

Investigating the Attitudes of Physical Education and Sports Teacher Candidates towards Technology and the Self-Efficacy of Specific Teaching Methods

Beden Eğitimi ve Spor Öğretmeni Adaylarının Teknolojiye Yönelik Tutumları ile Özel Öğretim Yöntemleri Öz-Yeterliklerinin İncelenmesi

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Abstract

This study investigates the relationship between physical education and sports teacher candidates' attitudes towards technology and their perceptions of self-efficacy in specific teaching methods. The study examined the effects of demographic variables such as gender, age, academic class, frequency of physical activity, daily phone use, and use of wearable technology on attitudes. Students (n=148) studying at the Faculty of Sports Science at Hitit University participated in the study. The data were collected through the 'Prospective Teachers' Attitudes Towards Technology Scale' and "Special Teaching Methods Self-Efficacy Scale for Prospective Physical Education Teachers" and the data were analysed using Independent samples t-tests and one-way ANOVA. The results showed that the gender variable only made a significant difference in the competence of "measuring and evaluating" and that male students performed better than female students. Academic level was associated with higher attitudes towards technology and higher perceptions of self-efficacy, particularly among senior students. It was also found that students in the younger age group showed higher attitudes towards using digital tools. The frequency of physical activity was found to have a positive effect on self-efficacy perceptions of prospective physical education teachers, while there was no significant effect between daily phone use and wearable technology variables. The results of the study indicate the importance of providing more applied courses and integrating technological tools into educational programs to improve prospective teachers' attitudes toward technology and their self-efficacy perceptions. In addition, it is recommended that the impact of the gender differences observed in the measurement and assessment procedures be studied in depth.

Keywords: Attitude Towards Technology, Physical Education And Sports Teacher Candidates, Self-Efficacy, Special Teaching Methods.

Öz

Bu araştırma, Beden Eğitimi ve Spor Öğretmeni adaylarının teknolojiye yönelik tutumları ile özel öğretim yöntemleri öz-yeterlik algıları arasındaki ilişkiyi incelemeyi amaçlamıştır. Çalışmada, cinsiyet, yaş, akademik sınıf, spor yapma sıklığı, günlük telefon kullanımı ve giyilebilir teknoloji kullanımı gibi değişkenler de incelenmiştir. Araştırmaya, Hitit Üniversitesi Spor Bilimleri Fakültesi'nde öğrenim gören 148 öğrenci katılmıştır. Veriler, "Öğretmen Adaylarının Teknolojiye Yönelik Tutumları Ölçeği" ve "Beden Eğitimi Öğretmeni Adayları İçin Özel Öğretim Yöntemleri Öz-Yeterlik Ölçeği" aracılığıyla toplanmış ve veriler Independent samples t-tests ile one-way ANOVA kullanılarak analiz edilmiştir. Bulgular, cinsiyet değişkeninin yalnızca "Ölçme ve Değerlendirme" yeterliklerinde anlamlı bir farklılık oluşturduğunu ve erkeklerin bu alanda kadınlardan daha yüksek puan aldığını göstermiştir. Akademik sınıf düzeyinin, özellikle son sınıf öğrencilerinde daha yüksek teknolojiye yönelik tutumlar ve öz-yeterlik algıları ile ilişkilendirildiği bulunmuştur. Ayrıca, genç yaş grubundaki öğrencilerin dijital araçlarla etkileşimlerinde daha yüksek tutum sergilediği tespit edilmiştir. Spor yapma sıklığı da mesleki yeterlik algılarını olumlu yönde etkilerken, günlük telefon kullanımı ve giyilebilir teknoloji değişkenlerinin anlamlı bir etkisi olmadığı saptanmıştır. Sonuç olarak, öğretmen adaylarının teknolojiye yönelik tutumlarını ve mesleki yeterlik algılarını artırmak için eğitim programlarının daha fazla uygulamalı ders ve teknolojik araç entegrasyonu ile zenginleştirilmesi gerektiğini ortaya koymaktadır. Ayrıca, cinsiyet farklılıklarının ölçme ve değerlendirme süreçlerinde gözlemlenen etkilerinin derinlemesine incelenmesi önerilmektedir. Elde edilen bulgular, öğretmen yetiştirme programlarının geliştirilmesi ve dijital çağın gerekliliklerine uygun olarak düzenlenmesi açısından önemli ipuçları sunmaktadır.

Anahtar Kelimeler: Beden Eğitimi Ve Spor Öğretmen Adayları, Özel Öğretim Yöntemleri, Öz-Yeterlik, Teknolojiye Yönelik Tutum

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Introduction

Due to the technological developments in today's education and training process, it is very important to apply new education and training methods in this area. Physical education and physical education should also benefit from new methods and procedures with today's technological developments. This situation is very important for students and teachers in the education and training process (Modra et al, 2021).

The attitudes of prospective teachers towards technology are closely related to their ability to use educational technologies effectively in the planning and implementation stages. If these attitudes are negative, it may lead them to stay away from innovative approaches and limit teaching to traditional methods (Aydın & Keser, 2019).

In addition, self-efficacy in specific teaching methods refers to the ability of prospective teachers to plan, implement and evaluate students' learning processes, taking into account individual differences (Bandura, 1997). A high perception of self-efficacy enables trainee teachers to adapt the curriculum to students' needs, develop different teaching materials and adopt new technological tools more easily (Zimmerman, 2000; Mishra & Koehler, 2006; Turhan & Canbolat, 2023). The literature often emphasizes that teachers' positive attitudes towards technology contribute to the adoption of innovative approaches in teaching methods (Kay et al., 2018; Aydın & Keser, 2019). This is also evident in subjects that are traditionally more focused on practical and physical activities, such as physical education and sport (Yalvuç & Karlı, 2022). Wearable technology devices, online exercise programs or interactive course materials have been reported to increase students' interest, attitude and motivation towards the course (Casey et al, 2015).

The effective integration of technology in physical education and sport is directly related to prospective teachers' attitudes towards technology and their perceived self-efficacy in using technological tools (Kretschmann, 2017). However, some studies show that prospective teachers do not have sufficient self-confidence in using technology and this situation is reflected in practice (Ozan & Taşgın, 2017). Especially in the field of physical education, it is stated that there are more difficulties in technology integration due to the structural and physical requirements of the course environment (Tatlı & Akbulut, 2017; Şahin & Karakaya, 2023). These obstacles include the lack of technological infrastructure, the lack of suitable application examples, and prospective teachers' concerns about their classroom management skills (Seçkin & Başbay, 2013).

At this point, strengthening prospective teachers' attitudes towards technological tools and their self-efficacy in using these tools is seen as an important step towards improving the quality of education (Türkekul & Sarıkabak, 2019). For example, the development of technology-enhanced instructional materials can increase students' participation and motivation to learn in physical education courses while accelerating the function of feedback in the assessment and evaluation process (Hodges & Grant, 2020). In addition, the curriculum and internships in physical education faculties are the main environments in which prospective teachers gain experience. Prospective teachers' theoretical and practical experiences with technology integration in these environments help them become teachers who better internalize and use technology in their future professional lives (Ulucan & Karabulut, 2012).

Our research aims to investigate prospective physical education teachers' attitudes towards technology and their perceptions of self-efficacy in relation to specific teaching methods. The research should show how the prospective teachers perceive technological tools and how competent they consider themselves in using these tools.

Considering the limited number of studies in the relevant literature, it can be said that such research in the field of physical education and sport will bring a different perspective to the process of teacher education (Zach et al, 2012). The research findings will make a significant contribution to the literature to make physical education teacher education more effective and systematically integrate technology-oriented practices into the curriculum.

H₁: There is a significant relationship between prospective physical education teachers' attitudes towards technology and their self-efficacy perceptions in special teaching methods.

H₂: Gender has a significant effect on prospective physical education teachers' attitudes towards technology and their self-efficacy perceptions in special teaching methods.

H₃: Age differences affect prospective physical education teachers' attitudes towards technology and their self-efficacy perceptions in special teaching methods.

H₄: Academic level influences prospective physical education teachers' attitudes towards technology and their self-efficacy perceptions in special teaching methods.

H₅: The frequency of physical activity has a positive effect on prospective physical education teachers' self-efficacy perceptions.

H₆: Daily phone usage and wearable technology usage have a significant effect on prospective physical education teachers' attitudes towards technology.

1. Materials and Methods

This study was conducted with students studying at Hitit University, Faculty of Physical Education, Department of Physical Education and Sport Education in the spring semester of the 2023-2024 academic year. Prior to the start of the study, approval was obtained from the Hitit University Ethics Committee for Non-Interventional Research (Decision Number: 2024-13; Application Number: 2024-0295). The voluntary informed consent form, the "Prospective Teachers' Attitudes Towards Technology Scale, and the "Special Teaching Methods Self-Efficacy Scale for Prospective Physical Education Teachers" were administered to students aged 18 years and older who voluntarily agreed to participate in the study.

This study is a field research in which the 'questionnaire technique' was used as a means of obtaining information and the "simple random sampling" method" was used for sample selection. The simple random sampling method provides a selection procedure in which each person has the same probability of being included in the sample. The main reason for choosing this method is to increase the generalizability of the study and to ensure that the sample best represents the study population. In addition, this method contributes to the reliability of the results obtained by minimizing any bias in the sample. The simple random sampling method used in the study increases the likelihood that the research results reflect the general population and strengthens the scientific value of the study, as each person included in the sample has an equal chance. It ensures that the findings can be applied to a broad student population (Bryman, 2016; Babbie, 2020). In the analysis phase of the study, the aim was to reach a conclusion through statistical significance testing using non-parametric "descriptive statistical methods".

1.1. Research group

The population of the study consists of (n=229) students studying at Hitit University, Faculty of Physical Education, Department of Physical Education and Sport Education in the spring semester of the academic year 2023-2024. The sample size was calculated with a confidence interval of 95% and a margin of error of 5. Our study was conducted with (n=148) participants. The proportion of the population was assumed to be 50%, which increased the generalizability of the results of the study and helped to keep the margin of error under control (Büyüköztürk et al., 2015). Therefore, the 148 students who participated in the study represent a sufficient sample size for the study to obtain reliable and valid results.

1.2. Data collection tools

Individuals who agreed with the scope and limitations of the study and wished to participate in the study first completed the voluntary informed consent form specially prepared for the study. In the first part, the volunteers were informed of demographic characteristics; in the second part, the "Prospective Teachers' Attitudes Towards Technology Scale" and the "Special Teaching Methods Self-Efficacy Scale for Prospective Physical Education Teachers" were completed.

1.3. Prospective teachers' attitudes towards technology scale

The Prospective Teachers' Attitudes Towards Technology Scale was created by Aydın and Kara (2013) to measure prospective teachers' attitudes towards technology. Many tests of attitudes towards technology can be found in the literature. However, this scale was preferred because it was developed directly for prospective teachers. The scale consists of a total of 17 items, 15 positive and 2 negative items. In addition, the scale has a one-dimensional factorial structure. The scale development studies were conducted with the participation of 378 prospective teachers (241 female and 137 male) who teach science, social studies and education at Dumlupınar University. The reliability coefficient Cronbach's alpha was determined by the researchers to be $\alpha=.87$. In addition, the reliability of the data obtained by applying the scale to this research group was calculated as $\alpha=.89$.

1.4. Special teaching methods self-efficacy scale for prospective physical education teachers

The self-efficacy scale for prospective physical education teachers (Special Teaching Methods Self-Efficacy Scale for Prospective Physical Education Teachers) was developed by Sayan et al. (2022). The scale consists of a total of 41 items and sub-dimensions on special teaching methods, physical education and physical education program as well as measurement and evaluation.

1.5. Data analysis

The data were analyzed using descriptive and inferential statistical methods with the help of the statistical software SPSS 25. Descriptive statistics, including mean, standard deviation, skewness and kurtosis, were calculated for all

variables. Following George and Mallery (2019), skewness and kurtosis values between -2 and +2 were used as a benchmark for assessing normal distribution. All variables in this study met this criterion, meaning that the data were approximately normally distributed. Independent samples t-tests were performed to compare variables between two groups (e.g. gender and use of wearable technology). A one-way ANOVA was used to compare variables between different age groups and exercise frequencies. Post-hoc tests were performed using Hochberg's GT2 and Games-Howell procedures to account for unequal variances and sample sizes.

2. Findings

In this section of our study, the results of the findings obtained in line with the collected data are given.

Table 1. Demographic Characteristics and Habits of Participants

Gender	n	%
Woman	46	31.1
Male	102	68.9
Total	148	100.0
Age		
18-20	92	62.2
21-23	38	25.7
24-26	14	9.5
Over 27	4	2.7
Total	148	100.0
Grade		
1	62	41.9
2	38	25.7
3	6	4.1
4	22	14.9
Extended student	20	13.5
Total	148	100.0
Doing Sports		
Never doing sports	28	18.9
1-2 days a week	46	31.1
3-5 days a week	58	39.2
6-7 days a week	16	10.8
Total	148	100.0
Time spent on the phone		
Spends less than 1 hour on the phone	12	8.1
1-3 hours	56	37.8
Between 3-5 hours	80	54.1
Total	148	100.0
Wearable Technology Usage		
No.	100	67.6
Yes	48	32.4
Total	148	100.0

The majority of participants are male (n = 102, 68.9%), while female participants make up 31.1% (n = 46).

The largest group is between 18-20 years old (n = 92, 62.2%), followed by participants aged 21-23 years (n = 38, 25.7%). Participants aged 24-26 years (n = 14, 9.5%) and 27 years and older (n = 4, 2.7%) make up a smaller proportion.

Almost 39.2% (n = 58) exercise 3-5 days per week, followed by 31.1% (n = 46) who exercise 1-2 days per week. A smaller proportion (n = 16, 10.8%) stated that they exercise 6-7 days per week, while 18.9% (n = 28) stated that they do not exercise at all.

More than half of the participants (n = 80, 54.1%) use their phone for 3-5 hours a day, while 37.8% (n = 56) state that they use their phone for 1-3 hours. Only 8.1% (n = 12) of participants use their phone for less than an hour.

A clear majority of participants (n = 100, 67.6%) do not use wearable technology, while 32.4% (n = 48) state that they use such devices.

Table 2. Descriptive Statistics of Variables

	n	Min	Max	Mean	Std. D	Skewness	Kurtosis
Special Teaching Methods	148	1.65	4.95	3.89	0.61	-0.99	1.44
Physical Education and Sport Program	147	1.00	5.00	3.23	0.98	-0.29	-0.22
Measurement and Evaluation	148	1.50	5.00	3.40	0.87	-0.38	-0.72
Attitudes Towards Technology Total Score	148	17.00	76.00	43.20	16.41	0.34	-0.95

The mean for this variable is 3.89 ± 0.62 , with values ranging from 1.65 to 4.95. The value for skewness is -0.990, indicating that the values are at the upper end of the scale. The value for kurtosis is 1.442, indicating that the distribution is rather peaked compared to a normal distribution.

The mean value is 3.24 ± 0.98 , with a range of 1.00 to 5.00. The skewness value of -0.299 shows a slight tendency towards the higher values, while the kurtosis value of -0.225 indicates that the distribution is relatively flat.

The mean value for this variable is 3.40 ± 0.88 , with values ranging from 1.50 to 5.00. The skewness value of -0.380 indicates a slight clustering of values at the upper end of the scale. The kurtosis value of -0.729 indicates that the distribution is flatter than a normal distribution.

The mean score is 43.20 ± 16.42 , with scores ranging from 17.00 to 76.00. The skewness value of 0.349 indicates a slight clustering of values at the lower end of the scale, while the kurtosis value of -0.957 indicates a relatively flat distribution.

Table 3. Comparison of Variables by Gender

	Gender	n	Mean	Std. Deviation	t	p
Special Teaching Methods	Woman	46	3.96	0.48	0.876	0.383
	Male	102	3.86	0.66		
Physical Education and Sport Program	Woman	46	3.05	0.94	-1.504	0.135
	Male	101	3.32	0.98		
Measurement and Evaluation	Woman	46	3.07	0.86	-3.116	0.002
	Male	102	3.54	0.84		
Attitudes Towards Technology Total Score	Woman	46	42.86	16.34	-0.165	0.869
	Male	102	43.35	16.53		

In which the variables were compared by gender, are summarized as follows. For the variable Special teaching methods, the mean value for women was 3.96 ± 0.49 , for men 3.86 ± 0.67 . The t-test revealed no statistically significant difference between the two groups ($t(146)=0.876, p=0.383$). The women also had a mean value of 3.06 ± 0.95 and the men a mean value of 3.32 ± 0.99 for the variable physical education and sports program, whereby no significant difference was found ($t(145)=-1.504, p=0.135$). However, a significant difference was found in the measurement and evaluation variable,

where women scored an average of 3.08 ± 0.86 and men scored an average of 3.55 ± 0.85 , resulting in a statistically significant difference ($t(146) = -3.116, p = 0.002$). Finally, for the total score for attitude towards technology, women scored an average of 42.87 ± 16.34 and men 43.35 ± 16.53 , which did not result in a significant difference ($t(146) = -0.165, p = 0.8699$).

Table 4. Comparison of Variables by Academic Year

		n	Mean	Std. Deviation	f	p	Post-Hoc
Special Teaching Methods	1st grade (A)	62	3.90	0.57	5.401	0.000	A>D B>D C>D
	2nd grade (B)	38	4.16	0.48			
	3rd grade (C)	6	4.10	0.13			
	4th grade (D)	22	3.48	0.53			
	Extended student (E)	20	3.73	0.85			
	Total	148	3.89	0.61			
Physical Education and Sport Program	1st grade (A)	61	3.05	0.97	2.842	0.026	No significant difference in multiple comparisons
	2nd grade (B)	38	3.47	0.99			
	3rd grade (C)	6	4.15	0.77			
	4th grade (D)	22	3.29	0.49			
	Extended student (E)	20	3.00	1.21			
	Total	147	3.23	0.98			
Measurement and Evaluation	1st grade (A)	62	3.07	0.92	5.358	0.000	A<B A<C A<D
	2nd grade (B)	38	3.81	0.69			
	3rd grade (C)	6	3.83	0.41			
	4th grade (D)	22	3.55	0.43			
	Extended student (E)	20	3.35	1.09			
	Total	148	3.40	0.87			
Attitudes Towards Technology Total Score	1st grade (A)	62	45.41	14.49	4.524	0.002	D>B D>E
	2nd grade (B)	38	38.94	17.02			
	3rd grade (C)	6	41.33	21.54			
	4th grade (D)	22	52.63	13.02			
	Extended student (E)	20	34.60	17.41			
	Total	148	43.20	16.41			

The results of the comparison of different groups based on their academic status for the selected variables are summarized below. Significant differences between groups were found for specialized teaching methods ($F(4,143) = 5.401, p = 0.001$). Post-hoc comparisons showed that first-year students, second-year students and third-year students performed significantly better than fourth-year students. For the variable physical education and sports program, the ANOVA was significant overall ($F(4,142) = 2.842, p = 0.026$), but the post-hoc comparisons did not reveal any statistically significant pairwise differences between the groups.

Significant differences between the groups were found for the variable measurement and evaluation ($F(4,143) = 5.358, p = 0.000$). Post-hoc analysis revealed that first-year students performed significantly worse than second-year students, third-year students, and fourth-year students. Finally, the results of ANOVA for the total score of attitude towards technology were significant ($F(4,143) = 4.524, p = 0.002$). The post-hoc analysis revealed that fourth-year students scored significantly higher than second-year students and students in the extended study period.

Table 5. Comparison of Variables by Age Groups

		n	Mean	Std. Deviation	F	p	Post-Hoc
Special Teaching Methods	18-20 years old	92	3.94	0.57	0.811	0.489	
	21-23 years old	38	3.83	0.58			
	24-26 years old	14	3.70	0.98			
	27 and above age	4	3.92	0.08			
	Total	148	3.89	0.61			
Physical Education and Sport Program	18-20 years old (A)	91	3.32	0.93	4.044	0.009	A>D B>D
	21-23 years old (B)	38	3.35	0.90			
	24-26 years old (C)	14	2.72	1.22			
	27 and above age (D)	4	2.00	0.00			
	Total	147	3.23	0.98			
Measurement and Evaluation	18-20 years old	92	3.45	0.83	1.963	0.122	
	21-23 years old	38	3.42	0.86			
	24-26 years old	14	3.30	1.10			
	27 and above age	4	2.40	0.46			
	Total	148	3.40	0.87			
Attitudes Towards Technology Total Score	18-20 years old (A)	92	43.43	15.64	3.426	0.019	A>C B>C
	21-23 years old (B)	38	46.26	18.01			
	24-26 years old (C)	14	31.14	12.15			
	27 and above age (D)	4	51.00	16.16			
	Total	148	43.20	16.41			

The results of the comparison of the variables in the different age groups are summarized below. For the specific teaching methods, mean scores ranged from 3.70 ± 0.98 for participants aged 24-26 to 3.95 ± 0.58 for those aged 18-20. However, the differences between the age groups were not statistically significant ($F(3,144)=0.811, p=0.489$).

Significant differences were found for physical education and the sports program ($F(3,143)=4.044, p=0.009$). Post-hoc analysis revealed that participants aged 18-20 years scored significantly higher than participants aged 27 years and older ($p<0.05$). In addition, participants aged 21-23 years scored higher than participants aged 27 years and older ($p<0.05$).

For the measurement and evaluation variable, the mean scores ranged from 3.45 ± 0.84 for participants aged 18-20 years to 2.40 ± 0.46 for participants aged 27 years and older. Although there was a trend towards decreasing scores with age, the differences did not reach statistical significance ($F(3,144)=1.963, p=0.122$).

Significant differences were found in the total score for attitude towards technology ($F(3,144)=3.426, p=0.019$). The post-hoc analysis showed that participants aged 18-20 and 21-23 years scored significantly higher than participants aged 24-26 years ($p<0.05$).

Table 6. Comparison of Variables by Weekly Exercise Frequency

		n	Mean	Std. Deviation	F	p	Post-Hoc
Special Teaching Methods	Never doing sports (A)	28	3.87	0.44	2.303	0.080	
	1-2 days a week (B)	46	3.97	0.42			
	3-5 days a week (C)	58	3.76	0.78			
	6-7 days a week (D)	16	4.18	0.53			
	Total	148	3.89	0.61			
Physical Education and Sport Program	Never doing sports (A)	28	2.93	0.52	5.351	0.002	A<B A<D C<D
	1-2 days a week (B)	46	3.41	0.95			
	3-5 days a week (C)	57	3.04	1.10			
	6-7 days a week (D)	16	3.94	0.75			
	Total	147	3.23	0.98			
Measurement and Evaluation	Never doing sports (A)	28	3.24	0.93	3.491	0.017	A<D C<D
	1-2 days a week (B)	46	3.49	0.84			
	3-5 days a week (C)	58	3.25	0.87			
	6-7 days a week (D)	16	3.97	0.63			
	Total	148	3.40	0.87			

	Total	148	3.40	0.87			
Attitudes Towards Technology Total Score	Never doing sports (A)	28	47.00	17.57	1.315	0.272	
	1-2 days a week (B)	46	44.69	15.94			
	3-5 days a week (C)	58	41.55	16.67			
	6-7 days a week (D)	16	38.25	13.98			
	Total	148	43.20	16.41			

The comparison of variables based on weekly training frequency is summarized below. For the specific teaching methods, mean scores ranged from 3.87 ± 0.45 for participants who did not exercise to 4.18 ± 0.54 for those who exercised 6-7 days per week. Although there were some differences between the groups, the differences were not statistically significant ($F(3,144)=2.303, p=0$).

Significant differences were found between the groups for the exercise program ($F(3,143)=5.351, p=0.002$). Post-hoc analysis showed that participants who did not exercise performed significantly worse than those who exercised 1-2 days per week ($p<0.05p$) and 6-7 days per week ($p<0.01p < 0.01p<0.01$). In addition, those who exercised 3-5 days per week scored significantly lower than participants who exercised 6-7 days per week ($p<0.05$).

For the variable measurement and evaluation, the differences between the groups were also statistically significant ($F(3,144)=3.491, p=0.017$). Post-hoc comparisons showed that participants who did not exercise performed significantly worse than participants who exercised 6-7 days per week ($p<0.05$). Similarly, participants who exercise 3-5 days per week scored lower than those who exercise 6-7 days per week ($p<0.05$).

For the total score for attitude towards technology, mean scores varied from 38.25 ± 13.99 for participants who exercise 6-7 days per week to 47.00 ± 17.58 for participants who do not exercise. However, these differences were not statistically significant ($F(3,144)=1.315, p=0.272$).

Table 7. Comparison of Variables by Daily Phone Usage

		n	Mean	Std. Deviation	F	p
Special Teaching Methods	Spends less than 1 hour on the phone	12	3.75	0.33	1.161	0.316
	1-3 hours	56	3.98	0.54		
	between 3-5 hours	80	3.85	0.68		
	Total	148	3.89	0.61		
Physical Education and Sport Program	Spends less than 1 hour on the phone	12	3.10	0.69	2.04	0.816
	1-3 hours	56	3.29	0.91		
	between 3-5 hours	79	3.22	1.06		
	Total	147	3.23	0.98		
Measurement and Evaluation	Spends less than 1 hour on the phone	12	2.85	0.84	2.922	0.057
	1-3 hours	56	3.51	0.78		
	between 3-5 hours	80	3.40	0.91		
	Total	148	3.40	0.87		
Attitudes Towards Technology Total Score	Spends less than 1 hour on the phone	12	50.00	17.92	2.464	0.089
	1-3 hours	56	39.89	13.46		
	between 3-5 hours	80	44.50	17.72		
	Total	148	43.20	16.41		

The results of the comparison of the variables for the different levels of daily telephone use are summarized below. For the specific teaching methods, the mean scores ranged from 3.75 ± 0.34 for participants who used their phone for less than 1 hour, to 3.99 ± 0.55 for those who used their phone for 1-3 hours, to 3.85 ± 0.69 for those who used their phone for 3-5 hours. The differences were not statistically significant ($F(2,145)=1.161, p=0.316$).

For the physical education and sports program, the mean values were 3.11 ± 0.70 for less than 1 hour of phone use, 3.29 ± 0.92 for 1-3 hours and 3.22 ± 1.06 for 3-5 hours. No significant differences were found ($F(2,144)=0.204, p=0.816$).

For the variable measurement and evaluation, the mean values were 2.85 ± 0.85 for less than 1 hour of phone use, 3.51 ± 0.78 for 1-3 hours and 3.41 ± 0.92 for 3-5 hours. Although the result of the ANOVA approached significance ($F(2,145)=2.922, p=0.057$), no significant differences were found.

Finally, for the total score for attitude towards technology, the mean scores ranged from 50.00 ± 17.93 for less than 1 hour of phone use to 39.89 ± 13.47 for 1-3 hours and 44.50 ± 17.73 for 3-5 hours. The differences were not statistically significant ($F(2,145)=2.464, p=0.089$).

Table 8. Comparison of Variables by Wearable Technology Usage

	Wearable Technology	n	Mean	Std. Deviation	t	p
Special Teaching Methods	No	100	3.87	0.56	-0.584	0.560
	Yes	48	3.93	0.71		
Physical Education and Sport Program	No	100	3.27	0.89	0.652	0.516
	Yes	48	3.16	1.14		
Measurement and Evaluation	No	100	3.37	0.87	-0.494	0.622
	Yes	48	3.45	0.89		
Attitudes Towards Technology Total Score	No	100	42.18	15.71	-1.094	0.276
	Yes	48	45.33	17.78		

For the specific teaching methods, the mean score of participants not using wearable technology was 3.87 ± 0.57 , while the mean score of participants using it was 3.94 ± 0.71 . The difference between the two groups was not statistically significant ($t(146)=-0.584, p=0.560$). The mean value for the variable physical education and sports program was also 3.28 ± 0.90 for the non-users and 3.16 ± 1.14 for the users, whereby there was no significant difference ($t(146)=0.652, p=0.516$).

For the measurement and evaluation variable, the non-users had a mean score of 3.38 ± 0.87 , while the users scored 3.45 ± 0.89 . The t-test showed no significant difference between these groups ($t(146)=-0.494, p=0.622$). Finally, the mean score for the overall attitude towards technology was 42.18 ± 15.72 for the non-users and 45.33 ± 17.78 for the users. This difference was also not statistically significant ($t(146)=-1.094, p=0.276$).

3. Discussion

This study examined the relationships between prospective physical education teachers' attitudes toward technology, their perceptions of the effectiveness of specific teaching methods, and some demographic characteristics. In the general examination of the results, it was found that the variables of gender, academic class, age, and weekly frequency of physical education influenced the participants' scores for the special teaching methods, physical education program, perception of the effectiveness of measurement and evaluation, and attitude toward technology at a certain level. On the other hand, the effect of daily phone use time and wearable technology use variables was not statistically significant.

The gender variable only led to a significant difference in the assessment of "measurement and evaluation", and it was found that men scored higher than women (Table 1). This result shows that men's self-efficacy perception is stronger in measurement and evaluation processes. Aydın and Keser (2019) reported that there may be gender differences in prospective teachers' technological self-efficacy. However, Kay et al. (2018) suggested that female prospective teachers may have higher levels of self-efficacy in technology integration and assessment and evaluation processes than males. The relationship between gender and self-efficacy levels in these studies supports our research.

In our study, it was found that fourth grade students have a higher attitude towards technology than the other grades (Table 1). This result shows that participation in hands-on courses and work experiences can increase positive attitudes toward technology. Tondeur et al, (2020) find that prospective teachers improve their technology content knowledge when they have more field experiences.

Zimmerman's (2000) self-regulation and self-efficacy theory states that work experience strengthens prospective teachers' technological and pedagogical self-efficacy. In our study, the lower scores of the first-year students indicate that the lack of professional experience limits their perceived self-efficacy. This finding can be overcome by restructuring the curriculum to increase professional experience at each grade level. In our study, it was found that participants in the 18-20 age group had higher scores in the areas of "physical education and sports program" and "attitude toward technology" compared to the other age groups (Table 5). According to the concept of digitalization, young people can

adapt more quickly to digital technologies and interact more effectively with these technologies. However, the lower scores in the 27 and older group suggest that technological adaptation requires more effort with increasing age or that less time is spent on this area due to other commitments.

Tondeur et al, (2020) reported that there is an inverse relationship between prospective teachers' age and their attitude towards technology, which may be related to the amount of time they spend with digital technologies. In this context, it might be useful to develop specific training programs for older prospective teachers to embrace digital tools.

The fact that the habit of exercising regularly made a significant difference in the ratings of "physical education and physical education program" and "measurement and evaluation" shows that physical activity has a positive impact on prospective teachers' professional perceptions and self-confidence (Table 6). Kretschmann (2017) found that prospective physical education teachers who exercise regularly have higher self-confidence and professional competence. Ulucan and Karabulut (2012) found that students who exercise at least 3-4 days per week show higher motivation in pedagogical courses. In our study, participants who exercised 6-7 days per week scored higher, indicating that a disciplined exercise routine may contribute to teaching methods and assessment and evaluation skills.

In our study, the variables of daily phone use and wearable technology did not cause a significant difference in any scale (Table 7; Table 8). Kay et al. (2018) emphasize that the duration of phone use is not directly related to technological attitude and self-efficacy and that the purpose and content of use are more important than the duration of use. Similarly, Tondeur et al, (2020) state that technological skills are assessed on the basis of quality and pedagogical integration. Casey et al, (2015) state that wearable technology can increase students motivation in physical education, but this depends not only on the technology but also on the effective use of pedagogical approaches. Our research supports these findings and shows that the effectiveness of technology use depends on the quality of the integration process.

The results showed that experience, age, and sport habits determine perceptions of self-efficacy, while factors such as phone use and wearable technology do not significantly influence individual differences. Tondeur et al, (2020) reported that there is an inverse relationship between the age of pre-service teachers and their attitudes towards technology, which may be related to the amount of time they spend using digital technologies. In this context, it might be useful to develop special training programs for older pre-service teachers to embrace digital tools.

The fact that the habit of exercising regularly made a significant difference in the ratings of "physical education and physical education program" and "measurement and evaluation" shows that physical activity has a positive impact on prospective teachers' professional perceptions and self-confidence (Table 6). Kretschmann (2017) found that prospective PE teachers who regularly engage in physical activity have higher self-confidence and professional competence. Ulucan and Karabulut (2012) found that students who exercise at least 3-4 days per week show higher motivation in pedagogical courses. In our study, participants who exercised 6-7 days per week scored higher, indicating that a disciplined exercise routine may contribute to teaching methods and assessment and evaluation skills.

This study comprehensively examined the relationship between prospective physical education teachers' attitudes toward technology and their perceptions of self-efficacy and demographic variables. The results showed that experience, age, and sports habits determined perceptions of self-efficacy, while factors such as phone use and wearable technology had no significant effect on individual differences. It is anticipated that these results will contribute to the development of curricula and interventions to improve prospective teachers' digital skills.

Conclusion and Evaluation

This study investigated the relationships between prospective physical education teachers' attitudes toward technology, self-efficacy perceptions of specific teaching methods, and various demographic variables. The findings revealed that gender, academic level, age and frequency of physical activity significantly influenced professional competencies and technological attitudes, while daily phone use and wearable technology had no substantial effect. Notably, male participants showed higher self-efficacy in measurement and evaluation, senior students exhibited greater technological pedagogical knowledge, younger participants had more positive attitudes towards technology, and regular exercise positively impacted professional awareness and self-confidence.

In conclusion, the study highlights the need for curriculum enhancements that incorporate practical training and digital tools to support pre-service teachers' professional and technological development. It is recommended to design educational policies that address gender differences in self-efficacy and offer tailored programs for older pre-service teachers. Future research should further explore individual differences and confirm these findings with broader samples to enhance the effectiveness of technology integration in teacher education.

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