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A study on interdisciplinary teaching practices: Primary and secondary education curricula

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ABSTRACT

This study addresses the views of teachers about the benefits of interdisciplinary teaching practices in primary and secondary school education curricula, the level of the use of interdisciplinary approach and the place of interdisciplinary approach in the curriculum. The study seeks to examine the views of teachers about the interdisciplinary approach and their level of use of this approach in primary and secondary education curricula. To this end, the explanatory mixed design was employed in the study. A descriptive scanning model was employed for the quantitative dimension of the study. In the quantitative dimension, the phenomenological method was used. The Interdisciplinary Teaching Approach Questionnaire was utilized to gather quantitative data, and qualitative data were gathered through a semi-structured interview form. The sample of the research is composed of 413 classroom and branch teachers working in official primary and secondary schools in the central districts of Denizli. Consequentially, it can be argued that teachers have positive views on the interdisciplinary approach. Further, the teachers found the interdisciplinary approach relatively useful, however, they did not effectively implement it in in-class activities as this approach was not sufficiently incorporated into the curriculum. Teachers' views on the interdisciplinary approach differed by the variables of professional seniority and teaching level, whereas the gender variable was not found to be a significant predictor.

Keywords: Primary education, secondary education, interdisciplinary approach, interdisciplinary teaching.

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INTRODUCTION

Humanity is inevitably making progress since it thrives to understand the universe. In the meantime, various scientific disciplines have emerged, and these newly emerging disciplines need to set clear boundaries as well as use different strategies and methods (Yıldırım, 1996). Thus, each scientific disciplines evolve autonomously to maintain its existence and conduct more in-depth studies. New fields of study have emerged to meet the needs of today's world, and as a result the limited nature of the disciplinary approach insufficiently addresses the managing and teaching of these fields (Turna et al., 2012). Therefore, the concept of an interdisciplinary approach, in which subjects from several disciplines are brought together in an effort to illuminate an event or a complex phenomenon, comes to the fore (Jacobs, 1989). Interdisciplinary teaching is related to holistic teaching which uses knowledge, skills and learning outcomes in different subject areas to clarify any issue or phenomenon (Yıldırım, 1996). The process of global change has made an enormous impact on scientific studies as well as in every field. In particular, changes in the political, social and economic areas directly influence the education process. Additionally, scientific and technological advancements today have improved efficiency levels compared with previous periods. In this respect, existing knowledge falls within the boundaries of another discipline and thus results in the creation of different disciplines and subject areas. Further, the boundaries of scientific fields that emerged in the previous process are gradually expanding as a result of recent developments (Baykal, 2004). Global developments manifest themselves in the field of education as well. At this point, education and education curriculum allow students to adapt to a rapidly changing

society. It is thus worth stating that the interdisciplinary curriculum approaches should be adopted so that students can keep up with new developments in all disciplines.

The process of change in education is inevitable in our age. This is because the existing job descriptions, information and technology, that is to say, the personal qualities needed are constantly evolving. In this frame, having new knowledge is the most significant quality (Akkoyunlu, 2008). As the importance of knowledge increases, the content of the concept of knowledge also changes rapidly. These changes led to the rise of the information society. The most important condition for transition to an information society is to increase investments in knowledge. It is very important to prioritize studies that can help students develop research and creative thinking skills so that students can easily access information at every stage of the education process (Yetkin and Daşcan 2006). This change process, which explicitly reveals that it is important to access information and knowledge, required the conventional education system to renew itself. To ensure the renewal of educational processes, the first thing to do is to renew the education and training programs. Thus, qualified individuals who can adapt to the information age will be raised. To this end, the Ministry of National Education constantly strives to improve primary and secondary schools' curricula, with an emphasis on transferring knowledge to different fields and reconstructing information (Yetkin and Daşcan 2006). The subject-centered curriculum has been previously used and the learning outcomes of each course were individually planned. Given today's changing needs, interdisciplinary teaching practices based on collaborative interaction will play a significant role in a fast-changing information environment (Alkan and Kurt, 2007). Today, educational activities that facilitate the learning process in the teaching-learning process and encourage perspective-taking to address any situation or event encountered in daily life are very often needed (Karakuş and Aslan, 2016). Relatedly, the interdisciplinary approach has become more efficient than the disciplinary approach today (Wang, 2012). This might be because the interdisciplinary approach is characterized by integrating multiple disciplines across a central subject, thereby reaching sub-dimensions of the relevant subject. In this context, interdisciplinary studies provide a person with opportunities to realize his/her full potential and to uncover it when needed. Such studies also enhance students' critical thinking skills since it encourages students to adopt multiple perspectives (Özçelik and Semerci, 2016). Any subject covered with this approach can be covered in all courses in the curriculum. Thus, it is intended to develop different perspectives regarding the subject. In interdisciplinary studies, based on any subject or problem, other disciplines' knowledge and skills are integrated, thereby addressing the issue from a different angle (Yıldırım, 1996). An interdisciplinary curriculum design is based on interacting with different course contents by acknowledging the integrity of each course. For instance, while the subject of Atatürk and the Republic is covered in the Life Science lesson, lessons such as Turkish, Music and Art classes also cover this subject. Students thus can develop a multidimensional and holistic approach to evaluate the subject. Integrating any topic with different lessons at primary and secondary school levels plays a vital role in ensuring holistic learning. Although an interdisciplinary curriculum is not implemented in primary and secondary school education curricula in our country, efforts have been made to establish connections between learning outcomes in the disciplines.

The most important advantage of interdisciplinary programs is to connect students to the real world, whereas traditional teaching environments fail to succeed (Yıldırım, 1996). The interdisciplinary approach is of vital importance for primary and secondary school students. This is because children in this age group have a Gestalt (holistic)-theoretical perspective towards phenomena considering their developmental characteristics. Yet, in our country, while primary schools enjoy the benefits of interdisciplinary activities, secondary and high schools adopt typically discipline-based curricula. Although it is not uncommon for high school students, it is not acceptable for secondary school students who are affected by strict discipline policies (Yıldırım, 1996). Previous studies also exclusively focused on the application and development of interdisciplinary teaching at different teaching levels (D'Hainaut, 1986 cited in Güven and Hamalosmanoğlu, 2012; Jacobs and Borland, 1986 cited in Jacobs, 1989; Roberts and Kellough, 2000 cited in Karataş-Coşkun, 2011). Conscious and comprehensive use of the interdisciplinary approach in the curriculum development process can significantly contribute to students' academic success. Studies on interdisciplinary teaching practices revealed that interdisciplinary teaching provides students with more effective and meaningful learning experiences (Jacobs, 1989). Since the process of curriculum development and implementation in the interdisciplinary approach requires collaboration, considerable time and effort should be devoted compared to the disciplinary approach. However, the results obtained from the said subject display that devotion of time or effort will achieve positive results (Yıldırım, 1996). The interdisciplinary approach encourages students to bring together the knowledge of different disciplines as well as realize the objectives in the analysis, synthesis and evaluation steps through the concepts obtained. Such an interdisciplinary approach makes teaching-learning more active and provides students with opportunities to enhance their creative thinking skills. This process also positively influences students' participation in the course (Aybek, 2001). In an interdisciplinary approach, students recognize their

responsibility for attaining self-regulation skills. To this end, students should be motivated to ask more questions and become engaged participants in the learning process (Roberts and Kellough, 2000).

Teachers play a crucial role in the process of student learning. If a teacher is engaged in separate teaching of a discipline for any course and does not make any connection between disciplines, students also perceive the disciplines as separate from each other. However, when the teacher establishes interdisciplinary relations for the course content, the students also learn to establish interdisciplinary connections. Therefore, teachers are the most important agents in the process of realizing interdisciplinary teaching. It is very important for teachers to be in contact with other colleagues and stakeholders in daily life while conducting their teaching activities. Thus, they can create opportunities for students to shape the information they learn in a way that can contribute to their daily lives (Özdemir and Yalın, 2000). However, since the teachers are responsible for their lessons and do not receive any support or encouragement regarding the other outcomes, they only intend to convey information about their course content. They do not receive any feedback on how much the obtained information is used in daily life or other lessons. Therefore, skill and knowledge groups are formed independently of each other in schools. For this reason, the most important output of the Gestalt theory, which also forms the basis of the interdisciplinary approach, is that the acquired knowledge cannot be transferred to different environments (Demir, 2009).

The most important factor that brings success today is to be aware of the factors that influence the problem to be addressed and deal with these factors holistically. It is very important to raise well-equipped individuals in this regard. For this reason, the interdisciplinary approach, which puts any problem at the center and allows thinking across disciplines related to this problem, should be carried out effectively at all education levels. Therefore, the views of teachers, who are the educators of the interdisciplinary approach, are of high importance. In addition to that, interdisciplinary studies should be incorporated into the curriculum to identify curriculum deficiencies and to allow teachers to gain insights into the interdisciplinary approach so that the teachers who are the agents of this process can conduct these studies effectively and appropriately. In this respect, this study addresses the views of teachers about the benefits of interdisciplinary teaching practices in primary and secondary school education curricula, the level of the use of interdisciplinary approach, and the place of interdisciplinary approach in the curriculum. In this sense, the answers to the following sub-problems were sought:

1) What are the teachers' views on the interdisciplinary approach in primary and secondary education curricula?
2) Do teachers' views on the interdisciplinary approach in primary and secondary education curricula according to the variables of gender, professional seniority and teaching level?
3) What is the level of teachers' use of the interdisciplinary approach in their lessons?

METHOD

In this research, the explanatory mixed design was employed to find out the opinions of teachers about the interdisciplinary approach in primary and secondary education curricula and the level of use of interdisciplinary approaches among teachers. Quantitative results first were confirmed by the data obtained using qualitative methods whereby it was intended to provide an in-depth insight into the causes of the problems experienced by teachers as well as address the problems. Interdisciplinary Teaching Approach Questionnaire and semi-structured interview form were utilized as measurement tools. Initially, quantitative data were gathered, and subsequently, qualitative data were gathered. The analysis results of the data obtained were compared and evaluated in terms of the level of compliance.

Quantitative dimension

In quantitative analysis, a scanning model was employed, since it was intended to reveal an existing situation. A survey method is a research approach aiming to describe a situation past and present as it is (Karasar, 2010).

Population and sample

The population of the research comprises official primary and secondary schools classroom and branch teachers working in the central districts of Denizli. The "convenience sampling" was used to determine the sample of the universe and the “Interdisciplinary Teaching Approach Questionnaire” was administrated to a total of 413 teachers. The researcher opted for the Convenience Sampling method to select the only available and easily accessible participants in terms of time and opportunity. Table 1 illustrates the data regarding the sampling.

Quantitative data collection tools

The Interdisciplinary Teaching Approach Questionnaire developed by Özhamamcı (2013) was employed to collect quantitative data in the research. The scale involves 3 sub-dimensions and a total of 40 items. The first sub-dimension entails the benefits of the

Table 1. descriptive statistics for research and sampling.

Personal variables		N	Percentage (%)
Gender	Female	232	56.2
	Male	181	43.8
Seniority	0-5 years	58	14
	6-15 years	92	22.3
	16-24 years	187	45.3
	25 years and above	76	18.4
Teaching level	Primary	179	43.3
	Secondary	234	56.7

interdisciplinary approach with 17 items followed by the sub-dimensions of interdisciplinary teaching practices with 14 items and the place of the interdisciplinary approach in the curriculum with 9 items. It was stated that 3 factors that make up the entire scale explained 63.33% of the total variance. This result was found to be sufficient considering all items on the scale. In addition to that, a reliability study was conducted to test the data obtained and the reliability coefficient of the scale was calculated using Cronbach's alpha. In this frame, the reliability coefficients of the total scores obtained from the Interdisciplinary Teaching Approach Questionnaire and the total scores obtained from the items belonging to the sub-dimensions are given in Table 2.

Considering Table 2, it can be argued that the research is reliable. A Cronbach's alpha value of .70 and over is enough for the reliability of scale (Büyüköztürk et al, 2011).

Data collection and analysis

This research was carried out with classroom and branch teachers working in official primary and secondary schools affiliated with the Ministry of National Education in Denizli in the 2021-2022 academic year. The teachers participating in the research were informed about the scale and the research applied. The research scale consists of 40 items. Teachers' views on the interdisciplinary approach were also evaluated within the framework of sub-dimensions. Three sub-dimensions emerged with respect to the interdisciplinary approach: the benefits of the interdisciplinary approach, the interdisciplinary teaching practices and the place of the interdisciplinary approach in the curriculum. In this frame, the competency levels were determined and the total scores of the participants were calculated. Additionally, skewness and kurtosis coefficients were checked and the normal distribution of the scores was tested using the Kolmogorov-Smirnov test to decide the further tests to be conducted, and the following results were obtained.

In Table 3, the skewness and kurtosis coefficients was used to test the normality of the scale and its sub-dimensions. As a result, the skewness and kurtosis values obtained from the total score of the scale and its sub-dimensions lie between -2 and +2. According to these results, it can be stated that the scores obtained by 413 teachers show a normal distribution in terms of both the total scale and sub-dimensions. Further, t-test and single-factor analysis of variance (ANOVA), which are parametric statistics, were performed in the study. Data were analyzed using SPSS 20.0 software. The significance level (p) was accepted as 0.05 in the data analysis.

The qualitative dimension

The study aims to determine primary and secondary school teachers' views on the interdisciplinary approach and whether they incorporate this approach into their lessons. In this respect, this study is phenomenological research. Phenomenological research refers to focusing on situations that are noticed in daily life but that we do not have detailed knowledge of (Yıldırım and Şimşek, 2016).

The research method borrows individuals' experiences to describe and interpret their experiences (Jasper, 1994). Thus, all the phenomena of experience can be explained by inquiring. In this respect, phenomenology was employed to determine the views of teachers about their experiences with the interdisciplinary approach. In this study, the views of the teachers, who are the data source, on the interdisciplinary approach were revealed using their school-based experiences. To this end, a semi-structured interview form formulated by the researcher was used. While no further questions can be posed following the responses received in other types of interviews, this limitation disappears in semi-structured interviews and additional questions can be asked depending on the answers given by the participants (Cemaloğlu, 2014). In addition to that, semi-structured

Table 2. Reliability coefficients of interdisciplinary teaching approach questionnaire.

Scale and sub-dimensions	Number of items	Sample (413)
The benefits of interdisciplinary approach	17	.84
The interdisciplinary teaching practices	14	.85
The place of the interdisciplinary approach in the curriculum	9	.82
The total score of the scale	40	.87

Table 3. The normality test results of data distribution of score.

Scale	$\overline{X}$	SD	Kurtosis		Skewness		K-S Test
			Coefficient	Standard error	Coefficient	Standard error	
The benefits of interdisciplinary approach	65.27	9.32	-789	.240	-104	.120	p=0.139
Interdisciplinary teaching practices	50.24	9.02	-1.002	.240	-072	.120	p=0.115
Place of interdisciplinary approach in the curriculum	31.53	6.42	-1.051	.240	-059	.120	p=0.117
Total score of the scale	147.04	17.72	-410	.240	-093	.120	p=0.166

interview forms are not only related to the verbal communication dimension of the interview. Nonverbal communication can also be observed during the interview process. Thus, more data can be obtained through more accurate and precise information (Cemaloğlu, 2014). To prepare the semi-structured interview form, expert opinions were taken and the information obtained from the literature review was taken as a basis. Following the examination of the interview form by three instructors who are experts in the field of training programs, the interview form was finalized based on the expert view. Focus group interview as a data collection method was carried out using Zoom. 15 (8 Males, 7 Females) teachers attended the semi-structured interview. It is used as a convenient sampling method to determine the participants. This method, which is one of the purposive sampling methods, is both convenient for the researcher and can provide practicality to the research process (Merriam, 2013). On the other hand, based on teaching level, 8 classroom teachers and 7 branch teachers participated in the qualitative phase of the study.

The interviews lasted approximately 25 to 30 minutes and were recorded using a voice recorder. Then, the data produced from audio recordings were written down and the content analysis was conducted.

The following research questions have been posed:

1. What is the interdisciplinary approach?
2. What is the effect of the interdisciplinary approach on students' learning?
3. What are the problems you encounter in using the interdisciplinary approach?
4. Do you incorporate the interdisciplinary approach into your lessons?

Qualitative data analysis

Content analysis was used to analyze the semi-structured interview forms prepared by the researcher. The data obtained from the interview forms were classified under appropriate themes. The themes were re-examined according to their similarities and the themes including the same or different views emerged. In addition to that, the agreement rate among researchers was calculated as 84%. Another dimension that is as important as validity-reliability in the qualitative research process is transferability and credibility. Therefore, some parts of the answers given by the participants are included in the findings to provide evidence for validity and reliability and to ensure transferability and credibility. Given all these processes, it can be stated that data is valid, reliable, transferable and credible.

FINDINGS

The findings obtained from the research are given. The quantitative and qualitative data obtained within the scope of the research are as follows:

Findings of the first sub-problem

The first sub-problem is related to the views of teachers about the interdisciplinary approach in primary and secondary education curricula. In this respect, the data obtained are presented in Table 4.

Teachers' mean score for the benefits of the interdisciplinary approach sub-dimension was calculated

Table 4. Descriptive statistics for the teachers' views about interdisciplinary approach.

Sub-dimensions	N	Minimum	Maximum	$\overline{X}$	Sd
The benefits of interdisciplinary approach	413	42	85	65.27	9.32
The interdisciplinary teaching practices	413	30	70	50.24	9.02
The place of the interdisciplinary approach in the curriculum	413	18	44	31.53	6.41
The total score of the scale	413	104	190	147.04	17.72

as $\bar{x}$ = 65.27; the mean score for the interdisciplinary teaching practices sub-dimension was calculated as $\bar{x}$ = 50.24 and the mean score for the place of the interdisciplinary approach in the curriculum sub-dimension was calculated as $\bar{x}$ = 31.53, and the mean score for the sum of scale was calculated as $\bar{x}$ = 147.04. The resulting mean values were divided by the number of items, and accordingly, the means obtained are as follows: $\bar{x}$ = 3.83 for the benefits of the interdisciplinary approach, $\bar{x}$ = 3.58 for the interdisciplinary teaching practices, $\bar{x}$ = 3.50 for the place of the interdisciplinary approach in the curriculum, and $\bar{x}$ = 3.67 for the total of the scale. Given these results, it can be contended that the teachers found the interdisciplinary approach relatively useful, however, they did not adequately use this approach in practice. They also expressed that this approach was not included in the curriculum at a sufficient level.

Findings of the second sub-problem

The second sub-problem of the study investigated whether teachers' views on the interdisciplinary approach in primary and secondary curricula differed according to gender, professional seniority and teaching level. Relatedly, teachers' views on the interdisciplinary approach according to the gender variable are reported in Table 5.

As seen in Table 5, no significant difference was found between the mean scores of female teachers ($\bar{x}$ = 3.82; Sd = 0.57) and male teachers ($\bar{x}$ = 3.86; Sd = 0.52) in terms of the sub-dimension of the benefits of an interdisciplinary approach (t = .783; p = .434 > 0.05). While female teachers' mean scores were found to be $\bar{x}$=3.59; Sd=0.44, male teachers' mean scores were found to be $\bar{x}$ = 3.57; Sd=0.42 in the sub-dimension of the interdisciplinary teaching practice. The study investigated whether there was any difference between the variables, and accordingly, there was no significant difference (t = .329; p = .742 > 0.05). There was also no significant difference between the mean scores of female teachers ($\bar{x}$ = 3.49; SD = 0.71) and male teachers ($\bar{x}$ = 3.51; Sd = 0.70) (t = .278; p = .781 > 0.05) in terms of the sub-dimension of the place of the interdisciplinary approach in the curriculum. When the total scores of the interdisciplinary approach scale were checked, no significant difference was detected between the female teachers ($\bar{x}$ = 3.67; Sd = 0.45) and male teachers' mean scores ($\bar{x}$ = 3.68; Ss = 0.42) (t = 0.344; p = 733 > 0.05). From these findings, it can be stated that gender is not statistically predicted teachers' views on the interdisciplinary approach. The results of the analysis of variance regarding the teachers' views on the interdisciplinary approach based on seniority are tabulated in Table 6.

As illustrated in Table 6, based on the sub-dimension of the benefits of the interdisciplinary approach, the mean scores of teachers with 5 years of seniority were found to be $\bar{x}$ = 3.80; Sd = 0.59; the mean scores of teachers with 6-15 years of seniority were found to be $\bar{x}$ = 3.96; Sd = 0.52; the mean scores of teachers with 24 years of seniority were found to be $\bar{x}$ = 3.87; Sd = 0.56, and the mean scores of teachers with 25 and more years of seniority were found to be $\bar{x}$ = 3.62; Sd = 0.55. As a result of the analysis of variance applied to compare the mean scores, a significant difference was found between teachers with 6 to 15 years of seniority and teachers with16 to 24 years of seniority and those with 25 and more years of seniority and this difference is in favor of teachers with 6 to 15 and 16 to 24 years of seniority (F = 6.414; p. = .000 < 0.05). It can thus be implied that the views of teachers with 25 and more years of seniority regarding the benefits of the interdisciplinary approach are relatively more negative. Based on the sub-dimension of the interdisciplinary teaching practice, the mean scores of teachers with 0 to 5 years of seniority were found to be $\bar{x}$ = 3.54; Sd = 0.61; the mean scores of teachers with 6 to 15 years of seniority were found to be $\bar{x}$ = 3.74; Sd = 0.67; the mean scores of teachers with 16 to 24 years of seniority were found to be $\bar{x}$ = 3.67; Sd = 0.66, and the mean scores of the teachers with 25 and more years of seniority were found to be $\bar{x}$ = 3.49; Sd = 0.62. As a result of the analysis of variance applied to the mean scores, a significant difference was found between teachers with 6 to 15 years and 16 to 24 years of seniority and teachers with 25 and more years of seniority in favor of teachers with 6 to 15 and 16 to 24 years of seniority (F = 3.910; p = .009 < 0.05). This result is consistent with the teachers' views on the benefits of the interdisciplinary approach. Looking at the teachers' views on the place of the interdisciplinary approach in the curriculum, it is seen that the mean scores of the teachers with 0 to 5 years of seniority were found to be $\bar{x}$ = 3.53; SD = 0.82; the mean

Table 5. Teachers' views on interdisciplinary approach according to the gender variable.

Sub-dimensions	Gender	N	Mean	Sd	Sd	t	p
The benefits of interdisciplinary approach	Female	232	3.82	0.57	411	.783	.434
	Male	181	3.86	0.52			
The interdisciplinary teaching practices	Female	232	3.59	0.44	411	.329	.742
	Male	180	3.57	0.42			
The place of the interdisciplinary approach in the curriculum	Female	232	3.49	0.71	411	.278	.781
	Male	181	3.51	0.70			
The total score of the scale	Female	232	3.67	0.45	411	.344	.733
	Male	181	3.68	0.42			

Table 6. The teachers' views on the interdisciplinary approach according to the seniority variable.

Sub-dimensions	Group	N	Mean	Sd	Sd	F	p	Differentiation
The benefits of interdisciplinary approach	0-5 years	58	3.80	0.59	3-409	6.414	**.000**	**2>4**
	6-15 years	92	3.96	0.52				**3>4**
	16-24 years	187	3.87	0.56				
	25 years +	76	3.62	0.55				
The interdisciplinary teaching practices	0-5 Years	58	3.54	0.61	3-409	3.910	**.009**	**2>4**
	6-15 years	92	3.74	0.67				**3>4**
	16-24 years	187	3.67	0.66				
	25 years above	76	3.49	0.62				
The place of interdisciplinary approach in the curriculum	0-5 years	58	3.53	0.82	3-409	1.017	.385	
	6-15 years	92	3.54	0.71				
	16-24 years	187	3.51	0.69				
	25 years above	76	3.77	0.65				
The total score of the scale	0-5 Years	58	3.68	0.48	3-409	3.384	**.018**	**2>4**
	6-15 years	92	3.79	0.44				
	16-24 years	187	3.66	0.43				
	25 years above	76	3.56	0.41				

scores of the teachers with 6 to 15 years of seniority were found to be $\bar{x}$ = 3.54; Sd = 0.71; the mean scores of teachers with 16 to 24 years of seniority were found to be $\bar{x}$ = 3.51; Sd = 0.6, and the mean scores of the teachers with 25 and more years of seniority were found to be $\bar{x}$ = 3.49; Sd = 0.62. The analysis of variance yielded no significant difference between the variables. Given the general views of the teachers on the interdisciplinary approach are examined, a significant difference was found between the teachers with 6 to 15 years of seniority and those with 25 and more years of seniority in favor of teachers with 6 to 15 years of seniority (F = 3.384; p = .018 < 0.05). The data on whether the views of the teachers on the interdisciplinary approach differ by the variable of teaching level are tabulated in Table 7.

From Table 7, it is understood that the mean scores of primary school teachers were found to be $\bar{x}$ = 3.87; Sd = 0.56 and the mean scores of secondary school teachers were found to be $\bar{x}$ = 3.81; Sd = 0.53 in the sub-dimension of the benefits of the interdisciplinary approach; and no significant difference was observed between the variables (t = .1.137; p = .253 > 0.05). Given the data based on the interdisciplinary teaching practices, primary school teachers' mean scores were found to be $\bar{x}$ = 3.65; Sd = 0.67 while secondary school teachers' mean scores were found to be $\bar{x}$ = 3.54; Sd = 0.61. The study examined whether there was any difference between the variables, and subsequently, no difference was found (t = 1.760; p = .075 > 0.05). In terms of the sub-dimension of the place of the interdisciplinary approach in the curriculum, there was no significant difference between the mean scores of primary school teachers ($\bar{x}$ = 3.57; Sd = 0.73) and the mean scores of secondary school teachers ($\bar{x}$ = 3.45; Sd = 0.69) (t = 1.649; p=.098 > 0.05).

Table 7. Teachers' views on interdisciplinary approach according to variable of teaching level.

Dimensions	Teaching level	N	Mean	Sd	Sd	t	p
The benefits of interdisciplinary approach	Primary	179	3.87	0.56	411	1.137	.253
	Secondary	234	3.81	0.53			
The interdisciplinary teaching practices	Primary	179	3.65	0.67	411	1.760	.075
	Secondary	234	3.54	0.61			
The place of interdisciplinary approach in the curriculum	Primary	179	3.57	0.73	411	1.649	.098
	Secondary	234	3.45	0.69			
The total score of the scale	Primary	176	3.72	0.45	411	2.098	.035
	Secondary	234	3.63	0.43			

When the total scores of the scale were analyzed, a significant difference was found between the mean scores of primary school teachers ($\bar{x}$ = 3.72; Sd = 0.45) and the mean scores of secondary school teachers ($\bar{x}$ = 3.63; Sd = 0.43), and this difference is in favor of primary school teachers (t = 2.098; p = .035 < 0.05). In view of the results obtained, although the mean scores of primary school teachers were relatively higher than secondary school teachers, there was no significant difference between the two groups with respect to the sub-dimensions. However, the small differences in the sub-dimensions yielded a significant difference for the entire scale.

Findings related to the third sub-problem

Referring to the first question in the qualitative research dimension of the study, namely, what is the interdisciplinary approach, 2 participants reported that they did not have any idea while 13 participants shared various definitions of the interdisciplinary approach rather than articulating a clear definition. While 9 of the participants expressed it as teaching the lessons together, the others expressed it as using any material in the lessons together, following a spiral program and classroom management in terms of regularity. All participants responded to the question of what is the effect of the interdisciplinary approach on students' learning. While the answers given by the participants are frequently expressed as ensuring holistic learning, other answers are as follows: contributing to scientific process skills, transferring the acquired knowledge to other lessons, providing permanence, the emergence of an informal learning environment, and adding functionality to the lesson. 14 participants intended to reply to the question “What are the problems you encountered in using the interdisciplinary approach?” 1 participant did not answer the question stating that he/she had no idea. While the majority of the participants explained the problem as moving away from the goal of the course, other participants remarked that it can cause negative information transfer, it takes a long time, it cannot be applied in every subject, and there may be problems in terms of tailoring instruction to students’ learning levels, and it is difficult to make a connection between the courses from time to time. Referring to the question “Do you incorporate interdisciplinary approach into your lessons?", 5 participants responded "yes" adding that they incorporated the interdisciplinary approach into their lessons while 7 of them reported they partially included it, and 3 of them said they did not. Four themes emerged as a result of the analysis of teachers' views on the interdisciplinary approach and its place in the teaching process. Quotations and themes from teachers' statements are stated in Table 8.

Table 8. Teachers’ views on the interdisciplinary approach.

Themes	Teachers’ statements
Integration of Several Courses	The course can be associated with other courses. To illustrate, using mathematics and Turkish in science course…
	I think it is teaching more than one lesson to the students by using them together.
	For example, he/she can understand when he/she uses a knowledge he/she learned in Mathematics or Turkish when he /she uses it in social studies or when he/she uses it in other lessons.
	I think I broadly incorporated it into my lecture. Because I had the students using measurements in the lesson, on the temperature change, so they used mathematics because

Table 8. Continues.

	it was a calculation. They made predictions, asked questions such as what to do and how, which contributed to their scientific process skills.
Close to Life	I think its contribution is huge, important. Because learning is achieved by integrating more than one course, he/she realizes that the acquired knowledge in the courses is related to daily life, so, the question of how I can use this knowledge is somewhat suppressed. You can say to the student that look, you will use it here. The student can use all of this knowledge at once, I mean, the student can make a product by blending his/her knowledge. Like I said, he/she feels closer to life. It makes more sense for the student when he/she sees the lessons together rather than independently. He/she can say that we are not learning in vain you know. He/ she can permanently associate what he/she learned with his/her lives. This can boost class participation.
Concretization	I think this approach makes the information that remains intangible more concrete. Because when you concretize it, it becomes more memorable. When a piece of information left unclear in any lesson is integrated with another lesson, it can be more meaningful for the student. Thus, solution suggestions can also increase. Because the information is sometimes integrated, I mean scientific process skills, I think it will also contribute to it.
Moving Away from the Goal	While teaching a subject by benefitting from different lessons, it can be a problem for the student to focus on the lesson again. Sometimes the student can ask a question about that lesson, and then the subject I'm teaching on is interrupted. This is a problem, I think. When I try to mention other courses, the subject is much interrupted. It is quite difficult for our students to implement. In the previous lesson, I gave a little break with a song you know. But actually it's not something I care so much. Because there are so many subjects. We can only deal with the subject of the course itself. And to be frank, there was no question in my mind about the importance of this. Today I included it more or less, with a song. Apart from that, honestly, I don't care so much. Because of the many number of subjects, we only cover normal lessons. Nobody prompted us to question whether interdisciplinary approach is important or not ever before.

DISCUSSION AND CONCLUSION

The aim of this study is to identify teachers' views on the interdisciplinary approach and whether they incorporate this approach into their instruction process. As a result of the data obtained, it can be argued that teachers have positive views on the interdisciplinary approach. According to the findings, the teachers consider the interdisciplinary approach useful, however, they do not effectively implement it in in-class activities as this approach is not sufficiently incorporated into the curriculum. There is a growing body of literature indicating that the interdisciplinary approach is fruitful and positive results are obtained as a result of the practice of the interdisciplinary approach. In his research, Doğan (2014) investigated the effect of the interdisciplinary teaching process on the geography course, concluding that interdisciplinary teaching significantly contributed to the achievement of the acquisitions in the geography curriculum and permanent learning. In a similar vein, Demir (2009) reported that interdisciplinary teaching practices influence the academic success of the second level of primary education. In their study, White and Carpenter (2008) acknowledged that the teaching strategy prepared within the framework of interdisciplinary approach principles increased student awareness of biology concepts. Courtney (2006) found that interdisciplinary instructional approach methods are more effective than existing approaches in the context of making learning connections. Suraco (2006) emphasized that interdisciplinary teaching practices contributed to the learning process of students who showed a lack of interest in the course. The vast majority of studies in the literature also confirm these results (Aytar and Özsevgeç, 2019; Şahin et al., 2018; Ürey et al., 2015; Konukaldı, 2012; Alp, 2010; Çıray, 2010; Matthews et al., 2009; Michelsen, 2008; Furner and Kumar, 2007; Özkök, 2005; Powers and Jones-Walker, 2005; Boakes, 2000; Elliott et al., 2001; Yıldırım, 1996). Additionally, only a few studies in the literature yielded opposite results in relation to the benefits of the interdisciplinary approach. To illustrate, Diker (2004) designed projects using the interdisciplinary

approach and investigated the effect of the interdisciplinary teaching approach on students' learning process. As a result of the research, a direct relationship could not be established between the courses, the information obtained in any course could not be used in different courses and could not be associated with current issues. Another finding of the study is that the content of the interdisciplinary approach is insufficient in the curricula. Also, there are also a series of studies supporting this research finding in the literature. In their work, Karakuş and Aslan (2016) revealed that the current primary school curriculum is insufficient in terms of an interdisciplinary instructional approach.

In the study, it was observed that while teachers' views on the interdisciplinary approach differed by the variables of professional seniority and teaching level, they did not differ by the gender variable. In parallel with the findings of this research, Delier's study (2005) titled "Interdisciplinary Approaches in Art Education" revealed that the gender variable did not show a significant difference according to the opinions of the teachers about the interdisciplinary approach. However, Çelik (2014) argued that male teachers' views on interdisciplinary approach differed significantly compared to female teachers in terms of the gender variable, while their views did not significantly correlate with the seniority variable.

In the education process, it is expected that the knowledge is created by individuals in a meaningful and holistic way, and the resulting knowledge is transferred to different environments and used in appropriate places. The knowledge that emerges in this way will also contribute to the problem-solving skills of individuals (Duman and Aybek, 2003). Thus, holistic education can be achieved with an interdisciplinary approach. Teachers are the agents of the interdisciplinary approach, allowing students to achieve learning gains (İhtiyaroğlu, 2018). In addition to that, the fact that teachers do not have sufficient knowledge of the interdisciplinary approach may prevent them from using it effectively, even if they use it in their own lessons. Consequently, it is necessary to provide in-service training to teachers at this point and encourage them to acquire the required knowledge and skills related to the interdisciplinary approach, especially in education faculties.

RECOMMENDATIONS

In order for teachers to be able to carry out applications related to the interdisciplinary approach, they must first know this approach. To ensure that, training on interdisciplinary approach applications can be given within the scope of in-service training practices. In these training, besides theoretical knowledge, planning applications for interdisciplinary approach can be made.

Teacher guidebooks should be included more instructions on how to implement interdisciplinary teaching practices.

Some lesson hours should be included in which teachers from different disciplines can come together and carry out interdisciplinary teaching practices together.

Relationships established between a small number of achievements in the curriculum should be established between all courses at the same education level as required by the interdisciplinary approach.

This study is aimed at primary and secondary school teachers, it can also be applied at the high school level, taking into account the developmental characteristics of the students.

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