use of the Internet, the problematic Internet use and academic achievement (gender, parent educational level, and daily access to the Internet) are investigated based on various variables and some significant relations are found.

Keywords—Scientific Attitude, Educational use of the Internet, Computer Anxiety, Problematic use of the Internet, Academic Achievement.

I. INTRODUCTION

INFORMATION and communication technologies have been developing at a rapid pace. These technologies affect individuals' lives and provide numerous benefits to the users [9], [18], [34]. Considering that traditional approaches in education have failed to raise the individuals who have the qualifications expected in our day, one of the most effective means for the solution of the problem would be taking advantage of all the opportunities provided by technology in an efficient way [5], [40]. One of the effective means of understanding the efficient use of technology by individuals is observing their attitudes towards technology.

According to [33], attitudes are general evaluations people hold in regard to themselves, other people, objects, and issues. These general evaluations are based on a variety of behavioral, affective, and cognitive foundations, and they influence the developments, changes, and formations in these foundations [25]. Bloom [11] refers to the importance of attitudes by stating the effect of affective domain behaviors in achieving cognitive domain behaviors in education. For example, in order for students to be successful in science and technology, they need to have positive attitudes towards science and technology [3], [4], [37]-[39].

A review of the literature shows that scientific attitude stands for willingness to understand and know, ambition to question everything, collecting data and inquiring its meaning, desire to prove out, thinking on the results, considering the premises and respecting logic [10], [20], [36]. Thinking in line with these definitions, raising individuals who keep up with the current age, show interest in scientific research, can provide logical solutions to the problems they may face in daily life, have scientific thinking skills and follow technological developments requires them to have high scientific attitudes. Learning the use of technology in order to follow technological developments has also become one of the most basic needs of individuals. For this reason, one of the topics that need to be momentously emphasized in education in the 21st century is the effective use of technology [35].

II. METHOD

A quantitative research method was used in the present study. The study was organized based on the general survey model. General survey models involve survey arrangements performed on the entire universe or a group or sample taken from that universe in order to reach a general judgment about the universe, which consists of a large number of elements [26]. In this study, it was examined whether the computer anxiety, problematic internet use and educational internet use, scientific attitude and academic achievements of secondary school students varied based on their demographic characteristics.

A. Sample

The participants of the study consist of the students of two private secondary schools located in the center of Konya.

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Although 365 students took part in the questionnaire survey, since 4 of the participants could not complete the questionnaire, the data analysis was conducted on the data collected from 361 secondary school students.

The distribution of the participants in terms of gender shows that approximately 45.2% (163) of the participants were female and 54.8% (198) were male. In terms of mother's education level, approximately 25.8% (94) of the participants' mothers were not university graduates and 74.2% (276) had a bachelor's degree or higher. The distribution of the participants in terms of father's education level shows that approximately 15.6% (57) of the participants' fathers were not university graduates and 84.4% (304) had a bachelor's degree or higher. In terms of grade point averages (GPA), approximately 28.3% (102) of the participants had a GPA of 400 and below, 35.2% (127) had a GPA between 401-450, and 36.5% (132) had a GPA between 451-500 (The points are the SBS-Level Assessment Exam- points of the students calculated out of 500 full score in the academic year of 2012-2013). The distribution of the participants in terms of the duration of daily internet use shows that approximately 26.6% (96) of the participants used the internet for 0-1 hours a day, 37.4% (135) of the participants used the internet for 1-2 hours a day and 36% (130) of the participants used the internet for 2 hours or more a day.

B. Data Collection Tools

The Scientific Attitude Inventory, Computer Anxiety Scale, Online Cognition Scale and Educational Internet Use Self-Efficacy Beliefs Scale were used in order to examine and present the computer anxiety, problematic internet use and educational internet use, scientific attitude and academic achievements of secondary school students based on different variables.

The Scientific Attitude Inventory (SAI) was developed in 1997 and it consists of 60 items. In the adapted version of the scale to Turkish by [20], the number of items in the scale was decreased to 40 and the scale was divided into 6 dimensions. In the validity study of the adapted scale, it is stated that content validity of the scale was examined, expert opinion was taken for determining the sufficiency of the scale items in terms of number and quality and the scale was adjusted based on these findings. The reliability study of the adapted scale was conducted and the Cronbach's alpha reliability coefficient of the scale was found to be 0.76, and the Spearman Brown split-half test correlation was found as 0.84. The items were created as five-point Likert-type items and the participants' level of agreement with the items were classified as "I agree completely", "I agree", "I am not sure", "I disagree" and "I disagree completely". Twenty of the items existing in the scale were determined as positive and 20 were determined as negative. In positive items, the responses given by the students were graded as 5 for "I agree completely", as 4 for "I agree", as 3 for "I am not sure", as 2 for "I disagree" and as 1 for "I disagree completely". In negative statements, items were graded in reverse of this scoring. Since there were 40 items in the scale, the highest and the lowest points that could be

achieved were determined as 200 and 40. The highness of the score indicates the existence of a high scientific attitude.

The Computer Anxiety Scale (CAS) developed by [15] was used to determine the computer anxiety levels of the students. The CAS consists of 28 items and it is formed of three subscales. The items of the scale were created as four-point Likert-type items. The validity and reliability study of the CAS was conducted through factor analysis, internal consistency coefficient, item total correlation coefficients, discriminant validity, and criterion validity analyses. A total of 1091 university students took part in the study. The internal consistency coefficient for all the items in the scale was found as 0.92. There are 24 negative and 4 positive statements in the scale. The items involving negative statements are graded as; Always: 4, Often: 3, Sometimes: 2 and Never: 1. The positive statements of the scale are graded in reverse of this scoring. The lowest and highest scores that can be achieved in the scale are 28 and 112. The highness of the score indicates the presence of a high level of anxiety. As the result of all the analyses performed, it was determined that the CAS was a valid and reliable tool for measuring the computer anxiety levels of university students [15].

The Online Cognition Scale (OCS) was developed by [19] to assess problematic internet use. The OCS is composed of 36 items that assess problematic internet use in four dimensions on a seven-point Likert-type scale ranging from "strongly disagree" to "strongly agree". The OCS assesses cognitions related to internet use. The evaluation of the scale is performed by calculating the subscale scores and the total score. In calculating the total score, the responses ranging from "strongly disagree" to "strongly agree" are scored from 1 to 7, only item 12 is reverse scored (e.g. 1 point=7 points, 2 points=6 points). A high total score is interpreted as "problematic use". The highest and lowest scores that can be achieved in this scale are 252 and 36. A score of 72 and below refers to unproblematic internet use, a score between 72 and 180 refers to problematic internet use, and a score of 180 and above refers to excessive internet use. The validity and reliability of the OCS was examined in [13]. The internal consistency coefficient of the scale was found as 0.91 [13].

"The Educational Internet Use Self-Efficacy Beliefs Scale", which was developed by [34] to determine the educational internet use self-efficacy beliefs of elementary school teachers, was used in this study. The unidimensional scale consists of 28 items. Kaiser-Meyer-Olkin coefficient of the scale was calculated as 0.968 and the Bartlett sphericity test result was found as 8045.409. The factor loads of the 28 items existing in the scale were found to vary between 0.526 and 0.814. Item total correlation coefficients calculated for the 28 items of the scale varied between 0.544 and 0.806. The Cronbach's alpha internal consistency coefficient of the scale calculated based on item analysis was found as 0.96. The highest and lowest scores that can be achieved in this scale are 140 and 28. The highness of the scale scores indicates that the teachers see themselves as effective in educational internet use, and a low scale score indicates that the teachers view themselves to have low efficacy in internet use [34].

C. Data Analysis

In the present study, t-test was used to find out whether the scientific attitude, computer anxiety, educational internet use, problematic internet use and academic achievement of the students varied with respect to gender, mother's and father's education level.

The independent samples t-test focuses on the comparison of measurements (scores) of dependent variables between groups formed based on a variable. The independent samples t-test checks whether the differences observed between the groups are statistically significant or whether these differences occurred by chance using hypothesis tests [12]. In this study, t-test was used to find out whether the variables differ with respect to gender, mother's and father's education level.

Single-factor variance analysis (ANOVA) for independent samples is used to test whether the difference between the means of two or more independent samples is significantly different from zero [12]. In this study, ANOVA was used to determine whether the variables were different depending on the duration of daily internet use.

III. FINDINGS

As it can be seen in Table I, the differences between the educational internet use (t=-2.073, p=0.007), OCS-social support (t=-6.422, p=<0.001), OCS-loneliness/depression (t=-5.295, p=<0.001), OCS-diminished impulse control (t=-5.641, p=<0.001), OCS-distraction (t=-4.479, p=<0.001), CAS-affectional anxiety (t=2.627, p=0.009), CAS- damaging anxiety (t=4.723, p=<0.001), CAS- learning anxiety (t=3.950, p=<0.001), SAI-structure of the laws and theories of science (t=-2.452, p=0.015), SAI-structure of science and its way of approaching events (t=3.503, p=0.001), SAI-exhibiting scientific behavior (t=2.380, p=0.018) scores of female and male students were found to be statistically significant. For the variable of educational internet use, the total mean score of female students was found as 109.74 and the total mean score of male students was found as 116.98. According to this result, it is seen that the educational internet use of boys was higher compared to that of girls. For the variable of OCS-social support of students, the total mean score of female students was 42.43 and the total mean score of male students was 55.90. Accordingly, the OCS-social support of male students was higher compared to female students. For the variable of OCS-loneliness/depression, the total mean score of female students was 17.21 and the total mean score of male students was 22.73. This finding shows that OCS-loneliness/depression levels of male students was higher compared to female students. For the variable of OCS- diminished impulse control, the total mean score of female students was 30.22 and the total mean score of male students was 39.18. Accordingly, the OCS-diminished impulse control of male students was higher compared to that of female students. For the variable of OCS-distraction, the total mean score of female students was 22.82 and the total mean score of male students was 28.35. According to this result, it is apparent that the OCS-distraction of male students was higher compared to female students.

TABLE I
COMPARISON OF FACTORS WITH RESPECT TO GENDER

Variable	Gender	N	$\bar{X}$	S	t	p
CAS-affectional anxiety	Female	163	18.76	5.78	2.627	0.009
	Male	198	17.33	4.52		
CAS-damaging anxiety	Female	163	14.63	5.12	4.723	<0.001
	Male	198	12.34	4.13		
CAS-learning anxiety	Female	163	10.39	3.51	3.950	<0.001
	Male	198	9.04	2.97		
SAI-structure of the laws and theories of science	Female	163	18.76	2.71	-2.452	0.015
	Male	198	19.48	2.83		
SAI-structure of science and its way of approaching events	Female	163	22.30	3.37	3.503	0.001
	Male	198	21.02	3.51		
SAI-exhibiting scientific behavior	Female	163	22.12	3.54	2.380	0.018
	Male	198	21.19	3.78		
SAI-structure and aim of natural sciences	Female	163	18.79	2.12	.104	0.918
	Male	198	18.76	2.35		
SAI-the place and importance of natural sciences in the society	Female	163	20.55	3.84	-.383	0.702
	Male	198	20.71	4.04		
SAI-willingness to conduct scientific studies	Female	163	34.46	7.93	-.646	0.519
	Male	198	34.98	7.15		
OCS-social support	Female	163	42.43	19.22	-6.422	<0.001
	Male	198	55.90	20.34		
OCS-loneliness/depression	Female	163	17.21	8.92	-5.295	<0.001
	Male	198	22.73	10.56		
OCS-diminished impulse control	Female	163	30.22	14.86	-5.641	<0.001
	Male	198	39.18	15.14		
OCS-distraction	Female	163	22.82	11.37	-4.479	<0.001
	Male	198	28.35	11.94		
Educational Internet use	Female	163	109.74	24.73	-2.703	0.007
	Male	198	116.98	25.79		
Internet use	Female	163	1.68	1.95	-1.071	0.285
	Male	198	1.87	1.54		
Academic achievement	Female	163	427.04	48.36	1.660	0.098
	Male	198	417.90	54.86		

For the variable of CAS-affectional anxiety, the total mean score of female students was 18.76 and the total mean score of male students was 17.33. According to this finding, it is seen that the level of female students' affectional problems associated with computers was higher compared to male students. For the variable of CAS-damaging anxiety, the total mean score of female students was 14.63 and the total mean score of male students was 12.34. According to this result, it occurs that the anxiety levels of female students associated with damaging the computer and the database was higher compared to male students. For the variable of CAS-learning anxiety, the total mean score of female students was 10.39 and the total mean score of male students was 9.04. Therefore, it is seen that anxiety and fear levels of female students associated with computer learning was higher compared to male students. For the variable of SAI-structure of the laws and theories of science, the total mean score of female students was 18.76 and the total mean score of male students was 19.48. According to this result, it is apparent that male students had a higher understanding level of the structure of the laws and theories of science compared to female students. For the variable of SAI-structure of science and its way of approaching events, the

total mean score of female students was 22.30 and the total mean score of male students was 21.02. According to this result, it is seen that male students had a higher understanding of the structure of science and its way of approaching events compared to female students. For the variable of SAI-exhibiting scientific behavior, the total mean score of female students was 22.12 and the total mean score of male students was 21.19. According to this result, it is apparent that female students exhibit a higher level of scientific behavior compared to male students. Furthermore, there was no statistically significant difference between the academic success (t=1.660, p=0.098), internet use (t=-1.071, p=0.285), SAI-structure and aim of natural sciences (t=0.104, p=0.918), SAI-the place and importance of natural sciences in the society (t=-0.383, p=0.702) and SAI-willingness to conduct scientific studies (t=-0.646, p=0.519) scores of female and male students. That is, there was no difference of gender concerning these variables.

The independent samples t-test was used to analyze whether the study variables showed a significant difference depending on gender and the analysis results are presented in Table II.

As can be seen in Table II, statistically significant differences were found between the academic achievement (t=-6.780, p=<0.001), educational internet use (t=-2.629, p=0.009), SAI-exhibiting scientific behavior (t=-2.969, p=0.003), SAI-structure of science and its way of approaching events (t=-2.960, p=0.003) scores of students with respect to mother's education level. For the variable of academic achievement, the total mean score of the students whose mothers were not university graduates was 32.25, whereas the mean of the total scores of the students whose mothers had a bachelor's degree or higher was 432.44. According to these results, it is seen that in terms of mother's education level, the students whose mothers had a bachelor's degree or higher had higher academic achievement compared to those whose mothers were not university graduates. For the variable of educational internet use, the total mean score of the students whose mothers were not university graduates was 107.79, whereas the total means of the students whose mothers had a bachelor's degree or higher was 115.82. According to these results, it is apparent that internet use among the students whose mothers had a bachelor's degree or higher was higher than the internet use of the students whose mothers were not university graduates. For the variable of SAI-exhibiting scientific behavior, the total mean score of the students whose mothers were not university graduates was 20.63 and the total mean score of the students whose mothers had a bachelor's degree or higher was 21.94. Accordingly, it is seen that the students whose mothers had a bachelor's degree or higher showed a higher level of scientific behavior compared to those whose mothers were not university graduates. Regarding the variable of SAI-structure of science and its way of approaching events, the total mean score of the students whose mothers were not university graduates was 20.70 and the total mean score of the students whose mothers had a bachelor's degree or higher was 21.93.

TABLE II
COMPARISON OF FACTORS WITH RESPECT TO MOTHER'S EDUCATION LEVEL

Variable	Graduation	N	$\bar{X}$	S	t	p
CAS-affectional anxiety	Without a bachelor's degree	93	18.66	4.96	1.472	0.142
	With a bachelor's degree or higher	267	17.74	5.24		
CAS-damaging anxiety	Without a bachelor's degree	93	13.08	4.46	-.697	0.487
	With a bachelor's degree or higher	267	13.48	4.84		
CAS-learning anxiety	Without a bachelor's degree	93	9.86	2.82	.708	0.479
	With a bachelor's degree or higher	267	9.58	3.44		
SAI-structure of the laws and theories of science	Without a bachelor's degree	93	19.13	2.70	-.046	0.963
	With a bachelor's degree or higher	267	19.15	2.84		
SAI-structure of science and its way of approaching events	Without a bachelor's degree	93	20.70	3.31	-2.960	0.003
	With a bachelor's degree or higher	267	21.93	3.52		
SAI-exhibiting scientific behavior	Without a bachelor's degree	93	20.63	3.51	-2.969	0.003
	With a bachelor's degree or higher	267	21.94	3.71		
SAI-structure and aim of natural sciences	Without a bachelor's degree	93	18.73	2.03	-.228	0.819
	With a bachelor's degree or higher	267	18.79	2.32		
SAI-the place and importance of natural Sciences in the society	Without a bachelor's degree	93	20.17	3.62	-1.366	0.173
	With a bachelor's degree or higher	267	20.82	4.05		
SAI-willingness to conduct scientific studies	Without a bachelor's degree	93	34.06	6.59	-1.025	0.306
	With a bachelor's degree or higher	267	34.99	7.81		
OCS-social support	Without a bachelor's degree	93	50.55	21.04	.389	0.698
	With a bachelor's degree or higher	267	49.57	20.95		
OCS-loneliness/depression	Without a bachelor's degree	93	20.29	10.62	.065	0.948
	With a bachelor's degree or higher	267	20.21	10.11		
OCS-diminished impulse control	Without a bachelor's degree	93	34.58	15.84	-.389	0.698
	With a bachelor's degree or higher	267	35.32	15.63		
OCS-distraction	Without a bachelor's degree	93	25.28	11.42	-.535	0.593
	With a bachelor's degree or higher	267	26.05	12.22		
Educational Internet use	Without a bachelor's degree	93	107.79	27.46	-2.629	0.009
	With a bachelor's degree or higher	267	115.81	24.60		
Academic achievement	Without a bachelor's degree	93	392.25	56.48	-6.780	<0.001
	With a bachelor's degree or higher	267	432.44	46.46		

According to the results, it can be seen that in terms of mother's education level, the scores of the students whose mothers had a bachelor's degree or higher for SAI-structure of

science and its way of approaching events was higher compared to the scores of those whose mothers were not university graduates. Besides, there was no statistically significant difference between the OCS-distraction (t=-0.535, p=0.593), OCS-diminished impulse control (t=-0.389, p=0.698), OCS-loneliness/depression (t=0.065, p=0.948), OCS-social support (t=0.389, p=0.698), SAI-willingness to conduct scientific studies (t=-1.025, p=0.306), SAI-the place and importance of natural sciences in the society (t=-1.366, p=0.173), SAI-structure and aim of natural sciences (t=-0.228, p=0.819), SAI-structure of the laws and theories of science (t=-0.046, p=0.963), CAS-learning anxiety (t=0.708, p=0.479), CAS-damaging anxiety (t=-0.697, p=0.487), CAS-affectional anxiety (t=1.472, p=0.142) scores of the students whose mothers were not university graduates and the students whose mothers had a bachelor's degree or higher. That is, in terms of these variables there was no significant difference between the students whose mothers were not university graduates and the students whose mothers had a bachelor's degree or higher.

The existence of a significant difference between the variables with respect to father's education level was analyzed by using the independent samples t-test and the analysis results are given in Table III. As can be seen in Table III, statistically significant differences were found between the academic achievement (t=-4.984, p=<0.001), SAI-exhibiting scientific behavior (t=-2.364, p=0.019), SAI-structure of science and its way of approaching events (t=-2.486, p=0.013) scores of the students whose fathers were not university graduates and the students whose fathers had a bachelor's degree or higher.

For the variable of academic achievement, the total mean score of the students whose fathers were not university graduates was 391.41, whereas the mean of the total scores of the students whose fathers had a bachelor's degree or higher was 427.99. According to these results, it is seen that the students whose fathers had a bachelor's degree or higher had higher academic achievements compared to those whose fathers were not university graduates. For the variable of SAI-exhibiting scientific behavior, the total mean score of the students whose fathers were not university graduates was 20.55, and the total mean score of the students whose fathers had a bachelor's degree or higher was 21.81.

According to the results, it is seen that the students whose fathers had a bachelor's degree or higher showed a higher level of scientific behavior compared to those whose fathers were not university graduates. For the variable of SAI-structure of science and its way of approaching events, the total mean score of the students whose fathers were not university graduates was 20.56, whereas the total mean score of the students whose fathers had a bachelor's degree or higher was 21.82. Accordingly, it can be seen that the students whose fathers had a bachelor's degree or higher had higher scores for SAI-structure of science and its way of approaching events compared to those whose fathers were not university graduates.

TABLE III
COMPARISON OF FACTORS WITH RESPECT TO FATHER'S EDUCATION LEVEL

Variable	Graduation	N	$\bar{X}$	S	t	p
CAS-affectional anxiety	Without a bachelor's degree	56	18.41	4.86	.660	0.510
	With a bachelor's degree or higher	303	17.91	5.24		
CAS-damaging anxiety	Without a bachelor's degree	56	12.80	4.15	-.973	0.331
	With a bachelor's degree or higher	303	13.48	4.85		
CAS-learning anxiety	Without a bachelor's degree	56	10.07	3.02	1.050	0.294
	With a bachelor's degree or higher	303	9.56	3.34		
SAI-structure of the laws and theories of science	Without a bachelor's degree	56	19.27	2.50	.355	0.723
	With a bachelor's degree or higher	303	19.13	2.86		
SAI-structure of science and its way of approaching events	Without a bachelor's degree	56	20.56	3.46	-2.486	0.013
	With a bachelor's degree or higher	303	21.82	3.48		
SAI-exhibiting scientific behavior	Without a bachelor's degree	56	20.55	3.77	-2.364	0.019
	With a bachelor's degree or higher	303	21.81	3.65		
SAI-structure and aim of natural sciences	Without a bachelor's degree	56	18.85	2.27	.296	0.767
	With a bachelor's degree or higher	303	18.76	2.25		
SAI-the place and importance of natural sciences in the society	Without a bachelor's degree	56	20.92	3.64	.558	0.577
	With a bachelor's degree or higher	303	20.60	4.01		
SAI-willingness to conduct scientific studies	Without a bachelor's degree	56	34.21	7.07	-.614	0.540
	With a bachelor's degree or higher	303	34.88	7.60		
OCS-social support	Without a bachelor's degree	56	51.02	23.38	.500	0.617
	With a bachelor's degree or higher	303	49.49	20.45		
OCS-loneliness/depression	Without a bachelor's degree	56	20.93	11.32	.602	0.548
	With a bachelor's degree or higher	303	20.04	9.99		
OCS-diminished impulse control	Without a bachelor's degree	56	36.05	17.03	.514	0.608
	With a bachelor's degree or higher	303	34.88	15.39		
OCS-distraction	Without a bachelor's degree	56	26.43	12.62	.426	0.671
	With a bachelor's degree or higher	303	25.69	11.88		
Educational Internet use	Without a bachelor's degree	56	113.72	24.24	.006	0.995
	With a bachelor's degree or higher	303	113.70	25.88		
Academic achievement	Without a bachelor's degree	56	391.41	59.63	-4.984	<0.001
	With a bachelor's degree or higher	303	427.99	48.61		

There was no statistically significant difference between the educational internet use (t=0.006, p=0.995), OCS-distraction (t=0.426, p=0.671), OCS-diminished impulse control

(t=0.514, p=0.608), OCS-loneliness/depression (t=0.602, p=0.548), OCS-social support (t=0.500, p=0.617), SAI-willingness to conduct scientific studies (t=-0.614, p=0.540), SAI-the place and importance of natural sciences in the society (t=0.558, p=0.577), SAI-structure and aim of natural sciences (t=0.296, p=0.767), SAI-structure of the laws and theories of science (t=0.355, p=0.723), CAS-learning anxiety (t=1.050, p=0.294), CAS-damaging anxiety (t=-0.973, p=0.331), CAS-affectional anxiety (t=0.660, p=0.510) scores of the students whose fathers were not university graduates and the students whose fathers had a bachelor's degree or higher. In other words, there was no significant difference between the students whose fathers were not university graduates and the students whose fathers had a bachelor's degree or higher in terms of these variables.

A one-way ANOVA was used to analyze whether the variables showed a significant difference depending on the duration of daily internet use and the analysis findings are presented in Table IV. As can be seen in Table IV, statistically significant differences were found in the CAS-affectional anxiety (F=16.82, p<0.001), CAS-damaging anxiety (F=9.24, p<0.001), SAI-structure of science and its way of approaching events (F=3.52, p=0.031), SAI-willingness to conduct scientific studies (F=3.92, p=0.021), OCS-social support (F=27.10, p<0.001), OCS-loneliness/depression (F=27.26, p<0.001), OCS-diminished impulse control (F=26.12, p<0.001), OCS-distraction (F=16.06, p<0.001) and academic achievement (F=5.46, p=0.005) scores of the students with respect to the duration of daily internet use. For the variable of CAS-affectional anxiety (F=16.82, p<0.001), it is seen that students whose daily internet use was between 0-1 hours $(\overline{X} = 20.42)$ had higher levels of affectional anxiety related to computers compared to those whose daily internet use was between 1-2 hours $(\overline{X} = 17.51)$ and 2 hours or more $(\overline{X} = 16.66)$. For the variable of CAS-damaging anxiety (F=9.24, p<0.001), students whose daily internet use was between 0-1 hours $(\overline{X} = 14.87)$ had higher levels of anxiety of damaging the computer and the database compared to those whose daily internet use was 2 hours or more $(\overline{X} = 12.20)$. For the variable of SAI-structure of science and its way of approaching events (F=3.52, p=0.031), students whose daily internet use was between 0-1 hours $(\overline{X} = 22.40)$ had significantly higher scores compared to those whose daily internet use was between 1-2 hours $(\overline{X} = 21.22)$. For the variable of SAI-willingness to conduct scientific studies (F=3.92, p=0.021), students whose daily internet use was between 1-2 hours $(\overline{X} = 35.57$ had significantly higher scores compared to those whose daily internet use was 2 hours or more $(\overline{X} = 33.28)$. For the variable of OCS-social support (F=27.10, p<0.001), it is seen that students whose daily internet use was 2 hours or more $(\overline{X} = 58.48)$ had higher perceived social support compared to those whose daily internet use was between 1-2 hours $(\overline{X} = 49.04)$ and between 0-1 hours $(\overline{X} = 39.17)$. Similarly, students whose daily internet use was between 1-2 hours $(\overline{X} = 49.04)$ had higher perceived social support compared to those whose daily internet use was between 0-1 hours $(\overline{X} = 39.17)$. For the variable of OCS-loneliness/depression

(F=27.26, p<0.001), students whose daily internet use was 2 hours or more $(\overline{X} = 24.28)$ scored higher compared to those whose daily internet use was between 1-2 hours $(\overline{X} = 20.22)$ and between 0-1 hours $(\overline{X} = 14.79)$.

TABLE IV
COMPARISON OF FACTORS WITH RESPECT TO DURATION OF DAILY INTERNET USE

Variable	Group*	Groups with a significant difference	N	$\overline{X}$	F	P
CAS-affectional anxiety	1		96	20.42	16.82	<0.001
	2	1-2, 1-3	135	17.51		
	3		130	16.66		
CAS-damaging anxiety	1		96	14.87	9.24	<0.001
	2	1-3	135	13.44		
	3		130	12.2		
CAS-learning anxiety	1		96	10.14	1.64	0.196
	2	-	135	9.59		
	3		130	9.35		
SAI-structure of the laws and theories of science	1		96	18.98	0.52	0.596
	2	-	135	19.09		
	3		130	19.34		
SAI-structure of science and its way of approaching events	1		96	22.4	3.52	0.031
	2	1-2	135	21.22		
	3		130	21.4		
SAI-exhibiting scientific behavior	1		96	21.46	1.49	0.228
	2	-	135	22.04		
	3		130	21.28		
SAI-structure and aim of natural sciences	1		96	19	0.76	0.468
	2	-	135	18.76		
	3		130	18.62		
SAI-the place and importance of natural sciences in the society	1		96	20.83	1.27	0.283
	2	-	135	20.92		
	3		130	20.2		
SAI-willingness to conduct scientific studies	1		96	35.56	3.92	0.021
	2	2-3	135	35.57		
	3		130	33.28		
OCS-social support	1		96	39.17	27.1	<0.001
	2	1-2, 1-3 2-3	135	49.04		
	3		130	58.48		
OCS-loneliness/depression	1		96	14.79	27.26	<0.001
	2	1-2, 1-3 2-3	135	20.22		
	3		130	24.28		
OCS-diminished impulse control	1		96	27.41	26.12	<0.001
	2	1-2, 1-3 2-3	135	34.41		
	3		130	41.6		
OCS-distraction	1		96	20.58	16.06	<0.001
	2	1-2, 1-3	135	26.26		
	3		130	29.33		
Educational Internet use	1		96	110.65	1.68	0.187
	2	-	135	112.94		
	3		130	116.76		
Academic achievement	1		96	435.39	5.46	0.005
	2	1-3	135	421.72		
	3		130	412.48		

*1: between 0-1 hours ; 2: between 1-2 hours; 3: 2 hours or more

It is seen that OCS-loneliness/depression scores of the students whose daily internet use was between 1-2 hours $(\overline{X} = 20.22)$ were higher compared to those with a daily

internet use of 0-1 hour ($\overline{X} = 14.79$). For the variable of OCS-diminished impulse control (F=26.12, p<0.001), students whose daily internet use was 2 hours or more ($\overline{X} = 41.60$) scored significantly higher compared to those whose daily internet use was between 1-2 hours ($\overline{X} = 34.41$) and between 0-1 hour ($\overline{X} = 27.41$). Likewise, the OCS-diminished impulse control scores of the students whose daily internet use was between 1-2 hours ($\overline{X} = 34.41$) was higher compared to those whose daily internet use was between 0-1 hour ($\overline{X} = 27.41$). For the variable of OCS-distraction (F=16.06, p<0.001), students whose daily internet use was 2 hours or more ($\overline{X} = 29.33$) scored significantly higher compared to those whose daily internet use was between 0-1 hour ($\overline{X} = 20.58$). Similarly, the OCS-distraction scores of those whose daily internet use was between 1-2 hours ($\overline{X} = 26.26$) were significantly higher compared to those whose daily internet use was between 0-1 hour ($\overline{X} = 20.58$). It is also understood that the academic achievement F=5.46, p=0.005) levels of the students whose daily internet use was 2 hours or more ($\overline{X} = 412.48$) were lower compared to those whose daily internet use was between 0-1 hour ($\overline{X} = 435.39$). Besides, there was no statistically significant difference in CAS-learning anxiety (F=1.64, p=0.196), SAI-structure of the laws and theories of science (F=0.52, p=0.596), SAI-exhibiting scientific behavior (F=1.49, p=0.228), SAI-structure and aim of natural sciences (F=0.76, p=0.468), SAI-the place and importance of natural sciences in the society (F=1.27, p=0.283) and educational internet use (F=1.68, p=0.187) scores with respect to duration of daily internet use.

IV. Discussion, Conclusion, and Suggestions

In this study, it was aimed to examine the scientific attitude, computer anxiety; educational internet use and problematic internet use of students in more detail and 4 different scales were administered to the students. These 4 scales used in the study consist of 13 sub-dimensions. Together with the scales, the sub-factors of the scales were also examined with respect to the variables.

According to the results of our study, there was no statistically significant difference in the academic achievement and internet use scores of the students with respect to gender. Regarding the scientific attitudes of the students, SAI-structure of the laws and theories of science, SAI-structure of science and its way of approaching events and SAI-exhibiting scientific behavior scores showed statistically significant difference with respect to gender. However, there was no statistically significant difference in SAI-structure and aim of natural sciences, SAI-the place and importance of natural sciences in the society and SAI-willingness to conduct scientific studies scores with respect to gender. In previous studies, it was found that scientific attitudes of students did not show any significant difference with respect to gender [8].

Computer anxiety scores of the students showed statistically significant differences with respect to gender. This finding revealed that computer anxiety levels of female students were higher compared to male students. Similar results were obtained in previous studies in the literature. Kotrlik and Smith [29] found that the female teachers that participated in their study had higher computer anxiety levels. Arıkan [7] stated that among preservice teachers, females had higher computer anxiety levels compared to males. In a study conducted on preservice teacher students, [22] pointed out that male students had a more positive attitude towards computer use compared to female students. However, in a study conducted on freshmen at the Faculty of Medicine, [41] states that there was no statistically significant difference between the attitudes of female and males towards computers. The results obtained by [2] also showed that computer anxiety did not show a significant difference with respect to gender. In summary, some studies report that computer anxiety showed significant difference with respect to gender, whereas some others claim the opposite.

A statistically significant difference was observed in the educational internet use scores of the students with respect to gender. Based on this finding, it can be concluded that the educational internet use of male students was higher compared to female students. In line with the present study, in previous studies it was found that male participants had more positive educational internet use attitudes compared to female participants [1], [17], [22]. A statistically significant difference was observed also in online cognition with respect to gender. It was found that the problematic internet use scores of male students were higher compared to female students. This finding shows similarity with the results of the previous studies in the literature [6], [30], [31], [37].

Regarding mothers' education levels, there was no statistically significant difference in problematic internet use and computer anxiety levels between the students whose mothers were not university graduates and those whose mothers had a bachelor's degree or higher. In terms of fathers' education levels, no statistically significant difference was found in problematic internet use, computer anxiety and educational internet use between the students whose fathers were not university graduates and those whose fathers had a bachelor's degree or higher. It was found that the students whose mothers had a bachelor's degree or higher had significantly higher educational internet use scores. That is, it can be said that as the mother's education level increases, the educational internet use by students also increases.

Students whose parents have bachelor's degrees or higher show higher academic achievement levels. In the present study, it was determined that the education levels of the mother and the father had an effect on the academic achievements of students. It was found that as the education level of the parents increased, the academic achievements of students also increased. Similar and also different results are reported in the literature. In [24], it was observed that the education levels of both the father and the mother had an effect on the achievement level of the student in OSS (University Entrance Exam). The results of a study on primary school students revealed that father's education level had an effect on the academic achievement of students; however, mother's education level did not have a significant effect on the academic achievement of students [27], [25].

Scientific attitude scores of the students did not show statistically significant difference depending on mother and father's education level, but a significant relationship was observed between the SAI-structure of science and its way of approaching events and SAI-exhibiting scientific behavior subscale total scores. The review of related literature shows that students whose mothers and fathers have high education levels also have high scientific attitude levels [28]. It can be concluded students whose mothers and fathers have high education levels could also have high scientific attitude levels.

There was no statistically significant relationship in educational internet use and scientific attitude levels among the three groups formed according to duration of daily internet use (1: between 0-1 hours; 2: between 1-2 hours; 3: 2 hours or more). Computer anxiety levels of students whose duration of daily internet use was longer were found to be lower compared to the other groups. Again, it was found in the study that student groups whose duration of daily internet use was longer had higher levels of problematic internet use. In various studies in the literature, it is stated that variables such as the number of previously taken computer classes, the time spent at the computer and frequency of use could be grouped under the name of computer experience. It was put forth that computer anxiety level decreased in case of an increase in computer experience. Computer anxiety levels of students whose duration of daily internet use was longer were found to be lower compared to the other groups. It was stated that an increase in computer experience also resulted in an increase in problematic internet use [16], [23], [32]. Finally, the academic achievement levels of students whose duration of daily internet use was longer were found to be lower compared to the other groups. It could be said that excessive daily internet use leads to failure in time management and a decrease in the time allocated to school subjects. It can be said that such a case would have a negative effect on the academic achievements of students.

A. Suggestions

Based on the findings obtained in the study, the following suggestions were developed for implementation and future studies. In the present study, it was observed that scientific attitude scores of female students were higher in certain dimensions. Studies can be performed to determine the reasons for the low scientific attitude levels of male students and to improve their scientific attitudes.

Computer anxiety levels of female students were found to be higher compared to males. Male students show a more positive attitude towards computers compared to female students. Certain steps could be taken such as introducing female students to computers at an early age, developing user friendly software that appeals to the interests of female students and especially providing computer training to the mothers. Furthermore, teacher training and orientation can be utilized for resolving the computer anxieties of the students. The interactions between the authority and the groups influenced by this authority are important in the formation of attitudes. Teacher and student interaction is the best example

for such an interaction. Attitudes of teachers towards computers would also affect the attitudes of their students. It would be useful to keep computers at schools allocated exclusively for the use of teachers, to improve the qualifications of the education staff in information technologies and to continuously update their knowledge through in-service training in order to help teachers and hence students to develop a positive attitude towards computers.

In the study, educational internet use and problematic internet use showed significant difference in favor of male students. The reason for this difference was not investigated in the study. For this reason, the difference between genders in cases of educational internet use and problematic internet use could be investigated in future studies.

In terms of the duration of internet use, computer anxiety levels of students whose duration of daily internet use were longer were found to be lower compared to the other groups. Considering that the increase of the time spent at the computer has a positive effect on the attitudes of students towards computers, transition to computer-based education at every level of education and training of individuals as computer literates should be maintained. In this aspect, studies can be conducted on the effects and contributions of the implementations of FATIH Project, which plays an important role in providing internet access to schools and overcoming the technological deficiencies at schools.

Student groups whose duration of daily internet use is longer also have higher problematic internet use levels. The problems that students may have in case of excessive internet use can be explained through seminars.

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