International Journal of Human Sciences
ISSN:1303-5134

Volume: 10 Issue: 1 Year: 2013

An investigation of educational technology standarts of physical education candidate teachers in terms of several variables[1]

Erkan Faruk Şirin[2]
Savaş Duman[3]

Abstract

The present study was designed to evaluate physical education candidate teachers' self-efficacy beliefs of technology usage in line with the views of physical education candidate teachers in terms of NETS*T standards and to find out whether their self-efficacy beliefs differentiate in terms of gender, time spent using computer, computer usage level, time spent using the internet and their type of using the internet. This study aims at revealing the overall state of pre-service physical education teachers in terms of educational technology standards. The survey method was applied in this study to collect the research data. The scale developed by Çoklar (2008) taking into consideration the sub-factors of NETS-T standards was used as the data gathering tool. 332 (male=203; female=129) final year undergraduate students studying at physical education department at 9 different universities participated in the study. One-way analysis of variance, one-sample independent t test and frequency, percentage from descriptive statistics were used in the analyses of the study and level of significance was set at 0.05. It was found that teacher candidates participated in the study had a high level of self-efficacy regarding educational technology standards. It was determined that there was not a significant difference between the time spent using computers, the time spent using the internet and sub-level self-efficacy beliefs of educational technology standards but there was a significant difference between level of using computer, type of using the internet and sub-level self-efficacy beliefs of educational technology standards.

Keywords: Educational technology; physical education; physical education candidate teachers

[1] This study was presented at International Scientific Conference Physical Activity For Everyone, 10-11 December 2010, Belgrad-Serbia and published in book of Conference Proccedings.

[2] Asst. Prof., Selcuk University, School of Physical Education and Sports, Turkey erkanfaruk@yahoo.com

[3] Asst. Prof., Mugla Sıtkı Koçman University, School of Physical Education and Sports, Turkey savasduman@mu.edu.tr

Şirin, E. F., Duman, S. (2013). An investigation of educational technology standarts of physical education candidate teachers in terms of several variables. *International Journal of Human Sciences*, *10*(1), 1298-1313.

Introduction

"When the education processes are taken into account, educational technologies need to be used widely and in all processes of education. For this purpose, the question "What does the use of educational technologies include and how should it be?" may help the issue of the use of educational technology. As an answer to this question, National Educational Technology Standards-NETS which were first recognized in the United States and widely adopted in countries worldwide could be accepted as guidance on the use of educational technologies for teachers, students and administrators who are the components of educational process" (Çoklar and Odabaşı 2009a). In the US, a program called "Preparing Tomorrow's Teachers to Use Technology-PT3" was started to provide benefit from educational technologies (Stuve and Cassady, 2005). Although this program contributed to increase the use of educational technologies by teachers, it was seen that not all teachers made enough use of educational technologies; therefore National Educational Technology Standards for Teachers- NETS*T were developed to enable teachers to use educational technologies more efficiently (NETS, 2006). NETS was not only limited to the efficacies of using educational technology that teachers should have. Regarding the issues of using and planning educational technologies for students in 1998 (NETS-S), teachers in 2000 (NETS-T) and administrators in 2001 (NETS-A), standards that these three groups should have were determined and they were all integrated into NETS - National Educational Technology Standards (NETS, 2006).

All steps of educational process were taken into account in the course of developing the standards and what teachers should do in a wide area including educational planning, assessment and evaluation, professional development etc. was determined. Although being developed on a national scale, many countries like Australia, China and England developed their own standards for the use of educational technologies using NETS*T standards (UNESCO, 2002). In the course of defining NETS-T standards, it is seen that the efficacies that teachers should have fall into 6 categories taking into account the leadership role of the teacher as a guide rather than a person giving a lesson (NETS, 2006; Stuve and Cassady, 2005). However, there is an index with a total of 23 items within these 6 categories which compose NETS-T. 6 categories come to the forefront as the related items in this index are put together (NETS, 2006). These categories of NETS are shown in Table 1.

Table1. NETS-T standards and sub-scales (*)

I.	Technology Operations and Concepts
II.	Planning and Designing Learning Environments and Experiences
III.	Teaching, Learning, and the Curriculum
IV.	Assessment and Evaluation
V.	Productivity and Professional Practice
VI.	Social, Ethical, Legal, and Human Issues

*Visit http://cnets.iste.org/Teachers/pdf/page09.pdf to see all NETS*T standards

When Table 1 is examined in general, it might be thought that educational technology standards focus only on the use of technology. However, when the titles and sub-scales of 6 categories are examined, it is seen that all processes from teaching methods and techniques found in the definition of education technology to assessment and evaluation are dealt with. Developments in educational technologies have caused remarkable changes in physical education and sport sciences. Physical education is a critical component of schooling. The physical education teacher has important roles as a planner, manager, colleague, professional physical educator, counselor, and representative of the school (Siedentop et al., 1984).

The use of information and communication technologies with the purpose of education and research in physical education and sport sciences has increasingly stepped up. Furthermore, it has been inevitable for coach, physical education teacher and sport administrator candidates attending these departments to use information and communication technologies; and they have become an indispensable part of physical education curriculum and instructions (Mayer et al., 2003; Koçak, 2003; Liang et al., 2006; Papastergiou, 2010). Examples of using technology to enhance and improve physical education are everywhere:

- Physical education teachers should be able to use office automation software in preparing lesson plans and performance tasks, building parent files and transferring audio-visual materials (power point, video etc.) to students (FitzPatrick, 2004; Antoniou et al., 2003; Kirkwood et al., 2002; Wiksten et al., 2002; Green, 2002; Ladda et al., 2004; Silverman, 1997).

- They should be able to make use of computer and internet effectively in preparing materials for physical education lessons, in professional/academic development and communicating with parents and students (Erwin and Valley, 2005; Pennington et al., 2004).

- They should be able to use hardware and software for video analysis and computer-aided devices to monitor the performance, ability and exercise models of students (Fay and Doolittle, 2002; Liang et al., 2006; Thomas and Stratton, 2006; Nigg, 2003; Mohnsen, 2001; Wood and Lynn, 2000).

- Physical education teachers should be able to use multimedia educational software/hardware to teach various sport branches (Vernadakis et al., 2002) and the internet to involve students in PE- and sport-related activities that range from mere information searches to inquiry-based activities (Woods et al., 2004); they are supposed to use office automation software for professional productivity and development and the internet for the defense of their programs and cooperation with their colleagues (Finkenberg, 1997; Shiffett et al. 2001).

- Moreover, physical education teacher candidates are supposed to use educational technologies in preparation of their assignments through office automation, in data analysis through statistical packages, in communication with their friends and teaching staff through e-mail, in reaching information through search engines, in participating in part-time or full-time online programs through electronic learning platforms and making research for their bibliography through online bibliographic databases (Worrell et al., 2002; Finkenberg, 1997; Green, 1999; Shiffett et al., 2001). In researches carried out in recent years to determine teacher technology efficacies, the skills to use technology for educational purposes have been found to be more important compared to the skills to use software and hardware programs. Therefore, technology skills of teachers should be dealt with multi-dimensionally and the question "What should teachers know about technology use?" needs to be answered on the basis of different knowledge and experiences that effective teachers have. Besides, in terms of determined educational technology standards, the education which physical education teacher candidates receive during pre-service period is of great importance. So, some research is needed for teacher candidates when the research into this field is examined. Based on the views of physical education teacher candidates, this study was designed to evaluate the self-efficacy for technology use in education in terms of NETS*T (National Educational Technology Standards for Teachers) which was widely accepted by many countries and, to determine whether the self-efficacies differentiate on the basis of gender, computer use time, computer use level, internet use time and internet use pattern.

Methods

This study used survey method and the self-efficacy of physical education teacher candidates which was dealt with within the scope of educational technology standards was examined based on different variables. 332 (n_{male}=203; n_{female}=129) students participated in the study and these were senior class teacher candidates attending the department of physical education at 9 different universities during 2009-2010 education year in Turkey . The present study which aimed to determine the self-efficacies of teacher candidates in terms of educational technology standards

was applied to senior class teacher candidates as the related efficacies are built during university education. The analysis was made using the data from 332 teacher candidates who made up sample of the study.

Table 2. Demographic background of the participants

		Frequency	**Percentage(%)**
Gender	Male	203	61.1
	Female	129	38.9
University	Ahi Evran University	38	11.4
	Aksaray University	20	6.1
	Gazi University	31	9.3
	Karadeniz Technical University	37	11.1
	Karamanoğlu Mehmetbey University	32	9.6
	Kırıkkale University	28	8.5
	Niğde University	41	12.3
	Selçuk University	40	12.1
	Ondokuz Mayıs University	65	19.6
Daily Computer Use Time	less than 1 hours	138	41.6
	1-2 hours	101	30.4
	2-3 hours	64	19.3
	3-4 hours	29	8.7
Computer Use Time	beginner	35	10.5
	moderate	252	75.9
	expert	45	13.6
Daily Internet Use Time	less than 1 hours	137	41.3
	1-2 hours	108	32.5
	2-3 hours	60	18.1
	3-4 hours	27	8.1
Firstly internet use pattern	research / information	108	32.5
	communication	140	42.2
	fun / relaxation	84	25.3

In this research, six factors were determined on the scale that is developed by Coklar and Odabasi (2009b) using NETS-T standarts. These factors are "Technology Operations and Concepts (NETS I) ", "Planning and Designing the Learning Environments and Experiences (NETS II)","Assessment and Evaluation (NETS IV)", "Productivity and Professional Practices (NETS V)", "Social, Ethical, Legal and Human Issues (NETS VI)", " Planning Education Considering Individual Differences and Special Needs".In this scale, there are 5 NETS-T standarts out of 6 but it does not include number three standart named "Teaching, Learning, and the Curriculum (NETS III)". However, a new factor was determined under the title of " Planning Education Considering Individual Differences and Special Needs".Process analysis results of reliability and validity reveal that the factors and items are feasible. According to the results, after the analysis, arithmetic averages of the remaining items are between 3.33 and 4.12 and thier

standart deviations are between 0.825 and 1.029. Also total item correlation values vary between 0.443 and 0.710. Cronbach Alpha coefficient of internal consistence of the scale was found as 0.957. It has been commented considering the arithmetic mean while evaluating the answers given by attendants to items in the scale related to educational technology standarts and its each lower dimension and in the process of gender and overall situation assessment. In the grading process of obtained mean scores, in accordance with the five rating scale that is used in data collection tools, it has been used as a base: "1.00 -1.80 Strongly Disagree", "1.81-2.60 Disagree" , "2.61-3.40 Undecided, "3.41-4.20 Agree", "4.21-5.00 Strongly Agree". On the other hand, it has been commented according to the midpoint during the process of data interpretation. In other words, it has been commented that if it is less than 3, a preservice teacher has a low self-efficacy, if it is 3, they have moderate self-efficacy and if it is more than 3, a preservice teacher has high self-efficacy.

For secondary goals, one-sample independent t-test was used to test whether there were any differences based on gender between the self-efficacies of teacher candidates regarding educational technology standards. Based on daily average computer use time, computer use level, daily average internet use time and internet use pattern, one-way analysis of variance was used to test whether there were any differences between the self-efficacies of teacher candidates regarding educational technology standards. The significance level was set at .05 in all analyses.

Results

Findings of the study were presented under this title. Firstly, mean values and standard deviations of the self-efficacy scores that were recorded in the sub-dimensions of educational technologies standards scale were presented in Table 3.

Table 3. Views of physical education teacher candidates on their self-efficacies related to Educational Technology Standards Scale sub-scales

Sub-scales	**N**	$\overline{X}$	**sd**
Technology Operations and Concepts(NETS I) İ	332	3.77	.75
Planning and Designing Learning Environments and Experiences (NETS II)	332	3.93	.72
Planning Education Considering Individual Differences and Special Needs (NETS III)	332	3.85	.81
Assessment and Evaluation (NETS IV)	332	3.81	.71
Productivity and Professional Practice (NETS V)	332	4.02	.75
Social, Ethical, Legal, and Human Issues (NETS VI)	332	3.62	.77

When the self-efficacy scores obtained from educational technology standards scale for physical education teacher candidates were examined in terms of their sub-scales, teacher candidates had the highest mean with $\overline{X}$ =4.02 on the sub-scales of productivity and professional practice and the lowest mean with $\overline{X}$ =3.62 on social, ethical, legal, and human issues. On the other

Şirin, E. F., Duman, S. (2013). An investigation of educational technology standarts of physical education candidate teachers in terms of several variables. *International Journal of Human Sciences*, *10*(1), 1298-1313.

hand, teacher candidates had a high level of educational technology standards in all sub-scales including social, ethical, legal, and human issues which had the lowest mean values.

Table 4. T test results of physical education teachers regarding educational technology standards and gender

Sub-scales	**Male**		**Female**		**t**	**p**
	$\overline{X}$	**ss**	$\overline{X}$	**ss**		
Technology Operations and Concepts (NETS I)	203	3.77	129	3.76	.178	0.859
Planning and Designing Learning Environments and Experiences (NETS II)	203	3.90	129	3.98	-1.016	0.311
Planning Education Considering Individual Differences and Special Needs (NETS III)	203	3.86	129	3.84	.194	0.847
Assessment and Evaluation (NETS IV)	203	3.80	129	3.83	-.451	0.652
Productivity and Professional Practice (NETS V)	203	3.96	129	4.11	-1.739	0.083
Social, Ethical, Legal, and Human Issues (NETS VI)	203	3.64	129	3.60	.471	0.638

*p<.05

As can be seen from Table 4, candidates' level of educational technology standards didn't show a significant difference based on gender in all sub-scales.

Table 5. The results of analysis of variance regarding the students' educational technology standards and the daily computer use time (*p<.05)

Sub-scales	**less than**	**N**	$\overline{X}$	**s.d.**	**Groups**	**Sum of Squares**	**df**	**Mean Square**	**F**	**p**
NETS I	1 hour	138	3.73	.82	Between Groups	.694	3	.231	.400	.753
	1-2 hours	101	3.75	.64	Within Groups	189.346	328	.577		
	3-4 hours	64	3.83	.76	Total	190.040	331			
	4-6 hours	29	3.86	.82						
NETS II	1 hour	138	3.92	.72	Between Groups	.442	3	.147	.278	.841
	1-2 hours	101	3.90	.68	Within Groups	174.006	328	.531		
	3-4 hours	64	3.94	.79	Total	174.448	331			
	4-6 hours	29	4.04	.74						
NETS III	1 hour	138	3.78	.84	Between Groups	1.995	3	.665	.999	.393
	1-2 hours	101	3.92	.62	Within Groups	218.351	328	.666		
	3-4 hours	64	3.82	.91	Total	220.346	331			
	4-6 hours	29	4.02	.99						
NETS IV	1 hour	138	3.78	.74	Between Groups	1.009	3	.336	.656	.580
	1-2 hours	101	3.82	.59	Within Groups	168.278	328	.513		
	3-4 hours	64	3.80	.78	Total	169.287	331			
	4-6 hours	29	3.98	.82						
NETS V	1 hour	138	3.98	.76	Between Groups	1.366	3	.455	.802	.494
	1-2 hours	101	4.01	.71	Within Groups	186.286	328	.568		
	3-4 hours	64	4.04	.79	Total	187.652	331			
	4-6 hours	29	4.22	.72						
NETS VI	1 hour	138	3.60	.79	Between Groups	.631	3	.210	.346	.792
	1-2 hours	101	3.62	.67	Within Groups	199.303	328	.608		
	3-4 hours	64	3.61	.83	Total	199.934	331			
	4-6 hours	29	3.76	.93						

As can be seen from Table 5, candidate teachers' level of educational technology standards didn't show a significant difference based on daily computer use (less than1 hour, 1-2 hours, 3-4 hours and 4-6 hours) in all sub-scales.

Şirin, E. F., Duman, S. (2013). An investigation of educational technology standarts of physical education candidate teachers in terms of several variables. *International Journal of Human Sciences*, *10*(1), 1298-1313.

Table 6. The results of analysis of variance regarding the candidate teachers' educational technology standards and the levels of computer use

Sub-scales			N	$\overline{X}$	S.d.	Groups	Sum of Squares	df	Mean Square	F	p	Significant Difference
NETS I	A	beginner	35	3.44	.95	Between Groups	10.313	2	5.156	9.439	.000	A-B A-C B-C
	B	moderate	252	3.74	.69	Within Groups	179.727	329	.546			
	C	expert	45	4.15	.76	Total	190.040	331				
NETS II	A	beginner	35	3.49	.97	Between Groups	11.765	2	5.882	11.896	.000	A-B A-C B-C
	B	moderate	252	3.93	.66	Within Groups	162.683	329	.494			
	C	expert	45	4.26	.69	Total	174.448	331				
NETS III	A	beginner	35	3.64	1.05	Between Groups	4.316	2	2.158	3.286	.039	A-C B-C
	B	moderate	252	3.84	.74	Within Groups	216.031	329	.657			
	C	expert	45	4.10	.91	Total	220.346	331				
NETS IV	A	beginner	35	3.50	.95	Between Groups	5.046	2	2.523	5.054	.007	A-B A-C
	B	moderate	252	3.82	.66	Within Groups	164.241	329	.499			
	C	expert	45	4.00	.70	Total	169.287	331				
NETS V	A	beginner	35	3.57	1.00	Between Groups	13.853	2	6.926	13.111	.000	A-B A-C B-C
	B	moderate	252	4.01	.69	Within Groups	173.799	329	.528			
	C	expert	45	4.40	.66	Total	187.652	331				
NETS VI	A	beginner	35	3.48	.85	Between Groups	3.660	2	1.830	3.068	.048	A-C B-C
	B	moderate	252	3.60	.76	Within Groups	196.273	329	.597			
	C	expert	45	3.87	.76	Total	199.934	331				

*p<.05

When the Table 6 is examined, it is seen that there was a statistically significant difference between preservice teachers' educational technology standards and the levels of computer use [Technology Operations and Concepts ($F_{(2-329)}$=9.439, p<.05), Planning and Designing Learning Environments and Experiences ($F_{(2-329)}$=11.896, p<.05), Planning Education Considering Individual Differences and Special Needs ($F_{(2-329)}$=3.286, p<.05), Assessment and Evaluation($F_{(2-329)=}$5.054, p<.05), Productivity and Professional Practice ($F_{(2-329)}$=13.111, p<.05), and Social, Ethical, Legal, and Human Issues ($F_{(2-329)}$=3.068, p<.05)]. In other words, preservice teachers' levels of educational technology standards significantly change depending on the levels of computer use.

Şirin, E. F., Duman, S. (2013). An investigation of educational technology standarts of physical education candidate teachers in terms of several variables. *International Journal of Human Sciences*, *10*(1), 1298-1313.

Table 7. The results of analysis of variance regarding the students' educational technology standards and the daily internet use time

Sub-scales	less than	N	$\overline{X}$	s.d.	Groups	Sum of Squares	df	Mean Square	F	p
NETS I	1 hour	137	3.70	.81	Between Groups	1.987	3	.662	1.155	.327
	1-2 hours	108	3.77	.71	Within Groups	188.053	328	.573		
	3-4 hours	60	3.79	.63	Total	190.040	331			
	4-6 hours	27	4.00	.87						
NETS II	1 hour	137	3.90	.71	Between Groups	1.484	3	.495	.938	.423
	1-2 hours	108	3.91	.75	Within Groups	172.965	328	.527		
	3-4 hours	60	3.92	.66	Total	174.448	331			
	4-6 hours	27	4.15	.78						
NETS III	1 hour	137	3.79	.84	Between Groups	2.057	3	.686	1.030	.379
	1-2 hours	108	3.91	.70	Within Groups	218.289	328	.666		
	3-4 hours	60	3.82	.83	Total	220.346	331			
	4-6 hours	27	4.04	1.02						
NETS IV	1 hour	137	3.77	.73	Between Groups	2.758	3	.919	1.811	.145
	1-2 hours	108	3.78	.66	Within Groups	166.529	328	.508		
	3-4 hours	60	3.82	.68	Total	169.287	331			
	4-6 hours	27	4.11	.81						
NETS V	1 hour	137	3.97	.78	Between Groups	2.743	3	.914	1.622	.184
	1-2 hours	108	3.99	.76	Within Groups	184.908	328	.564		
	3-4 hours	60	4.05	.64	Total	187.652	331			
	4-6 hours	27	4.31	.73						
NETS VI	1 hour	137	3.60	.78	Between Groups	3.064	3	1.021	1.701	.167
	1-2 hours	108	3.61	.72	Within Groups	196.870	328	.600		
	3-4 hours	60	3.57	.74	Total	199.934	331			
	4-6 hours	27	3.94	.93						

*p<.05

As can be seen from Table 7, candidate teachers' level of educational technology standards didn't show a significant difference based on daily internet use (less than1 hour, 1-2 hours, 3-4 hours and 4-6 hours) in all sub-scales.

Table 8. The results of analysis of variance regarding the candidate teachers' educational technology standards and the levels of internet use pattern

Sub-scales			N	$\overline{X}$	s.d.	Groups	Sum of Squares	df	Mean Square	F	p	Significant Difference
NETS I	A	Research/İnformation	108	3.90	.72	Between Groups	4.765	2	2.382	4.231	.015	A-C
	B	Communication	140	3.77	.74	Within Groups	185.275	329	.563			
	C	Fun/relaxation	84	3.58	.79	Total	190.040	331				
NETS II	A	Research/İnformation	108	4.06	.64	Between Groups	10.036	2	5.018	10.042	.000	A-C B-C
	B	Communication	140	4.01	.67	Within Groups	164.412	329	.500			
	C	Fun/relaxation	84	3.63	.82	Total	174.448	331				
NETS III	A	Research/İnformation	108	3.98	.71	Between Groups	5.705	2	2.852	4.372	.013	A-C B-C
	B	Communication	140	3.89	.82	Within Groups	214.642	329	.652			
	C	Fun/relaxation	84	3.64	.89	Total	220.346	331				
NETS IV	A	Research/İnformation	108	3.90	.63	Between Groups	6.140	2	3.070	6.191	.002	A-C B-C
	B	Communication	140	3.88	.70	Within Groups	163.147	329	.496			
	C	Fun/relaxation	84	3.58	.78	Total	169.287	331				
NETS V	A	Research/İnformation	108	4.21	.56	Between Groups	17.907	2	8.953	17.353	.000	A-C B-C
	B	Communication	140	4.11	.66	Within Groups	169.745	329	.516			
	C	Fun/relaxation	84	3.63	.95	Total	187.652	331				
NETS VI	A	Research/İnformation	108	3.71	.70	Between Groups	4.341	2	2.171	3.651	.027	A-C B-C
	B	Communication	140	3.68	.79	Within Groups	195.593	329	.595			
	C	Fun/relaxation	84	3.43	.81	Total	199.934	331				

*p<.05

When the Table 8 is examined, it is seen that there was a statistically significant difference between preservice teachers' educational technology standards and the levels of internet using

pattern [Technology Operations and Concepts ($F_{(2-329)}$=4.231, p<.05), Planning and Designing Learning Environments and Experiences ($F_{(2-329)}$=10.042, p<.05), Planning Education Considering Individual Differences and Special Needs ($F_{(2-329)}$=4.372, p<.05), Assessment and Evaluation ($F_{(2-329)=}$6.191, p<.05), Productivity and Professional Practice ($F_{(2-329)}$=17.353, p<.05), and Social, Ethical, Legal, and Human Issues ($F_{(2-329)}$=3.651, p<.05)]. In other words, preservice teachers' levels of educational technology standards significantly change depending on the levels of internet using pattern.

Discussion

It was found that teacher candidates participated in the study had a high level of self-efficacy regarding educational technology standards (Table 3). While this finding is consistent with several studies (Oh and French, 2005; Hofer, 2003) intended for discovering whether teacher candidates meet NETS-T standards or not, it differs from the study of Song et al (2005). This difference can be explained by the factor which was exhibited by the researchers that "although there are computer literacy and pedagogical formation courses in China, teacher candidates are not provided with the information about how technology will be integrated into learning and teaching process". Moreover it can be explained by the limited number of computers per students in China. It can be said that the opportunities from the type of provided education are effective in making the students have educational technology standards. This result from the present study can be evaluated as a positive outcome in terms of the suitability of the future teachers for the technology standards.

The finding (Table 3) that teacher candidates have a high levels of self-efficacy in the sub-scales of "productivity and professional practice" is in line with many scientific results in literature (Alobiedat, 2005; Basham et al, 2005; Bergacs, 2004; Dean, 2001; Hayden, 2002; Hofer, 2003; Oh and French, 2005). It can be said that the attitude and belief resulting from the idea that traditional education mediums can be enriched with the internet and computer technologies that grow rapidly and therefore should be followed necessarily affect the beliefs of teacher candidates in their professional developments.

The finding that teacher candidates had the lowest but adequate level of self-efficacy in the sub-scales of "Social, ethical, legal and human issues" (Table 3) is in line with many studies (Bergacs, 2004; Dean, 2001; Evans, 2006; Franklin, 1999; Hofer, 2003). However, there are studies which assert the finding that teacher candidates are inadequate in the dimension of social, ethic,

legal and human issues (Basham et al, 2005; Hayden, 2002). The main reason of the differentiation of the findings recorded by Haderlie (2001) is that the credits of the course on educational technology use are changeable and this might affect the educational technology use. Moreover, the finding of a research by Kadijevich and Haapasalo (2006) that the application types (theoretical or applied) of the courses on educational technologies are all an important and characteristic factor, may cause this differentiation. There are studies asserting that students are not well-informed about computer safety regarding ethical and social values in educational institutions (Çevik and Kuzu, 2006; Can and Kabakçı, 2007). The results of these studies show that the main reason why teacher candidates feel the least efficient in this sub-dimension of social, ethical, legal and humanistic issues with the lowest mean can be resulted from the fact that they have not been taught about related issues, and especially about ethical behaviors (Kılıçer and Odabası, 2006; Uysal, 2006).

Self-efficacy levels of other sub-dimensions were as follows (Table 3): "planning and designing learning environments and experiences", "assessment and evaluation", "planning education on individual differences and special needs", and "technology operations and concepts". The finding that teacher candidates had a high level of self-efficacy in the sub-dimension of "planning and designing learning environments and experiences" (Table 3) is in line with the results of many studies (Alobiedat, 2005; Basham et al, 2005; Bergacs, 2004; Dean, 2001; Hayden, 2002; Hofer, 2003; Oh and French, 2005). But this finding is different from some studies that have high and medium level of efficiency in learning experiences and learning environment including issues like planning educational environments, learning activities, teaching strategies, classroom strategies (Clift et al, 1990; Ekmekçi, 1992; İzci, 1999). In other words, while teacher candidates have an efficacy of low or medium level in planning and designing general learning environments and experiences, they say that they have a high level of self-efficacy in planning and designing learning environments, which is a dimension of educational technology standards. This may result from the positive attitudes of teacher candidates toward using computers in education.

According to the results of the present study, while the finding that teacher candidates have a high level of self-efficacy in "assessment and evaluation" (Table 3) is in line with the findings of some studies (Alobiedat, 2005; Bergacs, 2004; Hofer, 2003; Oh and French, 2005), it differs with the findings of some studies (Basham et al, 2005; Hayden, 2002; Dean, 2001). The difference between the studies might arise from the finding which is put forward by Kadijevich and Haapasalo (2008) in order to determine the intercultural differences of educational technology standards, that the application type (theorotical or practice) of the courses on educational technologies was an important factor. Besides, Haderlie (2001) stated in her study that the number of credits for the

course on educational technologies use might change and this might affect the use of educational technologies. The difference between the results of the studies might arise from the different ways of teaching and different number of credits of the related course or courses.

Teacher candidates perceived themselves as highly efficient in the sub-scales of "Planning Education Considering Individual Differences and Special Needs" (Table 3). Students do not get enough education at universities except Special Education Departments studying on planning education for students in need of special care (CHE, 1998a). Although it is not sufficient, students get education on planning teaching according to individual differences in "physical education and sports for disabled people" course at Physical Education and Sports Departments. In spite of the fact that teacher candidates did not receive enough education on this issue, it can be said that they express themselves efficient at a high level in "Planning Education Considering Individual Differences and Special Needs" sub-scales of the scale for determining educational technology standards because of the tendency to help and the positive tendency formed by many factors like environment, different school subjects, experiences, democratic attitudes and culture.

The finding that teacher candidates had self-efficacy at a sufficient level in the sub-scales of "Technology Operations and Concepts" (Table 3) differs from the study of Sumuer et al (2006), Kahraman et al (2005) and Tınmaz (2004). It can be suggested that this difference arose from the various viewpoints in the studies. In the study of Usluel et al (2007), it is pointed out that teachers use computer technologies only at a beginner level like using a word processor or the internet. Therefore, it can be concluded that while teachers perceive themselves efficient in some studies that assess basic skills, they perceive themselves efficient at a low level, which is expected.

It was found that self-efficacy levels of participant candidates for educational technology standards didn't show a significant difference in terms of "gender" (Table 4). According to this finding, it can be interpreted that the gender of teacher candidates didn't differ with their self-efficacy levels of educational technology standards and both males and females took advantage of technology at the same high level. Moreover, it was determined that teacher candidates' self-efficacy levels of educational technology standards didn't differ according to "daily computer use time on average" (less than 1 hour, 1-3 hours, 3-4 hours and 4-6 hours) in all sub-scales (Table 5). This finding shows that average computer use time for teacher candidates didn't affect their level of educational technology standards in all sub-dimensions. Studies on computer self-efficacy show that the type of experience rather than the computer use experience is determinant in affecting self-efficacy. For example, while positive computer use experiences increase the self-efficacy perception,

negative ones decrease the self-efficacy. This finding reveals that it is not the period but the type of previous experiences that is determinant in the development of self-efficacy.

In the study, it was determined that the level of computer use had a significant difference in the sub-scales of educational technology standards. When the sub-scales of educational technology standards were examined in terms of computer use level; "expert" computer users perceived themselves more efficient than "beginner" and "moderate" computer users (Table 6). Furthermore, it was found that teacher candidates' level of educational technology standards didn't differ according to their "daily internet use time on average" (less than 1 hour, 1-3 hours, 3-4 hours and 4-6 hours) in all sub-dimensions (Table 7). This study showed that internet use pattern had a significant difference in the sub-dimension of educational technology standards. When the sub-dimensions of educational technology standards were examined in terms of internet use pattern, those using the internet for "research/information" perceive themselves more efficient than the ones using the internet for "communication" and "fun, relaxation" (Table 8). This result of the study can be taken as an important progress in terms of making the use of internet for "research/ information" more common and a life-long learning. Therefore, it can be said that teacher candidates use the internet for "research/information" or they are in favor of that.

Conclusion

It can be concluded from the findings of the present study that teacher candidates attending department of physical education teaching and the physical education teaching department of sport high-schools perceive themselves highly efficient at educational technology standards and they are able to use technology properly; findings also showed that gender isn't a significant factor in terms of the scale of educational technology standards. What's more, gender isn't a significant factor in all sub-dimensions of educational technology standards. However, there was a statistical significance in favor of the participants who perceived themselves more efficient in computer use level and internet use pattern.

References

Alobiedat, A. (2005). Comparing pre-service technology standards with technology skills of special educators in Southwestern Michigan. *International Journal of Instructional Media,* 32(4): 385-395.

Antoniou, P., Derri, V., Kioumourtzoglou, E., and Mouroutsos, S. (2003). Applying multimedia computer-assisted instruction to enhance physical education students' knowledge of basketball rules. *Physical Education and Sport Pedagogy*. 8(1): 78-90.

Basham, J., Palla, A., and Pianfetti, E. (2005). An integrated framework used to increase preservice teacher NETS-T ability. *Journal of Technology and Teacher Education,* 13(2): 257-276.

Bergacs, R. (2004). Teacher technology use survey. pre-dissertation project, 2004. URL: http://njedtech.org/TeachTechUseValRel.pdf, [25.07.2009].

Can, V., and Kabakçı, I. (2007). İlköğretim öğrencilerinin bilgisayar ve internette güvenligine iliskin bilgisayar öğretmenlerinin görüşleri. *The Proceedings of 7th International Educational Technology Conference.* (May 3–5, 2007), Near East University, KKTC.

Cevik, A., and Kuzu A. (2006). Bilgisayar laboratuarlarında karşılaşılan güvenlik sorunları ve çözü önerileri konusunda öğretmen görüşleri. *6th International Educational Technology Conference,* (April 19-21, 2006), Eastern Mediterranean University, Gazimağusa, (KKTC).

Clift, R.T., Houston, R., and Pugach, M.C. (1990). Encouraging reflective practice in education: An analysis of issues and programs. New York: Teachers College Pres.

Çoklar, A.N., and Odabaşı, H.F. (2009a). Determining The Assessment and Evaluation Self-Efficacies of Teacher Candidates Regarding Education Technology Standards. *Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi,* 27, 1 -16.

Çoklar, A.N., and Odabaşı, H.F. (2009b). Educational Technology Standards Scale (ETSS): A study of reliability and validity for Turkish preservice teachers. *Journal of Computing in Teacher Education,* 25(4): 135-142.

Dean, C.M. (2001). Preparing preservice teachers to meet the ISTE National Educational Technology Standards: A case study of an instructional technology class. Unpublished doctoral dissertation, Ohio: Cincinnati University.

Ekmekçi, Ö. (1990). Problems encountered in teacher trainin sessions. *An International Conference Tradition Innovation ELT and Teacher Training.* February 1990. Ankara: 78-80.

Erwin, H., and Valley, J. (2005). Creating a web site for advocacy. *Teaching Elementary Physical Education*, 16(5): 26-30.

Evans, S.A. (2006). A validation study of a measurement of technology ıntegration skills for pre-service teachers. Unpublished doctoral dissertation, Charlotte: North Carolina University.

Fay, T., and Doolittle, S. (2002). Agents for change: From standards to assessment to accountability in physical education. *Journal of Physical Education, Recreation, and Dance,* 73(6): 29-33.

Finkenberg, M. (1997). The Internet in Kinesiology and Physical Education. *Quest,* 49, 327-332.

Franklin, T. (1999), Teacher computer access, student computer access, years of teacher experiences, and professional development as predictors of competency of K-4 Ohio public school students on The National Educational Technology Standards. Unpublished doctoral dissertation, Ohio: Ohio University.

FitzPatrick, K. (2004). An Investigative laboratory course in human physiology using computer technology and collaborative writing. *Advances in Physiology Education,* 28(3): 112-199.

Green, N. (2002). Using ICT within PE-Its impact on a working department. *The British Journal of Teaching Physical Education,* 33(2): 25.

Haderlie. S, (2001). An assessment of perceived technology standards achievement for preservice teachers at Utah State University. Unpublished doctoral dissertation, Logan: Utah State University.

Hayden J (2002). The development and formative evaluation of an assessment instrument based on National Educational Technology Standards for teachers. Unpublished Doctoral Dissertation. Georgia: Georgia State University.

Hofer, M.J. (2003). ISTE Educational Technology Standards: Implementation in award-winning teacher education programs. Unpublished doctoral dissertation. Virginia: Virginia University.

İzci, E. (1999). Ortaögretim kurumlarinda görev yapan ögretmenlerin ögretmenlik meslek bilgisi yeterliklerinin bazi degiskenlere göre incelenmesi. Unpublished Doctoral Dissertation, Malatya: İnönü University.

Kadijevich, D.J., and Haapasalo, L. (2008). Factors that influence student teacher's Interest to Achieve Educational Technology Standards. *Computers & Education,* 50(1): 262-270.

Kahraman, O., Köse, S., and Kara, I. (2005). İlköğretim okullarinda görev yapan branş öğretmenlerin bilgisayar okuryazarliği, bilgisayara karsi ve bilgisayar destekli öğretime karsi tutum araştirmasi. XIV. Ulusal Egitim Bilimleri Kongresi. September 28–30, 2005, Pamukkale University, Denizli, Turkey.

Kılıcer, K., and Odabaşı F (2006). Bilgisayar ögretmenligi: Etik bunun neresinde?. The Proceedings of 7th International Educational Technology Conference. (May 3-5, 2007), Near East University (KKTC).

Kirkwood, M., Sharp, B., De Vito, G., and Nimmo, M. (2002). Assessment of aerobic endurance. a comparison between CD-Rom and laboratory-based instruction. *British Journal of Educational Technology,* 33(2): 159–172.

Kocak, S. (2003). Computer attitudes and competencies in physical education and sport. *International Council for Health, Physical Education, Recreation, Sport and Dance,* 39(1): 49–52.

Ladda, S., Keating, T., Adams, D., and Toscano, L. (2004). Including technology in instructional programs. *Journal of Physical Education Recreation and Dance,* 75(4): 12-15.

Liang, G., Walls, R., Hicks, V., Clayton, L., and Yang, L. (2006). Will tomorrow's physical educators be prepared to teach in the digital age?. *Contemporary Issues in Technology and Teacher Education,* 6(1): 143-156.

Mayer, R.E., Dow, G.T., & Mayer, S. (2003). Multimedia learning in an Interactive Self Explaining Environment: What works in the design of Agent-Based Microworlds? *Journal of Educational Psychology,* 95, 806-813.

Mohnsen, B. (2001). "Instructional software to meet national standarts. *JOPERD,* 71(3): 19-22.

NETS (2006). National Educational Technology Standards. http://cnets.iste.org/, (12 September 2009).

Nigg, C.R. (2003). Technology's influence on physical activity and exercise science: The present and the future. *Psychology of Sport and Exercise,* 4, 57-65.

Oh, E., and French, D.R. (2004). Pre-service teachers' perceptions of an introductory instructional technology course, *Electronic Journal for the Integration of Technology in Education,* 3(1): 37-48.

Papastergiou, M. (2010). Enhancing physical education and sport science students' self-efficacy and attitudes regarding information and communication technologies through a computer literacy course. *Computers & Education.* 54, 298-308.

Pennington, T., Wilkinson, C., and Vance, J. (2004). Physical educators online: What is on the minds of teachers in the trenches?. *The Physical Educator,* 61(1): 45-56.

Siedentop, D., Herkowitz, J., and Rink, J. (1984). Elementary physical education methods. Englewood Cliffs, NJ: Prentice-Hall.

Shiffett, B., Murdach, C., Meschke, S., and Megginson, N. (2001). A presence on the web. *Physical Educator,* 58(4): 175-182.

Silverman, S. (1997). Technology and physical education: present, possibilities, and potential problems. *Quest,* 49, 306-314.

Sumuer, E., Doğusoy, B., Yıldırım, S. (2006). Preservice teachers' competiences, beliefs and integration levels in ICT. 2nd International Open and Distance Learning (IODL) symposium. (September 13-15, 2006), Eskişehir Anadolu University (Turkey).

Stuve, M., and Cassady, J. (2005). A factor analysis of the NETS performance profiles: Searching for constructs of self-concept and technology professionalism. *Journal of Technology and Teacher Education,* 13(2): 303-324.

Song, J, Liang, G., Liu G., and Walls, R.T. (2005). Are teachers in china ready to teach in 21st century. *Journal of Technology and Teacher Education,* 13(2): 197-209.

Tınmaz H (2004). An assessment of preservice teachers' technology perception in relation to their subject area. Unpublished Master Thesis. Ankara: Middle East Technical University.

The Council of Higher Education (CHE), (1998) Egitim Fakültesi Ögretmen Yetistirme Lisans Programlari.1998a,URL:http://www.yok.gov.tr/egitim/ogretmen/ogretmen_yetistirme_lisans/giris.doc, [12.11.2009].

Thomas, A., Stratton, G. (2006). What are we really doing with ICT in physical education: A national audit of equipment, use, teacher attitudes, support and training. *British Journal of Educational Technology,* 37(4): 617-632.

UNESCO (2002). Information and communication technologies in teacher education: A planning guide. France: Division of higher education.

Usluel, Y.K., Mumcu, F.K., and Demiraslan, Y. (2007). ICT in the Learning-Teaching Process: Teachers' views on the integration and obstacles. *Hacettepe University the Journal of Education.* 32: 164-178.

Uysal, O. (2006). Views of teacher trainees on computer ethics. Unpublished Master Thesis. Eskişehir: Anadolu University.

Vernadakis, N., Zetou, E., Antoniou, P., & Kioumourtzoglou, E. (2002). The effectiveness of computer-assisted instruction on teaching the skill of setting in Volleyball. *Journal of Human Movement Studies,* 43, 151-164.

Wiksten, D., Spanjer, J., and LaMaster, K. (2002). Effective use of multimedia technology in athletic training education. Journal of Athletic Training. 37(4): 213-219.

Wood, S.L., Lynn, S. (2000). Teaching elementary physical education. *Web Gym.* 11(5): 28-30.

Woods, M., Karp, G., Shimon, J., and Jensen, K. (2004). Using Webquests to create online learning opportunities in physical education. *Journal of Physical Education Recreation and Dance,* 75(8): 41- 56.

Worrell. V., Evans-Fletcher, C., and Kovar S (2002). Assessing the cognitive and affective progress of children. *Journal of Physical Education, Recreation, and Dance.* 73(7): 29-34.