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Examining the Physical Literacy Levels of Pre-Service Teachers

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Abstract

The aim of this study is to examine the physical literacy levels of pre-service teachers. A total of 333 pre-service teachers participated in the study. Personal information form and the "Perceived Physical Literacy Scale" adapted into Turkish by Munusturlar and Yıldızer (2020) were used as data collection tools. The collected data were analyzed with the SPSS using t-test and one-way analysis of variance (ANOVA) analyses to examine independent groups, taking into account the skewness and kurtosis criterion (±1.5). According to the findings of the research, significant differences were found in the levels of physical literacy on demographic and other variables except for the gender variable. As a result of the research, while there was no significant difference between physical literacy and gender, there was a significant difference in favor of physical education and sports and basic education majors and those who do regular physical activity according to the department. In addition, it was seen that the increase in grade level also significantly affected the result. Based on these results, it is thought that there may be an increase in pre-service teachers' perceptions of physical literacy when they engage in in-school or out-of-school physical activity.

Keywords: Physical activity, physical literacy, pre-service teachers, teacher training programs

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INTRODUCTION

Movement, which is considered one of the fundamental components of human life, is a set of motor skills that enables an individual to better understand both their own body and their environment. Starting with simple reflexive responses, it gradually becomes purposeful and goal-oriented voluntary behaviors that continue throughout life (Gallahue et al., 2014). In this process, movement is not limited to physical behavior but also shapes cognitive and social development (Haywood & Getchell, 2009), making it critically important for the holistic development of the individual.

The fundamental function of movement in life also requires understanding the concept of physical activity. The World Health Organization (2020) defines physical activity as "the consumption of energy produced by skeletal muscles through various body movements." In studies conducted on the subject, it has been proven that regular physical activity significantly reduces the risk of various chronic diseases, including some types of cancer, primarily cardiovascular diseases and diabetes (Caldwell et al., 2020). In addition, it is known that physical activity has positive effects not only on physical health but also on the cognitive and emotional aspects of individuals (Ramsland, 1998).

Recent global pandemics and technology-driven sedentary lifestyles have significantly reduced physical activity participation. This has led to a decrease in physical activity levels, especially among children and young people. According to the World Health Organization (2022), 81% of adolescents and 85% of adolescent girls do not engage in sufficient physical activity. The findings have shown the importance of physical activity and demonstrated the importance of the concept of physical literacy, which is known as the basic competence that will enable lifelong activity (Whitehead, 2010). In this context, physical literacy needs to be considered as a basic competence for individuals' participation in physical activity to be sustainable.

It appears that philosophical discussions on the concept of physical literacy began in the mid-1990s, with the first serious discussion being introduced by Margaret Whitehead. Whitehead (2010) defines physical literacy as a concept that includes motivation, self-confidence, physical competence, and knowledge that enable an individual to participate in physical activity throughout their life. This concept plays a critical role, especially in the development of children's fundamental movement skills and the maintenance of these skills throughout their lives.

In recent years, with the studies conducted by various organizations, especially the World Health Organization, on the importance of physical activity, it has been observed through research that interest in the concept of physical literacy has increased. The idea has particularly become a specific area of study in the field of physical education (Bailey, 2022; Durden-Myers & Bartle, 2023). It has been observed that the studies have focused on factors affecting motivation for participation in physical activity and participation itself. It is emphasized that in order to increase physical activity, it is important to develop basic movement skills known as locomotor movements, object control, and balance skills from a young age (Lubans et al., 2010; Balyi et al., 2013). It is known that the development of these

skills is important for more complex movements to be performed later and that this directly affects the level of physical competence.

In the acquisition of these skills, it is the responsibility of teachers, along with the interest and support of the family, to educate the individual from the preschool period, which begins at birth. It has been noted in studies that participation in physical activity is more significant for primary school students with competence in basic motor skills (Emadirad, 2021; Gu et al., 2021). This situation demonstrates the importance of basic movement competence provided during the preschool period. Additionally, studies have emphasized that the same result is valid for university students as well (Moss et al., 2020).

The school setting and physical education classes are the best settings for the development of physical literacy (Edwards et al., 2019). Especially at the primary school level, the development of students' fundamental movement skills can be more easily achieved within the framework of physical education and games classes or physical activities included in the curriculum. In this context, the measures that need to be taken to prevent the inadequacy of physical literacy levels and the various chronic diseases that arise from a sedentary lifestyle, especially in children and adolescents, hold an important place within current educational programs (Ministry of National Education (MEB), 2018).

The World Health Organization has emphasized the importance of teachers in developing physical literacy through physical education classes in its action plan on physical activity (WHO, 2020). It is important to structure students' after-school time to reinforce their awareness and development of physical literacy (Haerens et al., 2010). However, instilling physical literacy in individuals at an early age is not solely the responsibility of physical education classes and physical education teachers. In grade levels where there is no physical education class, classroom teachers and other subject teachers throughout the students' educational life also have responsibilities in imparting physical literacy. For this purpose, the holistic development of students and lifelong learning are emphasized in our country's educational programs (MEB, 2018; Taş & Hürmeriç-Altunsöz, 2021; Aşkar &Altun, 2023) and are also highlighted in Turkey's Century Education Model (MEB, 2024).

In this regard, it is extremely important for teachers, who will primarily serve as role models for students, to be physically literate for the sake of the students they will educate. It is important for teachers to adopt the importance of being physically literate even at the beginning of their careers as trainee teachers, as it will also benefit the students they will educate. The higher the teacher's awareness of this issue, the more the lives of the students they instill this in will change. Emphasizing to the student why they need to be active throughout their life is important for the student's physical literacy. Furthermore, those who are physically literate will be highly motivated to engage in physical activity for the rest of their lives.

This study aims to make significant contributions to both educational policies and teacher training programs by examining the levels of physical literacy among pre-service teachers. Additionally, it aims to fill the gap in the literature as one of the first studies comparing the levels of physical literacy among pre-service teachers from different disciplines.

In this context, the answers to the following questions have been sought in this study.

- Is there a difference in pre-service teachers' physical literacy levels according to gender variable?
- Is there a difference in pre-service teachers' physical literacy levels according to the branch variable?
- Is there a difference in pre-service teachers' physical literacy levels according to the grade level variable?
- Is there a difference in pre-service teachers' physical literacy levels according to the variable of doing sports?

METHOD

Research Model

In this study, which examines the physical literacy of pre-service teachers from different branches, a relational screening model has been used. This model is defined by Karasar (2018) as research models aimed at determining the existence and/or degree of joint variation between two or more variables.

Research Group

A total of 333 pre-service teachers enrolled in teaching programs in different branches at a state university participated in the study. Descriptive statistics of the participants are presented in Table 1.

Table 1. Statistics on Demographic Information of Participants

Category	Demographic Variable	f	%
Gender	Female	163	48.9
	Male	170	51.1
Teaching Discipline	Social Studies Teaching	31	9.3
	Turkish Language and Literature Teaching	24	7.2
	Turkish Teaching	26	7.8
	Biology Teaching	27	8.1
	Chemistry Teaching	25	7.5
	Mathematics Teaching	27	8.1
	Preschool Teaching	32	9.6
	Classroom Teaching	45	13.5
	Physical Education Teaching	96	28.8
Grade	First Grade	83	24.9
	Second Grade	86	28.8
	Third Grade	80	24.0
	Fourth Grade	84	25.2
Do you do regular physical activity?	Yes, I do.	142	42.6
	No, I don't.	191	57.4

Data Collection Tools

In the study, “Personal Information Form” and “Perceived Physical Literacy Scale” were used as measurement tools.

Personal Information Form: The personal information form prepared by the researchers consists of question statements aimed at learning the gender, teaching branch, class level, and regular physical activity status of the participating pre-service teacher.

Perceived Physical Literacy Scale: In the study, the "Perceived Physical Literacy Scale", developed by Sum et al. (2016) and adapted into Turkish by Munusturlar & Yıldızer (2020), was used to determine pre-service teachers' perceptions of physical literacy. In the adaptation study of the scale, it was observed that the fit indices in the EFA and CFA (CFI=.94, RMSEA=.046, SRMR=.084) tests were at good and acceptable levels. It is stated that the explained variance ratio of the 3-factor structure (Self-confidence, Knowledge-Understanding, and Communication) is 69.04%, and the Cronbach's Alpha reliability coefficient is .81. In the conducted research, the Cronbach Alpha coefficients for the scale were found to be .851 for the self-perception-self-confidence sub-dimension; .914 for the knowledge-understanding sub-dimension; .759 for the communication sub-dimension; and .867 for the entire scale. The Cronbach Alpha value of .7 and above is considered acceptable (Balcı & Ahi, 2020), and it is observed that the internal consistency of the scale is reliable with the values obtained in the study.

Data Collection

After obtaining the necessary ethical permissions for the research, the study group was contacted and informed about the purpose and importance of the study. After the information, data collection tools were delivered to the volunteer pre-service teachers. Participants' responses to the question about their physical activity status were obtained through self-report.

Data Analysis

In order to determine the appropriate type of analysis for the evaluation of the data, skewness and kurtosis coefficients ±1.5 limits were taken into consideration (Tabachnick & Fidell, 2013). According to the results of the analysis, it was determined that the data set met the parametric test assumptions (skewness=-0.796; kurtosis=-0.070). Since the values were within the accepted limits, it was concluded that the data were normally distributed. Accordingly, Independent Sample t-test was used for pairwise group comparisons, and One-Way Analysis of Variance (ANOVA) was used for comparisons of more than two groups. In addition, the effect size results are given, which allow the recognition of results that can be considered important in practice (Cohen, 2013) even if there is no significant difference between groups. Statistical significance level was accepted as $p<.05$.

FINDINGS

The findings of the analysis conducted to clarify the research questions are provided below. The physical literacy scores perceived by pre-service teachers based on gender were examined and presented in Table 2.

Table 2. Perceived Physical Literacy Scale t-test results by gender

Scale Sub-dimensions	Gender	X̄±SD	p	Cohen's d
Sense of Self/Self-Confidence	Female (n=153)	3.90±0.87	0.41	0.08
	Male (n= 180)	3.82±0.98		
Knowledge and understanding	Female (n=153)	3.78±1.05	0.61	0.05
	Male (n= 180)	3.72±1.09		
Communication	Female (n=153)	4.25±0.80	0.15	0.15
	Male (n= 180)	4.11±0.96		
Totally	Female (n=153)	3.94±0.72	0.30	0.11
	Male (n= 180)	3.85±0.82		

According to Table 2, there was no statistically significant difference in the average scores of the physical literacy scale based on the participants' genders (t=1.02, p > .05, Cohen's d= 0.11). This result indicates that gender does not have a significant effect on levels of physical literacy. When examining the sub-dimensions, although women's average scores are slightly higher than men's, the effect sizes are small (d<0.20). This suggests that the sample size may be insufficient.

In the study, the total score of the scale was analyzed to determine the general tendencies regarding the perceived physical literacy level among the teaching branches. This approach was adopted because physical literacy is a multidimensional concept and is considered as a holistic structure (Whitehead, 2010) and the total score of the scale is considered to be a valid indicator in evaluating the general level of physical literacy. The results of the analysis of the perceived physical literacy scale scores related to the teaching branch variable are given in Table 3.

Table 3. ANOVA results of the perceived physical literacy scale scores for the teaching discipline variable

Teaching Discipline	n	X̄±SD	p	Post Hoc Tukey	η2
(1) Social Studies	31	3.44±0.87	**0.001**	1<7, 1<9, 1<8*	0.181
(2) Turkish Literature	24	3.81±0.94		N.S.	
(3) Turkish	26	3.26±0.75		3<7**, 3<9**, 3<8**, 3<6*	
(4) Biology	27	3.54±0.66		4<9**	
(5) Chemistry	25	3.64±0.89		5<9*	
(6) Mathematics	27	3.93±0.86		6>3*	
(7) Preschool	32	4.41±0.42		7>1**, 7>3**	
(8) Classroom	45	4.04±0.84		8>1*, 8>3**	
(9) Physical Education	96	4.25±0.46		9>1**, 9>3**, 9>4**, 9>5*	

*p<.05, ** p<.01, N.S. (not significant)

According to Table 3, there are statistically significant differences in Perceived Physical Literacy scores among teaching branches (F=8.96, p<.05). Preschool and Physical Education Teaching have the highest scores, while Turkish and Social Studies Teaching have the lowest scores. According to the post-hoc tests conducted to determine which pairs of branches have significant differences, significant differences were observed between the following pairs: Preschool>Social Studies, Turkish; Physical Education>Social Studies, Turkish; Chemistry, Biology, Classroom Teaching>Social Studies, Turkish; and Mathematics>Turkish teaching branches. As a result of the ANOVA analysis of the Perceived Physical Literacy Scale total scores of pre-service teachers according to their branches, the effect size of the difference (η^2=0.181) shows that there is a moderate effect (Cohen, 1988; Pierce et al., 2004). This finding supports that the branch variable explained approximately 18% of the variance in pre-

service teachers' perceptions of physical literacy and created a significant difference, especially in physical education and preschool teaching branches.

Table 4. ANOVA results of the perceived physical literacy scale scores for the year variable

Scale Sub-dimensions	1st year (n=83)	2nd year (n=86)	3rd year (n=80)	4th year (n=84)	p	Post Hoc Tukey	η2
	X̄±SD	X̄±SD	X̄±SD	X̄±SD			
Sense of Self/Self-Confidence	3.59±0.99	3.75±0.87	3.95±0.99	4.15±0.76	0.01	4>1*,4>2*	0.051
Knowledge and understanding	3.60±1.19	3.65±1.04	3.72±1.12	4.03±0.87	0.03	4>1*	0.025
Communication	4.08±0.92	4.09±0.85	4.23±0.99	4.31±0.79	0.26	NS	0.012
Total	3.70±0.87	3.79±0.74	3.93±0.79	4.15±0.62	0.01	4>1*,4>2*	0.047

*p<.05, N.S. (not significant)

According to Table 4, there are statistically significant differences in the total score of the perceived physical literacy scale (F=5.38, p=.01), the self-perception/self-confidence (F=5.90, p=.01), and the Knowledge and Understanding (F=2.83, p=0.03) sub-dimensions (p<.05). There is no significant difference in the communication sub-dimension (p=0.26).

As the class level of pre-service teachers increases, a statistically significant increase is observed in the sub-dimensions of self-esteem/self-confidence and self-perception, as well as in the total scale scores (p<.05). According to post-hoc analyses conducted to determine which class pairs this difference originates from, 4th graders have statistically significantly higher scores in the sub-dimensions of self-perception/self-confidence and knowledge level, as well as the total scale score, compared to 1st and 2nd graders. These findings suggest that the educational process positively enhances the perception of physical literacy. In the sub-dimension of communication skills, no significant difference related to class level was observed. The effect size of the identified difference is small-medium in the sub-dimensions of self-confidence (η2=0.051), knowing and understanding (η2=0.025), and communication (η2=0.012), and in total (η2=0.047).

Table 5. Perceived physical literacy scale t-test results for doing physical activity variable

Scale Sub-dimensions	Yes, I do (n=142)	No, I dont (n=191)	p	Cohen's d
	X̄±SD	X̄±SD		
Sense of Self/Self-Confidence	4.03±0.92	3.73±0.92	0.00	0.32
Knowledge and understanding	3.84±1.09	3.68±1.05	0.16	0.14
Communication	4.17±0.90	4.18±0.89	0.33	0.01
Total	4.00±0.80	3.81±0.75	0.03	0.24

According to Table 5, a significant difference was observed between the groups in the average scores of the perceived physical literacy scale based on the participants' physical activity status (t=2.14, p<.05-Cohen's d=0.24). The strongest effect was observed in the self-confidence dimension (d=0.32). There is no significant difference in the other sub-dimensions.

DISCUSSION AND CONCLUSION

This study aimed to understand the perceptions of physical literacy among pre-service teacher by examining their levels of physical literacy across different branches according to various variables. The research findings revealed that the levels of physical literacy among pre-service

teachers did not show a significant difference according to the gender variable. This result shows that physical literacy can be developed independently of gender, however, in the study, female pre-service teachers exhibited higher average scores compared to male pre-service teachers. This finding is consistent with some previous studies (Zhang et al., 2022; Cengiz, 2023; Durden-Myers & Bartle, 2023; Sivri & Yılmaz, 2023; Yapar & Akıncı, 2023). However, studies conducted on adolescents and students have also emphasized the impact of the gender factor on physical literacy in the literature (Çalı, 2024; Iğdır et al., 2024). These differences may stem from the characteristics of the sample group and cultural factors. These results also indicate that the impact of the gender factor on physical literacy needs to be examined more in-depth.

Another important finding of the research is that there is a significant difference in the perceptions of physical literacy among pre-service teacher based on their subject specialization. The research showed that physical education pre-service teachers have a higher level of physical literacy compared to pre-service teachers from other branches. This result can be explained by the fact that physical education pre-service teacher focuses more on physical activity and bodily awareness during their educational processes (Yıldızer & Munusturlar, 2021). Physical literacy acquisition in schools is not solely the responsibility of physical education teachers (Castelli et al., 2014). The lower levels of physical literacy among pre-service teachers in other disciplines indicate a lack of sufficient education and awareness efforts in this area.

With the limited number of studies conducted on physical literacy in our country (Yıldızer & Munsuturlar, 2021), it has been emphasized in studies conducted in different countries that teachers have low awareness of the concept of physical literacy (Harvey & Pill, 2018; Robinson et al., 2018; Essiet et al., 2022). Physical literacy is one of the fundamental pillars of physical education teacher training programs and is supported by many courses (Flemons et al., 2018). For other subject teachers, physical education is offered only as a semester course. In a study conducted particularly with classroom teachers, participants indicated that they did not receive sufficient physical education classes and did not feel confident in this regard (Cothran et al., 2010). This research, which aims to reveal how the levels of physical literacy among pre-service teachers vary by subject, is important in terms of contributing to the field. The research findings emphasize that physical awareness and physical activity courses should be increased in teacher training programs outside of physical education. Such courses can contribute to pre-service teachers both maintaining their health and serving as role models for their students. Additionally, there are other studies indicating that participation in physical activity has a positive impact on physical literacy (Longmuir et al., 2015; Edwards et al., 2017). For this reason, school communities and school clubs should be made more functional in all educational institutions, especially universities, to support students' participation in sports.

Another finding of the research is that there is a significant difference in the levels of physical literacy among pre-service teacher based on their engagement in regular physical activity. The physical activities performed are a precursor to the level of physical literacy possessed (Edwards et al., 2017; Holler et al., 2019). Therefore, there is a linear connection between physical literacy and physical activity.

Regular physical activities will also make positive contributions to the fundamental components of physical literacy in individuals, which are physical competence, motivation, knowledge, and understanding. Individuals with developed physical literacy will be more willing to participate in physical activities and will adopt a healthier lifestyle through lifelong sports. Especially teachers with developed physical literacy can contribute to creating a sustainable lifestyle by instilling the habit of participating in physical activities in their students and fostering the development of their physical literacy.

In literature reviews, it is observed that regular physical activity is important for the development of physical literacy. Especially in early childhood, participation in physical activity will have a positive impact on physical literacy. Therefore, it is extremely important to place more emphasis on physical literacy in educational programs, starting with teacher training that will instill these habits in school-aged children. Additionally, encouraging teachers in this regard is crucial.

Recommendations

This study aims to contribute to teacher training programs by examining the levels of physical literacy among pre-service teachers. The findings obtained within the scope of the research have shown that physical education pre-service teachers who regularly engage in physical activity have a higher level of physical literacy. These results indicate that physical activity habits should be supported in teacher training programs. Additionally, it is recommended that future studies on this topic test these findings with larger samples and in different contexts.

In order for pre-service teacher to develop their physical literacy and to help their students acquire these skills, the concept of physical literacy should be given more emphasis in teacher training programs. Especially in subjects other than physical education (such as classroom teaching, science, social sciences, etc.), these courses should not be limited to theoretical knowledge but should also include practical activities. With such practical activities, pre-service teachers should be provided with practical skills such as basic movement skills, physical activity planning, and the ability to impart physical literacy to students.

Physical education classes and after-school physical activity programs are the most suitable environments for developing students' physical literacy skills. Additionally, various activities can be organized by establishing school sports clubs and sports communities. The effectiveness of the conducted activities should be regularly evaluated, and continuous improvement should be ensured through feedback and necessary adjustments.

In schools, teachers are very important role models for students. In this regard, planning such activities for teachers and ensuring that teachers engage in regular physical activities is extremely important. However, like every individual, teachers also need to have the habit of participating in physical activities. For teachers, such activities should encompass all subject teachers and support the participation of their families, which will further raise awareness. Community-based physical activity programs can be organized in collaboration with local governments and non-governmental organizations.

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Literature Review	Mehmet YANIK
Data Collecting	Mehmet YANIK
Data Analysis	Mehmet YANIK
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Statement of Ethics Committee	
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