Examining the relationship between academic achievement and attitudes of the middle school students

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Abstract

In this study, the relationship between academic achievement and attitudes towards "technology and design lesson" of the middle school, eighth grade students' gender, family income level, parent education level attitudes towards technology and design lesson have been investigated, and examined the relationship between attitudes and academic achievement. Eighth-grade total of 98 students selected from 3 middle schools by simple random sampling method has been identified at research in North Cyprus. The data collection tool used in this study was the 'technology and design course attitude scale'. Descriptive survey model was used in the research. The data were analyzed using independent sample t-test, Anova, correlation, frequency and percentage calculations. At the end of the research; no significant difference found between attitudes towards technology and design lesson according to students' gender, family income, parent education levels. Also no significant relationship found between students' academic achievements in "technology and design course" and "attitudes toward the technology and design course".

Keywords: Technology and design, academic achievement, attitude towards lesson, students

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1. Introduction

Ancient Greek (B.C. 415) concept of technology has emerged with the combination of "techne" word which means skill and mastery and "logy" word which means knowledge and (Coplugil, 2015). The word design; Latin and mark, mark, verb indicate "Signore" in the word "de" is derived with the prefix "designer" is the word, the French designer, converted from Turkish into English as the word derivation of the word was generated by envision design (Etimoloji Turkce, 2015).

People have begun to develop a tool to facilitate their work with the use of the technology. Technology is the struggle with nature and attempt to be superior of human (Simon, 1983). Thanks to innovations in technology and the needs of developing societies, continuously vary while the countries scientific and technological development is an inevitable process by accepting that individuals adapt to new technologies and how emerging technologies can be used to for education about economic, social, political and cultural reflections of the concept of technology become indispensable (Erkan, 1998). Technology education includes prepared processes to gain students to using current technologies, generating from different perspectives to problems, problem solving and self-expression skills (Gencoglu & Senel, 2003). Individual is directed on how to reach information within the scope of technology education (Smith, 2011).

In the modern sense of design, Germany (1919) the Bauhaus movement, with the influence of the industry emerged with the thought of art as functional that could be used for (Biyikci, 2007). Design refers to all, the decorations on all or part of a product design, line, shape, form, color, texture, material or flexibility perceived by the human senses composed of variety of feature, or features (TPE, 2015). Design is an intellectual process which enrichments with the imagination of people (Ozturk, 2001). Developed technological products' usefulness is increased by combining with the art.

Technology education has been a compulsory component in education systems all over the world and it might be vary from country to country. Different technology education systems combine on three points. Those; identification of needs, design-production-usefulness of formulation and computer usage (Sahin, Ekli & Deniz, 2015). Technology education has been implemented with industrial applications in Germany and England. Moreover it was one of the 15 obligatory lessons in 1993 (Sahin, Ekli & Deniz, 2015).

The works reached in the field study about technology and design course, content of course, the stages of evaluation, student attitudes towards the course were evaluated, and recommendations are presented. Students develop positive attitude towards the method of trip-observation in the course of technology and design (Ucar, 2013). For technology and design courses; workshops equipped schools, being interact with companies and giving for teachers in-service training must be provided (Karaoglu, 2013). Students' positive attitudes about the course should be used in the development of questioning thinking skills (Aydin, 2014). In technology and design course related learning experiences was determined that they could not concrete their thinking (Akgun, 2012). As students'; father and mother's education level increases rose of positive attitude towards the course, female students to be more successful, course notes of rose as economic income increases, there is a moderate positive and significant relationship between academic achievement and attitudes towards the course was determined (Saglık, 2012). The students' attitudes are negative towards the fiction zone of technology and design course. The most important reason for the negative attitude of eighth grade students in placement test "SBS" was determined not to ask questions related to the course (Kocabatmaz, 2011). The field type is examined, it was determined that changes in the attitudes of students in technology and design class. Courses applied technology and design at North Cyprus, a survey about the attitudes of secondary school students in the course was not performed. For this reason, research training has been made in the education area of Nicosia. Technology and design education is implemented in the secondary schools' grades of 6-7-8 depending on Northern Cyprus the Ministry of Education of Secondary Education Department Directorate General. According to students determining of the

significance of technology and design courses will give information about the implementation of the program. One way to become familiar with the program is the attitude scales are applied to students.

Attitude is a tendency that sets the person's thoughts and behaviors towards to psychological object. Attitudes subsequently acquired with learning methods (Wharton, 2008). When examining individuals ' attitudes that is orientations of behaving properly, is seen that people' attitudes affect thoughts, feelings, and behaviors (Plotnik, 2009). Attitude is a person's re-evaluate about some evets or phenomenon's' knowledge (Genc & Sahin, 2015).

The purpose of this study is to determine the technology and design course attitudes of North Cyprus secondary schools eighth grade class students and associate with academic success. For this purpose, the following sub-problems will be required to respond:

- Is there a significant difference between attitude scores towards technology and design lesson according to variables of eighth grade students' gender, family economic status, and educational status of parents?

- Is there a significant difference between attitude scores towards technology and design lesson according to variables of eighth grade students' gender, economic status, and educational status of parents?

- Is there a significant relationship between attitude towards technology and design lesson and academic achievement of eighth grade students?

2. Method

2.1. Research Model

In this study, descriptive survey model method was used. Also, quantitative research method is adopted. Quantitative research is an approach to testing objective theories by examining the relationship between variables. These variables can in order by using measuring tools thus quantifiable data can be analyzed by using statistical procedures (Creswell, 2013).

2.2. Participants

The participants of the research; the Nicosia district of North Cyprus, consists of randomly selected 98 of eighth-grade students randomly selected from 3 secondary schools located in the center of North Cyprus in 2015-2016 fall semester .

2.3. Data Analysis

In collecting data technology and design course attitude scale with 5-point Likert type scale developed by Saglık (2012) was used. The data collection instrument consists of 28 items. As a result of the reliability analysis, Cronbach's Alpha (α) reliability coefficients determined as 0.94. In order to analyze the data for normality, Kolmogorov - Smirnov test was utilized in which normality of data distribution in all variables was accepted ($p > 0.05$). Therefore, in this study, parametric tests; t-test, ANOVA, Pearson correlation test, frequency and percentage calculations have been used with the help of SPSS software 23.

3. Results and Interpretations

To determine whether there are any significant differences between students' attitudes scores according to gender towards technology and design lesson, independent sample t-test was conducted. The performed t-test from the results is shown in Table 1.

Table 1. Attitudes of students by gender, independent sample t-test results of the class

Gender	N	X	sd	df	t	p
Female	59	85.96	8,82	96	1,424	0,158
Male	39	83.41	8,49			
Total	98					

As can be seen from the table above, there is no significant difference between the students attitudes towards technology and design of lesson scores according to the gender (p>0.05). So, there is no significant difference between male and female gender and students ' attitudes toward the course.

To determine whether technology and design lesson towards students' attitudes according to the economic situation of the family has changed, the one way analysis of variance (Anova) was conducted. The data obtained are given in Table 2 below.

Table 2. ANOVA test results between the attitudes of technology and design course and the economic status of families

Source of the Variance	Sum of Squares	df	Mean Square	F	p
Between Groups	161.205	2	80.603	1.056	0.352
Within Groups	7253.540	95	76.353		
Total	7414.745	97			

As can be seen from the above table, the p value is 0.352 and p>0.05. According to the results of the ANOVA test, according to the economic status of the family, there is no significant difference between students' attitudes. Economic status of the families of students in a course on technology and design when looking at the effect of attitudes, income status whose families have 0-1400TL, the attitudes of pupils from families on minimum wage so the border had 84.65 arithmetic average; income status whose families have 1401TL - 2500TL the attitudes of pupils had 86.51, while students from families whose income is above the level of 2500 TL with arithmetic averages of class attitudes, 83. 60. Family income status is slightly more positive attitudes towards the course at students who are in intermediate level than others but not significant.

To determine whether technology and design lesson towards students' attitudes according to their father's level of education has changed, the one way analysis of variance (Anova) was conducted. The data obtained are given in Table 3 below.

Table 3. The results of ANOVA test between attitudes of technology and design course and educational status of fathers

Source of the Variance	Sum Of Squares	df	Mean Square	F	P (Significance)
Between Groups	51248	2	25.624	0.331	0.719
Within Groups	7363.497	95	77.510		
Total	7414.745	97			

As can be seen from the above table, the p value is 0.719, p>0.05. In this case, there is no significant difference between attitudes towards technology and design course according to the education level of the father. Child whose father graduated from primary school, the students' attitudes towards technology and design lesson is the highest level with the average of 85.80; this average 84.73 with his father who are high school graduate students and; students' average were 83.90 his father secondary school graduate.

To determine whether Technology and design lesson towards students' attitudes according to their mother's level of education has changed, the one way analysis of variance (Anova) was conducted. The data obtained are given in Table 4 below.

Table 4. The results of ANOVA test between attitudes of "technology and design course" and educational status of mothers

Source of the Variance	Sum of Squares	df	Mean Square	F	P (Significance)
Between Groups	213.657	2	106.828	1.409	0.249
Within Groups	7201.088	95	75.801		
Total	7414.745	97			

As can be seen from the above table, the p value is 0.209, p>0.05. In this case, there is no significant difference between attitudes towards technology and design course according to the education level of the mother. Child whose mother graduated from secondary school, the students' attitudes towards technology and design lesson is the highest level with average of 86.62; this average 86.16 with students' mother who are high school graduate and; students were 83.35 average with mother high school and up graduate.

To determine Students' report card grades whether it has changed according to gender, independent sample t-test was conducted. Independent sample t-test result is seen in Table 5.

Table 5. Independent sample t-test results table between report card grades of "technology and design course" and gender

Gender	N	$\bar{x}$	sd	df	t	p
Female	59	9.31	1.511	96	0.779	0.438
Male	39	9.08	1.265			
Total	98					

As can be seen from the above table, there is no significant difference between gender and grades since as a result independent sample t-test p-value is greater than 0.05 with the value 0.438.

To determine whether technology and design course grade has changed according to the economic situation of the families of the students, the one way analysis of variance (Anova) was conducted. The research results are seen in Table 6.

Table 6. ANOVA test results, between the student's report card grades of technology and design course and the economic status of families

Source of the Variance	Sum of Squares	sd	Mean Square	F	P (Significance)
Between Groups	0,294	2	0,147	0,110	0,896
Within Groups	126,522	95	1,332		
Total	126,816	97			

Table 6 observed p-value of 0.896, p>0.05, there is no significant difference between grade according to level of family income. Family income status of students with more than 2500 TL "0-1400 TL", although there is no big difference between students who are their grade point average among the students in the Group other income not family income status, and there is a big difference between grade point average. So there is no significant difference between technology and design course grades and family income status. There is no difference was observed between Family income high, medium and low students ' report card grades.

To determine whether technology and design course grade has changed according to their fathers' education level, the one way analysis of variance (Anova) was conducted. The research results are seen in Table 7.

Table 7. Education Level of Their Father's Impact on Student Grades

Source of the Variance	Sum of Squares	sd	Mean Square	F	P (Significance)
Between Groups	3.567	2	1.784	1.375	0.258
Within Groups	123.249	95	1.297		
Total	126.816	97			

0.258 p value that occurs as a result of one way analysis of variance is greater than 0.05. So, there is no significant difference between education level of father and report card grades. The students' fathers who graduated from primary school, has technology and design course score card average 9.56; the average grade of the students' fathers from secondary school is 9, 19; students' high school and graduate father has average 9.15 respectively. When looking at average grades of students, it is seen that there is very little difference between them but not significant.

To determine whether technology and design course grade has changed according to their mothers' education level, the one way analysis of variance (Anova) was conducted. The research results are seen in Table 8.

Table 8. Education Level of Their Mothers' Impact on Student Grades

Source of the Variance	Sum of Squares	sd	Mean Square	F	P (Significance)
Between Groups	0.146	2	0.73	0.055	0.947
Within Groups	126.670	95	1.333		
Total	126.816	97			

Since 0.947 p value that occurs as a result of analysis of variance is greater than 0.05, there is no significant difference between education level of mother and report card grades. The students' mothers who graduated from primary school, has average grade 9.35; the average grade of the students' mothers from secondary school is 9.31; students' high school and graduate mother has average grade 9.27 respectively. When looking at average grades of students, it is seen that there is very little difference between them.

In order to determine the relationship between students ' attitudes towards "technology and design lesson" and their success, in survey the firstly students' 2014 frequency distributions of report card grades, grade point averages, and percentages are given in Table 9.

Table 9. Percentage and distributions of students' grades in technology and design course in survey

Course grade	N	%
1	0	0
2	0	0
3	0	0
4	0	0
5	2	2.0
6	2	2.0
7	3	3.1
8	12	12.2
9	17	17.4
10	62	63,3
Total	98	100

When looking at the arithmetic average of student grades, it is observed that the level of success 9.31. It is seen that the maximum score can be taken from the course is 10 in Table 9. Grade level of technology and design courses of the highest grade is quite close to that observed. This situation of the students in this course, it is observed that the students reached to a high average grade. The relationship between academic achievement and students ' attitudes towards the lesson are examined below.

Table 10. Pearson's correlation test between students' attitudes toward "technology and design course" and course grades

Variables		Report card grade	Attitude
	R	1	0,073
Report grade	P		0,477
	N	98	98
	R	0,073	1
Attitude	P	0,477	
	N	98	98

When Table 10 examined, there was not found a significant relationship between the academic achievements of the students related the technology and design course and attitudes toward technology and design course (r=0.073 p>.05).

2. Discussion and Conclusion

As a result of research according to the gender of female and male students, there was not a significant difference between attitudes towards technology and design course. On this topic Yolac (2009) also identified that there was no significant differences for gender. Aydin (2014) according to the gender variable of male and female students in the study of technology and design has determined that there is no significant difference in their attitude towards the lesson.

There was no significant difference between the economic situation of the families in the study and attitude towards the course. In the same way Yolac (2009) also noted that the attitudes towards students in the course were not influenced by family income. It was determined that there was a significant difference between the income of families and the attitudes towards technology and design lesson in study conducted by Saglık (2012).

While it was found no significant difference between father's education status of students and attitudes towards technology and design lesson, Saglık (2012) in his study, found significant difference between the fathers who graduated from primary school and graduate high school on their attitude towards technology and design course. Children whose father graduated from a secondary school or higher have showed the higher attitudes towards the lesson.

There was no significant difference observed between the education status of mothers and attitudes towards technology and design course. Yalcin (2007) stated that there is a significant difference between education level of fathers and mothers ' and students' attitudes.

In this research has been determined that there was no significant difference between gender and grade. Saglık (2012) has determined that male students from female students in the study showed a significant difference. The average grade points of female students are higher than men.

There is no significant difference has been determined in study between the grade and revenues. Saglık (2012) in the study stated that the income level of the families increases, students ' report card grades as high as the proportion of correctly.

There was not a significant difference between the education situation of fathers and the grade. Saglık (2012) stated that as their father's educational attainment increases as students' grades increases in technology and design course in the study.

In the research, there has not been determined significant difference between the report card grades and the mother's educational status. Saglık (2012) stated that as their mother's educational attainment increases as students' grades increases in technology and design course in the study.

The arithmetic average of academic achievement of the students surveyed is 9.31 with highest level. Arithmetical average of students ' attitudes towards technology and design lesson is at the level of 84.95. Course report card grades and student attitudes towards technology and design, it was determined that were too high. The research examined there was no significant relationship between the students' attitudes toward the technology and design course and academic achievements in technology and design courses (r=0.073 p>.05). Aydin (2014) has determined that there is no relation between academic achievement and students' attitude towards the lesson. Yolac (2009) stated that the students' attitudes towards technology and design affect the overall success of the course. Saglık (2012) in his study found moderate positive significant (r=0.605, p<.01) correlation between students' attitudes toward technology and design course and academic achievements in technology and design courses.

In a survey, it is observed that without attached any conditions the students in North Cyprus had positive attitudes towards the lesson. It can be said that technology and design courses in North Cyprus has a good point because that it cannot be explained by these variables. Similarly, technology and design courses demonstrate the success that can be called academic grades. Although in technology and design courses students ' attitudes and report card GPA is high, having no significant difference reveals the necessity of other research about the course. Future research; requires a technology and design courses of the program the process of implementation, evaluation, lessons, teachers, school administrators, parents in the education system revision of the course. Also on the subject of using qualitative data collection methods in-depth study will allow us to reach new findings.

2.1. Suggestions

• In this regard, works should cover the entirety of middle school.

• Using mixed research methods, the topic in-depth and comprehensive can be investigated.

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• Simultaneous investigations should be done in the field in different regions for obtaining clearer results.

• In the field, by using the variables such as related to culture, interests, needs, teacher attitudes research can be continued.

• Researches about the relationships between student attitudes and the cooperation of the industry can be done.

• The program of the technology and design courses should be renewed according to the attitudes of the students, and in accordance with the conditions of the future.

• Made of grade course grade according to the criteria for the assessment phase, which is under review where they may be taken.

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