

Turkish Science Teachers' Use of Educational Research and Resources

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Research results demonstrate that there is a gap between educational research and practice. Turkey is not an exception in this case. This study aims to examine to what extent and how educational research and resources are being followed, understood and used in classroom practices by science teachers in Turkey. A sample of 968 science teachers working at junior high schools in Eastern Anatolia region of Turkey was surveyed. The data were collected through a questionnaire consisting of multiple-choice and open-ended questions. The results indicate that the most common sources of information used by teachers to follow educational research are "internet"; "radio", "television" and "newspapers"; "scientific magazine journals"; and "educational books" respectively. In contrast, the least followed sources of information used by teachers are "educational symposiums, conferences and workshops", and "educational scientific journals" and "dissertations". 18.7% of science teachers stated that they could understand scientific educational research. Science teachers' level of applying the educational research results into practice was found as 5.7 %.

Keywords: educational research, research resources, research-practice gap, science teacher

INTRODUCTION

In general, every country considers its own education system insufficient, and research by educationalists tries to find a solution to the problems regarding respective education systems. Hence, teachers are normally expected to benefit from the research aimed to offer new answers to the problems encountered in education. And, in order for teachers to be able to benefit from educational research, they must be cognizant of and apply in their own classroom activities the results of the relevant research from various countries suggested that there is a gap between education or particularly science educational research and its applicability in

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practice (Biesta, 2007; Costa, Marques, & Kempa, 2000; De Jong, 2004; Ekiz, 2006; Greenwood & Maheadly, 2001; Hemsley-Brown & Sharp, 2003; Kennedy, 1997; McIntyre, 2005; Ratcliffe et al., 2005; Vanderlinde & van Braak, 2010). The debates around the presence of a gap between research and practice have focused especially on the functionality of educational research, and its appropriateness and advantages for teachers. The main issues that these debates concentrate on are the process of program development of the educational research, teachers' ability to improve the classroom environment and create efficient learning and teaching processes in line with the research results (Ekiz, 2006) while researchers seem to concentrate on producing more research results without considering whether these results can be put into practice (Hemsley-Brown & Sharp, 2003). However, studies on the applicability and utility of the research results in classes or training environments have been given less priority. Paying insufficient attention to selection of research topics has resulted in researchers' obtaining findings which are not directly related to the practice. The issues addressed researchers seem to be the ones that are not generally paid too much attention by teachers (Kempa, 2002). Walter and Hen (2012) carried out a study based on an action research to overcome the gap between research, theory and practice, and they concluded that research skills can be best developed and implemented when teacher candidates carry out research projects, and work with (applied) contents that can be used in education, and when content is integrated into research. In a study conducted by Lysenko, Abrami, Bernard, Dagenais and Janosz (2014), it was investigated the predictors of school practitioners' use of educational research. Results of this research indicate that "opinions about research" had the most explanatory power. Research on science education is rather new when compared to the scientific research with a background of nearly more than three hundred years. In the last decades, although there has been a rapid increase in the number of science education studies, making use of the research to improve the science education has still remained limited (De Jong, 2004; Kempa, 2002). It has been reported that science teachers are not very aware of the science educational research, that their awareness and knowledge about the findings obtained through such research is very limited, and that their pedagogical knowledge derives more from their personal experience (Costa et al., 2000). In a small-scale study De Jong (2004) elaborated on the gap between science educational research and practice, and its reasons. This study reports and discusses the actions that need to be taken to close this gap and it presents some realistic measures at personal and structural levels in order to establish a closer relationship between teaching practices.

As for the Turkish context, only a few numbers of studies analysing educational researches, their application into practice and their relevance to teachers' practice in Turkey exist in the literature (Çepni & Küçük, 2003; Ekiz, 2006). A study conducted with 24 science teachers by Çepni and Küçük (2003) indicates that teachers have never or rarely benefited from research findings on teaching practice,

State of the literature

- Teachers are normally expected to benefit from education research and resources aimed to offer new answers to the problems encountered in education.
- Various countries suggested that there is a gap between education or particularly science educational research and its applicability in practice.
- As for the Turkish context, only a few numbers of studies analysing educational researches, their application into practice and their relevance to teachers' practice in Turkey exist in the literature.

Contribution of this paper to the literature

- The dearth of such research also indicates the existence of a gap between educational research and practice in Turkey.
- However, this problem has not been dealt with extensively to cover the science teachers' perspectives regarding the reasons for the gap between educational research and practice.
- This study aims to examine how and why science teachers follow, understand and turn educational research in to practice.

and completely unaware of current studies. In a study investigating teachers' perceptions and attitudes towards educational research Ekiz (2006) finds out that teachers consider educational research as scientists' work but they value the importance of teachers' participation in scientific research. Yıldırım, İlhan, Şekerci and Sözbilir (2014) analysed the opinions of 80 science teachers employed at schools in Erzurum and Erzincan, and in the districts of these cities, and the results show that very few teachers (10%) follow the educational research regularly, and those who follow the educational research feel difficulty in understanding and using it.

The dearth of such research also indicates the existence of a gap between educational research and practice in Turkey. However, this problem has not been dealt with extensively to cover the science teachers' perspectives regarding the reasons for the gap between educational research and practice.

The principal purpose of this paper is to examine how and why science teachers follow, understand and turn educational research in to practice. For this purpose, we will seek to answer the following research questions:

1. To what extent and how educational research and resources are being followed by science teachers?
2. To what extent and how educational research and resources are understood by science teacher?
3. To what extent and how educational research and resources are being applied in classroom practices by science teachers?

METHODOLOGY

The Research Design

In terms of methodology our study falls into the category of survey research. The major purpose of surveys is to describe the characteristics of a population (Fraenkel, Wallen & Hyun, 2012; McMillan & Schumacher, 2010). Surveys produce generalizable results and also enable to collect data from large number of participants in a reasonable short time and cost although despite the drawbacks such as inflexibility and validity as they mostly force the participants to response through a standardized items. In this study as the sampling distribution spanned a large area and it was impossible to reach them through other means, survey method was the most appropriate option to choose.

Population and the Sample

Notwithstanding the targeted research population consisting of all science teachers working at junior high schools in Turkey, the research population was composed only of teachers working in the Eastern Anatolia region of Turkey. The Eastern Anatolia Region is one of seven geographical (non-administrative) regions of Turkey and encompasses 14 eastern provinces out of 81 provinces of Turkey. According to the information gathered from General Directorate of Staff at the Ministry of Education in 2008, a total of 1922 science teachers were employed in the junior high schools (grades 6 to 8) of the provinces of the Eastern Anatolia. Survey population of the study involved 1491 science teachers who work in the region. We aimed to reach the whole population. All teachers were invited to take part in the study, however 968 science teachers responded the questionnaire. However, 50 of the responses were incomplete and therefore excluded from analysis and finally 918 questionnaires were analysed. Table 1 show the demographic features of science teachers.

Table 1. Participants demographic

Gender	n	%
Male	493	53,7
Female	425	46,3
Total	918	100
Location		
City centre	260	28,3
District centre	347	37,8
Town/small town	102	11,1
Village	209	22,8
Total	918	100
Educational status		
Vocational degree (2 years)	24	2,6
Bachelor's degree (4 years)	843	91,8
Master's degree	51	5,6
Total	918	100

Data collection instrument

The data were collected through a questionnaire developed by the researchers (see Appendix 1). The questionnaire consists of 12 questions (mixture of closed and open-ended). The first eight questions are about the extent that science teachers follow educational research, the 9th question was about their ability to understand educational research. The 10th, 11th and 12th questions were about the level of putting educational research into practice. The development of the questionnaire was accomplished in several steps. First, we reviewed a broad literature on the topic and later based on this literature review we determined the scope of the questionnaire (Costa et al., 2000; De Jong, 2004; Everett, Luera, & Otto, 2007; Everton et al., 2000; Gilbert, De Jong, Justi, Treagust, & Van Driel, 2003; Gitlin, Barlow, Burbank, Kauchak, & Stevens, 1999; Greenwood & Maheadly, 2001; Kempa, 2002; McIntyre, 2005; Shkedi, 1998). Second, the questionnaire questions were prepared with multiple choice and open-ended questions. 14 instructors from the department of chemistry and science education examined the questions thereby assuring the content validity of the questionnaire. In order to control how the questionnaire is understood and answered by the teachers we conducted a pilot study involving 40 teachers who attended the in-service training in Erzurum. Following the pilot study, we made the necessary revisions in language, wording and the general structure of the questionnaire to give its final shape.

Conducting the survey

Following the official permission from the educational directorates of the region, the questionnaires were conducted either by one-on-one meetings, or by posting the questionnaires to the schools or provincial/district of Ministry of Educational Directorates. As a result, 968 questionnaires were collected, 50 of which were excluded from the data analysis due to incomplete responses. The number of questionnaires in the analysis was 918.

Data analysis

The responses given to the closed-ended questions in the questionnaire were analysed descriptively (through analysing frequencies and percentages). The responses given to the open-ended questions in the questionnaire were analysed qualitatively through content analysis with the help of NVivo qualitative data analysis software (Bazeley, & Richards, 2000; Walsh, 2003). The responses were saved as Word format. The data were coded manually by each of the four researchers to establish the coding structure and then categories were formulated.

Four researchers agreed on the main categories. The rest of the data were analysed by NVivo following the developed coding scheme. NVivo, in fact, was used in order to ease data handling. In reporting the results quotations were used to illustrate the findings. The codes reported with each quotation, such as A1, A2 and A3 stand for the teachers.

RESULTS

The analysis results will be presented here in line with the research questions.

To what extent and how educational research and resources are being followed by science teachers?

Table 2 shows that the most commonly used sources of information for teachers following the educational research are internet (840 teachers); radio, television (TV) and newspapers (666 teachers); scientific journals (564 teachers); and educational books (527 teachers) respectively. The results also identify the least commonly used sources of information, which are educational symposiums, conferences and workshops (145 teachers), and educational scientific journals and dissertations (144 teachers).

In the first open-ended question, science teachers were requested to provide further information about the names and contents of the programs they follow via radio, television and newspapers, and 405 of those who said: 'I follow the new developments on education via radio, television and newspapers' provided the requested information. The opinions of these teachers (74 statements) were classified under two categories.

- a) Specifying the names of the radio and TV programmes and newspapers that are followed (f=50)
- b) Providing information about the names and contents of the programmes that are followed (f=24)

In the second open-ended question, the teachers were also requested to provide further information about the content of the topics they became cognizant of via official announcements and letters, and 162 of 293 teachers having said 'Yes' to this question provided the requested information. Depending on the information they provided, 76 of the statements were found to be directly related to educational topics, and grouped under 4 subheadings (Table 3). Similarly, the information in this category shows that teachers are mostly aware of 'in-service trainings, seminars, congresses, symposiums and project competitions' (f=28).

Table 2. Resources that science teachers use to gather information about educational research

	Yes		No		No answer	
	f	%	f	%	f	%
Q1-Radio, television and newspapers	666	72.55	221	24.07	31	3.38
Q2-Official correspondences	293	31.92	583	63.51	42	4.58
Q3-Books on education	527	57.41	338	36.82	53	5.77
Q4-Magazines with scientific contents	564	61.44	324	35.29	30	3.27
Q6-Internet	840	91.50	67	7.30	11	1.20
Q7-In service training seminars	305	33.22	594	64.71	19	2.07
Q8-Symposiums, conferences and workshops	145	15.80	744	81.05	29	3.16
Q9-Dissertations and scientific journal articles	144	15.69	561	61.11	43	4.68

Table 3. The official sources of information for science teachers

Category	f
In-service trainings, seminars, congresses, symposiums and project competitions	28
Topics related to educational science and research (teaching methods, performance and project assignments, assessment and evaluation)	26
Changes and development in the curriculum	15
Changes in official regulations (declarations, magazines)	7
Total	76

Table 4. Types of sources followed by science teachers

Types of books followed by science teachers	f
Books to prepare for the KPSS*	225
General books on education (Course books used in undergraduate education, books on assessment and evaluation, classroom management, and development and learning)	39
Other books (books to prepare for exams to become a principal, vice-principal, inspector etc.)	7
Total	271
Magazines with scientific contents followed by science teachers	
Magazines with scientific contents (Science and Technology, Science and Children etc.)	454
Personal development magazines (Young Minds, Super Minds, etc.)	18
Total	472
Scientific journals and dissertations followed by science teachers	
Statements about the names, contents and places of publication of the dissertations and articles on educational research	70
Statements on the matters other than educational research	25
Total	95

*KPSS is a nationwide exam carried out by the state for teacher employment.

The third question in the questionnaire aimed to reveal whether science teachers follow new developments and research on educational sciences through books that help preparing lectures and exams on educational sciences (undergraduate educational science books, preparation books for PPSE, the Public Personnel Selection Examination, etc.). In the third open-ended question, teachers were requested to provide further information about the names and contents of the books they follow, and 424 of 527 teachers who said 'Yes' (I am aware of the course books and exam preparation books on education) provided the requested information. Of these, 271 statements were found to be related to education, and grouped under three subheadings (Table 4).

In the fourth open-ended question, science teachers were also requested to provide further information about the names and contents of the magazines with scientific content they follow, and 476 of 564 teachers who stated that they follow magazines with scientific contents provided the requested information. 472 statements in this category were found to be relevant to the aim of the question, and grouped under two subheadings (Table 4).

In the fifth open-ended question, science teachers were also requested to provide further information about the content of scientific journals and dissertations on educational science and science education they are aware of. And 95 of 144 teachers, who stated that they are aware of the new developments in educational research via scientific journals and dissertations, provided the requested information, which was analysed under two subheadings (Table 4).

Among the scientific peer reviewed journals followed by teachers are the Education and Social Sciences published by the Ministry of National Education and the Journal of the Faculty of Education by Gazi University and etc.

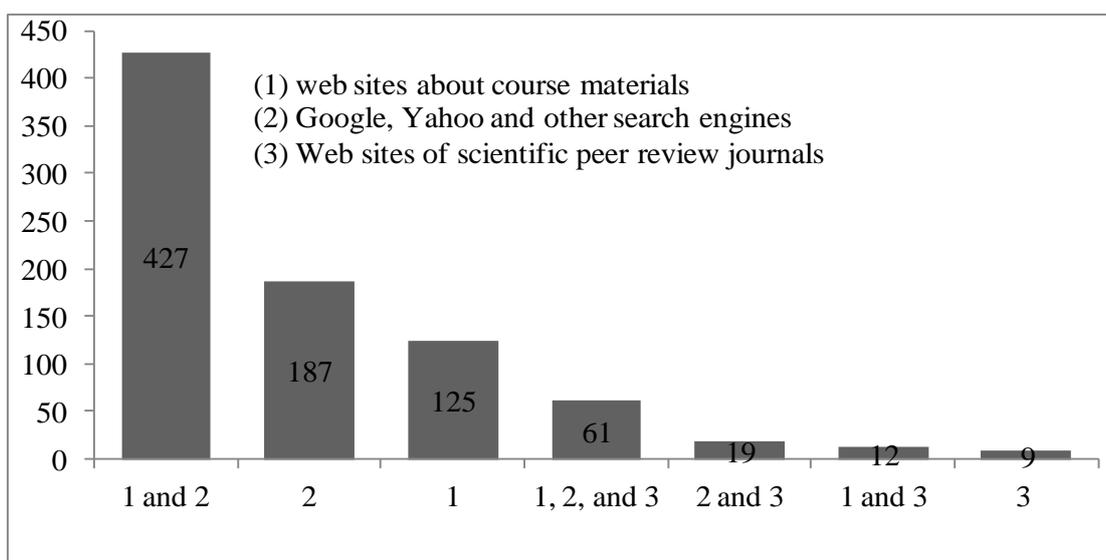


Figure 1. Web sites that science teacher's use

Table 5. The content of the in-service seminars followed by science teachers

Category	f
Seminars that will contribute to teachers' pedagogical knowledge (assessment and evaluation, classroom management, teaching methods and techniques, development and learning, special training, teaching approaches etc.)	98
Other seminars that teachers attend (Computer course, project development, use of Science and Technology laboratory etc.)	18
Total	116

Below are some extracts from teachers' statements about the dissertations and articles they follow:

...I read an article about the contribution of cooperative learning to the subjects taught at 6th, 7th, and 8th grades... (A80)

...the last article I read was about the implementation of the 7E model of constructivist learning approach.... (A92)

The sixth question in the questionnaire aimed to reveal whether science teachers follow new developments and research in educational science via the internet, and if they do so, to examine the purposes of those using the Internet (Table 2). The second part of this question aimed to reveal some information about the content of the web sites the teachers follow.

As Figure 1 shows, the number of teachers who use the search engines 'Google and Yahoo and other search engines' altogether, was 427. On the other hand, the number of teachers who use the 'web sites about course materials' and 'web sites of scientific peer review journals' together was 12, and the number of teachers who use the 'web sites of scientific peer review journals' only was 9.

The seventh question aimed to reveal whether science teachers follow new developments and research in educational sciences through in-service training seminars (Table 2). In the second part of the seventh question, the teachers were also requested to provide further information about the names and contents of the in-service seminars on science education that they have attended, and 222 of 305 teachers, who stated that they follow new developments and research in education through in-service seminars, provided the requested information. Of these 116 statements were specified and classified under two subheadings from teachers' opinions (Table 5).

The in-service seminars that the teachers have attended reveal that they mostly attend seminars which will contribute to their pedagogic knowledge (f=98). Such seminars as primary training seminars held when teachers first started their professions, and obligatory seminars held about the changes in curriculum were excluded from analysis.

The eighth question in the questionnaire aimed to reveal whether science teachers follow new developments and research in educational science through conferences, symposiums, panels and workshops (Table 2). In the open-ended eighth question, science teachers were also requested to provide further information about the names and contents of the conferences, symposiums, panels and workshops they have attended, and 73 of 145 teachers, who stated that they follow new developments and science educational research, provided the requested information. Depending on the teachers' opinions, 51 statements were specified and collected under three subheadings (Table 6).

The answers of the science teachers were classified in terms of the names and contents of the congresses, symposiums, workshops, panels and conferences they have attended. Teachers' answers were first classified under a subheading comprising information about 'the names and themes of the congresses, symposiums and workshops on educational research' (f=35).

To what extent and how educational research and resources are understood by science teacher?

The first part of the ninth question attempted to reveal whether science teachers found dissertations and articles in scientific journals understandable. 47.9% (440 teachers) of the teachers said 'No' about their ability to understand dissertations and articles, 18.7% (172 teachers) said 'Yes' and 30.2% (277 teachers) said that they had no idea about the contents of such studies, and lastly 3.2% (29) did not express any opinion(Figure 2).

Table 6. The academic meetings that science teachers attended

Category	f
Names and themes of the congresses, symposiums and workshops on educational research (Science and Mathematics Teaching Congress, National Congress of Educational Science, Training of Trainers Workshop, etc.)	35
Other conferences and seminars on education (Seminar on project design in education, learning and teaching, new approaches in education, etc.)	8
Conferences and seminars that are not related to education (This is my production, clean environment and clean society, training parents, etc.)	8
Total	51

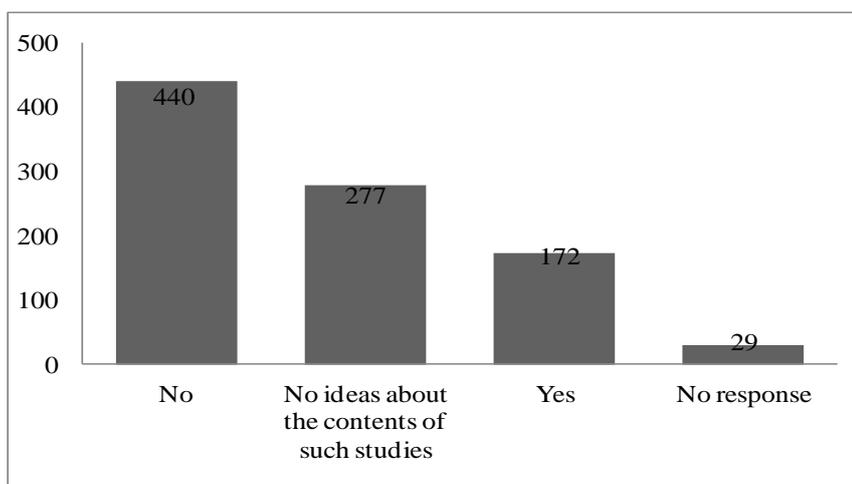


Figure 2. Science teachers' ability to understand dissertations and articles in scientific journals

In the second part of the ninth question, 93 of 172 teachers who stated that they found dissertations and articles in scientific journals understandable and qualified offered explanations. Teachers' explanations were gathered under two subheadings: 'the teachers who gave information about the content of the dissertation and articles about educational research' (75 teachers) and 'the teachers who gave information about studies other than educational research' (13 teachers) (Table 7).

The below extract exemplifies some of the opinions of teachers who have information about the content of dissertations and articles about educational research:

...The influence of using conceptual maps on 7th grade primary school students was studied with regards to their scientific process skills, attitudes towards science and academic success....(A775)

An example of the opinions of teachers who gave information about studies other than educational research can be seen in the following extract:

....energy conversions, how they are performed and account of the energy loss in the meanwhile.... (A153)

In the third part of the ninth question, we tried to reveal the reasons why science teachers fail to understand dissertations and articles in scientific journals. There were 440 science teachers who stated that they did not find such studies comprehensible (Figure 3).

Having examined all the reasons why science teachers found dissertations and articles incomprehensible, we found the frequency of choosing option (1) as 143. The second most frequent reason (123 teachers) for the failure to understand dissertations and articles in scientific journals is that scientific research methods are not clear and comprehensible (Figure 3). When we examined in detail the teachers' statements as regards their failure to understand articles and dissertations, we came

Table 7. The classification of contents of the studies that science teachers found understandable

Category	f
Teachers who gave information about the contents of dissertations and articles on educational research	75
Teachers who gave information about the studies other than educational research	13
Total	88

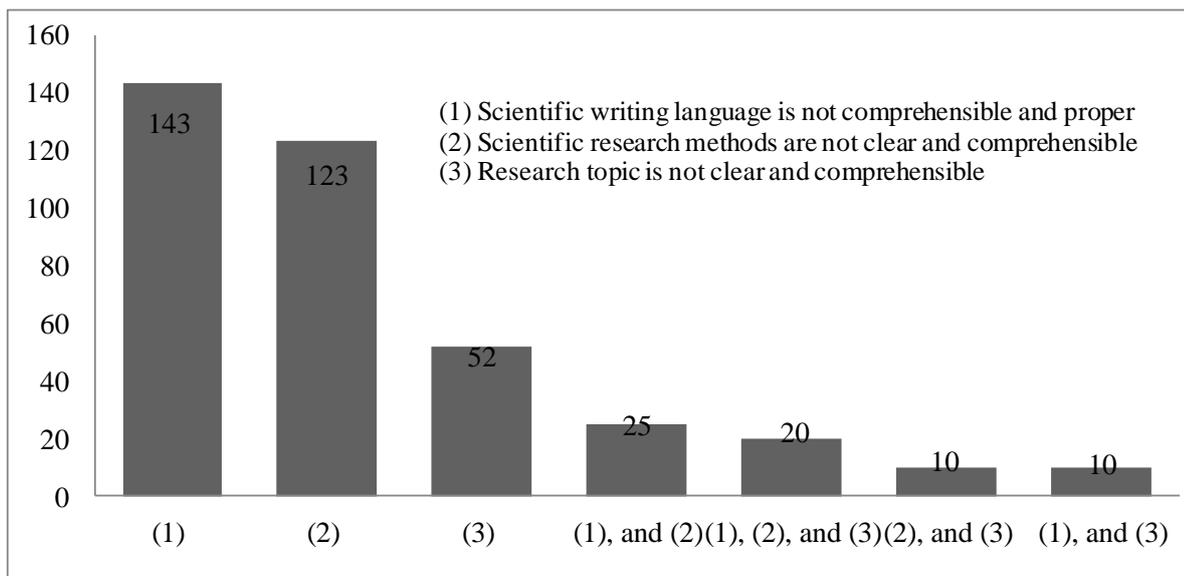


Figure 3. The reasons why science teachers found dissertations and articles incomprehensible

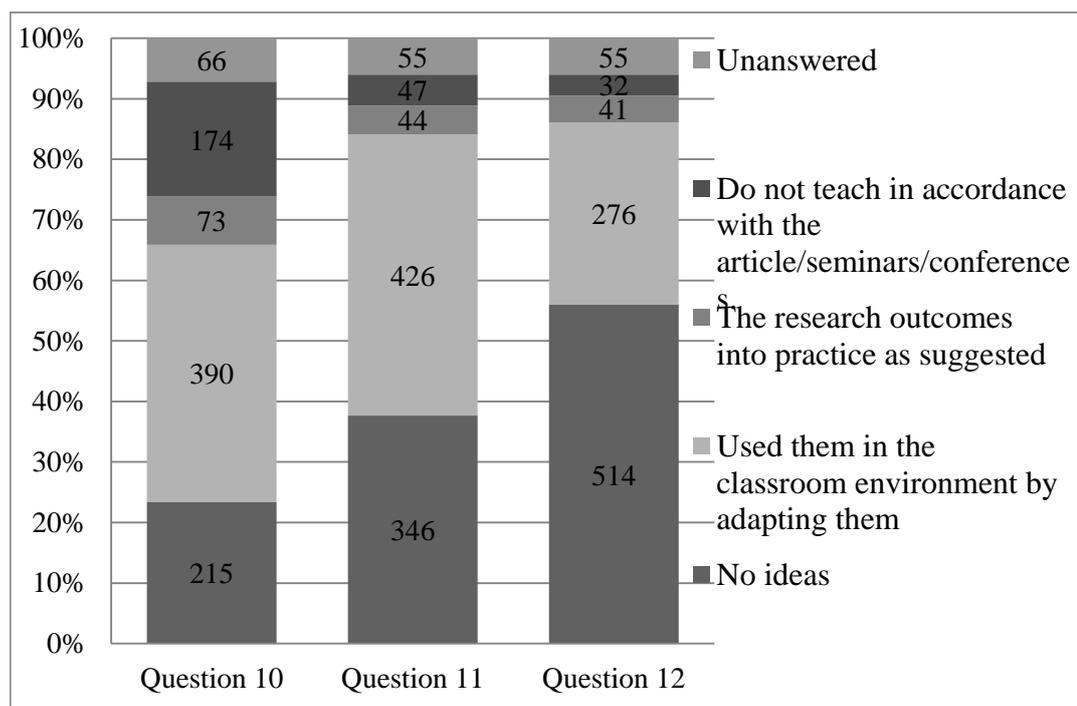


Figure 4. Science teachers' level of applying educational research into practice

to the conclusion that their failure stemmed from their negative thinking about such studies. 25 teachers were found to hold such negative ideas leading to the failure of understanding scientific articles and dissertations. The expression of such negative approach can be seen in the following extract;

...I believe that scientific research remains a theory. I think that the implementation stages of new data in theoretical studies must be clearer, more comprehensible and applicable. So, I think that studies are insufficient. (A112)

To what extent and how educational research and resources are being applied in classroom practices by science teachers?

We examined the answers given to the four choices in the 10th (dissertations, and articles published in scientific journals), 11th (the in-service training seminars), 12th (the conferences, symposiums and so on) questions of the questionnaire in order to determine the extent to which teachers put educational research outcomes into practice and how they use them in practice (Figure 4). In the second part of these questions, teachers' opinions were also analysed. The choices made by science teachers in Questions 10, 11, and 12 such as 'I can use the outcomes in the classroom environment as suggested in studies/seminars' and 'I can use them in the classroom environment by adapting them in my own way' evince that teachers put educational research into practice (Figure 4).

It was found that 7.9% of the teachers ($f=73$) in the 10th question, 4.8% of the teachers ($f=44$) in the 11th question and 4.5% of the teachers ($f=41$) in the 12th question stated that they put the research outcomes into practice as suggested in article/seminars/ conferences. Only 5.7% of the science teachers reported that they applied educational research results into practice.

Science teachers' level of putting into practice their knowledge of educational research by incorporating it to their own experience was 42.5% ($f=390$) for Question 10, 46.4% ($f=426$) for Question 11, and 30.1% ($f=276$) for Question 12.

The mean value of teachers' level of putting the educational research outcomes into practice by adapting them to their own experiences was found 39.7%.

The percentages of science teachers who neither put into practice the information they received as to educational research nor taught according to them were: 19.11% for Question 10, 5.1% for Question 11 and 3.5% for Question 12. The mean value was 9.2%, indicating that the teachers neither put educational research outcomes into practice or nor teach in accordance with such outcomes.

In the open-ended explanations of Questions 10, 11 and 12, Science teachers' opinions about their ability to put educational research outcomes into practice were analysed under two subheadings: 'Opinions about putting the educational researches into practice' and 'Opinions about the reasons for the failure to put the educational researches into practice'

There are 38 statements in Question 10, 23 statements in Question 11, 17 statements in Question 12, all of which represent science teachers' ability to put the educational researches into practice. Below are some examples of science teachers' ways of putting educational researches into practice.

I put into practice the information I received about cooperative learning, 6-hat technique, and discussion techniques in the classroom. (A452)

As far I learned in a conference, I can predict the intelligence area of a student by looking at his/her attitudes. When a student makes a sentence, I can understand whether he/she is lying or not by watching the way he/she looks at (A358)

The frequency of the statements was analysed together with Questions 10, 11 and 12, and the reasons why science teachers fail to put educational researches into practice were put into a table (Table 8).

CONCLUSION AND DISCUSSION

The results indicate that the most common sources of information used by teachers for following the educational research are "internet"; "radio", "television" and "newspapers"; "scientific magazine journals"; and "educational books" respectively. In contrast, the least commonly used sources of information, are "educational symposiums, conferences and workshops", and "educational scientific journals and dissertations". This results indicate that teachers are using mostly media available for them rather than scientific data bases or research resources available through libraries. This finding ensures that educational research results are not readily accessible by the science teachers as research on educational studies is mostly published in the form of dissertations and scientific articles. Drawing on the aforementioned results, we argue that focusing on using internet facilities for sharing scientific information will be a convenient medium for teachers. This reality is in fact in action. Almost every journal in national scale are started to be published online in parallel to the print copies. However, as there is no common media to access all of the journals in a single platform, teachers are not aware of the

Table 8. The reasons for science teachers' failure to put educational researches into practice

Category	f
Insufficient physical conditions (excessive number of students in a class and insufficient materials)	20
Considering that educational researches are superficial (carrying out the studies without considering the rural and urban differences, failure to consider differences among students)	15
Students are not accustomed to different teaching styles	7
Reasons stemmed from the shortage of time	7
Socio-cultural status of students (influence of families)	5
Total	54

availability of this knowledge to them. Therefore it could be recommend that developing educational research databases that can easily be accessed by teachers, transfer printed sources into online environments, and benefit from current internet technologies (Web 2.0 applications and social networking platforms) with the aim of spreading the exchange of information via communication amongst teachers. However, as Vanderlinde and van Braak (2010) rightly argue, top-down models (where the practitioner is informed by the researcher) are not successful in ensuring that the practitioners are informed about and can use the research results; instead it is necessary to focus more on the ways that develop collaboration between stakeholders. This view is supported by the findings that the dialogue experienced between the teachers and the academicians and aspirant teachers practicing at schools is seen as a source of information for teachers. For this reason, it is possible to think that spreading internet-aided sources of information will definitely have a benefit, but this type of top-down (from researcher to practitioners) and one way information transfer mechanism will not be an effective means in eliminating the gap between the research and practice.

In the current study, 144 of 918 teachers stated that they followed science educational research via scientific journals and theses (Table 2). This situation derives, most probably, from the fact that some of these teachers had their master's education in scientific areas other than educational sciences. The teachers also stated that they obtained information from books, which are among printed sources. However, when these books were analysed, it was seen that they were mostly preparation books for the exams of teaching profession. Since the focus of these books is to prepare teachers for the exams, they are far away from generating current and applicable solutions for the educational problems faced at schools.

305 of 918 teachers stated that they obtained information on educational research via the in-service training seminars. This also gives the idea that the in-service training seminars can have a bigger potential in informing teachers about educational research. There are findings in the literature suggesting that the in-service training implementations (Küçük & Çepni, 2005), action research project (Eilks & Markic, 2011) and the symposiums, congresses and conferences that will be prepared specifically for informing practitioners about scientific developments can have an important role (De Vries & Pieters, 2007). Therefore, it is necessary both to increase the number of such activities so that the teachers can renew themselves and follow the scientific developments after starting this profession, and to encourage and effectively support teachers for attending such activities.

18.7% of science teachers stated that they could understand scientific educational research (Figure 2). When the information on what they understand was examined, their explanations showed that 13 of 93 respondents provided information unrelated to scientific educational research. This shows that some of the teachers, who thought that they could understand educational research, do not in fact understand them. However, when the demographical features of the teachers, who stated that they could understand educational research and could provide explanations were examined; it was found that an important part of those teachers (27 teachers) have postgraduate degrees. This situation indicates that when teachers pursue postgraduate education, this enables them to better understand educational research. However, as discussed above, understanding the research is not a sufficient element by itself for putting its results into practice.

When the reasons for teachers' failure to understand the dissertations and articles published in scientific peer-reviewed journals were examined, the most important reason for failure was the incomprehensibility of scientific. Similar results are also existent in the literature (Ahuja, 2012; Broekkamp & van Hout Wolters, 2007; Hemsley-Brown & Sharp, 2003; Vanderlinde & van Braak, 2010). Another reason for teachers' failure to understand educational research is that the scientific

research methods used in these studies and research topics are not clear and comprehensible. On the other hand, a major part of the teachers stated that they had no information about the dissertations and articles published in scientific journals (%30.2). Since the results of scientific research are mostly published in academic journals, it is not very possible for teachers, who do not have enough knowledge of the language and writing style used in those texts, to understand the results even though they know about the research. Factors that will make a serious contribution to overcoming this problem are introducing aspirant teachers to scientific research during the teaching profession education and ensuring that they perform small projects (Sozbilir, 2007), and ensuring that they pursue postgraduate studies or are informed about the scientific research process and its results via in-service trainings, and ensuring that the researchers and teachers work and do research together (Broekkamp & van Hout Wolters, 2007; Everton et al., 2002; Hemsley-Brown & Sharp, 2003; Vanderlinde & van Braak, 2010).

In the study, when results concerning whether science teachers apply the knowledge gained from educational researches into practice (knowledge gained from dissertations, scientific journals, in-service training seminars, conferences, symposiums, congresses, etc.) are examined, it is observed that most of the teachers did not provide any explanation of how they realized this application.

When the teachers' views regarding their failure to apply the educational research into practice despite their awareness of such research are examined, it is seen that teachers are mostly worried about the insufficiency of the physical environment, the socio-cultural status of students and the student's inability to adapt into changes rapidly. This situation is widely addressed in the literature (Everton et al., 2002) within the scope of the reflection theory which posits that a person attributes the reasons of his failure to external factors.

The findings obtained from this research indicate that a very significant part of the teachers, who have an important role in putting educational research into practice, do not know much about research, and that the ones who are cognizant of educational research experience problems in understanding them and putting their results into practice. All in all, this points to the fact that the gap between research and practice, mentioned in the above literature review, is also common amongst the science teachers in the Eastern Anatolia Region in Turkey where this research was conducted.

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APPENDIX 1

Questionnaire on Following, Understanding and Applying Science Educational Research Outcomes into Practice

1. I follow the new developments and researches regarding educational sciences via radio, television and newspaper.

Yes No

If your answer is Yes, please give detailed information below on the names or contents of them.

2. I follow the new developments and researches regarding educational sciences via official correspondences.

Yes No

If your answer is Yes, please give detailed information below on the names or contents of them.

3. I follow the new developments and researches regarding educational sciences via the books written for preparing for lectures and exams regarding educational sciences (educational science books in undergraduate, books for preparing for PPSE, the Public Personnel Selection Examination, etc.).

Yes No

If your answer is Yes, please give detailed information below on the names or contents of them.

4. I follow the new developments and researches regarding educational sciences via the magazines with scientific contents (Bilim Teknik, Genç bilim etc.)

Yes No

If your answer is Yes, please give detailed information below on the names or contents of them.

5. I follow the new developments and researches regarding educational sciences via dissertations, articles published in scientific journals (MEB Eğitim ve Sosyal Bilimler Dergisi, Faculty journals etc.).

Yes No I do not have any information on the content of such studies/researches.

If your answer is Yes, please give information below on the topic of the most recent thesis or article that you have read.

6. I follow the new developments and researches regarding educational sciences with the help of surfing through the internet (web pages).

Yes No

If your answer is Yes, please indicate below the appropriate options for web pages that you follow regarding education. *You can indicate more than one option.*

I search at the web pages for the materials for my lessons.

I carry out researches in the search engines of Google, Yahoo etc.

I follow the web pages of the peer-reviewed online scientific journals.

Please write below the other environments, if any.

7. I follow the new developments and researches regarding educational sciences via the in-service trainings that I attended.

Yes No

If your answer is Yes, please give information below on the topic and content of them.

8. I follow the new developments and researches regarding educational sciences via the conferences, symposiums, panels and workshops that I attended.

Yes No

If your answer is Yes, please give information below on the topic and content of them.

9. When I read the dissertations and articles published in scientific journals (MEB Eğitim ve Sosyal Bilimler Dergisi, Faculty journals etc.) to be informed about the new developments and researches regarding educational sciences, I find them qualified and comprehensible.

- Yes No I do not have any information on the content of such studies/researches.

a) If your answer is Yes, please give brief information below on the content of the most recent scientific study (dissertation or article) that you read and found qualified and comprehensible

b) If your answer is No, please indicate below why you did not find the scientific studies regarding education comprehensible and qualified by indicating the options appropriate for you. *You can indicate more than one option.*

- Scientific writing language is not comprehensible and proper.
 Scientific research methods are not clear and comprehensible.
 Research topic is not clear and comprehensible.

Please write below the other causes, if any.

10. Please indicate the option appropriate for you among the following ones regarding how you use the dissertations, and articles published in scientific journals (MEB Eğitim ve Sosyal Bilimler Dergisi, Faculty journals etc.), which you benefit from for being informed about the new developments and researches regarding educational sciences, in your practices in the classroom. *Please indicate only one option.*

- I do not have any information on the content of such studies/researches.
 I use the findings of educational researches (dissertations, articles etc.) in the classroom by adapting them in my own way.
 I use the findings of educational researches (dissertations, articles etc.) in the classroom in the manner suggested in the research.
 I do not benefit from the findings of educational researches (dissertations, articles etc.) in the classroom.

Please give information below on your experiences about the applicability of the findings of educational researches in the classroom that are different from the bullets given above.

11. Please indicate the option appropriate for you among the following ones regarding how you use the information you obtained in the in-service training seminars (teaching methods, class management, constructivist approach, active learning etc.), which you benefit from for being informed about the new developments and researches regarding educational sciences, in your teaching practices. *Please indicate only one option.*

- I did not attend any in-service training seminars on such topics.
 I can use the information I obtained in the in-service training seminars in the classroom by adapting them according to my experiences.
 I use the information I obtained in the in-service training seminars in the classroom as indicated in the seminars.
 I do not benefit from the information I obtained in the in-service training seminars, in teaching practices.

Please give information below on your experiences about the applicability of the information you obtained in the in-service training seminars, in the classroom in your school that are different from the bullets given above.

12. Please indicate the option appropriate for you among the following ones regarding how you use the information you obtained in the conferences, symposiums, panels and workshops that you attended (teaching methods, class management, constructivist approach, active learning etc.) about the new developments and researches regarding educational sciences, in your teaching practices. *Please indicate only one option.*

- I did not attend any conferences, symposiums, panels and workshops on such topics.
 I use the information I obtained via conferences, symposiums, panels and workshops in the classroom by adapting them according to my experiences.
 I use the information I obtained via conferences, symposiums, panels and workshops in the classroom as indicated in the seminar.

I do not benefit from the information I obtained via conferences, symposiums, panels and workshops, in teaching practices

Please give information below on your experiences about the applicability of the information you obtained via conferences, symposiums, panels and workshops, in the classroom in your school that are different from the bullets given above.