The Investigation of the Relationship between Attitudes Towards E-Learning and Self-Directed Learning with Technology of Secondary School Students

Research Article

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ABSTRACT

The purpose of this study is to investigate the relationships between attitudes towards e-learning and self-directed learning with technology of secondary school students. This descriptive study is designed with correlational research methods. The sample of this study is consist of 313 students from 5 different secondary schools in Malatya in Turkey. Data is collected in 2015-2016 academic year through self-directed learning with technology scale for young students and attitude scale towards e-learning. Descriptive statistics, independent sample t-test, one way ANOVA and linear regression analysis is used for data analysis. According to the findings, levels of students’ self-directed learning with technology and attitude towards e-learning is slightly higher. Students’ self-directed learning with technology and attitude towards e-learning do not differ in terms of gender and purpose of internet use. But students’ self-directed learning with technology and attitude towards e-learning differ in terms of students’ daily internet use time and frequency of computer/internet use during school lessons. Students’ self-directed learning with technology predict students’ attitude towards e-learning significantly. %11 of the variance of students’ attitude towards e-learning can be explained by students’ self-directed learning with technology. The results indicates that frequency of internet use or time both in school lessons and out of school are important factors for students’ self-directed learning with technology and attitude towards e-learning. Also students’ self-directed learning with technology is one of important predictors of students’ attitude towards e-learning. Students’ internet and ICT usage should be increased controlledly to increase the level of students’ attitude towards e-learning and self-directed learning with technology.

Keywords:

Self-directed learning with technology, attitude towards e-learning, correlational research, secondary school students.

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Introduction

Today, there are rapid developments in information technologies. Developments in information technologies affect many fields. Clearly, one of the field that are most affected is education (Al-Musawi, 2014). Because the use of information and internet technologies as teaching and learning tools is now rapidly expanding into education (Demir & Yurdugüll, 2014; Liaw, Huang & Chan, 2007). Also technological advancement has led to important changes in the way education is being imparted (Suri & Sharma 2013). Besides, computers and the internet designed for educational purposes have fundamentally changed school education (Liaw & Huang, 2011). Many scholar and practitioners in education agree that Information and Communication Technology (ICT) plays an increasingly important role in facilitating the education (Hunaiyyan et al., 2008). So, the Internet and online learning currently capture public attention recently and define today’s popular perceptions of educational technology (Garrison & Anderson 2003).

Electronic learning (e-learning), which is one of the most important products of the development of information technologies in education, is a frequently researched subject (Kisanga & Ireson, 2016; Sun et al., 2008). But today, e-learning is still in an early stage, with many uncertain issues to be clarified and investigated. There are many factors potentially influencing e-learning effectiveness, such as media characteristics, learning context, technology, and learner characteristics (Zhang et al., 2004). Recently, there are direct and indirect result of studies showing that self-directed learning, which have been shown as important skills of the 21st century, may be related to e-learning as a learner characteristic (Song & Hill, 2007; Vonderwell & Turner, 2005). It is important to reveal the relationship between these two concepts, which are increasingly important in the digital age.

E-Learning

Evolution of internet and advancement in computer technology has led to new approaches in learning and training which are referred to as e-learning (Suri & Sharma 2013). E-learning is one of the most popular learning environments in the information age. The origins of the term e-learning most likely originated during the 1980’s, within the similar time frame of another delivery mode online learning (Moore et al., 2011). Especially with the advent of the microcomputer in the late 1970s, the quest for e-learning (that is, using a computer to aid in the learning process) at the school level had begun (Paris, 2004). Nowadays, e-learning is a frequently encountered concept and application area in educational technologies.

A multitude of definitions of e-learning already exists in literature (Tavangarian et al.,2004). E-learning can be defined as the use of computer network technology, primarily over an intranet or through the internet, to deliver information and instruction to individuals (Welsh et al., 2003). E-learning can be defined as technology-based learning in which learning materials are delivered electronically to remote learners via a computer network (Zhang et al., 2004). Basically e-learning is the use of telecommunication technology to deliver information for education and training (Sun et al., 2008). E-learning involves the use of computers and internet to aid in the learning process (Gunasekaran et al, 2002; Paris, 2004). E-learning includes instruction delivered via all electronic media including the internet, intranets, extranets, satellite broadcasts, audio/video tape, interactive TV, and CD-ROM. All efforts to implement e-learning will eventually move towards total automation of administrating the teaching and learning processes by means of a software known as Learning Management Systems (LMS) (Govindasamy, 2001). So E-Learning, in particular the use of learning management systems, introduced a new aspect (Link & Marz, 2006). Poulova and Simonova (2009) define “e-learning” as "a modern way of education, which uses computer technology, computer networks and appropriate applications. Also Rosenberg (2000), emphasize a technological approach to e-learning. They understand it as a tool for designing, updating, distribution and evaluation of the process of instruction, knowledge management run by net technologies and computers with appropriate hardware and software equipment.
E-learning has, over recent years, become ever more popular (Kisanga & Ireson, 2016). With the progress of information and communication technology development, e-learning is emerging as the paradigm of modern education (Sun et al., 2008). Essentially, e-learning is another way of teaching and learning (Govindasamy, 2001). Therefore, the trend of using e-learning as a learning and/or teaching tool is now rapidly expanding into education (Demir & Yurdugül, 2014; Liaw, Huang ve Chan, 2007). But, the success of students in e-learning environments depends on many factors. Student characteristics are regarded as a critical success factor in e-learning in developing countries (Bhuasiri, et al., 2012). These characteristics include computer self-efficacy, internet self-efficacy, computer experience, internet experience, computer anxiety, and attitudes toward e-learning (Chiu & Wang, 2008; Chu & Chu, 2010; Fuller et al., 2006; Pituch & Lee, 2006; Shih, Munoz, & Sanchez, 2006; Sun et al., 2008).

Attitudes are held with respect to some aspect of the individual's world, such as another person, a physical object, a behavior, or a policy (Ajzen & Fishbein, 1977). It can be defined a negative or positive tendency and attitudes give direct the behavior of individuals (Ülgen, 1994). Attitudes toward e-learning implies that learners’ positive or negative feelings about their participation in e-learning activities (Al-Musawi, 2014). Understanding students’ attitudes towards e-learning can help determine the extent to which students utilize the e-learning system in campus and to direct online courses towards the aims of quality assurance in education (Ong & Lai, 2006). Also, it can be useful for predict learning outcomes (Pérez Cereijo, 2006). Student attitudes towards e-learning have been identified as critical to the success of e-learning (Zhang & Bhattacharyya, 2008). Also Student attitudes and beliefs towards e-learning and past e-learning experiences are regarded as success determinants of future e-learning initiatives (Rhema & Miliszewska, 2014).

**Self-Directed Learning**

Self-directed learning (SDL) has been an influential adult learning concept and extensively researched area within the field of adult education (Caffarella, 1993; Ellinger, 2004; Garrison, 1997; Oddi, 1987; Owen; 2002). 1970s was undoubtedly the period of SDL characterized as it was by a plethora of empirical studies and by the efforts of Knowles (1975) and Tough (1979) to popularize the concept (Brookfield, 1985). Knowles regarded SDL as one of the manifestations of andragogy and a vital element in his understanding of contract learning. Underlying the whole idea is the idea that the individual is an autonomous learner (Jarvis, 2004). Self-direction in adult learning has ben referred to “self-directed learning”, “self-planned learning,” “self-initiated learning”,”inquiry method,” “independent adult learning,” “self-education,” “self-instruction/ self-teaching,” “self-study,” and “autonomous learning.” (Knowles, 1975; Owen, 2002). SDL has been characterized as a multifaceted concept (Ellinger, 2004). According to Knowles (1975), in the most-cited definition of the process of SDL (Beavers, 2009; Guglielmino, 2013), “self-directed learning” describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes”. According to Gibbons (2002) SDL is any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about by his or her own efforts using any method in any circumstances at any time. As the term suggests, SDL views learners as responsible owners and managers of their own learning process (Abdullah, 2001). Despite the many different definitions of SDL in the literature, it is common for the individuals to take responsibility for their own learning, to plan learning, to carry out learning and to evaluate learning (Caffarella, 2000; Merriam & Caffarella, 1999).

SDL is promoted as one of the critical skills for 21st Century and the development of SDL skills are much emphasized (Guglielmino, 2008; 2013; Owen, 2002; Rees & Bary, 2006; Smedley, 2007; Timothy et al., 2010; Demir et al., 2014; Rashid & Asghar, 2016; Jaleel & Anuroufa, 2017). Engaging students in SDL develops in them the capacity for educational growth throughout their lives (Bolhuis, 2003). Self-directed learner
diagnoses his or her own learning needs and formulates his or her own learning goals. A self-directed learner plays an active role in his/her learning process, such as planning, monitoring and evaluating the learning process in face-to-face learning contexts (Lee et al., 2014). Students’ engagement in SDL depends on their successful experiences of undertaking challenging activities that leads to the development of personal knowledge and skills (Gibbons, 2002). If the self-directed learner is fully functioning, he or she would do this for instrumental, dialogic and SDL, which all are more or less involved in most situations (Mezirow, 1985).

The concept of SDL has been recognized and researched for decades; however, digital revolution has brought it to the forefront and its context has changed with the presence of technology in current learning avenues (Rashid & Asghar, 2016). Technology may have direct impact on SDL because it has greatly facilitated access both to information resources and to online expertise (Timothy et al., 2010). So, SDL is one of important concept and research subject in information age (Owen, 2002).

**Self-Directed Learning and E-Learning**

In today’s fast-paced world, students can access information anywhere and anytime (Jaleel & Anuroofa, 2017). Information technology provides an excellent opportunity for the development of educational methods and paves the way for more effective and less expensive advance methods of instruction (Al-Musawi, 2014). Also ICT provides the appropriate tools for students to manage their learning effectively (Timothy et al., 2010). But there are some features that learners should possess in order to use these opportunities that technology provides. Learning through self-direction can be refined and amplified with the use of technology. Technology can support lifelong, self-directed learning beyond the regular classroom (Jaleel & Anuroofa, 2017). SDL could provide a more direct route into understanding the actual dynamics of and relationships between learning and technologies (Candy, 2004).

E-learning is one of the most popular learning environments in the information age and e-learning environments can offer students self-directed learning opportunities. According to Liaw and Huang (2003), e-learning systems, possess four characteristics. First, e-learning offers a multimedia environment for learners. Second, e-learning system supports interactive communication whereby users have full control over their own learning situations. Third, e-learning supports networking for accessing and sharing information. Fourth, by implementing as a web-based application, e-learning provides a cross-platform environment, which allows e-learning systems to be executed independently on various computer operating systems. Given these characteristics of e-learning environments, learners are expected to have self-directed learning skills and learner can control his/her learning. E-learning requires more maturity and self-discipline from students than traditional classroom education (Zhang et al., 2004). Also SDL views learners as responsible owners and managers of their own learning process (Abdullah, 2001).

According to result of studies on SDL have indicated that the close relationship between SDL and the use of technologies in learning. Also a significant level of agreement about the influence current technology affordances could have on SDL in literature (Rashid & Asghar, 2016; Timothy et al., 2010). For example according Vonderwell and Turner (2005), online learning environment provides more control of the instruction to the learners and thereby could enhance aspects of SDL, in areas such as students taking responsibility and initiative towards their learning. Similarly, Song and Hill (2007) reported that in an online environment, self-directed learners demonstrate control, critical reflection and responsibility. When the characteristics of e-learning environments and related research results are examined, it is thought that there is a possible relationship between e-learning and SDL. This relationship can make significant contributions to the design and implementation of e-learning. In addition, there is no study investigating the relationship between e-learning and SDL in the literature.
The Purpose Of The Research

The purpose of this study is to investigate the relationships between attitudes towards e-learning and self-directed learning with technology of secondary school students. Within this context, answers to the questions below are sought:

1. What is the level of secondary school students’ attitudes towards e-learning and self-directed learning with technology?

2.1. Is there a significant difference in secondary school students’ attitudes towards e-learning and self-directed learning with technology in terms of gender?

2.2. Is there a significant difference in secondary school students’ attitudes towards e-learning and self-directed learning with technology in terms of purpose of internet use?

2.3. Is there a significant difference in secondary school students’ attitudes towards e-learning and self-directed learning with technology in terms of students’ daily internet use time?

2.4. Is there a significant difference in secondary school students’ attitudes towards e-learning and self-directed learning with technology in terms of frequency of computer and internet use during school lessons?

3. Do self-directed learning with technology of secondary school students predict the attitudes towards e-learning?

Method

The Research Design

This descriptive study is designed with correlational research methods. Correlational models are models in which relationships between two or more variables are examined without any effect on variables (Fraenkel, Wallen, & Hyun, 2015).

Sample

The sample of this study is consist of 313 students from 5 different secondary schools in Malatya in Turkey. One of these schools private school, others public schools. 155 of the students (49 %) were female and 158 (51%) were male.

Measures

Data is collected through a questionnaire form including demographic information related to participants, self-directed learning with technology scale for young students and attitude scale towards e-learning.

Self-directed learning with technology scale for young students: Self-directed learning with technology for young students scale which was developed by Teo, Tan, Lee, Chai and Koh (2010), adapted to Turkish Demir and Yurdugüll (2013) was prepared five likert type, consist of 6 items and 2 factors which were named self-management and intentional learning. Study group of the validity and reliability research consisted of 1051 primary and secondary school students. According to Demir and Yurdugüll (2013), the scale, in total, explained 59,316% of the variance of self-directed learning construct. Self-management factor accounts for 16,758% of the variance and intentional learning accounts for 42,874% of the variance. Factor loads of items in the scale were found to vary between .852 and .642. The values of goodness of fit indices($\chi^2$/sd=9.49, RMSEA=.90, CFI=.95) were sufficient to proceed. Cronbach alpha internal consistency coefficient of the scale was calculated to be .729, reliability of the self-management and intentional learning factors were calculated to be .528 and .729 respectively. Also cronbach’s alpha alpha internal consistency coefficient is calculated .624 for whole scale in this study.
Attitude scale towards e-learning: Attitude scale towards e-learning which was developed by Haznedar and Baran (2012) was prepared five likert type. Study group of the validity and reliability research consisted of 567 university students. According to Haznedar and Baran (2012), factors analysis which was conducted for 20 item, displayed that this attitude scale can be used both with single factor and two factors. Single factor of the general attitude towards e-learning scale explained 45.12% of the total variance. Two factors scale explained 52.23% of the total variance. Cronbach’s Alpha internal consistency coefficient is 0.93 for single factor scale. Single factor version of the scale is used and cronbach’s alpha internal consistency coefficient for the scale is calculated .902 in this study.

Data Collection

A questionnaire including demographic information form related to participants and scales are applied to 400 students by researchers in 2015- 2016 academic year. 366 questionnaires of 400 questionnaires were answered by the students.

Data Analysis

The collected data is transferred to the computer after checking and making necessary arrangements. Since the internet is important for e-learning, 53 participants who do not use the internet are excluded from the analysis. Therefore, 313 questionnaire forms are included in the analysis. Using parametric statistical tests in analysis of research is a desirable situation in terms of generalizability and reliabilty of results (Can, 2013). But some preconditions (normal distribution, linearity, etc) must be met in order to use parametric statistical tests. For this reason, the data is organized by checking descriptive statistics such as standard deviation, mean, mode, median, skewness, kurtosis and z scores to ensure normality of the data obtained in the study (Can, 2013). In this procedure performed for the data, -3, +3 interval is taken as the criterion for z value. Central tendency values (mean, mode, median) calculated for scales and it is seen the values are close to each other. Also skewness and kurtosis values are in the range of -1 +1. Normal distribution of the data is observed according to these criterations.

Descriptive statistic such as mean, percentage is used to determine demographic features of the students and students’ level of attitude towards e-learning and self-directed learning with technology. independent sample t-test is used to determine whether students’ attitude towards e-learning and self directed learning with technology differ in terms of gender and purpose of using internet. One-way analysis of variance (ANOVA) is used to determine whether students’ attitude towards e-learning and self-directed learning with technology differ in terms of students’ daily internet use time, frequency of computer and internet use during school lessons. Scheffe test is used to determine differences between groups. Linear regression analysis is used to determine whether students’ self-directed learning with technology predict students’ attitude towards e-learning significantly.

Findings

In this section, level of students’ attitude towards e-learning and self-directed learning with technology is determined. Also students’ attitude towards e-learning and self-directed learning with technology are compared separately in terms of gender, purpose of internet use, daily internet use time, frequency of computer and internet use during school lessons. It is determined whether students’ self-directed learning with technology predict students’ attitude towards e-learning significantly.

Level of Students’ Attitude towards E-Learning and Self-Directed Learning with Technology

Table 1 indicates the means and standard deviations related to level of students’ attitude towards e-learning and self-directed learning with technology.
Table 1. Descriptives statistic related to students’ attitude towards e-learning and self-directed learning with technology

<table>
<thead>
<tr>
<th>Scales</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward e-learning</td>
<td>313</td>
<td>3.25</td>
<td>0.79</td>
</tr>
<tr>
<td>Self-Directed Learning with Technology</td>
<td>313</td>
<td>3.27</td>
<td>0.79</td>
</tr>
<tr>
<td>Self Management</td>
<td>313</td>
<td>3.60</td>
<td>0.75</td>
</tr>
<tr>
<td>Intentional Learning</td>
<td>313</td>
<td>2.61</td>
<td>0.95</td>
</tr>
</tbody>
</table>

The mean of students related to attitude towards e-learning is 3.25; the mean related to self management is 3.60; and the mean related to intentional learning is 2.61; the mean related to the whole of the self-directed learning with technology is 3.27.

Students’ Attitude towards E-Learning and Self-Directed Learning with Technology in terms of Gender

Independent sample t-test is used to determine whether the students’ attitude towards e-learning and self-directed learning with technology differ in terms of gender. The results of independent sample t-test are indicated in table 2.

Table 2. t test result related to students’ attitude towards e-learning and self-directed learning with technology in terms of gender

<table>
<thead>
<tr>
<th>Variables</th>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward e-learning</td>
<td>Female</td>
<td>155</td>
<td>3.26</td>
<td>0.79</td>
<td>1.420</td>
<td>.177</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>158</td>
<td>3.24</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Directed Learning with Technology</td>
<td>Female</td>
<td>155</td>
<td>3.28</td>
<td>0.79</td>
<td>1.473</td>
<td>.132</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>158</td>
<td>3.26</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.05

As seen in table 2, It is seen that students’ attitude towards e-learning (p>.05, t=1.420) and self-directed learning with technology (p>.05, t=1.473 ) do not differ in terms of gender.

Students’ Attitude towards E-Learning and Self-Directed Learning with Technology in terms of Purpose of Internet Use

Independent sample t-test is used to determine whether students’ attitude towards e-learning and self-directed learning with technology differ in terms of purpose of internet use. The results of independent sample t-test are indicated in table 3.

Table 3. t test results related to students’ attitude towards e-learning and self-directed learning with technology in terms of purpose of internet use

<table>
<thead>
<tr>
<th>Variables</th>
<th>Purpose of internet use</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward e-learning</td>
<td>Educational</td>
<td>142</td>
<td>3.27</td>
<td>0.68</td>
<td>1.246</td>
<td>.136</td>
</tr>
<tr>
<td></td>
<td>Non educational</td>
<td>171</td>
<td>3.24</td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Directed Learning with Technology</td>
<td>Educational</td>
<td>142</td>
<td>3.29</td>
<td>0.69</td>
<td>1.543</td>
<td>.121</td>
</tr>
<tr>
<td></td>
<td>Non educational</td>
<td>171</td>
<td>3.26</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.05

It is seen that students’ attitude towards e-learning (p>.05, t=1.246) and self-directed learning with technology (p>.05, t=1.543 ) do not differ in terms of purpose of internet use.

Students’ Attitude towards E-Learning and Self-Directed Learning with Technology in terms of Internet Use Time

One-way ANOVA is used to compare whether the students’ attitude towards e-learning and self-directed learning with technology differentiate in terms of students’ daily internet use time and the results are indicated in table 4, table 5.
Table 4. One way ANOVA results related to students’ attitude towards e-learning in terms of daily internet use time.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>Differential Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward e-learning</td>
<td>Between</td>
<td>5.350</td>
<td>2</td>
<td>2.675</td>
<td>5.188</td>
<td>0.06*</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>159.863</td>
<td>310</td>
<td>0.516</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>165.214</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.05

It is seen that it is found statistically significant differences students’ attitude towards e-learning in terms of students’ daily internet use time (F= 5.188; p<.05). Scheffe test is used to determine differences between groups. According to Scheffe test results, attitude towards e-learning of students who use internet higher than 4 hour in a day (M=3.52), are higher than students who use internet lower than 1 hour in a day (M=3.13).

Table 5. One way ANOVA results related to students’ self-directed learning with technology in terms of daily internet use time.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>Differential Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self directed learning with technology</td>
<td>Between</td>
<td>4.321</td>
<td>2</td>
<td>2.160</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>162.755</td>
<td>310</td>
<td>0.528</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>167.076</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.05

It is seen that it is found statistically significant differences students’ self-directed learning with technology in terms of students’ daily internet use time (F= 4.089; p<.05). Scheffe test is used to determine differences between groups. According to Scheffe test results, self-directed learning with technology of students who use internet higher than 4 hour in a day (M=3.48) are higher than students who use internet lower than 1 hour in a day (M=3.15).

Students’ Attitude towards E-Learning and Self-Directed Learning with Technology in terms of Frequency of Internet/Computer Use During School Lessons

One-way ANOVA is used to compare whether the students’ attitude towards e-learning and self-directed learning with technology differ in terms of frequency of internet/computer use during school lessons. The results are indicated in Table 6 and Table 7.

Table 6. One way ANOVA results related to students’ attitude towards e-learning in terms of frequency of internet/computer use during school lessons.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>Differential Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward e-learning</td>
<td>Between</td>
<td>8.158</td>
<td>4</td>
<td>2.040</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>157.056</td>
<td>308</td>
<td>0.510</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>165.214</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.05

It is seen that it is found statistically significant differences in students’ attitude towards e-learning in terms of frequency of internet/computer use during school lessons (F= 4.000; p<.05). Scheffe test is used to determine differences between groups. According to Scheffe test results, attitude towards e-learning of
students who usually use internet/computer during school lessons (M=3.57) are higher than students who rarely use computer/internet during school lessons (M=3.05).

**Table 7.** One way ANOVA results related to students’ self-directed learning with technology in terms of frequency of internet/computer use during school lessons.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sum of square</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>Differential Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self directed learning</td>
<td>6.278</td>
<td>4</td>
<td>1.570</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td></td>
<td></td>
<td></td>
<td>2.987</td>
<td>0.19*</td>
<td>4-2</td>
</tr>
<tr>
<td>Within groups</td>
<td>160.798</td>
<td>308</td>
<td>0.525</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>167.076</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is seen that it is found statistically significant differences students’ self-directed learning with technology in terms of frequency of internet/computer use during school lessons. (F= 2.987; p<.05). Scheffe test is used to determine differences between groups. According to Scheffe test results, self-directed learning with technology of students who usually use internet/computer during school lessons (M=3.58) are higher than students who rarely use internet/computer during school lessons (M=3.16).

The Relationship between Attitude towards E-Learning and Self-Directed Learning with Technology

Firstly, correlation coefficients are calculated through Pearson Product Moment analysis to determine the relationship between self-directed learning with technology and attitudes towards e-learning. The scattering diagram is examined to determine whether this relationship is linear and it is observed that there is a positive linear relationship. Then linear regression analysis is performed to determine the relationship between the attitude towards e-learning and self directed learning with technology of secondary school student. The results of linear regression analysis are indicated in table 8.

**Table 8.** Linear regression analysis results related to students’ attitude towards e-learning and self-directed learning with technology

<table>
<thead>
<tr>
<th>Predictive Variables</th>
<th>R</th>
<th>R²</th>
<th>F</th>
<th>F Change</th>
<th>B</th>
<th>Standart Error</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>.284</td>
<td>.108</td>
<td>37.231</td>
<td>.000</td>
<td>.328</td>
<td>.053</td>
<td>.328</td>
<td>2.957</td>
<td>.003</td>
</tr>
<tr>
<td>Self-directed with technology</td>
<td>.328</td>
<td>.108</td>
<td>37.231</td>
<td>.000</td>
<td>.328</td>
<td>.053</td>
<td>.328</td>
<td>2.957</td>
<td>.003</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

It is seen that linear regression analysis results show the students’ self-directed learning with technology predicts students’ attitude towards e-learning significantly (R=0.328, R²=0.108, F(1,309) = 37,231; p<.05). Nearly %11 of the variance of students’ attitude towards e-learning can be explained by students’ self-directed learning with technology.

Results and Discussion

According to the results of current study, levels of students’ self-directed learning with technology and attitude towards e-learning is slightly higher. Students’ self-directed learning with technology and students’ attitude towards e-learning do not differ in terms of gender. Also students’ self-directed learning with technology and attitude towards e-learning do not differ in terms of purpose of internet use whether it is used for educational purpose or not. But it is found statistically significant differences in students’ self-directed learning with technology and attitude towards e-learning in terms of students’ daily internet use time. Self-directed learning with technology of students who use internet higher than 4 hour in a day are higher than students who use internet lower than 1 hour in a day. Also attitude towards e-learning of students who use
internet higher than 4 hour in a day are higher than students who use internet lower than 1 hour in a day. It is found statistically significant differences in students’ self-directed learning with technology and attitude towards e-learning in terms of frequency of internet/computer use during school lessons. Self-directed learning with technology of students who usually use internet/computer during school lessons are higher than students who rarely use internet/computer during school lessons. Also attitude towards e-learning of students who “usually” use internet/computer during school lessons are higher than students who “rarely” use internet/computer during school lessons. According to the regression analysis results, the students’ self-directed learning with technology predict students’ attitude towards e-learning significantly. Nearly %11 of the variance of students’ attitude towards e-learning can be explained by students’ self-directed learning with technology.

It is seen that results of current study consistent with results of other studies. According to Lee et al (2014) and Demir et al (2014) students’ self-directed learning with technology is slightly higher. Also according to Paris (2004) and Kandil İnce (2015) students’ attitudes toward e-learning is higher. Therefore today, ICT is an important part of daily life (Almarabeh et al, 2016), it is expected that students have higher self directed learning with technology and higher attitude toward e-learning. However, levels of students’ attitude towards e-learning and self-directed learning with technology are not at the desired level. This may be due to students’ experiences with e-learning and self-directed learning with technology. Students may have limited or negative experience with e-learning. Students may also have limited opportunities and experiences in relation to self-directed learning with technology. Students should benefit from ICT-based learning opportunities such as e-learning, online learning, mobile learning etc by increasing level of students’ self-directed learning with technology and attitude towards e-learning.

When the results of this study are evaluated in terms of gender, it is seen that similar and different results have been obtained in some other studies. According to Demir et al (2014), Jaleel and Anuroofa (2017) there is no significant difference in students’ self-directed learning with technology in terms of gender. It is thought that because technology is used by everyone as a source of information without gender differences and self-directed learning with technology is a general personal characteristic, students’ self-directed learning with technology do not differ in terms of gender. When the attitudes towards e-learning are investigated in terms of gender, it is possible to encounter different results. For example according to Kandil İnc (2015), Suri and Sharma (2013) and Paris (2004) found no gender differences in relation to the attitudes towards e-learning. But some studies revealed that male students have more positive attitudes towards e-learning than female students (Liaw & Huang, 2011; Papaioannou & Charalambous, 2011). The reason for this differentiation in the results of researches may be due to the differences in the samples. Also students’ experiences related to e-learning in different research samples may vary. These differences in students’ experiences related to e-learning may have affected students’ attitudes toward e-learning.

One of interesting result of this study is that students’ self-directed learning with technology and attitude towards e-learning do not differ in terms of purpose of internet use whether it is used for educational purpose or not. It maybe excepted that students’ self-directed learning with technology do not differ in terms of purpose of internet use. But it is expected students’ attitude towards e-learning differ in terms of purpose of internet use. Because e-learning is an approach based on the use of internet computer for educational purposes (Sun et al., 2008; Welsh et al., 2003). Therefore it is expected students who use the internet for educational purposes more often may have higher attitudes towards e-learning. But internet is used by people to do a very different task such as, social media, banking, research, news, game etc (Almarabeh et al., 2016) and learning is just one of these tasks of internet. It is thought that since the educational use of the internet is not seen as a necessity, such a result has emerged in this research.
When the results of this study are evaluated in terms of internet use time and frequency of computer/internet during school lessons it is seen that there are results of some studies consistent with these results. According to Lee et al (2014), students’ use of technology for learning is important factor for their learning with technology. Also according to Rashid and Asghar (2016) use of technology has a direct positive relationship with students’ engagement and self directed learning. There are consistent research results in relation to the attitude towards e-learning. For example according to study of Kandil İneç (2015), experience in the use of computers, frequency of using internet are important for students’ attitude towards e-learning. Also according to Paris (2004) there is positive correlation between internet use and e-learning attitudes of students. The results of the some indirect studies are found to be consistent with the results of the present study. According to Brandström (2011), internet is a valuable teaching tool which can increase the motivation of the students, make teaching more enjoyable, and allow variation in teaching. According to Agyei and Voogt (2011) accessibility of technology tends to affect student attitudes and correlates positively with the level of technology use. According to Rhema and Miliszewska (2014) student levels of access to technologies represent an initial factor that would shape their attitudes towards e-learning. Accessibility of technology is indirect but it is first step to use technology. It is the infrastructure step of using ICT. ICT infrastructure adequacy allows students to use more ICT both in their daily life and in learning. As a result of this situation, it is thought that levels of students’ self directed learning with technology and attitudes towards e-learning will increase.

When the results of this study are evaluated in terms of relationship between self-directed learning with technology and attitude towards e-learning, it is said that expected results can be obtained. Because e-learning requires taking responsibility of the individual in learning (Zhang et al., 2004). Also self directed learning refers to the ability to take responsibility in learning (Abdullah, 2001). So the main purpose of current study is to determine the probable relationship between students’ self-directed learning with technology and attitude towards e-learning. Also results of the current research indicate that students’ self-directed learning with technology predict students’ attitude towards e-learning significantly. Also there are results of some indirect studies consistent with this result of current study. According to Demir et al (2014) there is high level positive correlation between students’ self directed learning with technology and attitude toward computer. E-learning is one of computer and network technology based learning system (Gunasekaran et al, 2002; Paris, 2004; Welsh et al., 2003). So it is thought that this indirect results consistent with the result of the current study. Also some other studies indicated that there is positive relationship between SDL and technology use in learning (Hill, 2007; Vonderwell and Turner, 2005). Technology use in learning may be effective at increasing student self-directed learning or achievement but only through proper instruction and demonstration (Bartholomew, 2016). This result obtained from the current study confirms that SDL is skill or characteristic associated with technology or ICT. Also self-directed learning with technology is important for e-learning and it might be associated with other ICT based learning such as on-line learning, mobile learning etc.

**Conclusion**

Consequently, current study indicate that gender and purpose of internet use are not important factor for students’ self-directed learning with technology and attitude towards e-learning. But frequency of internet use or time both in school lessons and out of school are important factors for students’ self-directed learning with technology and attitude towards e-learning. Also students’ self-directed learning with technology is one of important predictors of students’ attitude towards e-learning. To increase students attitudes towards e-learning, one of the most popular learning of 21. century, levels of students’ self-directed learning with technology should be increased.

In light of the results of the study, the following recommendations can be made:
- When designing e-learning applications, levels of students’ self-directed learning with technology should be taken into account by practitioners.
• To increase levels of students’ self-directed learning with technology, internet/ICT use time should be increased both at school and outside the school. But it should be ensured that students use the internet/ICT in a conscious and purposeful way. To do this schools and families should cooperate.

• The necessary infrastructure (mobile devices, network, wi-fi) should be established to increase the internet/ICT use of students by schools and parents.

**Limitations and Further Study**

Although the results of current study are conclusive, this study is not without its limitations. Sample size is limited to get more generalizing results. Since it is a correlational and quantitative research, it contains only descriptive data related to students attitude towards e-learning and self-directed learning with technology. For future research, similar research could be conducted with a larger samples. Experimental studies related to students’ attitudes towards e-learning and self-directed learning with technology and studies related to relationship between student achievement in e-learning and students’ self-directed learning with technology could be conducted. Researches can be conducted to determine relationship between students’ self-directed learning with technology and other ICT based learning such as on-line learning, mobile learning etc.
Giriş

Bu araştırmanın amacı ortaokul öğrencilerinin teknolojiyle kendi kendine öğrenmeleri ile e-öğrenmeye yönelik tutumları arasındaki ilişkiyi incelemektir. Bu kapsamda şu sorulara cevap aranacaktır:

1. Ortaokul öğrencilerinin e-öğrenmeye yönelik tutumları ve teknolojiyle kendi kendine öğrenmeleri ne düzeydedir?

2. Ortaokul öğrencilerinin e-öğrenmeye yönelik tutumları ve teknolojiyle kendi kendine öğrenmeleri cinsiyetlere göre farklılaşmakta mıdır?

3. Ortaokul öğrencilerinin e-öğrenmeye yönelik tutumları ve teknolojiyle kendi kendine öğrenmeleri interneti kullanım amaçlarına göre farklılaşmakta mıdır?

4. Ortaokul öğrencilerinin e-öğrenmeye yönelik tutumları ve teknolojiyle kendi kendine öğrenmeleri okul derslerinde internet/bilgisayar kullanım sürelerine göre farklılaşmakta mıdır?

5. Ortaokul öğrencilerinin teknolojiyle kendi kendine öğrenmeleri, e-öğrenmeye yönelik tutumlarını yordamakta mıdır?

Yöntem

Araştırma ilişkisel araştırma modelinde tasarlanmıştır. Araştırma örneklem grubunu Malatya ilindeki beş farklı ortaokulda okuyan 313 öğrenci oluşturulmuştur. Öğrencilerin 155'i (49 %) bayan, 158'i (51 %) erkek.

Bulgular


Sonuçlar ve Tartışma


Öneriler


Sınırlılıklar ve Araştırma Önerileri

REFERENCES


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