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ARE SCIENCE TEACHERS REALLY AWARE OF THE IMPORTANCE OF EDUCATIONAL RESEARCH?

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Abstract:
Teachers are expected to consider the implications of recommendations made in educational research. In-service teachers are primary actors who play a leading role in education, so their attitudes towards educational research and researchers are more important than those of pre-service or trainee teachers. This study aims to find out in-service science teachers' attitudes towards education research and some the factors that affect them such as gender, teacher's subject area, seniority, and postgraduate research area. The research data was obtained using a Likert-type scale developed by Ilhan, Şekerci, Sözbilir & Yildirim (2013). The study sample included 108 in-service high school science teachers from Turkey. The results show that in-service science teachers find educational research applicable and necessary but of limited value. Teachers who graduated from education faculties have more positive attitudes towards educational research and teachers who are newly appointed to the profession have a better understanding of the utilities and value of educational research. This study emphasizes and underlines that science teachers' attitudes towards the value of educational research are under the targeted level. In order to adequately support science teachers and provide them with the intended competencies of their curricula, this study provides some implications for both teachers and researchers in science education.

Keywords: educational research, science education, teachers' attitudes

1. Introduction

Education plays a crucial role in understanding modern technologies, societies, and the findings of educational research relating to avenues of successful educational activities. Therefore, teachers and their attitudes towards the findings of educational research play

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a pivotal role (Nel, Müller, Hugo, Helldin, Bäckmann, Dwyer, Skarlind, 2011) in the development of countries and their societies (Botha & Reddy, 2011; Ilhan *et al*., 2013). On the other hand, the popularity of science education is decreasing, negative attitudes toward science are becoming common in learners from various cultures (Stefanikova and Prokop, 2015), attitudes towards science from junior to high schools are declining (Hofstein & Welch, 1984), and non-science majors do not generally have positive opinions of science and scientists (Rogers and Ford, 1997; Movahedzadeh, 2011).

These negative attitudes towards the research pose a serious threat, not only to science education, but also to economic and social prosperity (Osborne, Simon, Collins, 2003), and threaten countries' chances of increasing their level of scientific literacy. Attitudes associated with science affect student participation in science lessons (Koballa, Crawley, & Shrigley, 1990), and impact performance in science (Hofstein & Welch, 1984; Neathery, 1997). However, science education plays an important role in the understanding of modern technologies that are applied to various parts of everyday lives (Lappan, 2000; Sorgo, Jausovec, Jausovec & Puhek, 2012; Stefanikova and Prokop, 2015).

However, some research has shown that teachers do not generally follow academic studies and do not sufficiently benefit from the findings of the research, and that they also hold negative attitudes towards educational research (Costa, Marques and Kempa, 2000; Greenwood & Maheadly, 2001; Everton, Galton & Pell, 2002; Çepni and Küçük, 2003; De Jong, 2004; Ekiz, 2006).

In developing countries, it is usually seen that some modern schools struggle to implement new practices resulting from the findings of latest educational research. These practices may affect their curriculum, certain classroom activities, or require a number of new and different instructional approaches. When considering all of a country's schools and teachers' willingness to perform new instructional practices is one of the key factors influencing educational improvement (Ghaith and Yaghi, 1997). Hence, determining the factors influencing teachers' attitudes towards educational research and the implementation of desired practice is important.

In recent years, it has been seen that there has been an increase in educational research (Chang, Chang & Tseng, 2010; Sözbilir, Kutu & Yasar, 2012; Tsai & Wen, 2005), but the utilization level of the findings of this research is still lower than desired (Biesta, 2007; Hemsley-Brown and Sharp, 2003; De Jong, 2004; Everton, Galton, and Pell, 2000; Vanderlinde & van Braak, 2010).

Teachers' attitudes towards educational research are a critical factor for them to benefit from the related findings. As these studies can have a router effect on personal behaviors, the attitudes may bring positive or negative behaviors (Tavşancıl, 2014, p74). The greater the number of teachers that believe in the efficacy, utility (Ilhan et al., 2013), and practicability of educational research, the greater the number that will benefit from the findings of educational research. This point once again indicates the importance of knowing teachers attitudes towards educational research.

It is a surprising result, even today, that during the instruction process teachers give priority to cognitive activities but generally ignore affective achievements (Bilen,

2001; Bacanlı, 1999; Demirbaş & Yağbasan, 2006), whereas, with multiple correlation, science achievement is correlated with attitude towards science (Neathery, 1997). Once again, this result indicates the importance of knowing teachers' attitudes towards educational research.

However, it is reported that most education practitioners (such as teachers, managers, and politicians) have negative attitudes towards education research and they also believe that education research does not find real solutions for the problems faced during educational practice (Shkedi, 1998; Everton, Galton and Pell, 2002; Hemsley-Brown and Sharp, 2003; Gore and Gitlin, 2004; Biesta, 2007; Yavuz, 2009; Ilhan et al., 2013).

This research provides interesting insights into teachers' attitudes towards educational research for all the researchers for the whole world countries with different economic structures. As a result of this, the reality is that improving teacher education system is not only a need for developing countries but also all the other countries as well.

When reviewing literature, it is seen that there are hundreds of studies assessing teachers' or students' attitudes towards general scientific research or methods but, conversely, there are few studies revealing in-service teachers' attitudes towards educational research. In this context, this study is one of these rare studies and this feature increases the importance of this study.

In order to determine what variables best predict educators' attitudes toward systematic inquiry in schools, Cousins and Walker (2000) investigated 310 educators through a Likert-type questionnaire. They suggest that increased attention to strategies designed to enhance teachers' knowledge and skill in research is likely to be productive and will add to a growing body of literature on teacher-training curriculum renewal in this direction.

In another study, in an attempt to describe the development of a scale concerning "attitudes toward research" and verify the dimensions of attitudes toward research among undergraduate students enrolled in introductory research courses, Papanastasiou (2005) identified five factors affecting students' attitudes toward research. These factors were: the usefulness of the research, anxiety, effects indicating positive feelings about the research, the life relevancy of the research to the students' daily lives, and the difficulty of the research. They report that students who can understand the usefulness of the research tend to have more positive attitudes toward the subject, but issues of whether research is difficult or if it causes anxiety to the students do not appear to be highly correlated with usefulness factors.

In an effort to determine the attitude of pre-service teachers toward scientific research, Korkmaz, Şahin & Yeşil (2011) surveyed 1085 undergraduate student teachers using a five-point Likert-type questionnaire composed of 30 items. Interesting reasons were given for unwillingness to participate in the questionnaire, such as containing unnecessary questions, not considering the participants' comments, and thinking such research is unrealistic and time consuming.

Regarding determining how teachers conduct research on education, identifying the characteristics they want to see in research on education and revealing which subject they have the most demands in Yavuz (2009) collected data from 209 teachers through an adapted version of Everton, Galton & Pell's (2002) Likert-type questionnaire. The study reports that the groups most interested in educational research were primary school teachers, special education teachers, and nursery school teachers. The teachers and principals generally follow research using the Internet. The research subject that they most wish to be researched and those that they are most affected by are considered "the effective education model, strategy and techniques for students in different ability groups".

In an attempt to develop a scale that measures the attitudes of PreK-12 in-service educators toward educational research, Öztürk (2010) gave a scale to 193 PreK-12 in-service educators (teachers, school counselors, school psychologists, etc.) working at schools. The study reports that educators' attitudes toward educational research hold much potential for future research and that these attitudes influence actual practices concerning research. Additionally, in order to understand the overall status of the subject, more qualitative work will be required.

There are also other scales assessing teachers' attitudes towards research in education (Cousins and Walker 2000; Papanastasiou, 2005; Walker, 2010) but, considering their theoretical framework and item content, it is difficult to say they are fully appropriate for the research of education. This is because these scales are able to assess attitudes towards scientific research or assess attitudes towards general education research (Ilhan et al., 2013). Also, most of the scales developed are intended for assessing trainee teachers' or undergraduates' attitudes instead of assessing active in-service teachers' attitudes.

In an effort to determine the attitude of teachers towards educational research, Ilhan et al., (2013) applied a survey on 504 teachers using a five-point Likert-type questionnaire composed of 20 items. As a result of the study, three factor structures were defined and the Cronbach's alpha reliability coefficient of the instrument was calculated as 0.88. These three factors were: necessity of educational research, value of the educational research, and the applicability of educational research. When compared to other scales that assess attitudes towards educational research, it can be commented that, although having fewer factors, the items of Ilhan et al.'s (2013) scale are more comprehensive. For this reason, we preferred to use Ilhan et al.'s, (2013) scale in order to assess in-service teachers' attitudes towards the research of education.

Determining in-service science teachers' attitudes towards educational research will be a guide towards designing activities that will going to help these teachers develop positive attitudes towards educational research. As a result of these implications, students' negative attitudes towards science lessons should give way to positive attitudes.

This study aims to determine the attitudes of in-service science teachers towards educational research and how these relate to the present aims of the science education curriculum and what can be done to troubleshoot the encountered problems.

This study intends to investigate in-service science teachers' views on educational research and the values they attribute to it.

1. Consequently, the research questions of this study are: What attitudes do high school science teachers have towards educational research?
2. Are there differences between teachers' attitudes depending on their subject area, gender, seniority, academic degree, and research area?
3. What may be the solutions for better science instruction in this frame?

2. Material and Methods

This study uses a descriptive method based on a qualitative survey-based model. The descriptive method requires determining the primary problem. This research attempts to determine in-service high school science teachers' perceptions towards educational research and educational researchers. The frequencies and distribution of the characteristics of the study sample are described and the relationships between the variables are explored.

2.1 Population and the Sample

The research population consisted of in-service science teachers working at state high schools in Isparta in Turkey. The data were collected at the end of 2014-2015 academic year. In-service science (Biology, Chemistry and Physics) teachers were invited to participate in the survey on a voluntary basis. The sample consisted of 108 in-service science teachers who taught grades 9-12 as professional teachers at high schools in Turkey. Demographic features of the sample can be seen in Table 1.

Table 1: Demographic features of in-service science teachers

Gender	**n**	**%**	**Mean**	**SD**
Female	53	49.1	3.76	0.425
Male	55	50.9	3.80	0.558
Total	**108**	**100.0**		
Type of Faculty Graduated From				
Faculty of Education	37	34.3	3.96	0.436
Faculty of Science or other	71	65.7	3.69	0.502
Total	**108**	**100**		
Teaching Subject				
Biology	42	38.9	3.86	0.384
Physics	35	32.4	3.67	0.513
Chemistry	31	28.7	3.78	0.595
Total	**108**	**100.0**		
Working Time				
1-10 Years	19	17.6	3.98	0.534
11-20 Years	44	40.7	3.80	0.467
21-30 Years	40	37.0	3.68	0.505
>30 Years	5	4.6	3.64	0.356
Total	**108**	**100.0**		

Training Level				
Bachelor's degree	92	85.2	3.78	0.473
Master's degree	16	14.8	3.80	0.630
Total	**108**	**100.0**		
Authored a Research Article				
Have authored an article	92	85.2	3.82	0.467
Have not authored article	16	14.8	3.55	0.599
	108	**100.0**		

2.2 Data Collection Tool (TASTER)

In order to determine in-service science teachers' attitudes towards educational research and researchers, an instrument named "Teachers Attitude Scale towards Educational Research (TASTER)," which was developed by Ilhan et al. (2013), was used in this study. This Likert-type scale has five points and consists of 20 items. The reliability coefficient (Cronbach's Alpha) of TASTER was calculated as 0.87 in Ilhan et al.'s (2013) study. However, in our study, the reliability coefficient (Cronbach's Alpha) of TASTER was calculated as 0.89.

Cronbach's Alpha reliability coefficients of TASTER and its sub-dimensions for the data obtained in the current study are presented in Table 3. TASTER's sub-dimensions are "Applicability of Educational Research" (Items 14,15,16,17,18,19,20), "Value of Educational Research" (Items 8,9,10,11,12,13), and "Necessity of Educational Research" (Items 1,2,3,4,5,6,7). The instrument's negative items were inverted before the data analysis process.

Table 2: Reliability coefficients for the data obtained by TASTER

Scale	Number of Questions	Cronbach's Alpha	*Ilhan et al.'s (2015) Study
TASTER	20	0.89	0.86
Necessity of Educational Research	7	0.86	0.77
Value of Educational Research	6	0.90	0.79
Applicability of Educational Research	7	0.85	0.71

In addition to the twenty statements from TASTER, participants were asked to state some demographic information such as their gender, the type of faculty they attended, branch, total service time, and training level.

2.3 Data Analysis

Inferential (T-test, ANOVA) and descriptive statistical techniques were used to evaluate data obtained through TASTER. SPSS 21.0, a statistical software package program, was used to analyze the research data. In order to investigate whether there was a statistically meaningful difference in the mean scores between the two sample groups, an independent sample t-test was performed.

Following the ANOVA, a Scheffe Post-Hoc analysis was performed to discern the statistical difference between the groups.

3. Results of the Research

A comparative or descriptive analysis of the study based on results, on previously studies, etc. The results should be presented in a logical sequence, given the most important findings first and addressing the stated objectives. The number of tables and figures should be limited to those absolutely needed to confirm or contest the premise of the study. The authors should deal only with new or important aspects of the results obtained. Material from the Results section should not be repeated, nor new material introduced. The relevance of the findings in the context of existing literature or contemporary practice should be addressed.

3.1 Descriptive Analysis of TASTER

Using the instrument (TASTER), arithmetic mean scores for each item obtained from the responses of in-service science teachers are given in Table 3. Ilhan et al.'s (2015) results obtained from trainee science teachers are also included in order to compare these with those of our study. In this context, the GPAs of every item from TASTER in the current study were compared with the GPAs of every item obtained from the trainee science teachers' answers in Ilhan, Yilmaz & Dede's (2015) study, in which an independent sample t-test was used. The result showed that there was no statistical significance between in-service science teachers' and trainee science teachers' attitudes towards educational research ($t=0.409$, $df=38$, $p=0.685$, $p>0.05$). However, when Table 3 was examined, the general arithmetic mean ($M=3.78$) of in-service science teachers' responses to TASTER was found to be higher than the arithmetic mean ($M=3.72$) of trainee science teachers' responses to TASTER. This result can be interpreted as in-service science teachers having a more positive attitude towards educational research and researchers than trainee science teachers have.

During the data analysis, the general arithmetic mean score for in-service science teachers who participated to the study was assessed as 3.78. According to the scale used by Ilhan et al. (2015), "the score interval between 1 and 2.59 refers to negative attitudes, 2.60-3.40 score interval refers to moderate attitudes, and the 3.40-5 score interval refers to positive attitudes."

So, in the light of the abovementioned scale, it is possible to say for our study that the general arithmetic mean score for in-service science teachers indicates that they have a positive attitude towards educational research.

Table 3: Descriptive analysis of TASTER

	In-service Science Teachers Responses in our study.		**Trainee Science Teachers responses from *Ilhan et al.'s (2015) Study**	
Items	**Mean (M)**	**Standard Deviation (SD)**	**Mean (M)**	**Standard Deviation (SD)**
1- Educational research provides beneficial	4.08	0.725	3.99	0.78

information that I can use in lectures.				
2- Scientific publications regarding education (dissertations, articles, books, etc.) contribute to an increase in the quality of education.	3.96	0.796	3.52	1.01
3- I am pleased to teach a lesson in class that accord with the findings of educational research.	4.09	0.815	4.06	0.81
4- Academics only conduct educational research to enhance their own careers.	4.03	0.676	4.01	0.86
5- If I teach lessons according to the data obtained from educational research, I cannot satisfactorily complete the topics.	3.77	0.816	3.73	0.80
6- Teachers should benefit from educational research findings.	3.89	0.789	3.85	0.79
7- I like seminars on educational research.	3.88	0.782	3.76	0.90
8- I believe that scientific publications regarding education (dissertations, articles, books, etc.) are superficial.	4.20	0.733	4.17	0.71
9- It is necessary to benefit from educational research to become a qualified teacher.	4.31	0.732	4.17	0.76
10- Educational research contributes to the development and renewal of curricula.	4.24	0.874	4.11	0.80
11- It is necessary to conduct scientific research regarding education.	4.44	0.789	4.24	0.82
12- It is important to be informed about educational research.	4.37	0.756	3.97	0.77
13- It is a waste of time to teach lessons according to the results of educational research.	3.99	0.922	4.08	0.82
14- Educational research generates solutions for the problems I encounter in teaching.	2.90	1.067	2.91	0.95
15- I do not think that educational research is applicable.	2.76	1.167	2.78	1.22
16- Educational research contributes to the development of the teaching profession.	2.93	1.039	3.11	0.96
17- Educational research findings that are recounted in seminars are beneficial.	3.15	1.048	3.37	1.04
18- Educational research is not applicable in the school environment.	3.60	0.976	3.62	0.96
19- Teaching according to the findings of educational research reduces the success of students.	3.26	1.008	3.17	1.11
20- Educational research findings are important for me when selecting teaching models, methods, and techniques for the topic in the teaching process.	3.73	0.838	3.72	0.99

*Data included for comparison.

When the mean scores of each item in Table 3 were examined, it can be seen that no item has a mean score within the interval of negative attitudes (1-2.59) towards educational research. There are only five items in the interval of moderate attitudes towards educational research. These items' numbers are 14, 15, 16, 17, and 19,

respectively. Excepting these five items, the mean scores of the other fifteen items in Table 3 are in the interval of positive attitudes towards educational research.

Table 4: Attitudes of science teachers towards educational research based on the sub-dimensions of TASTER

Attitudes of in-service Science Teachers				**Attitudes of Trainee Science Teachers**		
				***Ilhan et al.'s (2015) Study**		
Scale	**N**	**M**	**SD**	**N**	**M**	**SD**
Applicability of Educational Research	108	4.26	0.659	517	3.25	0.63
Necessity of Educational Research	108	3.96	0.573	517	3.85	0.56
Value of Educational Research	108	3.19	0.745	517	4.12	0.55

*Data included for comparison.

When Table 4 is examined, the two sub-dimensions are in the interval of positive attitudes towards educational research. Of these sub-dimensions, "Applicability of Educational Research" has the highest mean score (4.26) and "Necessity of Educational Research" has the second highest mean score (3.96). However, having the lowest mean score, the sub-dimension of "Value of Educational Research" is in the interval of moderate attitudes towards educational research.

Table 5: The results of independent group t-test in relation to gender

	Gender	**N**	**M**	**SD**	**t**	**DF (Degree of Freedom)**	**Significance (p)**
	Female	55	3.80	0.58			
TASTER	Male	53	3.76	0.425	0.492	106	0.624*
	Total	108					

*$P>0.05$

The results in Table 5 indicate that there is no statistical significance between in-service science teachers' attitudes according to gender (t=0.492, df=106, p=0.624, p>0.05), whereas men have a higher attitude mean score (M=3.80) towards educational research than women (M=3.76). This result shows that male science teachers have more positive attitudes towards educational research than their female colleagues.

Table 6: The results of ANOVA analysis in relation to branch of education

Branches	**N**	**M**	**SD**	**F**	**DF (Degree of Freedom)**	**Sig.**
Biology	42	3.86	0.384		2	
Chemistry	31	3.78	0.595	1.359	105	0.261
Physics	35	3.67	0.513			
Total	108	3.77	0.496		107	

When GPAs of the in-service high school teachers were compared according to their branches, there was no statistical significance between the three groups in relation to attitudes towards educational research, as determined by a one-way ANOVA ($F_{(2-105)}$=1.359, P=0.261). However, biology teachers had the highest mean (M=3.86),

chemistry teachers had the second highest mean (M=3.78), and physics teachers had the lowest mean (M=3.67). These results in Table 6 show that biology teachers have more positive attitudes towards educational research than chemistry teachers, and chemistry teachers have more positive attitudes towards educational research than physics teachers.

Table 7: The results of ANOVA analysis in relation to the teachers' years of experience

Years of Experience	N	M	SD	F	DF (Degree of Freedom)	Sig.
1-10 years	19	3.98	0.534	1.792	3	.153
11-20 years	44	3.80	0.467		104	
21-30 years	40	3.68	0.505			
>31 years	5	3.64	0.356			
Total	**108**	**3.77**	0.496		**107**	

When GPAs of the in-service high school teachers were compared according to their experience, there was no statistical significance between the three groups in relation to attitudes towards educational research, as determined by a one-way ANOVA ($F_{(3-104)}$=1.79, P=0.153). However teachers in the first group (1-10 years) had the highest mean (M=3.98), teachers in the second group (11-20 years) had the second highest mean (M=3.80), teachers in the third group (21-30 years) had the third highest mean (M=3.68), and teachers in the fourth group (31-over years) had the lowest mean (M=3.64) The results in Table 7 show, as if on a yearly basis, teachers lose their positive attitudes towards educational research. However, the reality is that, in the last decade, the national ministry of education sees pedagogic competencies as compulsory requirements to be appointed as a teacher. In Turkey, after receiving a qualified education from an Education faculty, persons have a right to be appointed as teachers in government schools. Therefore, junior teachers having the required competencies have the highest positive attitudes towards educational research. This result verifies the finding of Botha & Reddy (2011): that pre-service teachers demonstrate an understanding of science and science knowledge; although it is felt that pre-service teachers are up to date with the curriculum and methodology, there seems to be some lack of subject content knowledge.

When GPAs of the in-service high-school teachers were compared in regard to those who authored a master's thesis, there was no statistically significance on attitudes towards educational research between in-service science teachers' attitudes (t=0.150, df=106, p=0.881, p>0.05), whereas teachers that possess a master's thesis have a higher attitude mean score (M=3.80) towards educational research than the teachers that do not have a master's thesis (M=3.78). This result shows that teachers with a master's diploma have more positive attitudes towards educational research than teachers without a master's diploma.

When GPAs of the in-service high school teachers were compared in regard to those who had published a research article, there was statistically significance in regard to their attitudes towards educational research (t=2.066, df=106, p=0.041, p<0.05).

Interestingly, teachers who had published a research article have a lower attitude mean score (M=3.55) towards educational research than teachers that had not published a research article (M=3.82). This result shows that teachers who have not published a research article have more positive attitudes towards educational research than teachers who have published a research article. When Table 1 is examined, it is found that, of the total 108 teachers, 92 had a licensed diploma whereas 16 had a master's diploma. Of the 16 teachers who had a master's diploma, 15 of them had a master's diploma in pure science (M=3.77), but only one of them had a master's diploma in science education (M=4.45).

Table 8: In-service science teachers' attitudes towards sub-dimensions of TASTER in relation to their years of experience

Years of Experience	Necessity		Applicability		Value of Educational Research	
	Mean	SD	Mean	SD	Mean	SD
1-10 Years	3.99	0.834	4.32	0.901	3.68	0.696
11-20 Years	3.94	0.499	4.36	0.539	3.19	0.713
21-30 Years	3.97	0.519	4.14	0.660	2.99	0.752
31-40 Years	3.86	0.553	4.20	0.558	2.94	0.296

When GPAs obtained from the instrument's sub-dimension named "Value of Educational Research" were compared with teachers' years of experience, there was a statistical significance on attitudes towards educational research between the two groups of teachers. Of these, teachers working for 1-10 years had more positive attitudes (M=3.68) than teachers working for 21-30 years (M=2.99), as determined by a one-way ANOVA (($F_{(3\text{-}104)}$=4.163, p=0.008), p<0.05). The result in Table 8 shows that, in terms of value of educational research, teachers that have recently graduated from faculties have more positive attitudes towards educational research than teachers that have graduated earlier. One of the causes for this result may be the current conditions in Turkey to be appointed as a teacher. Two decades ago, there were not certain conditions to be appointed as teacher but teacher candidates who wish to be appointed as teachers must provide two conditions recently. The first is to certify that they have necessary pedagogic competencies and the second condition is to get sufficient score from Central Teacher Selection and Placement Exam.

In order to get sufficient score from the central exam, pre-service teachers attend private education courses so as to develop their pedagogic knowledge and skills. This struggle may be one of the reasons that indirectly helps newly appointed teachers to have positive attitudes about the educational research when compared to the ones with more than twenty year experience. When the general GPAs obtained from the whole instrument in Table 7 are examined, teachers in the first group (1-10 years) had the highest mean (M=3.98), teachers in second group (11-20 years) had the second highest mean (M=3.80), teachers in third group (21-30 years) had the third highest mean (M=3.68), and teachers in fourth group (31-over years) had the lowest mean (M=3.64).

Table 9: In-service science teachers' attitudes towards sub-dimensions of TASTER in relation to the faculty from which they graduated

Faculty	Necessity		Applicability		Value of Educational Research	
	Mean	SD	Mean	SD	Mean	SD
Education	4.09	0.453	4.39	0.486	3.45	0.638
Science or others	3.89	0.618	4.19	0.726	3.05	0.764

When GPAs obtained from the instrument's sub-dimension named "Value of Educational Research" were compared with the faculty type from which the teachers had graduated, there was a statistical significance between the groups in regard to attitudes towards educational research ($F_{1\text{-}106)}$=7.417, p=0.008), p<0.05). This difference was in favor of teachers who graduated from an education faculty. The result in Table 9 shows that teachers who graduated from the faculty of education attribute greater value to educational research (M=3.45) than teachers who graduated from science and other faculties (M=3.05). When GPAs obtained from the sub-dimension of the instrument named "Applicability" were compared with the type of faculty from which the teachers graduated, there was no statistical significance between the groups in regard to attitudes towards educational research (($F_{1\text{-}106)}$=2.256, p=0.136), p>0.05). When GPAs obtained from the sub-dimension of the instrument named "Necessity" were compared with the faculty type from which the teachers graduated, there was no statistical significance between the groups in regard to attitudes towards educational research ($F_{1\text{-}106)}$=3.01, p=0.086), p>0.05). However, these results show that, in every sub-dimension of TASTER, teachers who graduated from the faculty of education have more positive attitudes towards educational research than the teachers that graduated from science or other faculties.

4. Discussion

Attitudes of in-service science teachers (biology, chemistry, and physics teachers) towards Turkish educational research were assessed by this study. One of the results of this study is that in-service science teachers generally have positive attitudes (M=3.78) towards educational research. In a previous study, Yıldırım et al. (2014) examined 918 science teachers and found out that science teachers in general have positive attitudes (M=3.73) towards educational research. In another study, Ilhan et al., (2015) also found that the pre-service science teachers generally have positive attitudes (M= 3.72) towards educational research. When compared to the GPAs of previous studies that used TASTER, the general mean attitude score of the in-service science teachers are similar (M=3.78) to this study.

When Table 4 is examined, it is seen that in-service high school science teachers find educational research more applicable and significant but less valuable. This result corroborates the findings of previous studies that reported teachers have positive attitudes towards educational research (Yıldırım, Ilhan, Şekerci & Sözbilir, 2014; Korkmaz, Şahin, & Yeşil, 2011). In addition, these studies also put forward the opinion that educational research fails to generate solutions to the problems faced in the

classroom environment (Biesta, 2007; Yıldırım et al., 2014). Morrell and Lederman (1998) report that the type of science courses taken, previous experiences regarding science, science teachers, and various other factors can influence these attitudes toward science. These results suggest that, during the implication of educational research, teachers observe some of the stages of educational research in the classroom environment but, generally, they are not informed about the results and findings of the educational research that they witness. In addition, some of the educational research in the literature suggests educational implications for the future, but teachers may have some difficulties concerning how to implicate the theoretical suggestions of the educational research and how to practice them in a multidimensional classroom atmosphere. These multidimensional notions probably put teachers in a dilemma in which teachers perceive that educational research is not valued or sufficiently necessary, and implicating their theoretical suggestions in practice is difficult in a multidimensional classroom environment.

One other probable cause for these results may be that experienced teachers believe that educational research may be necessary for a better instruction. Educational research is also applicable, but teachers are in doubt in regard to the "Value of Educational Research." This result corroborates the statement asserted by Osborne et al., (2003) concerning the definition of "attitude": "the concept of an attitude towards science is somewhat nebulous, often poorly articulated and not well understood." On this basis we can conclude that in-service teachers have far from a good understanding about what an educational research is, or its' targets, benefits, or methods.

This study also reveals that in-service science teachers' attitudes differ depending on the type of faculty they graduated from (see Table 1). The results in Table 1 indicate that there is a statistical significance between in-service science teachers according to type of faculty from which they graduated ($t=2.750$, $df=106$, $p=0.007$ $p<0.05$). Teachers who graduated from the faculty of education have a higher mean score ($M=3.96$) towards educational research than the teachers who graduated from the faculty of science ($M=3.69$). These results show that teachers who graduated from the faculty of education have more positive attitudes towards educational research than the teachers who graduated from science or other faculties. This is because faculty attitudes toward educational research, which potentially influence how they teach the course and how students learn, are shaped by the type of departmental and institutional support the faculty receives.

5. Conclusion

There have been many previous studies on trainee teachers' attitudes towards scientific research or educational research; however, contrarily, there is insufficient research on in-service teachers' attitudes towards educational research in scientific literature. Hence, in order to strongly understand the causes of the differences between high school and secondary school science teachers' attitudes towards educational research, science education researchers should make more and comprehensive research on both

pre-service and in-service teachers' attitudes towards educational research. Through its findings and suggestions, this study contributes to the growing body of science education literature. Hence, the findings of this study can be used as a base and as an important data source for science education researchers who wish to develop better teacher training.

Lest it be forgotten, attitudes are enduring that knowledge often has an ephemeral quality. As stated by Osborne et al., (2003) the price of ignoring this simple fact and its implications is the potential alienation of our youth and/or a flight from science – a phenomenon that many countries are now experiencing. This study prognosticates the probable forthcoming danger in science education. There can, therefore, hardly be a more urgent agenda for research.

Being unaware of what educational research is, how it is implemented, and what are the potential benefits of that research may cause teachers to be prejudiced against educational research (Regis, Albertazzi & Roletto, 1996, Demirbaş & Yağbasan, 2006). However, science encourages students to be skeptical but not to be prejudiced for or against objects or events. Societies must face the fact that it is difficult to make contemporary educational achievements when teachers have prejudgments towards or against educational research or science.

Studies in the last decade have shown that when students harbor a poor attitude toward science, their attitude level is not only strongly correlated with student participation in science (Koballa, Crawley, & Shrigley, 1990) but also achievement in science as a subject (Linn, 1992, Neathery, 1997). Studies have also shown that these attitudes are declining from junior to senior high school (Hofstein & Welch, 1984). These attitudes affect how teachers approach their teaching responsibilities and even how they interact with students. Negative attitudes towards educational research can have a negative impact on teachers' effectiveness in the science classroom (Earthman & Lemasters, 2009). These results are not unique for a special country. For this reason, this study emphasizes and underlines the dangers when science teachers' attitude level towards the value of educational research is under the targeted level. In other word this situation is a cause and effect relation. So, teachers with a low attitude level towards educational research may be one of the probable causes for students' poor attitude toward science.

A solution for a lack of a positive attitude is engaging academicians and teachers in the benefits of educational research, which can provide a powerful learning and teaching experience where students not only learn about contemporary science education content but also gain reasoning and research skills. The opinions and input of teachers should be carefully considered because their thinking could be pivotal (Nel et al., 2011) in the successful implementation of a science education curriculum. Teaching staff at institutions of higher education should be well informed of the practical application of educational research in real-life classroom situations. Academicians, and thereby their students, who are the teachers of future, will come to understand the nature of educational problem-solving as the pursuit of meaningful questions through the use of procedures that are thoughtfully generated and evaluated (Foley & McPhee,

2008). People who believe in the importance of this issue agree that something needs to be done.

In order to create meaningful awareness for prospective teachers in regard to educational research; this study suggests that instead of "Scientific Research Methods," "Research Methods in Education" should be taught as a new lesson to prospective teachers at teacher education faculties.

Poor attitudes towards educational research not only offer a significant need for the self-evaluation and self-development of science teachers, but also for schools and institutions to optimize the quality of science and instruction. In this regard, another solution to the lack of positive attitudes is to enhance teachers' attitudes and interest in educational research through in-service refresher courses that address the latest instructional techniques, and discuss some results (e.g., PISA) in light of the latest educational research. Such further argumentations can provide more evidence that science educators will be able to use in-course revisions for pre-service teaching curricula.

Mighty oaks from little acorns grow. For this reason, determining in-service science teachers' attitudes towards educational research will be a guide to design activities, which will help them to develop positive attitudes towards educational research and, as a result of these implications, students' negative attitudes towards science lessons should give way to positive attitudes.

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