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ORIGINAL ARTICLE

The impact of the Sports Science Students' Attitudes towards the Scientific Research Methods Course on their Critical Thinking Skills

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ABSTRACT

Background: Scientific research processes are of capital significance in defining problems from a critical perspective, identifying the variables, determining the relationships between these problem variables, and finding solutions to existing issues.

Aim: Based on this direction, the current study aimed to examine the effects of sports science students' attitudes towards scientific research methods course on their critical thinking skills considering various variables.

Methods: The study group, determined by a simple random sampling method, comprised 412 students with an average age of 21.92, studying in sports sciences. "Attitude Scale Towards Scientific Research Course" and "Critical Thinking Skills Scale" were used to scale students' scientific research and critical thinking skills.

Results: *The study determined that while there was no significant difference between the students according to the gender variable, there were differences according to the department and class variables.*

Conclusion: As a result, there is a positive relationship between students' attitudes towards scientific research methods and their critical thinking skills.

Keywords: Sport Sciences, Scientific Research, Critical Thinking

INTRODUCTION

To use a common expression to describe Research today, it is simply ″information seeking″. In a broader sense, we can also explain Research as a scientific and systematic examination of knowledge about a particular subject. In that connection, the primary purpose of Research is to reach accurate and reliable information with a critical approach.

The Advanced Learner's Dictionary of Current English defines the meaning of Research as "a careful inquiry or examination, seeking facts in any branch of science." Redman and Mory (1923) have defined Research as "a systematic effort to acquire new knowledge[1]." Many people see Research as a journey of discovery from the known to the unknown. In this sense, we all have a vital instinct of curiosity towards the unexplored, and this impetus enables us to explore and fully understand it. This curiousness is the beginning of all wisdom, and we can call it the method that people use to get knowledge of everything unexplored[2,3]. However, the scientific knowledge-acquisition process differs from everyday, unscientific knowledge-acquisition ways[4]. Therefore, to obtain scientific knowledge, Research must follow the processes of field study, problem definition, hypothesis and assumption formulation, collecting, organizing, and evaluating data, and carefully testing the results to determine whether they fit the formulated hypothesis[3,5].

This process leads us to knowledge and a careful and critical approach. Critical thinking is a defense against too many people and the world of knowledge trying to persuade us[6]. Moore et al. (2012) have defined critical thinking as a systematic evaluation of the arguments, ideas, and theories of others[7]. Ennis (1991) has defined critical thinking as reasonable reflective thinking focused on deciding what to believe or do[8]. In contemporary debates, critical thinking continues to be advocated as a significant educational goal or ideal by some researchers (e.g., Nussbaum, 1997; Siegel, 1988, 1997). In this context, teaching critical thinking in education and other disciplines improves students' thinking skills and thus better prepares them to be successful in the world they live in[9]. Since the early 1980s, attention to critical thinking and following scientific processes to reach knowledge has increased significantly. Students (and all people in general) have been assessed as rational, reasonable, and critical thinkers to the extent that they believe, judge, and act on reasons which are also considered skills[10].

Undoubtedly, educational institutions should assume responsibility for enabling the individuals living in the information society to acquire the skills of scientific thinking and critical approach. Universities have significant duties in realizing the education system's function of raising individuals with these attitudes and behaviors[11]. In this context, the "scientific research methods course" aims to bring a different perspective to scientific events to reach the truth, with a critical approach and a detailed explanation of the methods and techniques used in achieving knowledge.

The literature review has revealed many studies examining students' attitudes towards scientific research methods courses[12,13,14,15,16,17,18,19,20,21,22,23]. However, there was no study aimed at students studying in the sports sciences, covering "scientific research methods course" and "Students' attitudes towards critical thinking" together. This study, which will contribute to the literature, aimed to examine the effect of "attitudes of sports science students towards scientific research methods course" on "their critical thinking skills" in terms of various variables.

MATERIAL & METHODS

Participants: The study group consisted of 412 students - 212 boys and 200 girls- selected by random sampling method, studying in the fields of Sport Sciences at universities in the 2020-2021 academic year. The average age of the students was 21.92. Of the 412 students, 142 were studying in the Department of Physical Education and Sports Teaching, 141 in Sports Management, and 129 in Coaching Education.

Measuring Tools ***The Scale of Attitudes Towards Scientific Research Methods Course:*** Developed by Yaşar (2014), the Scale of Attitudes Towards Scientific Research Methods Course used in the study is a scale that includes a 7-point Likert-type rating, comprising 20 items and four sub-dimensions (Importance, Cognitive Self-Confidence, Interest, Daily Life-Professional Relationship). The internal consistency coefficient "Cronbach Alpha" was calculated to determine the reliability of the items on the scale containing no reverse score items[24]. The general reliability of the scale was found very high as alpha=0.917

Critical Thinking Skills Scale: The Critical Thinking Skills Scale developed by Sarıgöz (2014) is a 22-item scale with a 5-point Likert-type rating[25]. The Cronbach's alpha value of the scale, containing no reversed item, was found high at alpha=0.80, which established its validity and reliability.

Data Collection: In the data collection phase, randomly selected sports science students were reached via online questionnaires due to the ongoing distance education during the Pandemic. The students were asked to answer questions about their personal information, attitudes towards the scientific research methods course, and critical thinking skills. After collecting online questionnaires, 412 scales were evaluated.

Data Analysis: The current study examined the effects of sports science students' attitudes towards scientific research courses on their critical thinking skills. The research performed Kolmogorov-Smirnov (n>50) and Skewness-Kurtosis tests to determine whether the measurements had a normal distribution. After determining normal distribution, parametric tests were applied. The current study expressed descriptive statistics as mean and standard deviation for continuous variables and as number (n) and percentage (%) for categorical variables. Cronbach's alpha coefficients were calculated for the scale questions' reliability analysis, considering the average scores of the scale answers. Independent t-test and One-Way Analysis of Variance (ANOVA) were used to compare scale and sub-dimension scores according to categorical groups. While the Tukey test was used to identify different groups, the Multiple Regression Analysis was utilized to estimate the effect of attitudes towards scientific research courses on critical thinking skills. Pearson correlation coefficients were calculated to determine the relationships between scale dimensions taking Statistical significance level (□) as 5%. In the calculations, SPSS statistical package program was used for analysis.

RESULTS

This section covers the statistical analysis of the data and the relationship between the scales in the study.

Table 1 shows the results of the correlation analysis between the scales and their sub-dimensions. In line with these results, there was a statistically significant relationship between the Critical Thinking Skills scale and all Scientific Research Course scales and its sub-dimensions (p<0.05). Similarly, other significant dual relations are denoted by the asterisk (*).

Table 1. Correlation analysis results between scales and sub-dimensions

		Age	The Significance of Scientific Research	Cognitive Self-Confidence	Interest	Daily Life-Profession Relationship	The Scale of Attitudes Towards Scientific Research Course
The Significance of Scientific Research	r	-,188**					
	p.	,001					
Cognitive Self-Confidence	r	,076	,085				
	p.	,125	,084				
Interest	r	-,104*	,239**	,648**			
	p.	,035	,001	,001			
Daily Life-Profession Relationship	r	-,058	,184**	,658**	,719**		
	p.	,239	,001	,001	,001		
The Scale of Attitudes Towards Scientific Research Course	r	-,098*	,559**	,780**	,847**	,816**	
	p.	,046	,001	,001	,001	,001	
Critical Thinking Skills Scale	r	-,191**	,099*	,424**	,439**	,383**	,438**
	p.	,001	,044	,001	,001	,001	,001

** p<0,05; **p<0,01 r: Pearson correlation coefficients*

Table 2. A comparison of scales according to the gender variable

		N	Mean	Std. Dev.	Std. Error	t	**p.*
The Significance of Scientific Research	M	211	3,9076	1,12347	,07734	1,678	*,094*
	F	200	3,7183	1,16222	,08218		
	Total	411	3,8155	1,14502	,05648		
Cognitive Self-Confidence	M	211	4,3204	1,22766	,08452	,880	*,379*
	F	200	4,2150	1,19848	,08475		
	Total	411	4,2691	1,21322	,05984		
Interest	M	211	4,3687	1,06206	,07312	,007	*,995*
	F	200	4,3680	1,14943	,08128		
	Total	411	4,3684	1,10408	,05446		
Daily Life-Profession Relationship	M	211	4,4289	1,23839	,08525	-,594	*,553*
	F	200	4,4988	1,13877	,08052		
	Total	411	4,4629	1,19002	,05870		
The Scale of Attitudes Towards Scientific Research Course (General)	M	211	4,2303	,88501	,06093	,819	*,413*
	F	200	4,1610	,82739	,05851		
	Total	411	4,1966	,85712	,04228		
Critical Thinking Skills Scale	M	211	3,6293	,58466	,04025	,123	*,902*
	F	200	3,6223	,56678	,04008		
	Total	411	3,6259	,57534	,02838		

*Significance levels according to Independent T-test results

Table 2 shows the comparison results of the scale sub-dimensions by the gender variable. There was no statistically significant difference in all scale dimension scores according to the gender variable (p>0.05). Consequently, the gender variable does not affect these scale scores.

Table 3. Comparison of scales according to the Department variable

		N	Mean	Std. Dev.	Std. Error	F	*p.
The Significance of Scientific Research	Coaching	129	4,0297[a]	1,05911	,09325	4,861	*,008*
	Physical Education and Sports Teaching	142	3,6009[b]	1,06672	,08952		
	Sports Management	141	3,8310[ab]	1,25767	,10592		
	Total	412	3,8139	1,14407	,05636		
Cognitive Self-Confidence	Coaching	129	4,3721[a]	1,26336	,11123	3,051	*,048*
	Physical Education and Sports Teaching	142	4,3859[a]	1,21238	,10174		
	Sports Management	141	4,0695[b]	1,15263	,09707		
	Total	412	4,2733	1,21474	,05985		
Interest	Coaching	129	4,4744	1,16782	,10282	1,920	*,148*
	Physical Education and Sports Teaching	142	4,4211	1,03983	,08726		
	Sports Management	141	4,2270	1,10071	,09270		
	Total	412	4,3714	1,10441	,05441		
Daily Life-Profession Relationship	Coaching	129	4,6027	1,18693	,10450	1,252	*,287*
	Physical Education and Sports Teaching	142	4,3926	1,26091	,10581		
	Sports Management	141	4,4149	1,11557	,09395		
	Total	412	4,4660	1,19026	,05864		
The Scale of Attitudes Towards Scientific Research Course	Coaching	129	4,3411	,88319	,07776	2,763	*,064*
	Physical Education and Sports Teaching	142	4,1606	,84291	,07074		
	Sports Management	141	4,1064	,83582	,07039		
	Total	412	4,1985	,85699	,04222		
Critical Thinking Skills Scale	Coaching	129	3,6600	,59225	,05214	2,617	*,074*
	Physical Education and Sports Teaching	142	3,6850	,55225	,04634		
	Sports Management	141	3,5387	,57545	,04846		
	Total	412	3,6271	,57519	,02834		

*Significance levels according to the results of one-way ANOVA test; a,b,c show difference between groups (Tukey post hoc test)

Table 3 shows the comparison of the scale sub-dimensions by the Department variable. There was a statistically significant difference in the "Significance of Scientific Research sub-dimension score" considering the Department variable (p=0.008). In other words, the Coaching Education students' "Significance of Scientific Research sub-dimension score" was higher than that of the Physical Education and Sports Teaching students. Sports Management students were similar to other groups. Likewise, there was a statistically significant difference in the "Cognitive Self-Confidence sub-dimension score" according to the Department variable (p=0.048). Here, the "Cognitive Self-Confidence sub-dimension score" of sports management students was higher. On the other hand, there was no statistically significant difference in the scores of other scale sub-dimensions according to the Department variable (p>0.05).

Table 4. Comparison of the scales according to the Class variable

		N	Mean	Std. Dev.	Std. Error	F	*p.
The Significance of Scientific Research	1	62	3,8656[b]	1,27568	,16201	3,547	*,015*
	2	90	3,9907[a]	1,20609	,12713		
	3	118	3,9477[a]	1,07300	,09878		
	4	142	3,5681	1,06805	,08963		
	Total	412	3,8139	1,14407	,05636		
Cognitive Self-Confidence	1	62	4,3161	1,41956	,18028	1,382	*,248*
	2	90	4,1111	1,08849	,11474		
	3	118	4,2000	1,15352	,10619		
	4	142	4,4183	1,23860	,10394		
	Total	412	4,2733	1,21474	,05985		
Interest	1	62	4,5548	1,23894	,15735	1,048	*,371*
	2	90	4,3333	1,11698	,11774		
	3	118	4,2610	1,01628	,09356		
	4	142	4,4070	1,10432	,09267		
	Total	412	4,3714	1,10441	,05441		
Daily Life-Profession Relationship	1	62	4,5484	1,25600	,15951	,348	*,790*
	2	90	4,4056	1,23706	,13040		
	3	118	4,4089	1,01520	,09346		
	4	142	4,5158	1,27100	,10666		
	Total	412	4,4660	1,19026	,05864		
The Scale of Attitudes Towards Scientific Research Course (General)	1	62	4,2871	1,04595	,13284	,261	*,854*
	2	90	4,1894	,86747	,09144		
	3	118	4,1814	,73965	,06809		
	4	142	4,1799	,85699	,07192		
	Total	412	4,1985	,85699	,04222		
Critical Thinking Skills Scale	1	62	3,7082	,60244	,07651	1,691	*,168*
	2	90	3,6803	,65847	,06941		
	3	118	3,5351	,50060	,04608		
	4	142	3,6344	,56027	,04702		
	Total	412	3,6271	,57519	,02834		

**Significance levels according to the results of one-way ANOVA test; a,b,c show difference between groups (Tukey post hoc test)*

Table 4 shows the comparison of the scale sub-dimensions by the Class variable. There was a statistically significant difference in the "Significance of Scientific Research sub-dimension score" according to the Class variable (p=0.015). In other words, the First-year students' "Significance of Scientific Research sub-dimension score" was lower than those of the students in other classes. On the other hand, there was no statistically significant difference in other scale sub-dimensions scores according to the Class variable (p>0.05).

DISCUSSION

The current study aimed to examine the effects of sports science students' attitudes towards scientific research courses on their critical thinking skills. In this direction, students' attitudes towards the scientific research course and critical thinking levels were examined with the gender, department, and class variables.

According to the Gender variable, there was no difference in the students' attitudes towards scientific research courses in the study. While some studies supported this finding (Polat, 2014; Yenilmez & Ata, 2012; Bibi, Lqbal & Majid, 2012; Saracaloğlu, 2008; Saracaloğlu, Varol & Ercan, 2005; Crawley & Koballa, 1991), some studies observed that female students' attitude scores towards scientific research course were higher than male students[11,31] (İlhan, Çelik & Aslan, 2016; Korkmaz, Şahin & Yeşil, 2011). Similarly, Mills (2004) found that female students had a more positive view of the scientific research methods course than males[32].

Regarding the attitudes towards scientific researchers, some studies observed no difference between Departments. However, contrary to these findings, the current study detected differences between the departments of Physical Education and Sports Teaching, Sports Management, and Coaching Education. In their research, Karamustafaoğlu and Meşeci (2021) also observed differences between departments[12]. On the other hand, It has been stated that the weight given to theoretical and applied courses directly affects the critical thinking and beliefs of the students[33]. The reason for different statistics results of various studies regarding department variables might be using of distinct study groups or sample variability[34]. The results of the literature studies support the findings of this study.

As for the Class variable, in terms of positive attitudes towards research, the attitudes of the 4th-Class students have been observed as more positive than the 1st-Class students. Polat (2014) has found a significant difference in the "unwillingness to help researchers" item. The difference between these two studies may be due to the different study groups. Polat (2014) has stated that the 4th-Class students' higher positive attitude than the 1st-Class students might be associated with their rising perception of the importance of academic studies and research while their education levels increase[17]. Kurt et al. (2011) did not find any difference in gender and class variables in their study conducted on the Computer and instructional technology education department students regarding the scientific research methods course[35]. Contrary to their finding, the current study observed differences among the students according to the class variable and found that the score levels of the first-class students were lower than the other classes.

Polat (2014) has provided a critical view on the scientific research methods courses and on their effect on students in developing positive attitudes towards scientific research[17]. Similarly, Butt and Shams (2020) have emphasized the necessity of building up a positive attitude towards the scientific research methods course and that this will be the key to success in the education process and also this approach is imperative to produce a critical approach[36]. The current research suggests that students' positive attitudes towards scientific research courses support their critical thinking skills. This view also supports the literature.

CONCLUSION

Although many studies have been conducted on students intensively, there is no study in the literature examining the effects of sports science students' attitudes towards scientific research courses on their critical thinking skills. However, developing positive attitudes towards research activities and having critical thinking skills are essential requirements for students in their research activities and assessing the results.

The current study presents the investigation findings on the effects of sports science students' attitudes towards scientific research courses on their critical thinking skills and underlines the significance of developing a positive attitude towards scientific research. The study examined students' experiences, attitudes, and these attitudes' effects on their critical thinking skills in terms of various variables. Investigating students' attitudes considering different sociodemographic characteristics will contribute to the existing knowledge about students' attitudes towards scientific research courses. In addition, the study results can develop the curriculum for the scientific research course in the field of sports sciences.

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