The interdisciplinary programme model and an evaluation of the practices in education

Memet Karakuş

Çukurova University
Faculty of Education

Abstract: This study which evaluates teachers' views with regard to the practices of interdisciplinary programme model in education aims to identify primary and secondary school teachers' suggestions about the interdisciplinary programme model, the practices in education processes, and the effective implementation of the model. The participants were 29 teachers, 18 females and 11 males, from five different branches. The data were collected through a semi-structured interview form consisting of 6 questions and analyzed descriptively. The participants were found to be in favour of establishing connections between the courses. They were found to believe interdisciplinary instruction had many educational advantages and report that they could establish interdisciplinary connections with other courses. Some constraints mentioned by the teachers regarding the method were causing chaos in the lesson, drifting away from the topic, prolonging the time allocated for the topic, and not understanding the borders of the disciplines. It is recommended to take necessary actions in order to help teachers to use the method effectively in educational practices; to give importance to interdisciplinary education programmes in both undergraduate education and in-service trainings; and to redesign educational environments in a way to support interdisciplinary instruction.

Key words: Interdisciplinary instruction model, integrated programmes, planning education, constructivism

1. Introduction

The most important fact which distinguishes information society from industrial society is that information changes rapidly and thus increases the knowledge and skills to be attained by individuals in that. Only Internet by itself has opened a new world to the technological skills needed to help students find their ways in the complicated information society. Therefore, in today's world in which information changes so rapidly, educators need to think very carefully about the things students should learn as well as the skills and values they should be given in the future (Drake, 2007). Thus, which information and skills should be the focus of the education programmes and models has become an important issue.

Correspondence to: Memet Karakuş
Çukurova University
Faculty of Education
011330 Adana, Turkey
Tel.: +90 322 338 67 33
E-mail: memkar@cu.edu.tr

Every education model has a design. Instructional design includes analyzing, selecting, and ordering aims, content, learning-teaching processes, and evaluation aspects separately. According to Tyler who laid the foundations of programme development models, the main source and the determiner of the aims of the programme model should be the individual, the society and the topic while designing a programme. In line with this, if the programme puts students in the centre, it should prioritize individual development of students. If it puts society in the centre, then it should prioritize solving the problems of the society. If it puts topic in the centre, its focus should be on teaching and learning that topic completely (Oliva, 2005). The modern globalizing world is facing various and embedded problems such as terrorism, health, famine, energy resources, racism, inequality, and injustice. When viewed from this perspective, designing programmes on more than one field and relations rather than on single topic and source emerge as necessity. As one discipline is not adequate anymore, many countries in the world are trying to explain developments in science and technology as well as phenomenon and events with more than one discipline. Therefore, interdisciplinary education practices play an important role in today's education system (Drake, 2007).

Interdisciplinary education has a long and rich historical background. In *Principles of Psychology* Herbert Spencer used the term 'integration' for the first time. In *L'Enseignement Integral*, published in Paris, Alexis Bertrand developed the Integrated Instruction Theory. The term 'Integrated Education Programme' emerged together with the project approach in 1920s, core programme movement in 1930s, and problem-centred core curricula in 1940s and 1950s. In 1980s and 1990s, most innovative approaches related to more than one subject or discipline were commonly and excursively called as integrated programmes (Klein, 1996). Therefore, interdisciplinary approaches which date back to Plato, Aristotle, Kant and Hegel (Vidaurri, 1996) and which have attracted notice in the education programmes of many countries since the beginning of the 20th century have now gained an increasing importance.

Discipline as a concept refers to only one field while 'interdisciplinary' expresses the relationship between more than one field (Apostel, 1970). Jacobs (1989) defines discipline as a 'scientific field' which is a body of knowledge and which has its unique content, instruction, and method. To him, interdisciplinary is an integrated approach which consults knowledge of more than one discipline in order to examine one main theme, case, problem, subject, or experience.

Disciplinary approach aims to attain information and skills with regard to a specific discipline. Therefore, this approach does not mention interdisciplinary relations; the disciplines are independent of each other. However, in the interdisciplinary approach, the disciplines are handled in an interrelated way, there is integrity between them. The disciplines that come together in a common ground work together. This comparison can be concreted with the concept of 'management'. Taking the 'management' concept scientifically in its borders and examining the main concepts of management as well as how it is and how it should be and will be is a disciplinary approach. However, associating the concept of management with many other fields such as sociology, psychology, economy, business, and education is an interdisciplinary approach.

Interdisciplinary programmes are designed in various ways. Some examples include standard based integrated design, concept based interdisciplinary design and problem based inter-

disciplinary design (Drake, 2007; Erickson, 1995). Standard based programmes are designed according to some previously identified aims and criteria while problem based designs are designed according to real life problems. Concept based approach chooses a concept and creates the conceptual integration of this concept in various disciplines (Erickson, 1995). For instance, the content in relation to concept of cycle is composed of all the related information sources. Butterfly cycle, season cycle, water cycle, plant life cycle, population cycle, recycle and people effect on cycle. The focus of this approach is to create the main concepts about the course.

Today, information, methods and techniques specific to one discipline are not enough for making sense of the concepts to be learned. Therefore, it is necessary to integrate more than one discipline. This integration should involve a synthesis of disciplines rather than the disciplines independent of each other. In line with these statements, interdisciplinary programme notion can be considered to have emerged as a natural result of the needs of today's information society. Taking a specific concept or problem as a base with an interdisciplinary design, the topic can be integrated with knowledge and skills of various fields that can shed light into that topic from different angles. This way enables both the instruction of knowledge and skills in specific disciplines and the meaningful use in an integrated way (Yıldırım, 1996).

In line with the above mentioned purposes, the study aims to find answer to the following question: What are the views of teachers on the instruction practices of interdisciplinary programme model?

1.1. Purpose of the study

The purpose of the present study is to identify teachers' views on the instruction practices of interdisciplinary programme model. In line with this purpose, the study aims to find answers to the following questions:

1. What are the teachers' views on interdisciplinary programme model?
2. What are the teachers' views on the practices of interdisciplinary programme model in the education processes?
3. What are the teachers' suggestions on the effective implementation of the interdisciplinary programme model?

2. Method

2.1. Research design

This study which is descriptive in nature and aims to identify the present situation on the issue was designed using qualitative research techniques. As the purpose of the study was to identify views, the data were collected using semi-structured interview technique, which is one of the qualitative data collection methods. This technique enables time flexibility in practice. Researchers can ask previously prepared questions and include more questions in the interview process with a view to obtaining in depth information (Bogdan and Biklen, 2007; Yıldırım and Şimşek, 2006).

2.2. Participants

The study was conducted with secondary school teachers working in the city centre of Adana, Turkey. The teachers were selected using one of the purposeful sampling methods—maximum variation sampling method. Maximum variation sampling method aims to identify common points and similarities among diverse groups, rather than make generalizations about the target population through variation (Yıldırım and Şimşek, 2006). Maximum variation was enhanced by choosing teachers from 5 different branches and schools with different socio-economic levels. Table 1 summarises the information about the teachers.

Table 1. Frequency of the participants according to gender and years of experience in profession

Branch	Years of experience	Female	Male	Total
English (E)	4, 8, 9, 9, 14, 15, 17	5	2	7
Turkish (T)	8, 9, 12, 12, 14, 15,	4	2	6
Mathematics (M)	4, 8, 13, 14	3	1	4
Science (S)	3, 4, 8, 9, 15, 20	3	3	6
Social Studies (SS)	7, 7, 8, 14, 17, 21	3	3	6
Total		18	11	29

S o u r c e: Author's own elaboration.

As seen in Table 1, the study was conducted with 29 teachers, 18 females and 11 males, from 5 different branches. The teachers' experience in profession ranges between 4 and 21 years.

2.3. Data collection tool

The data were collected using a semi-structured interview form consisting of 6 questions. The form included such questions as the teachers' general views on interdisciplinary programme model, advantages and disadvantages of interdisciplinary practices, problems they experience in interdisciplinary practices and ideas regarding possible solutions.

2.4. Data analysis

Data collected from the semi-structured form were analyzed using descriptive methods. Teachers' views on interdisciplinary programme model were identified in line with the questions in the form. In some cases, quantitative values such as percentages and frequencies were given with a view to making interpretations easier. Once the teachers were grouped according to the initial letters of their branches (E for English, S for Science, SS for Social Studies, M for Mathematics, T for Turkish), their views were presented with their original expressions given in quotation marks.

3. Findings

3.1. Findings in relation to the teachers' views on limiting a course with its own borders and associating it with other courses

As indicated by the evaluation of the findings regarding the teachers' views on limiting a course with its own borders and associating it with other courses, the teachers agree with the idea that the courses should be associated with each other. Teachers' views parallel to this notion are as follows:

> 'Absolutely, the courses should be associated with each other. A course should not be limited with its own field only. Once courses are associated with each other, students can understand the topic better; and learning becomes easier' (E1, E4, T1, T4, T5, T6, M1, S2, S3, S5, S6, SS1, SS3, SS4, SS5, SS6). 'Associating the topic covered with different courses helps students to understand the topic in an integrated way and enables them to have a broader point of view. Integrating Science with Mathematics and Social Studies makes learning easier' (S4).

As it can be seen in these findings, 'associating, integrating, understanding, making it easier, learning, and looking from a broader perspective' are the highlighted points on the issue.

> 'Courses should absolutely be associated with each other. Information in many courses affects each other. English is related to Turkish, and Maths is related to Science. If your Turkish is good, you learn English more easily' (E2). 'You cannot understand a course well enough without associating it with other courses' (E3). 'In order for a student to solve a problem, s/he should understand the question. This case is directly related with reading comprehension, namely Turkish lesson' (M2). 'My branch is Mathematics. This field is related to both Turkish and Science. A student can only solve the problem after understanding what s/he has read' (M3). 'No borders remain between courses when you support the information you give with the examples from other courses. For instance, we benefit from Mathematics and science while teaching 6th grade geography and map information topics' (SS2). 'While teaching parallel and meridian topics and identifying the location of somewhere in the world in Social Studies, we have to associate them with Mathematics' (SS3).

This finding suggests that teachers try to make concrete explanation of the effects of connections between courses on reasoning and comprehension. It is important to note that especially Turkish and Mathematics courses are believed to form a basis for other courses while Science is thought to be related to real life.

> 'Courses should be holistic and comprehensive. For instance, while solving problems in Mathematics, many interdisciplinary connections can be established (e.g reading, understanding, writing well, grammar, and daily life)' (T4). 'Interdisciplinary connections

should be established, but they should be appropriate to the aims of the course' (E6). 'As constructivist approach is dominant in Turkey, it is impossible to limit a course with its own borders' (T2). 'Courses should be associated not only with each other but also with life'(T3).

This finding suggests that teachers highlight the importance of appropriateness of real life connections to the attainments of the course.

3.2. Findings in relation to the teachers' views on the advantages and disadvantages of associating a course with other courses

Teachers' views on the advantages and disadvantages of instructing a course by associating it with other courses are analyzed under two sub-dimensions as advantages and disadvantages.

All the teachers participating in the study state that associating a topic with other courses brings advantages. Views of teachers on this issue are as follows:

'There are many advantages because a child's knowledge affects his success in other lessons as well' (E2, M1, M4, S1, SS3). 'I associate English with Social Studies through Atatürk and national holidays topics, and with Mathematics through numbers and problems topics. The course becomes more interesting and informative then' (E1). 'Instruction becomes more meaningful and effective. As people perceive life in a holistic way, interdisciplinary connections save teaching from artificiality. […] No disadvantages occur as long as the connections are established correctly' (E3). 'There are no disadvantages of establishing interdisciplinary connections; on the contrary, the reverse case may cause disadvantages. If the student sees and understands the relationships among courses in real sense, s/he learns the topic permanently. He improves his research and exploration skills' (E4, S2). 'If one course is associated with other courses, students can handle the topic with all aspects and concretize the topic. They are motivated and become aware of the importance of the lesson. They have the advantage of looking from different perspectives and thus compare and examine' (E5, E7, T5, T6, M2, M3, S4, S6, SS4, SS5, SS6). 'I believe it has more advantages than disadvantages. Everything is connected in the universe; and the same is true for the courses. They help learners to refrain from memorizing and they make concepts easier' (T1). 'They also enable to transfer what is learned to various lessons and thus contribute to the meaningful learning' (T2).

In line with the above mentioned views, interdisciplinary instruction is thought to bring many educational advantages such as increasing academic success by combining the knowledge in one course with another, freeing instruction from memorization and artificiality by transferring knowledge to different courses, motivating students by making the lesson interesting and informative, developing research and exploration skills by looking at the topic from different perspectives, and concretizing the topic.

As for the disadvantages of interdisciplinary instruction, teachers were found to focus more on the wrong practices and the limitations of the interdisciplinary instruction than the disadvantages. Teachers' views on this issue are as follows:

> 'Each topic should be learned as a discipline in its own field. If the student learns the topic well in its own field, he can make connections with other courses much more easily. Otherwise, there can be many problems in learning and teaching' (SS2). 'I do not think that it has disadvantages, but it may cause confusion if it is not used right' (E1). 'Interdisciplinary associations make learning more concrete, but there can be some problems while learning abstract topics' (T3). 'Establishing connections between courses and thus making learning permanent are an advantage; but if it is not the teacher's field of expertise, some difficulties can be experienced. The teacher can overcome this problem by making some research and prior preparation' (T4). 'The advantage is that a student can increase his success by using the knowledge he gained in other courses. As for the disadvantages, it can take a lot of time; you may drift away from the topic, which causes confusion among students' (S1, S2, S3, S5). 'The course may lose its unique basic qualities. If the instruction goes beyond its aims, students may ignore the lesson. Therefore, it is more beneficial to establish connections by sticking to the main course' (SS5).

In line with the findings mentioned above, the teachers seem to focus on some disadvantages or limitations of interdisciplinary instruction. Some examples regarding disadvantages of interdisciplinary instruction as perceived by the teachers include disciplinary information that may be learned wrongly, it may cause confusion regarding the scope and limitations of the courses, constantly trying to make topics more concrete makes teaching abstract concepts more difficult, it can take a lot of time, there is a risk of wrong information transfer because the topics are not the teachers' field of expertise, and it may cause chaos in the class as a result of drifting away from the topic.

3.3. Findings in relation to the things teachers take into account while they establish interdisciplinary connections

Of the 29 teachers who participated in the study, 28 teachers stated that they could establish connections with other courses. The teachers' views on the issues they consider while establishing these connections are as follows:

> 'I use tools such as art and music to help comprehension. I am also trying to attract students' attention by using the computer' (E2). 'I give research tasks so as to help students to see the connections between the courses' (T5).

In line with the finding above, teachers seem to give importance to visuality, interest, technology, and research while establishing connections with other courses.

> 'It is easier to try to establish connections between the courses with similar scope. For instance; in my courses (English), I establish more connections with Turkish, which is another language course' (E4). 'While learning a foreign language, students can benefit from their own language a lot. I use language-culture and language-society relations while teaching English' (E6). 'When the student learns other courses well and has enough readiness level, it is much easier to establish interdisciplinary connections. Otherwise, it is very difficult to establish these connections. For instance, a student who is good at Turkish grammar learns English grammar faster and more easily' (E7).

Views in these findings show that the teachers try to establish connections with fields that are close to each other.

> 'While establishing connections, I try to make students see the relations generally, without going into details' (T1). 'In line with students' prior knowledge, I try to establish connections through questions and answers, without going into details' (T2). 'I exchange ideas with other teachers before establishing interdisciplinary connections. I try to make connections through concrete experiences' (T4).

These findings suggest that some teachers tend to make general connections without getting into details. Besides, exchanging ideas with other teachers is another remarkable finding.

> 'While analyzing the problem, I establish connections with Turkish lesson in terms of language and expression, with Social Studies lesson by drawing conclusions for real life, and with Art lesson by making students draw geometric shapes' (M4).

This finding also suggests that some teachers are quite aware, conscious, and careful about interdisciplinary relations and can systematically establish these connections.

> 'I try to draw attention to contemporary real life topics and establish concrete connections' (S3, S4, SS2, SS3). 'By putting my course in the centre as the purpose, I put other courses around as tools' (E3). 'I try to establish connections by discussing how my course is handled in other courses' (S6). 'I try to establish connections through the other topics students learn in other courses' (E1).

This finding shows that contemporary topics are made more concrete and the main course is put in the centre. Another important point in these views is that teachers take students' opinions while establishing interdisciplinary connections.

As mentioned before, one of the participants stated that he could never establish interdisciplinary connections; and one other teacher said she could establish connections with only one course. Teachers' views and their justifications are as follows:

'I can establish interdisciplinary connections only with topics that require calculations because I do not have time to review the programmes of other courses and establish connections' (S1).

'No, I cannot establish interdisciplinary connections. There are not enough materials at school, and the crowded classrooms do not have adequate equipment. Generally, indiscipline in education causes problems in establishing connections between courses' (SS5).

In line with the two views mentioned above, knowledge level of teachers about other courses and the school equipment has effects on making interdisciplinary connections.

3.4. Findings in relation to the teachers' view that interdisciplinary connections can be established in every course

Of all the teachers participating in the study, 23 teachers stated that interdisciplinary connection could be established in every course. The views on this finding are as follows:

'I agree. Lessons are like domino. If one of them falls down, the others will fall down, too. If a student's reading skills have not developed, he cannot comprehend what he reads' (E2). 'Interdisciplinary connections can be established in every course because interdisciplinary does not mean to mention each course a little. For instance, it does not mean to mention a little science and a little Social Studies in Mathematics lesson. It is the effective integration of information from different fields while instructing knowledge and skills' (E3). 'I totally agree. One cannot think that there are no connections between the courses. These connections should absolutely be established so as to make learning permanent. We cannot separate English from Turkish. We cannot think of Science without Mathematics' (E4). 'Interdisciplinary connections can be established in every course because education is integration. All courses are the interrelated parts of the integrity called life' (E5, E7, T5, T6, M2, M4, S3, S4, S6, SS2). 'Each course has an aspect that can be associated with another course. I am trying to see these aspects' (T1, T2, T3). 'In fact, each course forms a basis for understanding other courses. A student who learns how to read and write well in Turkish course can better understand the other courses. A student who is good at Maths performs better in Science' (T4). 'As a Science teacher, I try to make connections with Mathematics while solving problems, with Social Studies while teaching such topics as minerals and fossils, and with Music while teaching sound propagation' (S2). 'Interdisciplinary connections can be made in every course. If we are good at Turkish grammar, we can learn English grammar more easily. Everything in life is interrelated with each other' (SS3).

Three participants said that interdisciplinary associations could be established in every course; however, they also mentioned that some problems might be experienced. Their views on this are as follows:

'I believe that it should be made, but I have some problems with students' knowledge level in some classes' (SS1). 'There can be some problems in establishing the connections appropriate to the students' levels' (S4). 'I agree, but it does not have the same effects or benefits in all courses' (E1).

Three teachers stated that interdisciplinary instruction could not be applied in every course. Their views are as follows:

'No, interdisciplinary connections cannot be established in every course. Numerical and verbal courses have topics that are not related with each other' (M3, S1). 'No complete connections can be established between core courses and talent courses' (SS5).

3.5. The teachers' views on the courses they thought most appropriate for interdisciplinary instruction

Findings in relation to the teachers' views on the courses they thought most appropriate for interdisciplinary instruction are analyzed according to the teachers' branches. For a general review, the frequency of the courses that the teachers thought most appropriate for interdisciplinary instruction is analyzed according to the teachers' branches.

Table 2. Frequencies and percentages of teachers' views on the courses they thought most appropriate for interdisciplinary instruction

Branch	Frequencies according to the courses								
	Turkish	Science	Social Studies	Mathematics	Music	Art	English	Physical Education	Total
English	5	2	2	3	2	1	1	2	18
Turkish	5	2	3	2	2	2	–	–	16
Mathematics	3	3	1	3	–	–	–	–	10
Science	5	6	5	4	3	2	1	1	27
Social Studies	3	3	4	2	1	–	3	1	17
Total	21	16	15	14	8	5	5	4	88
%	24	18	17	16	9	6	6	4	100

S o u r c e: Author's own elaboration.

As seen in the table above, teachers find Turkish lesson most appropriate for interdisciplinary connections (24%). Beside Turkish, the other highly preferred courses are Science (18%), Social Studies (17 %) and Mathematics (16%). Music (9%), Art (6%), English (6%) and Physical Education (4%) are also the courses that are associated with interdisciplinary instruction.

Teachers' views on the courses that are most appropriate for interdisciplinary instruction are English, Turkish, Mathematics, Science, and Social Studies respectively.

'Science, Mathematics, English, Social Studies, Turkish (E1, E4, E5). Turkish is related with English, and Science is related with Maths. In fact, Visual Arts, Information Technologies, and Music are related to many courses. These courses make comprehension easier in other courses' (E2). 'Since Music and Art courses address more than one sense, they are the most appropriate courses' (E3). 'Physical Education and Mathematics are appropriate; body and mind control can discipline the person' (E6). 'First Turkish, then Social Studies because they are the courses about language, history, and life' (E7).

'Turkish, Social Studies, Mathematics, Science, English, Art, and Music are the most appropriate courses' (T1, T2, T5, T6). 'The most appropriate course is Turkish because reading texts include fundamental information about life and courses at school. Sentences we use while teaching grammar are associated with other courses' (T3). 'The courses can be divided as numerical and verbal. For instance, the Turkish course can be connected with Social Studies, Music, and Art courses' (T4, M4).

'Turkish, Mathematics, Science, and Social Studies courses are the most appropriate ones for interdisciplinary instruction. The topics in these courses are not independent of each other' (M2). 'Mathematics, Science, and Turkish are the courses that can be used for effective interdisciplinary connections. For instance, we cannot expect a student who does not know the ratio and proportion topic in Mathematics to calculate elongation of the springs in Science lesson. The effects of Turkish lesson are seen in all courses. If the student's reading comprehension is not good enough, he does not perform well in other courses, either' (M1, M3).

'Some connections can be established between Turkish and Social Studies and Science and Mathematics' (S1). 'Science-Social-Mathematics, English-Turkish and Science-Music courses are appropriate' (S2). 'Connections can be made between Science-Mathematics, Music-Art, Turkish-Social Studies' (S3). 'Connections can be made between Science--Social and Turkish-Social' (S4, S5). 'Turkish, Science, Art, Music, Physical Education, Mathematics' (S6).

'Mathematics, Science, Turkish, Social Studies courses are interrelated with each other. A student who is successful in one becomes successful in the others as well' (SS1). 'It is possible to establish connections between Social Studies and all the other courses' (SS2). 'Social Studies, Science, English-Turkish' (SS3). 'Mathematics-Science-Technology Design-English, Social Studies-Turkish-English-Religion, Technology Design-Visual Arts--Music-Physical Education courses can be associated' (SS5).

3.6. Findings in relation the teachers' suggestions on how to conduct interdisciplinary instruction effectively

Findings in relation the teachers' suggestions on how to conduct interdisciplinary instruction effectively are as follows:

'Teachers should be prepared and aware of interdisciplinary instruction. They can be provided with trainings on the issue' (E1, SS2). 'Interdisciplinary instruction is not just combining the contents of two courses. It means a qualitative integrity between the

courses. Teachers should be provided with trainings to improve their awareness and skills on the issue of interdisciplinary practice' (E3, T5). 'While planning the lesson, we should identify with which courses we would establish connections and make preparations accordingly' (T1). 'The topics should be reviewed by the teachers and the points to be associated should be identified beforehand' (M2).

The statements above indicate the teachers' need for in-service training opportunities on the interdisciplinary instruction. Teachers' views seem to focus on understanding interdisciplinary instruction, preparing the lesson, and improving practice skills.

'It is important that the teaching environment is physically convenient, that students have enough readiness level, and that teachers from different branches work cooperatively' (E4, S4, SS1). 'We can have meetings with the teachers whose branches are going to be associated with ours. Teachers from different branches can be invited to our classes and these teachers can explain the parts related to their branch' (T4, S3). 'Interdisciplinary connections should be established with concrete examples. Teachers should work cooperatively' (T2, T6, S1, S2, S5).

These statements emphasize the importance of cooperation among the teachers. In addition, the participants mentioned the importance of readiness level and suggested that interdisciplinary connections should be established with concrete examples.

'Curriculum and course books can be prepared in accordance with the interdisciplinary instruction. However, the core knowledge in the main course should be taught accurately first. Connections between the units should be made correctly' (T3, S1, S3, S6, SS3). 'Weekly schedule of the courses should be prepared considering the interdisciplinary associations' (S1) 'The attainments in the main course should be considered while establishing connections because there is a risk of getting away from the purpose' (M2). 'Units should be parallel to each other in the curriculum' (S2). 'Numeric lessons and verbal lessons should be associated within each other. Physical Education course is especially important for discipline and order'(SS6).

Teachers' views on the statements above are related to curriculum, content, courses, and the way the connections should be established. There are concrete suggestions especially about the ways connections should be established.

'Connections should be established benefitting from the technology and explained using tools such as pictures, figures, videos, etc.' (S3). 'Schools should have a very rich substructure. Classrooms, ateliers, sports halls, laboratories, and technological equipment should be very good and they should be used effectively. The classes should not be crowded' (SS5).

This finding draws attention to the importance of the school equipment in interdisciplinary education practices. As it is known, technology and other school facilities are of great importance in every education environment.

4. Discussion

All the teachers participating in the study agree with the idea that the courses should be associated with each other. Only three teachers stated their concerns about the process of establishing interdisciplinary connections. Teachers think that associations among courses unify the courses, help students to have a look at the topics to be learned with a broader, thematic understanding, make learning easier, and help students to make analytical connections by synthesizing. According to Humphreys, Post and Ellis's (1981), interdisciplinary practices help students to expand knowledge about many aspects in their environments; they enable students to improve their knowledge, skills, and practice in more than one field. Interdisciplinary instruction can therefore be said to integrate disciplines by eliminating the borders between them, and this integrity makes learning and transferring easier.

Teachers focus especially on the effects of interdisciplinary associations on comprehension and reasoning. This case is appropriate to the nature of interdisciplinary instruction because one of the important aims of interdisciplinary instruction is to make comprehension easier by integrating the disciplines. Besides, teachers mentioned courses such as Turkish, Mathematics, and Science as the foundations of the other courses, which can be explained with the perception that Turkish is important in comprehension, Mathematics is important in thinking, and Science is important in interpreting life. Findings in this issue seem to be parallel with the notion that Jacob's (1989) interdisciplinary curriculum helps teachers to design motivating learning experiences for students and find new options in implementing curriculum.

Teachers' emphasizing the appropriateness of the interdisciplinary connections with the attainments of the course can be explained by their role to develop disciplinary scientific knowledge. Interdisciplinary approach does not mean that disciplinary instruction should be eliminated completely. Learning about language, knowledge, and skills that are unique to specific subjects is of great importance in thinking effectively and searching in that specific field. Interdisciplinary approach is not the antithesis of disciplinary instruction, rather, it should be considered as an approach that can be applied together with disciplinary approach (Yıldırım, 1996).

All of the teachers participating in the study believe that interdisciplinary instruction brings more advantages than disadvantages. Teachers stated that interdisciplinary instruction had important advantages such as helping transfer, increasing success, making the topic more concrete and comprehensible, making learning meaningful and permanent, motivating students by making the course more interesting and informative, and improving research and exploration skills. These views seem to be consistent with the first finding. Research on neurophysiology indicates that human brain improves with variety and works more effectively with the connections established. Every operation in the brain concerns the whole brain; the production is obtained as a result of brain's working as a whole (Hebb, 1959). Interdisciplinary approach not only increases students' interest in school and active participation in the

lesson but also eliminates undesirable student's behaviour (Sullivan, 2000). Therefore, interdisciplinary instruction is effective in such cases as transfer and permanent and meaningful learning.

As to the disadvantages of interdisciplinary instruction, teachers mentioned such problems as the long time allocated for such instruction, insufficient or incorrect teaching and learning of a discipline topic and confusion about the borders of the course. Teachers think these kinds of concerns might have resulted from the notion that unique borders of the disciplines cannot be learned. Interdisciplinary instruction does not eliminate any discipline; conversely it brings its function by integrating with other disciplines.

Of the 29 teachers who mentioned establishing interdisciplinary connections in their course, 28 stated that they featured such properties as visuality, interest, technology and research. They also said they tried to establish connections between the fields that are related to each other. This case is consistent with interdisciplinary philosophy and its understanding of learning and teaching. Integrating Art, Mathematics, Natural Sciences, and Social Studies increases cognitive development, abstract thinking, creativity, and problem solving skills (Perkins, 1994).

Some teachers were found to make general associations without getting into details, which indicates that they are cautious about the borders of interdisciplinary connections or they relate detailed information about one field with disciplinary instruction. Besides, exchanging ideas with other teachers, making the topic more concrete with contemporary issues, and putting the main course in the centre indicate that they consider life, discipline and interdisciplinary balances.

Of all the teachers participating in the study, 23 mentioned that interdisciplinary connections could be established in every course because the courses formed base for each other, they united in a large field, and life was integrity. As interdisciplinary associations help students to see and understand the variables about real life as a whole (Drake and Burns, 2004), teachers might have associated interdisciplinary relations with the integrity of the whole universe.

Three teachers participating in the study stated that interdisciplinary connections could be established in every course, but it might cause some problems. These teachers seem to be aware of the importance of interdisciplinary instruction but have some worries and hesitations about practices. Other three teachers participating in the study stated that interdisciplinary connections could not be established due to the differences in the field and the different functions of the courses in the curriculum. Those who have hesitations about practicability or who say that the approach cannot be used in every course might think so due to such factors as their notion of education, their experience in interdisciplinary education practices, physical conditions of the schools, and the problems about students' readiness levels. Teachers who apply this approach put it into practice by cooperating with other teachers in the same classroom, at the same time. Generally, planning this model requires great effort and devotion with a view to making associations between time and programme content. Getting monotonous is eliminated, so teachers can review programmes from a new and different perspective. However, it might bring extra workload to the teachers. This fact might have affected teachers' attitudes towards interdisciplinary instruction in a negative way.

Teachers think that interdisciplinary associations can be used most conveniently in the Turkish, Science, Social Studies, and Mathematics lessons respectively. This finding might result from the fact that these courses are the core ones in primary and secondary schools. Spicer (2001) points that interdisciplinary approach helps to improve reading and writing skills in numeric and verbal sciences. English teachers participating in the study find Turkish and Mathematics courses appropriate to interdisciplinary instruction. This finding might result from the fact that Turkish is a language course like English; and Mathematics is a course related to abstract concepts.

Views of Mathematics teachers show that they found Mathematics, Science, and Turkish courses more appropriate to interdisciplinary instruction. Mathematics is important for Science, and Turkish is important both for Science and Mathematics, which might have affected the teachers' opinions. Besides, although Science teachers found their course appropriate to interdisciplinary practices, they also found Mathematics, Turkish and Social Studies courses appropriate at high levels. On the other hand, findings about Social Studies teachers seem to be parallel to the ones about Science teachers. Although Social Studies teachers also stated their own course primarily, they found Science and Turkish courses more appropriate for interdisciplinary instruction.

The teachers made some suggestions about the deficiencies in understanding, planning and implementing interdisciplinary practices. In this regard, teachers need to have in-service training courses about interdisciplinary instruction. The importance of cooperation is remarkable among the suggestions with regard to interdisciplinary instruction. Another remarkable suggestion is the importance of readiness level, curriculum, content, course books, the way courses are associated, and the use of concrete examples in making interdisciplinary associations. In this regard, the design of interdisciplinary instruction should be made by considering many variables about education. The appropriateness of the education teachers received, curriculum, books, and students' readiness levels for interdisciplinary instruction play an important role in designing integrated programmes.

5. Conclusions and recommendations

The results of the present study which aimed to identify teachers' views on interdisciplinary programme model and its practices are summarized below.

All the teachers participating in the study believe that courses in primary and secondary schools should be associated with each other. They also think that interdisciplinary instruction brings many educational advantages such as increasing academic success, transferring knowledge to different courses, enhancing meaningful and permanent learning, drawing attention, motivating, concretizing, and developing research skills. Some important constraints of the interdisciplinary instruction mentioned by the teachers included causing chaos in the lesson, drifting away from the topic, prolonging the time allocated for the topic, and not understanding the borders of the disciplines.

Teachers can easily establish connections between their courses and other courses. While doing so, they use such methods as problem solving, discussion, and question and answer. Some other methods used with a view to establishing connections include cooperating with

other teachers, using contemporary issues, and integrating disciplines in a general field without going into details.

According to the 23 teachers participating in the study, interdisciplinary connections can be established in every course while 6 teachers think it is not possible because the topics are not related with each other. Teachers think that connections can be established mostly in Turkish, Science, Social Studies and Mathematics courses. They believe that there should be more in-service training courses regarding interdisciplinary instruction. Given the above mentioned statements, it is recommended to provide teachers with trainings to help them use interdisciplinary instruction effectively. Therefore, practical trainings on integrated programmes should be planned in the undergraduate programmes and in-service trainings.

Just like in every education environment, it is important to have a rich education environment in terms of materials in interdisciplinary instruction. It is important to redesign places such as laboratories, libraries, research centres, ateliers, sports halls and art galleries which can make important contributions to interdisciplinary education in a way to support these services.

Teachers should instruct their courses by establishing connections with real life. They should use strategies, methods, and techniques such as trips, observations, experiments, cooperative works, and performance and project tasks which would associate different courses with each other.

References

Apostel, L. (1970). *Interdisciplinarity: Problems of teaching and research in universities.* Paris: Organisation for Economic Co-Operation and Development.

Bogdan, R. C., Biklen, S. K. (2007). *Qualitative research for education*. 5th ed. Boston: Pearson A & B. ISBN 0205482937.

Drake, S. M. (2007). *Creating standards-based integrated curriculum: Aligning curriculum, content, assessment and instruction*. Thousand Oaks: Corwin Press. ISBN 9781412915069.

Erickson, H. L. (1995). *Stirring the head, heart and soul. Redefining curriculum and instruction.* Thousand Oaks: Corwin Press. ISBN 0803961545.

Hebb, D. O. (1959). A Neuropsychology Theory. In: S. Koch (ed.), *Psychology: A study of a science*. New York: McGraw-Hill.

Humphreys, H. A., Post T. R., Ellis, A. K. (1981). *Interdisciplinary methods: A thematic approach*. Santa Monica: Goodyear Publishing Company. ISBN 0830243879.

Jacobs, H. H. (1989). The growing need for interdisciplinary curriculum content. In: H. H. Jacobs (ed.). *Interdisciplinary curriculum: Design and implementation.* Alexandria: ASCD. ISBN 0871201658.

Klein, T. J. (1996). *Crossing boundaries: Knowledge, disciplinarities, and interdisciplinarities.* Charlottesville: The University Press of Virginia.

Oliva, P. F. (2005). *Developing the curriculum.* Boston: Allyn and Bacon. ISBN 0205412599.

Perkins, D. N. (1994). *The intelligent eye*. Santa Monica: The Getty Center for Education in The Arts.

Spicer, J. (2001). *Integrated curriculum: A driving force in 21st-century Mathematics education*. [online, accessed: 2009-06-27]. Retrieved from: www.smallschoolsproject.com/PDFS/ Planning_Resources/summer2003/summer2003-integrating.pdf.

Sullivan, J. M. (2000). *A study of the effect of an interdisciplinary study improvement program on academic achievement and classroom behavior among tenth grade students.* Unpublished doctoral dissertation. University of Massachusetts, Lowell. (UMI no. 9994171).

Vidaurri, M. M. (1996). *Comparative study of interdisciplinary curriculum and non-interdisciplinary curriculum classrooms: The difference and relationships in regarding TAAS scores, reading yearly averages and students' attitudes*. Unpublished doctoral dissertation. Texas A & I University. (UMI no. 9706637).

Yıldırım, A. (1996). Disiplinlerarası öğretim kavramı ve programlar açısından doğurduğu sonuçlar. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *12*, 89–94.
Yıldırım, A., Şimşek, H. (2006). *Sosyal bilimlerde nitel araştırma yöntemleri.* 7th ed. Ankara: Seçkin Yayıncılık. ISBN 9750200071.

Model interdyscyplinarnego programu edukacyjnego oraz ewaluacja jego wprowadzania do procesu nauczania

Abstrakt: Artykuł zawiera analizę badań poglądów nauczycieli na model interdyscyplinarnego programu edukacyjnego oraz ich sugestii dotyczących możliwości efektywnego wdrożenia tegoż programu do procesu nauczania. W badaniu uczestniczyło w sumie 29 nauczycieli, w tym 18 kobiet i 11 mężczyzn uczących pięciu różnych przedmiotów. Odpowiedzieli oni na 6 pytań w formie ankiety, która następnie została poddana drobiazgowej analizie opisowej. Ankietowani ogólnie uznali za słuszną ideę integracji międzyprzedmiotowej, wskazali na jej dobre strony, ale także zauważyli wady. Były to między innymi pewne ograniczenia w sposobie prowadzenia lekcji, który wprowadzał chaos, oddalanie się od właściwego tematu a co za tym idzie – wydłużenie czasu przeznaczonego na jego realizację. Ankietowani stwierdzili również, że uczniowie nie zauważają granic pomiędzy konkretnymi przedmiotami. Po końcowej analizie ankiety zaleca się szeroko pojęte wspomaganie nauczycieli w zakresie korzystania z metod interdyscyplinarnych oraz pomoc przy wdrażaniu nauczania zintegrowanego do pracy dydaktycznej.

Słowa kluczowe: interdyscyplinarne metody nauczania, zintegrowane programy nauczania, edukacja, planowanie procesu edukacji, konstruktywizm