Music Teachers' Opinions on Block (Visual) Based Coding in Digital Literacy

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ABSTRACT

This case study was conducted to determine whether there is a need for coding training in undergraduate education and in-service trainings by taking the opinions of music teachers about block (visual) based coding. The population of the research consists of music teachers in Turkey, while the sample consists of 170 music teachers who voluntarily participated in the research. An interview form was prepared for the teachers participating in the study. This form was finalized by taking expert opinion and prepared on "Google forms". The results of content analysis revealed that music teachers did not receive any training and did not have any knowledge about the use of block (visual) based code. In this context, it has been determined that music teachers' demand for block (visual) based coding training is quite high.

Key words: Music Education, Music Teacher, Coding, Block Based Coding, Digital Literacy

INTRODUCTION

Music education plays an important role in developing individuals musical skills, increasing their musical understanding and exploring their creative expression. Music education, which consists of different processes from birth to adulthood, is divided into 3. These are defined as general music education, vocational music education, and specialized music education. According to Biber Öz (2001), general music education is defined as the education that everyone should receive, regardless of whether they have an interest and talent in music. Amateur music education is a much more versatile education process than the education given in general and vocational music education. Specialized music education also fulfills certain prerequisites in vocational music education and overcomes the deficiencies and inadequacies in general music education (Uçan, 1997, p. 34). Vocational music education, on the other hand, refers to the specialization of many concepts such as music scientist education, composition education, performance education, music technology education, music teacher education (Albuz, 2004). Candidates who graduate from music teaching work as music teachers in primary and secondary schools. Music teachers make use of materials to teach the subject in music lessons. Teaching materials include blackboards, textbooks, written resources, computers and tablets. The use of materials in education provides effective learning. It has an important role in students reaching the target more easily and achieving success (Karamustafaoğlu, 2006). Teachers need to have knowledge and skills in the use of instructional technology and materials in order to teach effectively in the classroom (Varank & Ergün, 2005).

One of the instructional technology tools that are frequently used today is software and coding education. Coding is a language used to create computer software. Today, the importance given to coding and coding education is increasing. It has started to have qualities that people of all ages can be interested in and learn.

Coding is not only the basic skill of computer science but also develops students' quantitative skills such as problem solving, communication, planning, decision making, analyzing, critical and creative thinking. For this reason, coding, which is considered among the skills of the 21st century, is important for lifelong success (Ergin & Ercan, 2022).

Coding education has many benefits. These are gaining analysis skills, making sense of patterns between phenomena, developing creative thinking and problem solving skills, providing systematic thinking and understanding the working logic of computers (Aytekin et al., 2018).

In public schools, the course called "Information Technologies and Software" is given as a compulsory course to 5th and 6th grade students. In 7th and 8th grades, it is an elective course. The aim of these courses is to provide basic programming skills. However, this curriculum is not intended for coding and software development (Tağci, 2019). In coding education, there are many code education approaches such as block (visual) based programming, robotics, text-based and computer-free coding. Block (visual) based code is among the most frequently used in education.

Some companies have produced block-based programs to positively affect students' attitudes towards code learning and to provide much more convenience in terms of learning. Some of these and the most widely used programs are Scratch, Blockly, code.org, codemonkey, hackercan and tinkercad (Yünkül et al., 2018).

Most teachers face the difficulty of using computers in the classroom. Since they do not have the necessary training

and expertise, they cannot break away from traditional teaching methods. Block-based coding provides great convenience in this sense. There is no need to write code in block coding. Thanks to the programs and animations created by using visual and auditory elements together using drag and drop method, expression becomes easier (Aytekin et al., 2018).

Especially in the field of music education, there are no studies on block-based coding, and there are not enough studies for researchers who want to conduct studies on block-based coding for music teachers and music teacher candidates.

In line with these shortcomings, the aim of the study is to obtain music teachers' views on block (visual) based coding. Within the scope of this purpose, the problem statement was determined as "What are the opinions of music teachers about block (visual) based coding?".

Objectives and Research Questions

The aim of this study is to determine the training levels and needs of music teachers for block (visual) based coding education. This study is also important in terms of the fact that it has not been done so far in the field of music education in Turkey and there is a need for studies on the education of such current tools.

The research questions created in line with the main objective of this study are as follows:

1. What are the opinions of music teachers on the status of following the developments in instructional technology?
2. What are the opinions of music teachers about their coding training?
3. What are the opinions of music teachers about their block (visual) based coding training?
4. What are the opinions of music teachers about whether they have knowledge about block (visual) based coding?
5. What are the opinions of music teachers about the use of block (visual) based coding in music lessons?

METHOD

Research Model

In this study, a qualitative research approach was adopted in order to determine the views and opinions of music teachers on block (visual) based coding and a case study design was used. According to Arslanoğlu (2016), qualitative research is the collection of sources in books and articles and the qualitative evaluation of the data obtained through various information gathering techniques. With this method, information is collected, combined, classified and interpreted, and results are formed. Since the analysis technique is qualitative, statistical calculations are not made.

Case study is an in-depth investigation of one or more situations. In case studies, factors such as environment, individuals, events, processes, etc. are investigated, focusing on how they affect the relevant situation and how they affect the relevant situation (Yıldırım & Şimşek, 2013).

Population and Sample

The population of the study consists of all music teachers in Turkey and the sample consists of volunteer music teachers selected from these teachers according to the maximum diversity sampling method. The maximum diversity sampling method is to reflect the diversity of individuals related to the problem being studied to the maximum degree (Yıldırım & Şimşek, 2004).

A total of 170 music teachers contributed to this study with the participation of volunteer music teachers. Each of the music teachers was named as "M1,M2, M3…" in the findings and comments section, the answers of some music teachers are presented directly.

Demographic Characteristics

The demographic information of the participating music teachers is shown in Tables 1-3.

Data Collection Tool

As a data collection tool in the research, "Music Teachers' Block (Visual) Interview Form Regarding Based Coding" was prepared. The interview form was prepared by the researcher and expert opinions were taken. According to the results of the expert opinions, the interview form consists of a total of questions. There are multiple choice and open-ended questions. The designed interview form was prepared through "Google forms" and sent to music teachers.

Table 1. Distribution of music teachers according to gender

Gender	*n*	**%**
Female	118	69.2
Male	52	30.8

Table 2. Distribution of music teachers according to professional experience

Experience	*f*	**%**
1-5	12	7
5-10	51	30
10-15	65	37.8
15 and above	43	25.2

Table 3. Participation status of music teachers according to regions

Regions	*f*	**%**
Marmara	80	47
Karadeniz (Black Sea)	20	11.7
Akdeniz (Mediterranean)	18	10.5
Ege (Aegean)	16	9.4
İç Anadolu (Central Anatolia)	15	8.8
Doğu Anadolu (Eastern Anatolia)	12	7
Güneydoğu Anadolu (Southeast Anatolia)	9	5.6

The interview form consists of 3 sections.
- In the first section, a text on the definition of block (visual) based coding and its usability in education,
- In the second section, a video example of block (visual) based coding,
- The last section includes questions prepared for music teachers.

Data Analysis

Content analysis method was used to analyze the data. This method is used to characterize and compare interview records. The data obtained are interpreted in line with the determined themes and concepts (Yıldırım & Şimşek 2008, p. 227). In this study, an evaluation was made with experts in the field of music education and the process and results were shared. The common opinion of the experts was taken on the examination, analysis and categorization of the data.

FINDINGS

In this section, the answers to the questions posed to the music teachers are discussed separately. The answers were quoted, written under a common theme and expressed with graphs.

Findings Related to the First Research Question

As seen in Figure 1, it was revealed that music teachers mostly follow the developments in instructional technology.

It was observed that 76.9% of music teachers, i.e. 130 music teachers, followed instructional technologies, while 23.1%, i.e. 40 music teachers did not.

Findings Related to the Second Research Question

In Table 4, when asked whether music teachers had received coding training before, it was found that the majority had not.

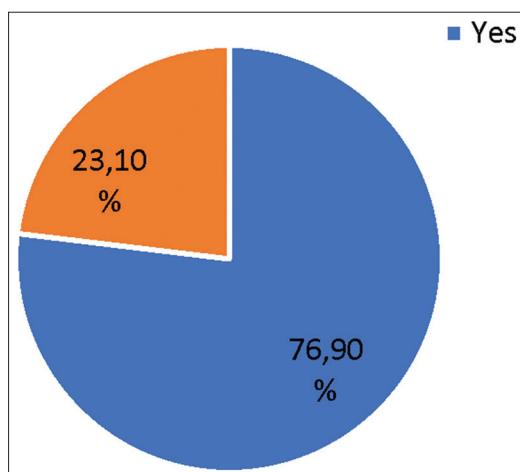Only 27 of the music teachers (10%) stated that they had received coding training.

Figure 1. Music teachers' views on following the developments in instructional technology

Findings Related to the Third Research Question

In Figure 2, it continues in proportion to the graph in Table 4.

Regarding whether they have knowledge about block (visual) based coding, 92.3% of the teachers have no knowledge, while 7.7% stated that they have knowledge about block (visual) based coding. Out of a total of 170 music teachers, 157 did not have any knowledge.

Findings Related to the Fourth Research Question

As can be seen in Table 5, there are data on the opinions about whether block (visual) based coding should be used in music lessons.

While 140 (82%) of the music teachers stated that it should be used, 30 (18%) could not express an opinion and remained undecided. In addition to this question, music teachers were asked to answer the question "Why?". Some of these answers are as follows:

> *Since students attach more importance to technology-based education, it increases interest in the given subject.* (M77)
> *Since it is visually interesting, it can make the theoretical part of music easier to learn.* (M3)
> *It is easy to access information, it offers a multiple learning environment, and it offers a fun learning environment for students.* (M48)
> *It can make learning permanent by ensuring active participation of the student in the lesson.* (M 32)
> *Block-based coding can be used to create simple melodies or simple rhythms in music lessons.* (M 55)
> *It can be enjoyable for students who have difficulty in creating and writing rhythms.* (M8)

Table 4. Music teachers' opinions on coding training

Theme	f	%
Yes	17	10
No	153	90

Table 5. Opinions on the use of block (visual) based coding in courses

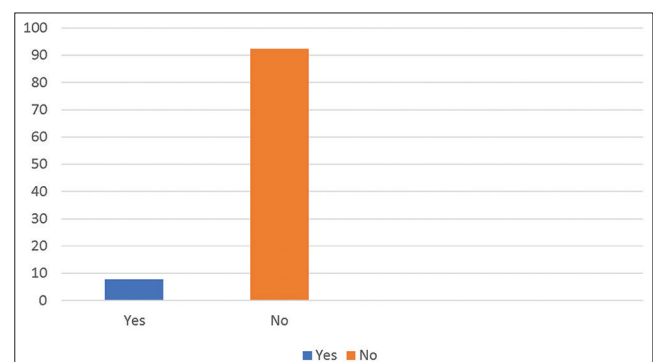| Theme	f	%
Should be used	140	82
No opinion	30	18

Figure 2. Music teachers' opinions on whether they have knowledge about block (visual) based coding

I could use it to facilitate note teaching. (M101)
I create audio questions with Scratch. (M102)
I don't know much at the moment. (M15)

The participant talked about the "Scratch" application, which is used as only "M 102" block-based music components. It seems that he is one of those who have little knowledge about not doing this. In general, "M 55", "M8", "M101" and "M3" are about the theoretical part of music; They presented their ideas that block code training should be taken for teaching notes, simple melodies and simple rhythms. In addition, according to the appearance of the products named M15, it is understood that being block-based is not sure about its useful life in the course.

Findings Related to the Research Question

Finally, Table 6 presents the findings related to the fifth sub-problem.

Music teachers were asked whether they would like to receive block (visual) based coding training. As can be seen in Table 6, there is a majority demand for training. While 160 music teachers wanted to receive block (visual) based coding training, only 10 of them chose "No" because they were not sure. For this question, the question "Why?" was asked and some of the answers were directly quoted:

It will facilitate the learning of some subjects. (M9)
It makes music lessons interesting for students who do not like music. (M56)
Supporting the auditory sense with the visual sense will increase permanent learning. (M1)
Considering that students grow up intertwined with technology, it will make the lesson more understandable and enjoyable by moving away from the classical teaching model. (M 118)
I think it can attract students' attention. Thus, we can increase participation by increasing interest and desire. (M90)

As it can be understood from the sample answers above, it is understood that a minority participant is undecided on this issue, since the majority of participants who want to receive training are in the majority (M"148 & "M6"). Looking at the other sample answers, "M9", "M56", "M1", "M118" and "M90" stated that they wanted to receive training in terms of use in lessons, for students, and for making the lesson fun.

DISCUSSION AND CONCLUSION

Block (visual) based coding is a software that does not require learning how to write code, but is used by drag and drop method like assembling lego pieces. It meets the needs of teachers and students especially in education. As a result of the literature review, it was determined that there are very few studies on coding in music education. For this reason,

Table 6. Music teachers' opinions on the demand for block (visual) based coding training

Theme	*f*	%
Yes	160	94.2
No	10	5.8

in the research, the opinions of music teachers about block (visual) based coding were taken and their interest and needs were determined. In the light of the data obtained;

In the current study it was determined that most the music was determind that most of the music teachers follow the developments in instructional technology. It was determined and they benefit from technology in their lessons, but it was seen that they do not have enough knowledge. Ayhan and Aydınlı Güler (2023) also examined the views of music teachers on the use of technology in their study and concluded that music teachers do not have information about the use of technology in music lessons. In this context, they made a suggestion to create in-service trainings. Karademir et al. (2018) in their study, elicited data on teachers' opinions on the use of robots in education, and emphasized that teachers should have a certain technical and pedagogical knowledge.

In line with the answers given, the demands of music teachers to receive training on block (visual) based coding are quite high. 160 of the music teachers who participated in the study expressed a positive opinion that they should receive training. In his study, Sayın (2020) identified seven coding trainings preferred by teachers in line with the answers given by the participants to the survey questions. These are; computer-free coding training, block-based visual programming, robotics, mobile application development, web design/web game development, game design and 3D technologies (augmented reality).

It is essential for music teachers to contribute to their professional development in order to easily respond to the needs of children. In his study, Ziyagil (2021) ensured to increase the interest of students at different ability levels by having students in music lessons code with the Arduino platform. In his master's thesis, Özkandemir (2019) prepared a sample study on the use of robotics and coding programs in elementary music lessons. In his study, the "Scracth" program designed for block-based coding was used. As a result of the study, it was determined that the students enjoyed the note reading and writing activities.

In addition, it was determined that music teachers who received coding training were mostly teachers with 1-5 years of professional experience.

In line with these results it can be recommended that;

- In-service trainings on block (visual) based coding can be provided for music teachers.
- Information about coding can be added to the curriculum in undergraduate and graduate programs. However, since technology is changing and developing day by day, the programs in the curriculum should continue to be updated.
- Workshops can be organized for music teachers and music teacher candidates.
- Only block (visual) based coding and other coding types can be studied.
- An experimental study can be conducted using a program related to block (visual) based coding.
- Music teachers can use it in many ways for music education with block-based coding. Block-based coding is an effective tool for teaching music concepts. By putting the blocks together, students can create rhythms,

harmonies, melody patterns, and other musical structures. Music teachers can help students better understand musical concepts by using block-based coding.

- It can be used to create music teaching materials. Teaching materials can be prepared by combining musical concepts with blocks for students to understand and learn. By using these materials, music teachers can teach musical concepts more effectively.

- Block-based coding allows students to produce music. Students can create their own music by putting the blocks together. Music teachers can improve students' music production skills by using block-based coding.

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