



The Study of Primary School Visual Arts and Science Curricula in Turkey in the Context of Interdisciplinary Approaches: 1923–2020

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ABSTRACT

This study aims to identify any associated subjects in the primary school Visual Arts and Science courses in Turkey from 1923 when the Republic was declared till 2020, and reveal the historical dimension of such associations between the two courses. In this context, primary school curricula of 1924, 1926, 1936, 1948, 1968, and 1992 implemented in primary schools of our country; 2005 Science and Technology and 2006 Visual Arts course curricula; 2013 and 2018 primary school curricula have been reviewed. Since the scope of this research covers the primary school level, Grades 4-5 until 2012 when the Law No. 6287 was adopted and Grades 3-4 after the adoption of this law are discussed. The data were evaluated by content analysis in the research which was carried out by the document review method. As a result of the analyses, it is recognized that the association between the two courses has been made since the 1924 Curriculum, the first program of the Republic although it was disrupted in certain periods. In addition, it has been found that in the interdisciplinary approach adopted between 1926 and 1992, the Art-Craft course was primarily seen as the field of application of the Science courses and assumed a role of an auxiliary course in teaching the Science courses. Thus, despite the increase in the number of learning outcomes in the current programs, the learning outcomes to be associated with the two courses are still quite limited.

Keywords: Visual arts course, science course, interdisciplinary approach, interdisciplinary relations.

Türkiye’de İlkokul Görsel Sanatlar ve Fen Bilimleri Programlarının Disiplinler Arası Yaklaşımlar Bağlamında İncelenmesi: 1923–2020

Öz

Bu araştırmada, Türkiye’de Cumhuriyet’in ilanı olan 1923’ten 2020’ye kadar uygulanan ilkököl Görsel Sanatlar ve Fen Bilimleri derslerinde birbiriyle ilişkili konuların olup olmadığının tespit edilmesi ve iki ders arasındaki ilişkilendirmelerin tarihsel boyutunun ortaya çıkarılması amaçlanmıştır. Bu kapsamda ülkemiz ilkokullarında uygulanan 1924, 1926, 1936, 1948, 1968, 1992 tarihli ilkököl programları; 2005 Fen ve Teknoloji ve 2006 Görsel Sanatlar dersi öğretim programları; 2013 ve 2018 ilkököl programları incelenmiştir. Araştırmada 6287 Sayılı Kanun’un kabulü olan 2012’ye kadar 4 ve 5; bundan sonra ise 3 ve 4. sınıflardaki çalışmalar ele alınmıştır. Doküman incelemesi yöntemiyle yürütülen araştırmada veriler, içerik analiziyle değerlendirilmiştir. Araştırma sonunda -belli dönemlerde sekteye uğrasa da- Cumhuriyet’in ilk programı olan 1924 Programı’ndan beri iki ders arasında ilişkilendirme yapıldığı anlaşılmıştır. Ayrıca 1926-1992 arasında benimsenen disiplinler arası yaklaşımda Resim-İş dersinin, Fen derslerinin uygulama sahası olarak görüldüğü ve bu dersin öğretiminde yardımcı ders rolü üstlendiği; güncel programlarda ise kazanım sayılarındaki artışa karşın iki dersin ilişkilendirileceği kazanımların oldukça sınırlı olduğu tespit edilmiştir.

Anahtar kelimeler: Görsel sanatlar dersi, fen bilimleri dersi, disiplinler arası yaklaşım, disiplinler arası ilişkiler.

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1 | INTRODUCTION

Educational and instructional programs are a form of targeted changes to be realized in individuals expressed as the whole of pre-designed activities within a plan. Although educational programs are more comprehensive compared to instructional programs, instructional programs refer to a narrower framework. Because, instructional programs can be considered as type of programs that can vary across specific subject contents, courses, levels of education, educational institutions and structures of schools and include all the processes that are required for the accomplishment of the objectives determined in line with needs.

In the first periods of the Republic, the instructional programs which consisted of target and content dimensions are now prepared with a more comprehensive understanding compared to the past by brining different components of the program together. These programs which contain information and instructions on the objectives and content of the courses, learning and teaching process and evaluation dimensions are designed separately for each course. The concept of course can sometimes be defined as "discipline" in the educational literature. The term "discipline" refers to a strict understanding of order according to the Turkish Language Institution and to "the whole of the information that is or may be the subject of instruction and a field or a scientific branch of specialization" in the field of education (Turkish Language Institution, 2000, p.286). In the current study, what is meant by the interdisciplinary associations is the links established between courses and the relevant points shared between courses.

Interdisciplinary teaching can be seen as one of the instructional approaches used in the field of education and instruction. Klein and Newell (1997) define the interdisciplinary teaching approach, which has been interpreted differently by many researchers, as the process of answering a question, solving a problem, or dealing with a subject that is too broad and complex to be adequately addressed by a single discipline or area of expertise (Klein & Newell, 1997, p.396). According to Jacobs, it is the use of methods and knowledge of multiple disciplines to teach an issue while Erickson describes it as the conceptual integration of a concept in different disciplines (Erickson, 1995, p.96). According to Yarımca (2010), it is "an education process that is integrated to improve the objectives of two or more fields being taught in a school's program" (Yarımca, 2010, p.1). However, Yıldırım suggests a different and elaborative definition of the interdisciplinary approach. For him, the interdisciplinary approach is the ability of the student to produce solutions to the problem he encounters after learning in different courses, to create his own inference with the knowledge he has gained from different disciplines and to comment on the problem from different angles (Yıldırım, 1996). In this approach, which involves the interaction of two or more disciplines, this interaction may have a very wide scope. In fact, the interaction between disciplines can range from the simple connection of ideas to the mutual integration of organizational concepts, methodology, data and research and educational organization in a very large area (Berger, 1972, p.24-25). Furthermore, in our country, making reference to learning outcomes of other/relevant disciplines in places where the different disciplines are related to the same subject being taught in a curriculum can be considered within the scope of interdisciplinary teaching. Regardless of which definition is accepted, the interdisciplinary teaching can be considered as an approach where a subject, theme or problem situation is analyzed from different perspectives; students establish connections between concepts with the ideas they have acquired from knowledge of different disciplines, and can adapt and apply the knowledge gained in one discipline to another discipline by deepening their learning experiences.

Even though a lot of information that students may use in everyday life is taught in schools, students cannot easily explain the reasons of many events they encounter in daily life using the information they learned at school. Similarly, students have difficulties in switching between subjects of different courses and science disciplines. This view is also supported by Berryman. Berryman (1991) states that individuals cannot only use the information they learn in school effectively in everyday life but also they are unable

to use the information they acquire in daily life in school environment and that context-based education is critical for understanding and therefore learning (qtd in Wicklein & Schell, 1995, p.61). Educators express that teaching without making any connection to the real life is not met with interest by students and that concepts are easily forgotten (Ciesla, 2009). For Yıldırım (1996), if the information learned at school cannot be transferred to daily life, it means that the time spent by students at school is wasted.

Ziya Selçuk, the Minister of National Education, points out similar issues in the Turkish education system too. Selçuk explains the project he wants to realize in education as follows: "The student has also difficulties in applying the theoretical knowledge in their minds when they begin to work.... Instead of making them [students] memorize knowledge, we aim to make them internalize and use such knowledge in life by developing the links between knowledge and life." Stating that the most successful countries in education are Australia, Far East countries and Finland, Selçuk highlights that the number of courses is low in all of these countries and that teaching is carried out in an interdisciplinary manner (Akyol, 2019).

Since the history of interdisciplinary education is linked to the history of disciplines, it is also possible to trace back the history of this approach to the years before Common Era. For instance, Pythagoras, who associated the subjects of mathematics, music and astronomy, being inspired by the sound of objects in 586 BC, also established a number-harmony relation and revealed the relation of musical series (Yıldırım & Koç, 2003). The most obvious example of this approach in Turkey was the 1926 Program. It is possible to evaluate the system called "Collective Education" adopted in this program as a derivative of interdisciplinary association.

In a study examining the theses on interdisciplinary approach, it was found that this concept entered the field of education in the 1990s and reached its highest number in the 2000s (Turna & Bolat, 2015). Indeed, it can be said that the importance of this approach has started to be mentioned frequently in our country especially after the 2000s. When the related literature is reviewed, it is observed that experimental studies are conducted in which Visual Arts and Science courses are examined in various aspects in terms of interdisciplinary approaches. If expressed in chronological order, in the study by Güven and Hamalosmanoğlu (2012), the activities with environmental content in the Grade 4 Science and Technology textbook were dealt with in terms of interdisciplinary approach and the relationship of this course with the Visual Arts course was revealed in virtue of the activities with environmental content. Aslantaş's study (2013) examines the attitudes of students towards the lesson designed and implemented according to the interdisciplinary approach in the Grade 4 Visual Arts course. In the study conducted by Korkmaz and Konukaldı (2015), the effects of the interdisciplinary thematic teaching approach in primary school Science and Technology education on students' learning products are examined; the academic achievements and attitudes of students are measured. In the research conducted by Karakuş, Turhan Türkkan and Karakuş (2017), the opinions of Science teachers on interdisciplinary associations are identified; the Science teachers' frequency of making associations with the Visual Arts course in their lessons is determined. In the studies of Uğraş, Güneş and Asiltürk (2018), the opinions of the Science course teachers on the relationships of the activities in the textbooks with the branches of arts are collected. Cura and Yalman (2019) investigate the levels of utilizing the interdisciplinary approach by pre-service science course teachers. However, there has been no research specifically examining the historical changes and developments of the associations between these two courses in teaching programs.

Art and science are two fields that complement each other and benefit from each other's mindset. Especially in recent years, in the field of science, it is essential that students learn knowledge and skills in a multidimensional way from the perspectives of different disciplines, and STEM (Science, Technology, Engineering, Maths) education, where the holistic examination of science, technology, engineering and mathematics fields is prioritized, has come to the fore. This education, which has an interdisciplinary approach in itself, has moved to a different level with the addition of the field of art. This new approach combining science fields with art is called STEM+A or STEAM. In other words, the unique knowledge and skills of art have been combined with technology, science and engineering in this education.

If these two seemingly distinct fields are addressed in an integrated manner, it will be possible for students who are inclined to the field of science, whose logical-mathematical intelligence are dominant or who have a developed visual-spatial intelligence to comprehend the relationship between these two fields, make sense of the information, recall it, transform it into a form that can be used in daily life, and create awareness and sensitivity to search for art in science and science in art because the examinations and observations made with a scientific perspective towards nature in the field of science gain an artistic character in the field of visual arts; thus, scientific knowledge is enriched with aesthetic sensitivity and artistic perspective. Similarly, the aesthetic sensitivity and observation power gained towards the environment add a different dimension to nature studies in the field of science. The starting point of the research about the connections between art and science is the idea that visual art studies will be effective in the teaching of science subjects, and science applications will be effective in the teaching of visual art studies. However, the predominant tendency is to facilitate and make learning permanent by supporting science subjects with art studies. Art and science, which are constantly evolving according to the demands and needs of society, are complementary to each other and like branches fed from the roots of a single tree. The more frequent use of the association between these two disciplines in education, whether be it science-based or art-based, is very important for raising and training individuals who have developed the ability to design, think more freely, are academically successful, can transfer the knowledge they learned at school to daily life, can express themselves by transforming what they learned into an aesthetic and usable scientific form and have both artistic and scientific perspectives.

The past should be depicted exactly and the present should be interpreted correctly so that the quality of future practices may be improved and the future may be directed. From this point of view, revealing the past and current practices between the two courses, showing the changes, identifying the similarities and differences of the past and present practices are deemed to be important in the research as it may manifest a situation and shed light on future curricula.

PURPOSES OF THE PRESENT STUDY

The purpose of this research is to examine comparatively if the association between Visual Arts and Science courses was established in primary school curricula implemented in Turkey between 1923 and 2020. The general research question may be expressed as "Which topics are associated with each other in the primary school Visual Arts and Science courses curricula implemented between 1923 and 2020?" The answers to the following questions were sought in order to investigate the general purpose:

- 1) How is the association between the Painting and Nature Study (Resim ve Tabiat Tetkiki), Agriculture and Health (Ziraat ve Hifzısıhha) courses in the 1924 Curriculum?
- 2) How is the association between the Painting-Handicraft (Resim-Elişi), Nature and Material (Tabiat ve Eşya) courses in the 1926 Curriculum?
- 3) How is the association between the Art-Craft (Resim-İş) and Nature Studies (Tabiat Bilgisi) courses in the 1936 Curriculum?
- 4) How is the association between the Art-Craft (Resim-İş) and Nature Studies (Tabiat Bilgisi) courses in the 1948 Curriculum?
- 5) How is the association between the Art-Craft (Resim-İş) and Science and Nature Studies (Fen ve Tabiat Bilgileri) courses in the 1968 Curriculum?
- 6) How is the association between the Art-Craft (Resim-İş) and Science (Fen Bilgisi) courses in the 1992 Curriculum?
- 7) How is the association between the courses in the Science Curriculum of 2000 and the Art-Craft Curriculum of 1992?

- 8) How is the association between the courses in the Visual Arts Curriculum of 2006 and the Science and Technology Curriculum of 2005?
- 9) How is the association between the Visual Arts and Science courses in the 2013 Curriculum?
- 10) How is the association between the Visual Arts and Science courses in the 2018 Curriculum?

2 | METHOD

RESEARCH MODEL

This research was carried out on the basis of the document analysis method which is one of the qualitative research methods. Since qualitative research is one of the important sources of information, it is necessary to actively use the documents in the document analysis, which includes information about the facts and events aimed to be examined, and the analysis of written items (Yıldırım & Şimşek, 2008, p.187). The main reason for selecting the document analysis method in this research is that the relevant content information regarding the education and teaching curricula implemented in Turkey within 97 years is included in written forms, namely documents.

POPULATION AND SAMPLE

The population of the research consists of the teaching curricula that have been implemented from 1923, when the Republic was proclaimed, to the present day (2020). The unit to be included in the sampling based on the population was determined by the "criteria sampling" method. In this sampling method, situations that are predetermined by the researcher or prepared on the basis of any list of criteria are studied (Yıldırım & Şimşek, 2008). In the event that the units to be examined consist of people, situations, objects or events with certain characteristics, the units that meet the predetermined are taken as a basis in the selection of the sample (Büyüköztürk et al., 2010). Moreover, the teaching curricula of Visual Arts and Science courses approved by the Ministry of National Education (MoNE) and implemented only in primary schools located in urban areas were accepted as criteria in determining the sample of this research. Accordingly, the curricula and draft curricula implemented in primary schools located in rural areas between 1926 and 1948 were not included in the research.

Science courses were taught in all grades from 1923 to 1926, in Grades 4 and 5 from 1926 to 2013, and in Grades 3, 4 and 5 since 2013. Since primary schools which were consisted of Grades 1-5 for many years started to cover Grades 1-4 with the Law No. 6287 enacted in 2012, the comparisons were made for Grades 3 and 4 after this date. Therefore, the curricula of the two courses were examined only for these grades and in terms of the content of such curricula.

DATA COLLECTION

Some limitations may be encountered in the collection of documents subject to the document review method. One of them is that the documents may not reflect the truth and do not contain accurate information (Creswell, 2017). However, it is possible to say that this situation is more likely valid for the sources that are not directly related to the events being examined, but where the events and situations are conveyed in a third person's narration. For instance, according to Cohen, Manion and Morrison (2005), the sources, textbooks, encyclopedias and reproductions cited by the researchers are considered among the secondary data sources. The secondary resources are not defined as original ones and are used in cases where the primary resources are not available. Some of the primary sources are laws, regulations, official reports and all kinds of official publications.

The documents used in this research are the teaching curricula prepared by the Board of Education which is the official unit of the state, and approved by the Ministry of Education. These documents in written form are genuine and primary data sources that have not been modified. The institutions and persons that prepared the documents and the time and place that the documents were prepared are

obvious. All of these factors may give an idea of the reliability of the documents used in the research (Yıldırım & Şimşek, 2008). While some of the curricula were accessed from the Ferit Ragıp Tuncor Archive and Documentation Library affiliated to the Ministry of National Education, the others were accessed from online media.

DATA ANALYSIS

The teaching curricula, which constitute the only data set of this research, were examined by the “content analysis”. The main purpose of the content analysis is to explain the data at hand and to reveal the relationship between them (Yıldırım & Şimşek, 2008). A number of stages were followed while analyzing the data in the research. The first stage is to choose a sample from the data set. In this sense, the curricula belonging to Visual Arts and Science courses were chosen among other curricula as samples. Only the “content” aspect of such courses was taken into consideration. However, as general education and teaching practices adopted in the curricula are included in the introduction section of such curricula, those explanations in the introduction of the curricula are also included in the research. Subsequently, analysis units were identified for each curriculum in line with the sub-purposes of the research.

Analysis units vary depending on the purpose of the research and words, themes, characters, sentences, paragraphs, items, and contents are used as an analysis unit (Yıldırım & Şimşek, 2008, p.199). In this sense, words, sentences, paragraphs and explanations given in the content constitute the analysis unit of this research. Accordingly, the words “association between courses/interdisciplinary association/ relationship/ link/ connection/ reference” were firstly scanned in the introduction section of the curricula. Then, the following keywords were scanned for the two courses respectively: (a) “Painting/ Painting-Handicraft/ Art-Craft/ Visual Arts/ association between courses/interdisciplinary association/ relationship/ link/ connection/reference” in the Science curriculum; (b) “Nature Study/ Nature and Material/ Nature Studies/ Science and Nature Studies/ Science/ Science and Technology/ Sciences/ association between courses/ interdisciplinary association/ relationship/ link/ connection/ reference” in the Visual Arts curriculum. Next, the sentences and paragraphs in which these words were included were examined semantically in terms of content with a holistic approach by means of context reading. Finally, the connections were determined in the curricula where the relationship between Science and Visual Arts courses was anticipated and comparisons were made and a relationship was established between the related subjects.

While the teaching curricula of all courses were simultaneously issued on the same date until 1968, issue dates varied after this date. For example, Visual Arts curricula were issued in 1992, 2006, 2013 and 2018 while Science curricula were issued in 1992, 2000, 2005, 2013 and 2018. Comparisons were made chronologically, regarding the order of the years in which the curricula were issued and reported in prose. In addition, direct citations from original sources were made for the purpose of increasing the reliability of the research.

3 | FINDINGS

The principal research question is “Which topics are associated with each other in Visual Arts and Science courses teaching curricula implemented between 1923 and 2020?” In this section, results regarding the sub-purposes identified for the overall research purpose are given. In each sub-purpose, the denomination of Science and Visual Arts courses belonging to the relevant period is also included.

FINDINGS REGARDING THE FIRST SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE PAINTING AND NATURE STUDY, AGRICULTURE AND PUBLIC HEALTH COURSES IN THE 1924 CURRICULUM?

In this curriculum, the subjects of the paintings that students are required to do within the framework of the “Painting Education (Tedrisi Resim)” taught in all grades in the Painting course are taken from the

themes in other courses. In this regard, the following exact statement is included in the curriculum: "Painting education: Drawing paintings and portraiture works belonging to the Accounting, Geometry, Language, History, Geography, Nature Study and Homeland Study courses" (MoNE, 1340, pp.45-47). As it can be understood from this statement, associations were made between the "Nature Study (Tabiat Tetkiki), Agriculture (Ziraat ve Hıfzıssıha)" course, taught in all grades and can be counted as Science course today, and the Painting course in the 1924 Curriculum which was the first curriculum of the Republic. To put it more clearly, the subjects covered in the Nature Study course constitute the subject of the works to be done in the Painting course in all grades in primary school. The subjects covered in the Nature Study courses are as follows in general according to the grade levels:

Grades 1 and 2: Examining the seasonal variation of seasonal flowers, fruit and non-fruit trees, and various vegetables in the immediate vicinity of the student; handling of domestic and non-domestic animals, insects, birds, aquatic animals and plants from various aspects; explaining the ways of sowing, mowing and grinding grains; inquiring natural phenomena such as day and night, seasons, stars and rain and snow.

Grade 3: Continuing previous studies; inquiring local arts such as coppersmith, sericulture, carpetmaking, schools and household items and house construction.

Grade 4: Continuing studies on animals, plants and natural phenomena; examining the human body from all angles; health information.

Grade 5: Continuing studies on animals, plants and natural phenomena; teaching some physics-related subjects such as floating ferries and explaining steam power through machines; examining visible physical phenomena such as lightning bolt and lightning (MoNE, 1340).

Although there is no explanation in the curriculum that there is an obligation to establish a relationship between the courses, and such approach is not adopted as a general practice, it is understood that an interdisciplinary approach is applied in the Painting course.

FINDINGS REGARDING THE SECOND SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE PAINTING-HANDICRAFT, NATURE AND MATERIAL COURSES IN THE 1926 CURRICULUM?

In the program in which the principle of collective teaching was embraced in the Grades 1, 2 and 3, which is called the first period, the associations between the courses of Grades 4 and 5, which are the second period classes, were considered important and this issue was explained as follows in the "Introduction" section of the curriculum: "In the second period, the teaching of the courses in a way that will more or less regularly present the principles of various sciences was found useful. However, the need for these lessons to go parallel and reinforce each other has not been overlooked" (MoNE, 1930, p.4). The Science course is included in this curriculum as two separate courses, "Nature" and "Material". In the curriculum, Nature courses are taught in Grades 4 and 5; Material courses are taught only in Grade 5. For this reason, the subjects related to the Painting course are involved in those classes only.

In the Painting-Handicraft course curriculum, the framework of the associations with the Nature and Material courses is explained as follows: "[The student] sketches the materials he observed and the subjects discussed in the Nature and Material courses" (MoNE, 1930, p.114). The concept of "materials" here refers to the tools and machines that are included in physics and chemistry subjects and that the student sees and uses every day. For example, mirrors and lenses (magnifying glass) used in the teaching of the subject of light, the barometer used in the teaching of air pressure, the thermometer used in the teaching of the subject of temperature, the pulleys and levers used in teaching of the working mechanisms of simple machines, and the batteries and dynamos used in the teaching of electricity are some of these materials (MoNE, 1930, pp.98-100). The associations between Painting-Handicraft and Nature and Material courses in the curriculum were established with the following four works in the Painting course: "Paintings from Nature", "Sketches", "Decorative paintings" and "Industrial paintings".

The works of painting from nature, as the name suggests, includes the drawing of objects in nature. In paintings from nature, it can be said that the works that students will draw are directly selected from the subjects of the Nature course. In the scope of paintings from nature in the Grades 4 and 5, students are required to make drawings of leaves and plants, branches and fruits, branches with flowers, flowers in glasses, spring plants, birds, flowers, butterflies, insects, simple landscapes, animal pictures, second-hand beautiful items. In the Nature course, the growth, reproduction and development conditions of fruit and non-fruit trees growing in the environment where the school is located; insects such as locusts, ants and bees that appear in various seasons and birds such as storks, swallows and sparrows; aquatic animal species such as fish, frogs and crabs are studied in various aspects (MoNE, 1930). In other words, the starting point of both paintings from nature and the Nature course is nature, and the subjects studied in the Nature course constitute references to the works of paintings from nature.

Sketches cover simple depiction of the shapes examined in the Nature and Material courses in a simple form of schematics and plans. In the decorative paintings, old items are decorated with shapes inspired by animal and plant pictures made from nature and geometric shapes (MoNE, 1930, p.113). In this case, it can be said that the subjects of the Nature and Material course are significant in determining the works of the Painting-Handicraft course. At this point, it is necessary to remind the following statement in the "Introduction" section of the 1926 Curriculum: "A special value has been attributed to the Painting-Handicraft courses especially as an important educational element that will revive other courses" (MoNE, 1930, p.4). In other words, Painting-Handicraft is a course that reinforces the Nature and Material courses and reinforces them by the implementation of what is learned in those courses.

Within the scope of industrial painting works, a machine part or tools and equipment used in the visited factories, shops like joineries and blacksmiths are drawn in the form of simple sketches. Similarly, after examining plants and animals in the Nature course, they are depicted in the notebook as simple pictures and sketches. Educational trips to factories around schools, agricultural and industrial schools, repair shops and garages are organized in the Material course, the subjects of which are related to the fields of physics and chemistry. Furthermore, the working mechanisms of leverages and simple machines are examined; Students draw their experiences with sketches and pictures in their notebooks after their visits related to the teaching of vehicles such as automobiles, tractors, cameras and telephones which operate with forces such as wind, water, electricity and light (MoNE, 1930). Besides the Nature course, all of these activities, especially in the Material course, are almost identical to the industry paintings which are among the topics of the Painting course in the Painting-Handicraft curriculum in terms of content.

In addition to the Painting discipline, the Handicraft discipline is also associated with the Nature and Material courses. In the Handicraft course, students are required to make materials such as leverages, handbarrows, pulleys, tumblers used in education with matters such as mud, clay, plaster, wax, paper, cardboard, timber and wood. The main objective here is to teach the working mechanisms of the tools and equipment used in school (MoNE, 1930, pp.120-127). Given the areas of use of these materials and the main reason for the performance of these works, it can be said that the teaching materials in the Nature and Material courses create sources for the handicraft works and that a better understanding and comprehension of the subjects of the Nature and Material course is, in turn, enabled by the handicraft works.

FINDINGS REGARDING THE THIRD SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE ART-CRAFT AND NATURE STUDIES COURSES IN THE 1936 CURRICULUM?

Just as in the 1926 Curriculum, the relations between the second period courses are emphasized in this curriculum. In this respect, the expressions of "the Art-Craft course will take its subjects from all courses in the second period" and "the Art-Craft course is an assistant to other courses in the widest meaning" are included in the curriculum of the Art-Craft course (Ministry of Culture [MoC], 1936, p.187).

Based on the explanations, it is understood that there is a compulsory association between the Art-Craft and the Nature Studies courses. Accordingly, it can be said that the “Paintings from Nature”, “Industrial Painting” and “Decorative Paintings” works in the Painting course are associated with the Nature Studies course.

Paintings from Nature works start from the second period with the Nature Studies course in the curriculum. Within the scope of paintings from Nature works, creatures such as branches, flowers, butterflies, insects and leaves, which are part of nature, are drawn individually or as a whole in landscapes such as country, street, and forest (MoC, 1936, pp.194-195). Animals such as sheep and goats, hunting animals and fish studied in the “Food we receive from animals” unit and vegetables and fruits studied in the “Vegetable foods” unit included in the Nature Studies course can also be the subjects of painting works from nature.

In the industrial painting works in the second period, the sketches of the tools and machines examined in the other courses are performed. Machines such as mills, meat grinders, carpenter workshops, pulleys and spinning wheels are also studied in the Nature Studies course. In decorative paintings, some objects are decorated based on natural motifs such as flowers and leaves in nature (MoC, 1936, pp.194-195). In addition, trips are made for educational purposes to personally observe nature or events in the Nature Studies course. The things observed during these trips are drawn in the form of drafts and sketches (MoC, 1936, p.114). This reveals the intrinsic association of the Nature Studies course with the Painting course by taking visual notes.

The “Craft” part of the Art-Craft course can also be associated with the Nature Studies course through “gardening” because vegetables and flowers are planted in pots prepared in advance within the scope of gardening; trees are planted in the garden; poultry, bees, birds and other animals in school are cared (MoC, 1936, pp.197-198). In parallel with this, school practice gardens, school poultry houses, aquariums, terrariums and insectariums are prepared in the Nature Studies course (MoC, 1936, pp.116-117). In other words, the work done in the garden in the Craft course creates a source for the teaching materials of the Nature Studies course; therefore, students learn about animals and plants while gaining value about the contribution of these products to the national and local economy.

FINDINGS REGARDING THE FORTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE ART-CRAFT AND NATURE STUDIES COURSES IN THE 1948 CURRICULUM?

In the introduction section of the curriculum- as in the previous two programs- it is stated that the subjects taught in separate disciplines in the second period should be studied by associating with each other (MoNE, 1948, p.21). In this respect, it is expressed in the Art-Craft curriculum that “the Art-Craft course will take its subjects from all courses in the second period” and “the Art-Craft course is an assistant to other courses in the widest meaning” (MoNE, 1948, p.219). Although the subjects through which this practice as the general teaching approach of the curriculum is to be performed for these two courses are not specified, the associated subjects of the two courses have been tried to be identified depending on this approach. Painting works identified to be associated with the Nature Studies course are “Paintings from Nature” and “Craft paintings”.

While the “Living and Non-Living Beings Around Us” unit at the Grade 4 of the Nature Studies course focuses on plants and animals, in the Painting course works, branches, flowers, butterflies, insects and leaves that are part of nature are depicted separately or in their natural environment. Again, tools such as leverage and wheel are emphasized in the “Tools That Make Our Work Easier” unit at the Grade 4 of the Nature Studies course, the tools and items examined in other courses are drawn in the form of sketches in craft paintings of the Painting course works (MoNE, 1948). In addition to these, the following expressions, which clarify the way in which the feedback and corrections are made regarding Art-Craft works, are also significant in revealing the association between the two lessons:

The teacher will reinforce the child's knowledge and opinion on the subject, and explain the role of the subject and the laws of nature affecting the subject. In a sense, the task of the teacher in the Art-Craft course is to teach nature. For example, "The leg of table is short; if we lean on this table, it will bend over one side", "The stem of the flower doesn't stand straight like that. It will obviously bend due to the weight of the flower" (MoNE, 1948, pp.223-224).

The aforementioned examples are directly related to the topics of weight and balance studied within the subject of "Gravity and its effects" in the Grade 5 "Nature Force and Us" unit of the Nature Studies course.

Apart from the Painting course, when the content prepared within the scope of "Craft" works is examined, it is understood that some of the craft works are directly or indirectly associated with the subjects studied in the Nature Studies course. Tools and equipment to be used in other courses are prepared in some craft works. For example, students prepare collections from objects such as stones, flowers, insects, trees and leather and etc. found in their immediate surroundings. Tools and equipment used to catch living things in the collections are made in metalworking; materials such as partitioned stone collection boxes, standard boxes, frames and butterfly drying boards required for the preservation and display of the products in the collection are also made in woodworking. Moreover, sundials and the color circle also called Newton's wheel, pulleys and spinning wheels are also made within the framework of craft works (MoNE, 1948, pp.232-234). Especially these materials are used in the teaching of Physics subjects covered in the Nature Studies course.

In the Nature Studies course, students express the subjects studied both in writing and in drawing; after students summarize the subjects studied in the course, they support and enrich these summaries by drawing drafts, sketches and graphics. In addition, during the trips and observations organized within the course, drawings in the draft and sketch styles are made (MoNE, 1948, pp.160-161). In sum, students acquire the habit of taking visual notes by means of painting in order to make their learning more permanent in the Nature Studies course.

FINDINGS REGARDING THE FIFTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE ART-CRAFT AND SCIENCE AND NATURE STUDIES COURSES IN THE 1968 CURRICULUM?

In this curriculum, the collective teaching practice adopted in the first period since 1926 was also embraced in the second period. In this framework, all courses are gathered around the axis of the two courses determined as pivots. One of the pivot courses is Social Studies (Sosyal Bilgiler) and the other is Science and Nature Studies (Fen ve Tabiat Bilgileri). According to the collective teaching practice, expression and skill lessons, including the Art-Craft course, are taught in association with the pivot courses (MoNE, 1968, p.18). In the Art-Craft course curriculum, it is stated that "Provided that the main objective of the Art-Craft course which is the teaching of Art and craft is not forgotten, some subjects will be taken from other courses, daily events, and students' own lives in the second period" (MoNE, 1968, p.217). Although there is no explanation for the links to be established with the Art-Craft course in the Science and Nature Studies course curriculum, how the two courses are to be associated with each other within the framework of the subjects of Kemalism introduced to the curriculum in 1986 is described. In contrast, since any subject studied in the Science and Nature Studies courses constitutes one of the subjects of the Painting course due to the nature of the curriculum, it is possible to establish association between the two courses through "Painting from Nature" and "Craft paintings".

The Grade 4 units of "Let's Investigate the World of Living Beings", "Animals in the World of Creatures" and the Grade 5 unit of "Our Sources of Richness" in the Science and Nature Studies course focus on plants and animals in various aspects (MoNE, 1968). They can be associated with paintings from nature studies in which plants such as leaves, branches, flowers and animals such as insects are drawn. The "Matter and Energy" unit of the Science and Nature Studies course examines pulleys, wheels, levers and

gear wheels that make up machines. Craft paintings also cover simple sketch-style drawings of tools and items examined in other courses (MoNE, 1968). Therefore, these items examined in the Science and Nature Studies course can also be a source for craft paintings.

Students draw their observations in the form of drafts and sketches during the field of educational trips in the science course (MoNE, 1968, p.85). In addition, regarding the learning and teaching process in the Art-Craft course curriculum, it is stated that "... the teacher will reinforce the child's knowledge and opinion on the subject; the teacher will explain the role of the subject and the laws of nature affecting the subject" (MoNE, 1968, p.219). In short, when drawing pictures on natural sciences, it is necessary to benefit from science at the points that form the essence and theoretical dimension of the subject.

In the craft course, collections of stones, insects, flowers, trees, leather and other products available in the neighborhood where the school is located are prepared in the subject of "course craft tools and equipment" studied in the second period classes; sundial and color circles are made. In order to preserve the objects in the collection, items such as boxes and frames are made in woodworking (ağaç işleri); the tools and equipment necessary for catching insects and butterflies to be included in the collection are also made in metalworking (maden işleri) (MoNE, 1968, pp.227-229). So, at this point, the 1948 and 1968 curriculums appear to be the same.

While this curriculum was in effect, with the decision of the Board of Education dated on April 24, 1986, a clear association was made between the two courses due to the subjects of "Kemalism". Accordingly, in the Grade 4 within the scope of "Atatürk's Life" and "Atatürk's Personal Characteristics and Various Aspects", students are required to draw pictures based on memory and imagination in the Art-Craft course about the subjects studied in the "Our World and the Sky" unit of the Science course. In the Grade 5, students are required to draw pictures based on memory and imagination about the subjects in the "Our Wealth Resources" unit of the Science course for teaching the subject of "National Power Elements in Kemalist Thought" (Ministry of National Education, Youth and Sports, 1988, pp.653-654).

FINDINGS REGARDING THE SIXTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE ART-CRAFT AND SCIENCE COURSES IN THE 1992 CURRICULUM?

The deep-rooted understanding since almost 1926 that the Art-Craft course had been seen as an auxiliary and complementary in the teaching of other courses was abandoned with the acceptance of the 1992 Curriculum. Regarding this issue, it is stated in the curriculum that "...The painting course should not be considered as the time reserved for activities such as making and repairing tools and equipment related to other courses" (MoNE, 1992, p.8). In other words, the signals of a change regarding the status of the Art-Craft course in the program have been given. There is no statement that the implementation of an interdisciplinary approach is implemented in any section of the current curricula of the Art-Craft and Science courses issued in 1992.

FINDINGS REGARDING THE SEVENTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE COURSES IN THE SCIENCE CURRICULUM OF 2000 AND THE ART-CRAFT CURRICULUM OF 1992?

While the curriculum of the Art-Craft course, which was accepted in 1992, was in effect, the new curriculum of the Science course was in effect in 2000. It was not mentioned that an interdisciplinary approach should be implemented in the curriculums of both courses in general or that association should be made between the two courses in particular.

FINDINGS REGARDING THE EIGHTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE COURSES IN THE VISUAL ARTS CURRICULUM OF 2006 AND THE SCIENCE AND TECHNOLOGY CURRICULUM OF 2005?

Studies, subjects and activities required to be performed by students in many of the curricula prepared after the 2000s have been determined in accordance with the learning outcomes. Yet, curricula of some

courses include pre-framed units and subjects. The Science and Technology course is among such courses. However, the order of content in the Visual Arts course has been made in such a way that it may be structured by teachers together with the student in line with the learning outcomes.

Although there is no reference to the Visual Arts course in the Science and Technology course curriculum accepted in 2005, the association between the two courses is mentioned in the sample activities of the Visual Arts course curriculum. For instance, the learning outcomes of “Distinguishes natural and artificial (produced) objects” and “Recognizes that s/he can benefit from natural and artificial objects in his/her visual studies” within the learning domain of “Figuring in Visual Arts” at the Grade 4 Visual Arts course are suggested to be associated with the learning outcome of “Distinguishes natural, processed and artificial matter” within the learning domain of “Matter and Change” in the “Getting to Know the Matter” unit of the Science and Technology course (Commission, 2006, pp.47-49). Within the framework of this learning outcome of the Science and Technology course, it is mentioned that natural materials such as stone, soil, rock, wood, copper, silver, cotton, leather and clay are processed and transformed into artificial substances; natural substances are used in the production of many materials such as magazines, books, fabrics, sweaters, vases, pots, plates today (Commission, 2008, pp.100-101). In addition, although not specified in the curriculum, it is possible to associate the learning outcome of “Realizes that colors vary according to light” of the learning domain in the Grade 4 Visual Arts course Figuring in Visual Arts with the subjects in the “Light and Sound” unit of the Science and Technology course. However, it cannot be said that directly associated subjects are encountered at the level of Grade 5.

FINDINGS REGARDING THE NINTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE VISUAL ARTS AND SCIENCE COURSES IN THE 2013 CURRICULUM?

With this curriculum, the Science course started to be taught from the 3rd grade of primary school and the curriculums of both courses were accepted in 2013. In the curriculum, it is reported that the activities prepared for the learning outcomes of the Visual Arts course should be linked to other courses, and for this purpose it is stated that “Cooperation with other fields should be made for students to achieve the learning outcomes in the curriculum. In this sense, activities can be carried out in cooperation with many fields such as Turkish, Social Studies, Science, Mathematics, Music, Physical Education and Sports” (MoNE, 2013a, p.6). However, the activities and the ways to create such associations were not been officially announced; this task was left to the responsibility of the teacher. At this point, the interrelated learning outcomes of each course were analyzed comparatively.

Accordingly, within the context of one of the objectives of the Visual Arts 3rd grade curriculum “Uses geometric and organic forms in his/her observation-based drawings” and one of the objectives of the Science curriculum in the unit “The Shape of the World” “Expresses that the shape of the World is like a sphere”, students are expected to express that the shape of the world is like a sphere (MoNE, 2013a, p.13; 2013b, p.6). In other words, with this objective, awareness is raised about the sphere as a three-dimensional form. While the three-dimensional form of the Earth is a sphere, its image on a two-dimensional plane is a circle. In the stated objective of the Visual Arts course, students are expected to use geometric forms in their drawings. Thus, it is possible to make connections between these two courses by associating geometric shapes with each other.

In the fourth grade, the links between these two courses can be established through the theme of “environment”. Correspondingly, connections can be created between the two objectives “Understands the importance of mutual interaction between human and environment” and “Discusses how to prevent environmental pollution” within the unit “Human and Environment Relationship” in the Science course curriculum (MoNE, 2013b, p.13) and the objective “Uses the steps of shaping while constructing the work of visual arts” in the Visual Arts course curriculum (MoNE, 2013a, p.15). Students who gain awareness of

environmental pollution in the Science course can be engaged in performing visual arrangements about the environment within the Visual Arts course.

FINDINGS REGARDING THE TENTH SUB-PURPOSE: HOW IS THE ASSOCIATION BETWEEN THE VISUAL ARTS AND SCIENCE COURSES IN THE 2018 CURRICULUM?

As in the 2013 curriculum, it is also reported here with the same statement that there should be association between the Visual Arts course and other courses including the Science course. In the curriculum, the units, subjects or learning domains that will be associated with the Visual Arts course are included separately for each grade. In addition, within the framework of interdisciplinary relations, it is stated that the Visual Arts course in all grades can be associated with the appropriate learning outcomes of other courses (MoNE, 2018a, p.18). In this direction, the two learning outcomes of the Grade 3 in the curriculum are associated by means of the “Shape of the World” subject of the Science course. Within the subject, it is taught that the earth has the form of a sphere and consists of layers (MoNE, 2018b, p.15). The associated learning outcomes of the Visual Arts course with this subject are as follows:

- a) G.3.1.4. Uses geometric and organic forms in his/her drawings based on observation.
- b) G.3.1.6. Performs three-dimensional work using different materials by adding, removing, applying internal and external force (MoNE, 2018a, pp.18-19).

In the first of these learning outcomes (the Article a), geometric and organic forms of objects such as flowers, leaves and seashells in the surrounding area are emphasized in drawings based on observations; in the second one (the Article b), three-dimensional works are performed with waste materials such as wood, metal, fabric, and balloons (MoNE, 2018a, pp.18-19). As it is known, the sphere which is a three-dimensional form is a circle in its geometric shape when considered in two dimensions. Therefore, in order to achieve the learning outcome specified in the Article a, it is possible for students to examine objects in the sphere form such as oranges, balls, watermelons and marbles, which are likened to the world in terms of shape in both curriculums and textbooks. In line with the other learning objective (the Article b), similar to inflating a balloon or a ball by applying internal force, it can be stated that materials such as clay, mud, play dough or dough will be transformed into spheres by applying external force in the palm and that they can be used as artistic units in visual art works. Thus, the association between the shape of the world and the learning outcomes of the course can be established.

In the 4th grade, connections can be established between the two courses through the theme of “extravagancy” or “saving” because two objectives are addressed within the context of the topic “Conscious Consumer” in the unit “Human and Environment” in the Science course. These are “Becomes careful about saving in the use of resources” and “Recognizes the importance of the resources necessary for life and recycling”. Within the context of these objectives, the concepts of “resource use, saving, thriftiness and recycling” are explored (MoNE, 2018b, p.24). Correspondingly, in line with the objective “Uses the steps of shaping while constructing the work of visual arts” in the Visual Arts course, the issue of “extravagancy” is addressed (MoNE, 2018a, p.21). Therefore, after making students more conscious of the issue of saving in the Science course, awareness can be increased by getting students engaged in visual art activities on the issue of extravagancy.

4 | DISCUSSION & CONCLUSION

In this article, the interaction of the Visual Arts and Science courses was examined in terms of interdisciplinary associations in primary school curriculums implemented from 1923 to 2020. In light of the data obtained in the study, the following results have been reached:

1) Interdisciplinary associations are clearly stated in some of the past primary school curriculums, whereas they are not specified others. While this approach was envisaged in the primary school

curriculums of 1926, 1936, 1948, 1968 and the Visual Arts course curriculums of 2006, 2013 and 2018, such implementation was not mentioned in the curriculums issued in between 1992 and 2006.

2) No reference has been made to the manner in making connections with the Art-Craft/Visual Arts course in any Science curriculum implemented since the Republic. However, the associations to be made with the Science course are mentioned in the Painting/Painting-Handicraft/Art-Craft/Visual Arts course curriculums dated in 1924, 1926, 2006, 2013 and 2018 and in the teaching of the subjects of Kemalism in 1986.

3) The main point of the associations between the two courses consists of paintings from nature, craft drawings and craft studies at technical level from 1926 to 1992. To put it more clearly, the paintings made in this period are based on the nature and natural sciences such as flowers, trees, animals that the student sees in his immediate surroundings and related to the working principles of vehicles such as automobiles, tractors, cameras, telephones and the subjects of the physics and chemistry relevant to them. The subjects studied in the Science course become the subjects of the Art-Craft course; they are sometimes well-known landscape paintings, sometimes in the forms of schemes, plans and sketches by reducing things into simple drawings or in other times in the forms of decorations by transforming them into decorative painting. In addition, the educational and teaching materials such as handbarrows, leverages, pulleys, wheels, gear wheels, tumblers, collection boxes, sundial and color wheel used in the teaching of Science courses are also used in the "Handicraft or Craft" discipline of the course and are shaped by craft techniques and materials such as mud, clay, paper, cardboard, wood and metal.

4) Between 1926 and 1992, the Art-Craft course was largely a course that served the purposes of better grasping the subjects in the Science course or preparing the course materials in this course. Therefore, it can be said that the association between the two courses was established in a one-way direction only from the Science course to the Art-Craft course in these years. However, in a true interdisciplinary association, it can be said that the interaction is expected to be two-way, that is, mutual and multi-dimensional. Basically, it is possible to attribute this situation to the purposes of raising individuals "who can use knowledge and skills in daily life" and "who can provide benefits to their school, family, environment and ultimately society" which were dominant objectives in the curriculums of that period.

5) When the course contents are examined, it is understood that the associated and complementary learning outcomes that will enable the two courses to be conducted interactively in the curriculums after 2006 are limited. For example, when the learning outcomes in the Visual Arts course curriculum of 2006 are compared with those of the Science course, it is seen that while a limited number of connections can be made at the level of the Grade 4, it is unlikely to encounter associated subjects in the Grade 5. As a matter of fact, the result of the research carried out by Güven and Hamalosmanoğlu (2012) also supports this finding. In the research, it was understood that the environmental activities taught in the Grade 4 of the Science and Technology curriculum of 2005 were associated with the same learning outcome in the 2006 Visual Arts course curriculum. This learning outcome is similar to those stated in the curriculum of the Visual Arts course: "Distinguishes natural and artificial objects" and "Enjoys exhibiting their work and watching the work of their friends", which can be adapted to each class.

6) It was understood that the Science course and Visual Arts course are associated with each other through geometric shapes in the third grade and through the environmental issues in the fourth grade in the 2013 and 2018 curriculums. In these curriculums, these two courses were found to be associated with each other through one or two objectives in the 3rd and 4th grades. While the connections between the two courses were stronger in older curriculums, they were weakened after the 2000s. In the study conducted by Karakuş et al. (2017), it was found that the Visual Arts course ranked fourth among the courses that Science teachers made connections; that is, it was not even among the top three courses.

The limited number of topics or objectives found to be related to each other in these two courses may be one of causes of this result. Moreover, in the study of Karakuş and Aslan (2016), it is determined that in interdisciplinary practices, teachers face problems such as insufficient course time, excessive number of learning outcomes and lack of sufficient activities that can be associated with other courses (Karakuş & Aslan, 2016). One of the reasons why teachers experience difficulties in creating connections between the courses can be said to be the limited number of the points of connection between these courses or the limited number of the shared themes. At the same time, it is understood that the levels of pre-service science teachers' ability to apply this approach in accordance with the activities given to them in the new curriculum is at the moderate level (Cura & Yalman, 2019). This result makes us think of two possibilities. One of them is that the level of the topic or objective is over the level of the student and the other one is that during the undergraduate education of pre-service teachers, they are largely educated in a discipline-centered manner and as a result their awareness of interdisciplinary approaches cannot be raised enough.

In the studies conducted, it is identified that with the help of the interdisciplinary approach, transfer of knowledge is maintained by combining knowledge and skills belonging to different disciplines, knowledge is made to be applied in daily life, meaningful and permanent learning is achieved, and students become more willing to learn (Yarımca, 2011; Karakuş et al., 2017; Cura & Yalman, 2019, Kaçar, 2012). It is concluded that the science teaching integrated with the visual art activities carried out by Türkoğuz (2008) and the interdisciplinary teaching approach implemented in science education by Korkmaz and Konukaldı (2015) positively affected the academic achievements and attitudes of the students. Similarly, in the study of Kaçar (2012), it is proved that the science academic achievements, scientific creativity and science learning attitudes of the students have increased in the courses implemented through the problem-based teaching method integrated with the visual arts in the Science and Technology course. In addition, it is understood in the aforementioned study that students learn the concepts of science better, are able to embody abstract concepts of science, to establish cause and effect relationship between events, learn the types of visual art, begin to seek art in science and science in art, realize that science and art benefit from each other, and have increased interest in science. In contrast, the study conducted by Alkış Küçükaydın (2019) highlights that the primary school students of the Grade 4 have difficulty in associating what they have learned in science class with daily life.

All these results indicate that as the relevant points between the courses increase, the attitudes towards and interests in the courses can change in a positive direction. Without doubt, as people cannot internalize the concepts they cannot understand or make sense of, they may have difficulty in incorporating those concepts or experiences into their lives. In particular, it is thought that the concretization of science subjects, which are thought to contain socially more complex or abstract concepts, and reduce them to daily life and address them from the perspective of other disciplines will break down some prejudices developed against this field and remove the obstacles to learning. It can also be said that visual arts course should be used more frequently in teaching science lessons, especially in this interaction. Similarly, in visual arts education, it is important to realize the scientific, social and historical structure behind a so-called very ordinary event in daily life for the art to occupy more space in the lives of individuals. In this way, it is thought that individuals who receive aesthetic pleasure from the works and who can make arrangements to combine aesthetics and science by blending art and science will be educated.

However, while in the 2018 Curriculum, which is currently in practice, the Visual Arts course have 17 learning outcomes at the Grade 3 and 16 learning outcomes at the Grade 4 and the Science course have 36 learning outcomes in the Grade 3 and 46 learning outcomes in the Grade 4, establishing association(s) between one or a few of them is a serious issue that needs to be focused because many subjects in Science courses can be a material for the Visual Arts course. For this reason, it is recommended that the teaching curriculums be reviewed in terms of interdisciplinary relations between the Visual Arts and Science courses. Furthermore, it can be said that examining the associations of these courses with other courses is also important for demonstrating the level of implementation of the interdisciplinary approach in the curriculum.

Finally, in the study of Karakuş and Aslan (2016), it is stated that classroom teachers believe that the activities related to the interdisciplinary teaching approach in their curriculum are limited and they have difficulty in establishing relationships between courses (Karakuş & Aslan, 2016, p.1335). Based on both this reality and the result of the weak association between the Visual Arts and Sciences course in the present study, it is recommended to prepare theme, topic or problem-centered activity guidebooks combined with other disciplines essentially for primary schools. Since Science and Visual Arts courses are given by classroom teachers in primary schools, it is believed that it will be much easier for the courses to be studied around a single theme by integrating courses at this level compared to the secondary school level.

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The contribution rate of the to this article first author is 75%, and the contribution rate of the second author is 25%.

CONFLICT OF INTEREST

The authors declare that the study has not any conflicts of interest with respect to the research and/or authorship.

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