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## THE INVESTIGATION OF THE RELATIONS BETWEEN STUDENTS' ATTITUDES TOWARD THE NATURE OF TECHNOLOGY AND PROBLEMATIC INTERNET USAGE

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**Abstract:** The purpose of the present study was to explore the relevance between the sub-dimensions of the instrument for assessing students' concepts of the nature of technology scale developed by Pey-Yan Liou and the sub-dimensions of problematic internet usage scale developed by Ceyhan, Ceyhan and Gürçan. The instrument for assessing students' concepts of the nature of technology scale consists of six sub-dimensions named technology as artifacts, technology as an innovative change, the current role of technology in society, technology as a double-edged sword, history of technology, and technology as a science-based form. The problematic internet usage scale consists of three sub-dimensions named negative consequences of the internet, social benefit / social comfort, excessive usage. In this quantitative research survey design was used. Data in this study were collected from a total number of 365 students studying at four different high schools. In accordance with the analyses carried out in this study suggestions were made for practical and research studies.

**Keywords:** Nature of technology, problematic internet usage, negative consequences of the internet.

### Introduction

#### What is the nature of technology?

The answer we get can be remarkably different when we ask the question "What is the (nature of) technology?" to a young student or an old man. In our age, even infants suddenly find themselves in a technological world in all areas of the life. That's why we need to investigate how new generations' concepts of nature of technology are formed. Technology plays a significant role in meeting the future challenges and fulfilling the demands of the global economy for a nation's growth. The nature of technology has been rarely discussed despite the fact that technology plays an essential role in modern society (Liou, 2015).

There is considerable disagreement over the definition of technology. Although there is a lack of consensus over the role technology should play in the curriculum, technological concepts are being taught, are expected to be taught, and should continue to be taught (DiGironimo, 2011). The definition of the nature of science has been more widely discussed than the definition of nature of technology. The concept of nature of science is dynamic and involves systematic thinking about science which has changed through the development of science (Celik and Bayrakçeken 2006). The meaning of NoT can be broadly defined as human-made systems and processes (NRC, 2011). In Technology for All Americans Project, the standards to get a concept of the nature of technology are defined as an understanding of the characteristics and the scope of technology; core concepts of the technology and the relationships among technologies and the connections between technology and the other fields of the study (ITEA, 2000). The purpose of this study was to adapt the instrument for assessing students' concepts of the nature of technology scale developed by Pey-Yan Liou (2015) to Turkish language in order to assess its reliability and validity.

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## Problematic Internet Usage

Before defining the problematic Internet usage, it may be rational to describe what healthy Internet usage is. While several articles in the literature have discussed problematic use of the Internet, there has been little talk of healthy Internet use. Millions of people around the world use the Internet to and information, communicate with friends, work, play, and otherwise function well on this new medium. Healthy Internet refers to using the Internet for an expressed purpose in a reasonable amount of time without cognitive or behavioral discomfort. Healthy Internet users can separate Internet communication with real life communication (Davis, 2001:188).

Problematic Internet use is defined as excessive or poorly controlled preoccupations, urges or behaviors regarding Internet use that lead to impairment or distress (Weinstein & Lejoyeux, 2010). In general, problematic Internet usage can be defined as "use of the Internet that creates psychological, social, school, and/or work difficulties in a person's life" (Beard & Wolf, 2001:378). Davis (2001) defines two distinct types of PIU: specific and generalized. Specific pathological Internet use includes those people that are dependent on a specific function of the Internet. Clinical and media accounts of this include overuse (abuse) of online sexual material/services, online auction services, online stock trading, and online gambling. Generalized pathological Internet use involves a general, multidimensional overuse of the Internet. It might also include wasting time online, without a clear objective.

## Purpose of the Study

The purpose of this study was to explore the relevance between the sub-dimensions of the instrument for assessing students' concepts of the nature of technology scale developed by Pey-Yan Liou and the sub-dimensions of problematic internet usage scale developed by Ceyhan, Ceyhan and Gürcan.

## Methods

### The Participants

Table 1: The participants

School Type	Grade			Gender	
	9th	10th	11th	Male	Female
Science High School	27	24	28	37	42
Anatolian High School	93	83	55	87	143
Anatolian Religious Vocational High School	51	-	-	51	-
<b>Total</b>	171	107	83	175	185

In this quantitative research survey design was used. The participants included 360 high school students of whom 185 were female, 175 were males. The participants study in three different high school types in the Province of Karaman/Turkey. It took about 20 minutes for students to answer the scales.

### The Instruments

The instrument for assessing students' concepts of the nature of technology scale consists of six sub-dimensions named: Technology as artifacts, Technology as an innovative change, the current role of technology in society, Technology as a double-edged sword, History of technology, Technology as a science-based form. The problematic internet usage scale consists of three sub-dimensions named: Negative consequences of the internet, Social benefit / social comfort, Excessive usage.

According to the reliability analysis through the use of SPSS program Cronbach's alphas for the 29 nature of technology and 27 problematic internet use items were .91 and .93, respectively. In this study the relations between students' attitudes toward the nature of technology and problematic Internet usage was investigated. Pearson Correlation Analysis was used to review the relations.

## Results and Findings

Table 2 shows the correlation values of the dimensions of the Nature of Technology Scale between each other.

Table 2. The correlation values between the dimensions of the nature of technology scale

		<b>Technology as Artifacts</b>	<b>Technology as an Innovative Change</b>	<b>Current Role of Technology in Society</b>	<b>Technology as a Double Edged Sword</b>	<b>History of Technology</b>	<b>Technology as a Science Based Form</b>
<b>Technology as Artifacts</b>	Pearson Correlation	1	,420**	,361**	,354**	,383**	,457**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	359	359	359	359	359	359
<b>Technology as an Innovative Change</b>	Pearson Correlation	,420**	1	,562**	,471**	,547**	,581**
	Sig. (2-tailed)	,000		,000	,000	,000	,000
	N	359	361	361	361	360	361
<b>Current Role of Technology in Society</b>	Pearson Correlation	,361**	,562**	1	,422**	,587**	,525**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
	N	359	361	361	361	360	361
<b>Technology as a Double Edged Sword</b>	Pearson Correlation	,354**	,471**	,422**	1	,512**	,576**
	Sig. (2-tailed)	,000	,000	,000		,000	,000
	N	359	361	361	361	360	361
<b>History of Technology</b>	Pearson Correlation	,383**	,547**	,587**	,512**	1	,614**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	359	360	360	360	360	360
<b>Technology as a Science Based Form</b>	Pearson Correlation	,457**	,581**	,525**	,576**	,614**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	359	361	361	361	360	361

All the six dimensions in Nature of Technology scale were significantly correlated with each other. The relation between the dimensions Technology as a Science Based Form and History of Technology had the highest correlation level. The students having a high attitude in technology as a science based form dimension had also a high attitude in the history of technology dimension.

Table 3 shows the correlation values of the dimensions of the Problematic Internet Usage scale between each other.

Table 3. The correlation values between the dimensions of the problematic internet usage scale

		<b>Negative Consequences Of The Internet</b>	<b>Excessive Usage</b>	<b>Social Benefit / Social Comfort</b>
<b>Negative Consequences Of The Internet</b>	Pearson Correlation	1	,655**	,677**
	Sig. (2-tailed)		,000	,000
	N	361	360	361
<b>Excessive Usage</b>	Pearson Correlation	,655**	1	,463**

	Sig. (2-tailed)	,000		,000
	N	360	360	360
<b>Social Benefit / Social Comfort</b>	Pearson Correlation	,677**	,463**	1
	Sig. (2-tailed)	,000	,000	
	N	361	360	361

All the three dimensions in Problematic Internet Usage Scale were significantly correlated with each other. The relation between the dimensions Social Benefit / Social Comfort and Negative Consequences of The Internet had the highest correlation level. The students having a high point in social benefit / social comfort dimension had also a high attitude in negative consequences of the Internet dimension. This finding shows that the students who use the Internet for social benefit or comfort experience the negative consequences of the Internet more.

Table 4 shows the correlation values between the dimensions of the Nature of Technology and the Problematic Internet Usage Scales.

Table 4. The correlation values between the dimensions of the nature of technology and the problematic internet usage scales

		<b>Negative Consequences Of The Internet</b>		<b>Social Benefit / Social Comfort</b>
		<b>The Internet</b>	<b>Excessive Usage</b>	
<b>Technology as Artifacts</b>	Pearson Correlation	,049	,189**	,045
	Sig. (2-tailed)	,356	,000	,400
	N	359	358	359
<b>Technology as an Innovative Change</b>	Pearson Correlation	,003	,143**	,074
	Sig. (2-tailed)	,948	,007	,161
	N	361	360	361
<b>Current Role of Technology in Society</b>	Pearson Correlation	,032	,164**	,062
	Sig. (2-tailed)	,538	,002	,237
	N	361	360	361
<b>Technology as a Double Edged Sword</b>	Pearson Correlation	-,174**	-,011	-,088
	Sig. (2-tailed)	,001	,842	,097
	N	361	360	361
<b>History of Technology</b>	Pearson Correlation	,022	,222**	-,030
	Sig. (2-tailed)	,681	,000	,575
	N	360	359	360
<b>Technology as a Science Based Form</b>	Pearson Correlation	-,090	,121*	,014
	Sig. (2-tailed)	,087	,022	,792
	N	361	360	361

As seen on the table except the dimension of technology as a double edged sword of NOT scale, the dimension excessive usage of PIU scale had significant correlation with the other five dimensions. The dimension of negative consequences of the Internet of PIU had positive significant correlation with the dimension of technology as a double edged sword of NOT scale. The dimension of social benefit/comfort of PIU scale had no significant correlation with the dimensions of the NOT scale.

## Conclusion

In Turkey, there are the rapid increase in Internet usage in general, and more specifically widespread usage of internet by adolescents and youths for various purposes. Problematic internet use may damage individuals' relations with their environments and hinder their success. For this reason, the Internet related psychological dependency or pathological Internet use is a great field of interest in research and discussion (Ceyhan, Ceyhan & Gürcan, 2007).

The relation between the nature of technology and the problematic Internet usage is also crucial to come up with the issue. Especially, how students answer what technology means to them can be a key point to understand their perspectives of the new era of Internet and technology. Once in an interview a 13-year-old boy responded to a researcher's question about what technology is by mentioning the steam engine. But he immediately took back his answer by stating that this was not an appropriate example of technology, because it was too old. Clearly something has to be at least a 20th century invention in order to be called technology (de Vries, 2005: 106).

In general we can see that children reflect what society tells them about technology. Watching television and reading magazines constantly enhances the idea that technology is 'high tech' (de Vries, 2005: 106). As educators what we should do is to reveal them the good and negative consequences of the technology and the Internet itself.

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