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An Analysis on Music Maps with Their Symbolic and Graphic Representations

Ebru Şen [1]

Abstract

The idea of making music meaningful, which is an abstract concept, leads to a need for developing various visual materials in line with today's contemporary music education approaches. One of the visual materials that can be used in line with this need is the maps that involve use of symbolic and graphical elements (lines, pictures, shapes, etc.). These materials, which can be used efficiently to perceive, analyze, and interpret music as a whole, making musical structures and concepts meaningful, can be named as music maps in a general expression. In this research, 12 music map examples in literature were investigated through content analysis method, which were created in line with different purposes and methods and which are different from each other in terms of their styles. It was tried to reveal the purposes, methods, and application fields of music maps according to the findings achieved through the visual contents that were found in the 12 music maps in total, investigated under the themes of "Structural Content" and "Musical Content". Results of the research showed that music maps are creative and original materials that would contribute to those who implement them, for various purposes in their practices at different levels of the general, amateur, and professional music education processes. Accordingly, it is thought that the visual music map examples and the analyses on these maps in this study will be a guide for trainers, students, and performers who want to use music mapping methods, as well as for parents.

Keywords

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[1] Sinop University, Faculty of Education, Department of Fine Arts Education, Turkey, esen@sinop.edu.tr

Introduction

Music involves many abstract concepts; and at the same time, it is a branch of art, in which it is possible to express such concepts concretely by means of various symbols and terms. It is considered important to make musical structures and concepts meaningful through concretizing elements of music, in order to achieve a more effective learning in the process of music education, which has an important place in expressing the art of music. At this point, a need for meaningful learning can be mentioned.

According to Ausubel (1969), meaningful learning depends on whether certain ideas expressed symbolically are related to certain structures (image, symbol, concept, expression, etc.) that are already known by learners and instinctively exist in their minds. This requires learners to establish a connection between the knowledge they already have and the knowledge they have just learned. Hence, there can be a need for certain tools that will ensure interpreting and thus organizing the information. These tools can be several audial materials, pictures, or certain graphic stimulants, which are defined as pre-organizers. Pre-organizers form a structure outline for the information and help process details into the information, draw the attention to the more important parts of the information to be presented, and help learners remember their prior knowledge, establishing a relation between the prior and new knowledge (Kılınç, 2007; Senemoğlu, 2007). The stimulants that appeal to all of the sense organs are utilized to make abstract concepts meaningful in teaching by presentation, which was developed based on meaningful learning approach and where active participation of students in lessons is important (Senemoğlu, 2007; Senemoğlu, Gömleksiz, & Üstündağ, 2001). Further, according to the dual coding theory suggested by Paivio within the scope of multimedia learning theory, learning is more effective and efficient when verbal content is presented in combination with visual content (Aldağ & Sezgin, 2003).

Music has many elements in terms of rhythm, melody, harmony, texture, and form, and each element contains complex structures that are interrelated in themselves and among each other. Music mapping techniques can be presented in the form of graphical methods that can fall into pre-organizer visual stimulants, which cognitively support demonstration of the relationship and interaction among complexly structured musical elements, when considered within the scope of the said theories (Weyde & Wissmann, 2004).

Reybrouck (2003, 2004, 2006, 2015), who studied on semiotics and musical perception, mentioned about how important personal representation strategies of listeners in the first place is for making music meaningful, and in this line, researched listeners' process of making music visually meaningful as a result of audio perception and cognitive processes. Reybrouck (2004) stated that semiotics is based on symbolic approach, while cognitive approach is based on experimental and scientific research. However, he also expressed that process of signing is a critical factor for creating musical meaning, thus, there are common grounds between semiotics and cognitive approach. Accordingly, it can be said that music maps can be effective in reinforcing such common grounds, ensuring concrete expression of abstract musical ideas and perception of musical structures.

According to Kerchner (2014); reading, writing, and applying the standard musical notes may restrain students from interacting freely and intuitively, and hamper their musical creations. Accordingly, it is possible to make use of alternative visualization systems, especially the ones to be created by students. Mapping is one of these representation systems. According to Conneely (2007) music maps provide an environment for students to have an opportunity to discuss, make presentations, and demonstrate their personal perceptions during the activities in music lessons. Further, according to Shockley (2006), mapping brings students in a different point of view. Music maps, which can be used at any phase of piece studies, can be presented particularly through pictures for learning the theory of music and remembering the meanings of musical terms. In addition to this, musical stories can be visualized using music maps for teaching children songs.

Dunn (2006), who stressed that intuitive listening has an important place for perceiving all structural elements of music as a whole, stated that various strategic methods should be used in educational environments in order for students to acquire lifelong experience, and considered listening maps, which can be addressed within music maps, as one of the important strategic methods that ensures representation of music holistically for gaining intuitive learning experience. According to Dunbar (2016), the visual symbols in these maps, which can be created either by teachers or by students, help students visually make meaning out of what they hear, allowing them to see the musical concepts set as a target, as a whole. Today, there are various listening maps prepared particularly as primary education music teaching materials, some of which are animated. It is seen that these maps are sometimes in the form of musical notes composed of figurative drawings, icons, or animal faces, and are sometimes designed as symbols or pictures that represent instruments and musicians (Colwell & Webster, 2011). Previous research (Anderson, 2012; Fairfield, 2010; Yu, Lai, Tsai, & Chang, 2010) showed that listening maps improve music listening skills of students, at the same time they are effective materials that can be used for improving creativity and increasing motivations of students.

It was seen when investigating music mapping studies (Blair, 2006; Carmon & Elkoshi, 2010; Conneely, 2007; Kenney, 2013; Kerchner, 2000; Olson, 2003) that most of them were conducted in order to create musical ideas and ensure development of abstract concept in children. The common point of these studies is that they were generally prepared by children. Moreover, it was seen that music mapping activities were conducted in active learning environments that included plays, stories, and improvisation, and sometimes at home with parent support. In the results of these studies, it was determined that self-expression and critical thinking skills developed in children, while it was also observed that children were more active and eager in lessons.

It was seen in that there are music mapping studies that were designed for young and adult individuals in different age groups in literature, in addition to music mapping studies intended for children. It can be predicted when these studies (Colgin Abeln, 2008, 2011; Curley, 2010; Tan & Kelly, 2004) are analyzed that music maps can be used for many different purposes. Music maps are designed sometimes to determine how music is perceived by those who have a music education history and those who do not have, and sometimes to increase performance skills of musicians for a professional purpose. For example, performers are expected to have the skill of playing a composition without any need to look at notes with the use of mind maps, once mapping is completed. In addition, it is also thought that performers will gain an effective performance skill, since they address all the elements of a composition carefully and note them on mind maps during the practice process (Shockley & Colgin Abeln, n.d.).

Upon investigating the relevant literature, it was seen that music maps were mentioned in different research for certain purposes. On the other hand, no research that addresses music maps created for different purposes and created with different methods together has been found. Presence of such a study can increase recognition of music maps and can be a source for practitioners to include music maps into their studies as an educational material.

The main purpose of this study is to reveal the purpose, methods, and application fields of music maps, analyzing visual contents of music maps that are given different names in the relevant literature and are created through different methods for certain purposes. Accordingly, the analyzed music map examples are expected to guide for trainers, students, performers, as well as for parents. Answers to the following questions were sought in line with the general purposes of the study:

1. What are the structural contents of music maps?
2. What are the musical contents of music maps?

Method

Research Design

This study is a qualitative research in which various visual music map examples in the studies conducted by music educators and researchers are subjected to content analysis by means of document review.

Study Group

In this study, purposeful sampling is used to include various music map examples with different purposes and characteristics and maximum variation sampling method is used in this scope. In purposeful sampling, the researcher determines the most suitable sampling in line with the purpose of the research, using his/her own consideration for which sampling to choose (Balcı, 2006). This sampling allows for an in-depth research, choosing the situations rich in information depending on the purpose of the study (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2008). Besides, as for maximum variation sampling method, the researcher tries to create a heterogeneous sampling group, including different units with various characteristics into the scope of the sampling (Baş & Akturan, 2017). In this direction, a literature review was made on the Internet, over the keywords such as "music map" and similar terms, for an evaluation under topic title of "music maps" in the study. As a result of the detailed reviews made by the researcher, 72 studies in total were found, which were conducted by 51 music educators and researchers, who were determined to have conducted scientific studies on mapping in the field of music. It was detected that 48 studies in total present visual contents, upon analyzing these studies. Firstly, 43 studies were chosen among the visuals, as they have map contents that can be addressed under the name of music maps, in compliance with the maximum variation principle. In this direction, among the map examples from the 43 studies, 12 maps in total were included in the study, as they were created for different purposes and through different methods, and presented different stylistic features from each other. It is seen that some of the maps included in the study have the same names. However, these maps were still included in the study, since they were prepared for different purposes and through different methods. Table 1 shows the names of the 12 music map examples reached from the sources, and the musical compositions to which these maps correspond are also indicated in Table 1.

Table 1. Information on the 12 Music Maps

No	Name of Music Map	Compositions Processed on Maps
1	Listening Map	A. Ketelbey-In a Persian Market "Princess"
2	Cognitive Map	L. V. Beethoven-Symphony 5, 1st movement
3	Listening Map	I. Stravinsky-The Firebird Suit "Berceuse"
4	Musical Icon Map	J. Haydn-Symphony No. 94, 'Surprise', 2nd movement
5	Graphic (Symbolic, Pictorial, Textual, Numerical) Music Maps (4 pcs.)	1-2) B. Britten-The Young Person's Guide to the Orchestra "Trumpets" 3) F. Chopin-Étude in G flat major, Op. 10, no. 5, 'Black Key' 4) A. Turner-A Certain Romance
6	Memory Map	B. Bartok-Hungarian Folk Song for piano
7	Music Analysis Profile	P. Hindemith-Symphony in b-flat for Concert Band 3th movement
8	Musical Mind Map	F. Lizst- "Liebestraum No.3"
9	Memory Map	W. A. Mozart-Flute Concerto no. 1 in G-Major, K. 313. 1st movement
10	Song Map	S. Egüz-Karga ile Tilki "Children's song"
11	Dynamic Musical Concept Map	J. S. Bach-Die Kunst der Fuge BWV 1080
12	Animated Graphical Score	L. V. Beethoven-Symphony 5, 1st movement

Data Collection

The research data was obtained by means of document review method. Document review consists of analyzing the written or visual materials that contain information about the phenomenon or phenomena to be researched (Yıldırım & Şimşek, 2018). The 12 music maps in total in this study constitute the visual documents of the research. These documents were reached from the studies of the researchers and educators who have music mapping studies, through their printed publications and studies in Internet environment.

Data Analysis

The data obtained in the study was analyzed by means of content analysis method. Content analysis is a systematic technique applied to determine the existence of the words or concepts in elements such as texts and images, in which they are summarized in smaller content categories by means of codes based on certain rules (Büyüköztürk et al., 2008).

Music maps are generally created basing on a certain musical idea or composition. In this direction, recordings of the compositions corresponding to the maps were used to analyze the maps addressed in the study. The visual elements on the maps were matched with the audial data of the music samples, and thus it was tried to reach expressive meanings of the music. The data obtained as a result of analyzing the visual elements were categorized under the themes of "Structural Content" and "Musical Content", which were coded and determined by the researcher within the scope of the research questions. The data that are obtained from the visual elements were reported in tables that contain "Themes", "Categories", and "Codes" under the title "Indicators", for the convenience of readers to see the relationships between the visual representations on the maps and the findings. The data in the tables were not digitized, and the findings obtained from the data were interpreted descriptively. That is because; the purpose of this study is to reach the meanings of visual representations on music maps, rather than determining the frequency of elements to appear on maps.

The data were analyzed by listening to the relevant recordings, paying regard to the explanations of the researchers who created the maps and the instructions in the studies that included the maps, in order to ensure validity and reliability of the study. Besides, the map analyses and interpretations made by the researcher were evaluated by two experts of the field. It was detected in line with the opinions of both of the experts that the data were coded correctly and assigned to the proper categories. Music map images are presented together with the findings and the data that form the visual indicators are reported in tables, which is important for ensuring the reliability of the research.

Results

This chapter presents tables that show images and content analyses of the music map examples and contains descriptive explanations and interpretations in line with the images and tables. Each map was addressed under the title of "Music Map" and image descriptions present the original names of the maps given in the relevant sources. When the tables are examined, it is seen that the visual elements on the maps are described under the title of "indicators", and the obtained data are coded in the framework of the themes of "Structural Content" and "Musical Content", and assigned to the relevant categories.

Music Map 1:

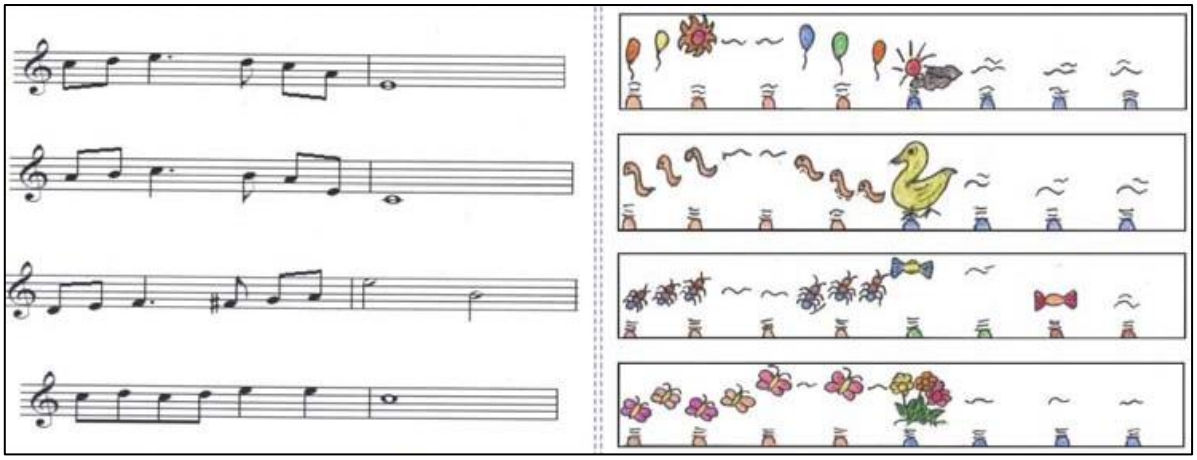

Image 1. Listening Map (Yu et al., 2010, p. 156)

Table 2. Structural and Musical Contents of Music Map 1

Themes	Categories	Codes	Indicators
Structural Content	Style	Relational	I1: Image and map for composition's notes
	Scope	Child	I2: Colored figures (Duck, butterfly, etc.)
Musical Content	Terms-Concepts and Signs	Term (Staff)	I3: Rectangular boxes
	Rhythmic	Note values	I4: Figures on symbols
	Structure	Measurement time indicator, Unit beat	I5: Equidistant symbols with colored patterns
		Durations of notes	I6: Curved linear symbols following figures
	Melodic Structure	Pitches	I7: Figures in different heights

Image 1 shows the notes of "Princes" theme of the composition named "In a Persian Market" by Ketelbey and a listening map related to it. This map allows for visually tracking the piece that is made listened (I1). The map was prepared in color and it contains figures such as various animals, balloons, and candies (I2). The lower parts of the rectangle boxes (I3) contain equidistant symbols that represent unit beats in four-beat time-measure (I5). The figures over these symbols allow tracking the quavers and the following dotted crotchet values (I4). There is a figure created for each of the notes. The durations of the extended notes are shown over the unit beats by means of the curved linear symbols coming right after these figures (I6). It is possible to follow the high-pitch and low-pitch status of the sounds by means of the pitch level differences among the figures compared to each other (I7). Table 2 contains the code "Relational" in the category of "Style" and the code "Child" in the category of "Scope", under the "Structural Content" theme of Music Map 1. In addition, the categories of "Term-Concept and Signs", "Rhythmic Structure", and "Melodic Structure" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 1, it is understood that the listening map was prepared through note-map association. The map was prepared for children and gives information about the rhythmic and melodic structure of the composition. It can be stated in line with the findings that the map can be used to acquire music listening skills at preschool and primary education levels. It can be said that the map will be effective in teaching basic rhythmic and musical elements of music.

Music Map 2:

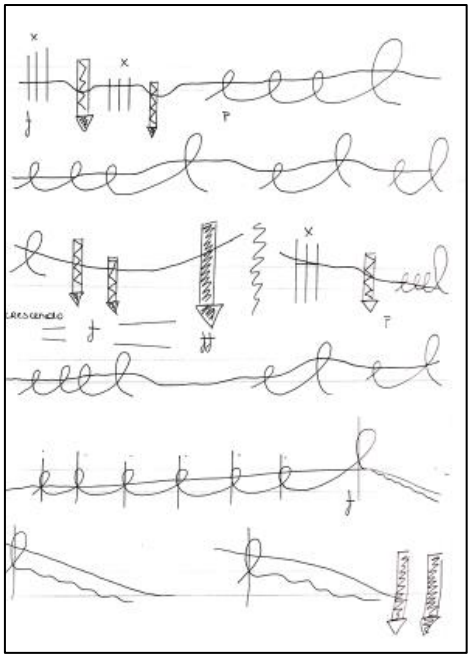

Image 2. Cognitive Map (Reybrouck, 2008, p. 31)

Table 3. Structural and Musical Contents of Music Map 2

Themes	Categories	Codes	Indicators
Structural Content	Style	Line drawing	I1: Charcoal drawing
		Linear	I2: Lines in regular, simple forms
Musical Content	Rhythmic Structure	Durations of notes	I3: Three vertical lines and a downwards arrow. Small and big curved lines in different sizes
	Melodic Structure	Tune	I4: Linear and symbolic signatures on horizontal lines parallel with each other
	Musical Expression	Nuance	I5: p, f,
			I6: Visualizations represented in small and big forms
		Articulation technique (Legato)	I7: Interconnected 3 small and 1 big circular lines

The cognitive map given in Image 2 refers to the movement "Allegro con brio" of Beethoven's "5th Symphony". The map was created by hand and generally in linear form (I1, I2). The horizontal lines on the map represent staffs, while the linear and symbolic marks on these lines give an idea about the rhythmic and melodic structure (I3, I4). The map is read from left to right and downwards as row passages, as is done for music writing. The main motif of the piece and the rhythmic structure of this motif are shown by three vertical lines and down arrow sign given at the beginning of the map (I3). The movements where the main motif is repeated are shown by similar signs. The three small lines and one big circular line connected to each other reflecting the legato playing style also describe the note durations without leaving the rhythmic structure (I3, I7). Nevertheless, nuance marks are also added onto the map (I5). Linear demonstrations are represented in small and big forms to indicate the nuances (I6). It is seen that Table 3 contains the codes of "Line Drawing" and "Linear" in the category of "Style" under the "Structural Content" theme of music map 2. Besides, the categories of "Rhythmic Structure", "Melodic Structure" and "Musical Expression" were reached under the theme of "Musical content".

According to the findings obtained from Music Map 2, the cognitive music map was designed in line drawing and linear forms. In addition to this, it is understood that it was prepared for recognition of the rhythmic and melodic structure of the composition together with musical expressions. It can be stated that the map can be prepared by trainers or students, and can be applied at different class levels. Any type of music listened during classroom activities can be represented linearly and symbolically by students through such kind of maps, within the framework of their own perceptions. Thus, it is possible to make discussions on different maps prepared for the same piece. Further, students can track the images on the maps during music listening activities; in the meantime, they can do movements similar to the images on the maps, using their hands.

Music Map 3:

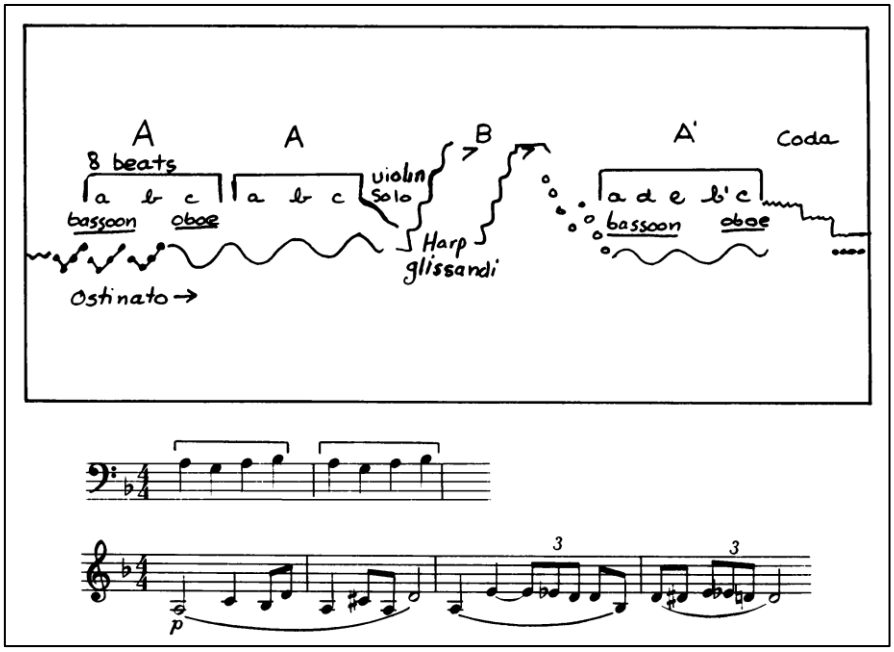

Image 3. Listening Map (Miller, 1986, p. 30)

Table 4. Structural and Musical Contents of Music Map 3

Themes	Categories	Codes	Indicators
Structural Content	Style	Relational	I1: Note image and map of composition's theme
		Linear, Symbolic	I2: Lines, symbols, terms, and concepts
	Scope	Professional	I3: Regulated ciphers, codes, terms, and concepts
Musical Content	Terms-Concepts and Signs	Term (Ostinato)	I4: The word "Ostinato". Curved line following dotted lines
	Rhythmic Structure	Unit beats	I5: Dots over the lines at the beginning
	Melodic Structure	Pitches	I6: Ascending curved line
		Descending melody	I7: Descending small circles
		Descending chromatic melody	I8: Descending zigzagged lines
	Expression	Articulation technique (Glissando, Tremolo)	I9: "Glissandi"
			I10: Zigzagged lines (trimolo)
	Sound-Tone	Instruments (Fagot, oboe)	I11: The words "bassoon", "oboe", "violin solo", "harp"
	Style and Form	Motif, Sentence, Section	I12: A, B, A', a & c, Coda
			I13: The word "8 beats"

Image 3 shows a listening map prepared for the Movement named "Berceuse" of Stravinsky's suite named "The Firebird". The ostinato (a motif that persistently repeats) theme is given in the notation in bass clef below the map. The term "ostinato" is also given on the map and the unit beats in this theme are indicated by dots (I4). The curved line seen afterwards shows that ostinato continues. The 8 beats demonstration under Section A at the beginning of the map indicates the number of beats in each of the motifs (I13). As for the notation in treble clef, the main theme is seen facing us throughout the piece played with bassoon. The map also indicates the instruments used for playing the motifs in the piece (I11). For example, it is understood that the motifs a and c in Section A are played with bassoon and oboe. The motif played by solo violin is emphasized separately. Then, the transition to Section B is clearly seen through the glissando (I9) of the harp towards the high pitch. Besides, the descending motif that provides transition to Section A' is figured as small descending circles (I7). The curved line seen at the lower part of Section A' shows that ostinato resumes (I4). The zigzagged lines in the section Coda explain the chromatic descents occurring with tremolos of violins (I8). According to Table 4, the category of "Style" contains the codes "Relational" and "Linear-Symbolic", and the category "Scope" contains the code "Professional", under the "Structural Content" theme of Music Map 3. It is also seen that the categories of "Term-Concept, and Signs", "Rhythmic Structure", "Melodic Structure", "Expression", "Sound-Tone", and "Style-Form" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 3, it is understood that the example listening map was created through linear and symbolic methods, with note-map association. In addition, it can be expressed that the map can be used for occupational music education. However, it is also possible to implement such mapping techniques for different age groups, designing from simple to complex. As a matter of fact, this map was designed by a primary school music teacher and was tried for the first time on her 7 year-old son (Miller, 1986). The map gives a chance to see various structures of music simultaneously. Although the map shows the rhythmic and melodic structure of the work, also it provides a general information about the form of music. In this direction, it can be stated that such maps can be utilized for ensuring students to acquire listening skills or in the process of practicing a composition to be performed. It can be indicated that maps can be designed by trainers in advance, while they can also be created individually or as a group activity under the guidance of a trainer in classroom environment.

Music Map 4:

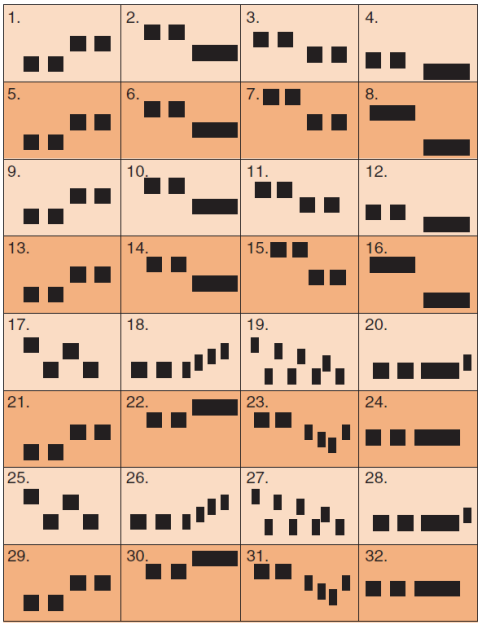

Image 4. Musical Icon Map (W. M. Anderson & Lawrence, 2013, p. 192)

Table 5. Structural and Musical Contents of Music Map 4

Themes	Categories	Codes	Indicators
Structural Content	Style	Number	I1: Sequential numbers (1,2,3,4,5,)
		Colors	I2: Light-dark pink
		Geometric shapes	I3: Square-rectangle
Musical Content	Rhythmic Structure	Measurement	I4: Rectangular boxes
		Measure numbers	I5: Numbers located on top left corners of boxes
		Note values	I6: Square and rectangular shapes in different sizes
	Melodic Structure	Pitches	I7: Positioning of shapes lower or higher than each other
	Style and Form	Section repetition (Form)	I8: The same images between boxes 1 and 8 and 9 and 16.

The musical icon map seen in Image 4 describes the main theme of 2nd movement of Haydn's "Surprise Symphony". It is understood from the map that the rectangle boxes divided in 32 parts represent the bars of the piece (I4). The numbers placed on the left top parts of the boxes indicate the numbers of the bars (I1). The sizes of the square and rectangle shapes on the map are organized based on the durations of the notes (I6). In addition to this, the pitch levels of the shapes compared to each other remark the pitch level among the notes (I7). When the piece is listened, it is understood that the sections between the 1st and 8th bars and the 9th and 16th bars are rhythmically and melodically equal to each other. This similarity is seen more clearly when the map is checked (I8). According to Table 5, it is seen that Music Map 4 contains the codes of "Number", "Color", and "Geometric shapes" in the category of "Style" under the "Structural Content" theme. It is also seen that the categories of "Rhythmic Structure", "Melodic Structure", and "Style-Form" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 4, the symbol map was created using numbers, colors, and geometric shapes. In addition to this, it also gives information about the rhythmic, melodic, and stylistic form structure of the composition. Accordingly, symbolic maps can be considered as the materials that can be useful for developing musical memory by apprehending the rhythmic and melodic structures. It can be suggested that it is possible to make use of similar music maps with simple or complex structures to be prepared manually or in computer environment using geometric shapes, at different levels of the process of education.

Music Map 5:

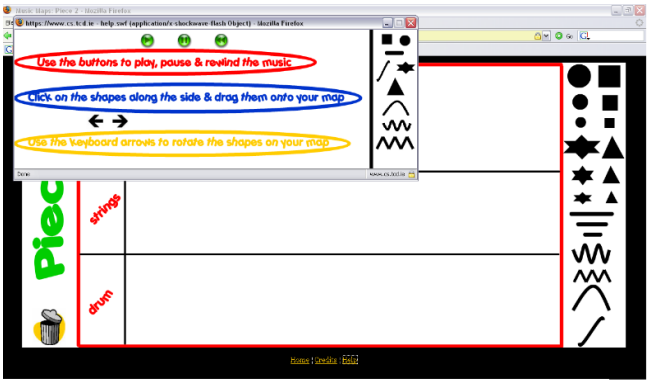

Image 5a. Music Mapping Display (Conneely, 2007, p. 18)

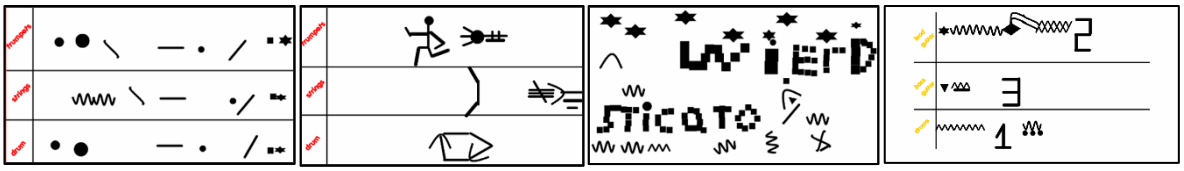

Image 5b. Graphical (Symbolic, Pictorial, Textual, Numerical) Music Maps (Conneely, 2007, pp. 75-77)

Table 6. Structural and Musical Contents of Music Map 5

Themes	Categories	Codes	Indicators
Structural Content	Style	Graphical drawing	I1: Symbol, Picture, Word, Number
		Guideline	I2: Expressions highlighted in color
	Scope	Child	I3: Simple, irregular, free geometric and graphical visualizations
Musical Content	Rhythmic Structure	Speed	I4: Running child
		Note values	I5: Small-big symbols
		Motion	I6: Zigzagged lines
	Melodic Structure	Melody	I7: Straight-curved lines
		Pitches	I8: Descending, ascending lines
	Expression	Articulation technique (Staccato)	I9: The word "Sticato"
	Sound-Tone	Instruments	I10: Words such as "Trumpets, strings, drum, lead guitar, etc."

Image 5a gives a screenshot from a music mapping software, while Image 5b shows graphical music map examples created by children using this music mapping software (I3). The mapping software was designed to create symbolic, pictorial, textual, and numerical music maps (I1). The software includes instructions for creating maps (I2). Various graphical symbols (straight-curved, angled-round, big-small, etc.) on the right part of the display represent musical elements (I5, I6, I7, I8). The music map creating software is similar to a computer game designed to attract children. According to Table 6, Music Map 5 contains the codes of "Graphical drawing" and "Guideline" in the category of "Style", and the code "Child" in the category of "Scope", under the "Structural Content" theme. It is also seen that the categories "Rhythmic Structure", "Melodic Structure", "Expression", and "Sound-Tone" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 5, it was determined that these music maps were created using graphical symbols, pictures, words, and numbers. It is understood that the map is specifically intended for children. Maps are created by children with their own experiences. Thus, this mapping method contributes to children's music listening experiences, while giving them a chance to use their creativity. The variety of the graphical symbols in the software helps students discover the rhythmic, melodic, and expressive meanings of music. Such kind of maps can contribute to cooperative learning, as they are usable also for group studies. As the mapping process is performed in the form of a play, it is possible to give a chance to perform enjoyable music listening and creating activities, increasing the duration of children's attention and interest.

Music Map 6:

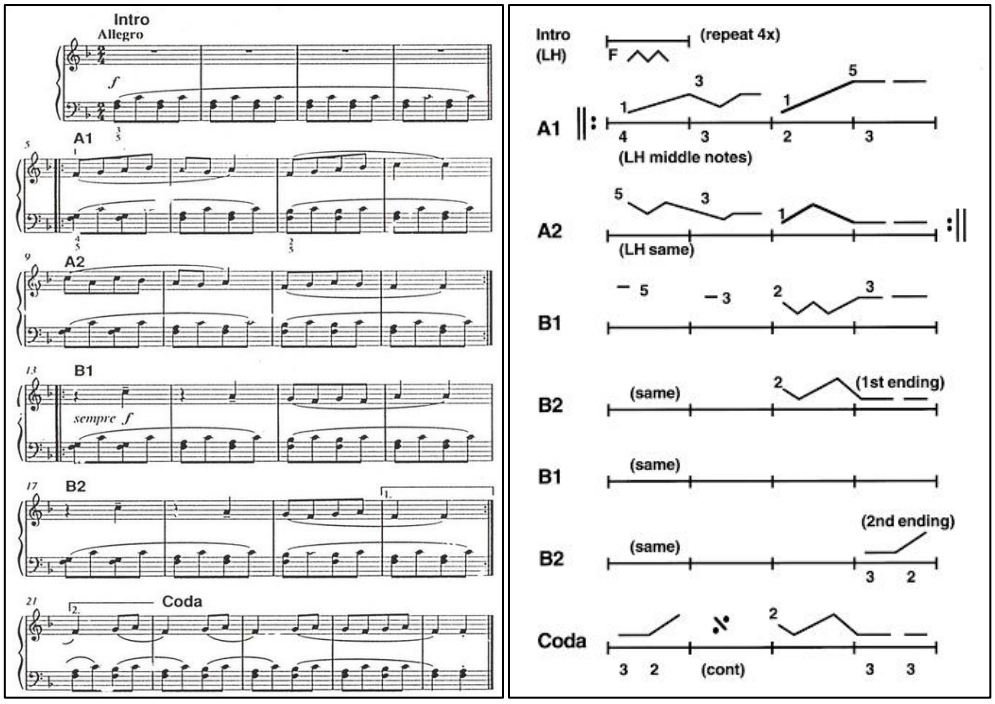

Image 6. Memory Map (Shockley & Colgin Abeln, n.d.)

Table 7. Structural and Musical Contents of Music Map 6

Themes	Categories	Codes	Indicators
Structural Content	Style	Graphical	I1: Regulated lines
		Relational	I2: Map associated with note image
	Scope	Mental preparation	I3: Mnemonic words and signs "Same, (cont), (repeat)"
		Professional	I4: Technical terms and signatures on the field of music associated with notes
Musical Content	Terms-Concepts and Signs	Staff	I5: Long lines on plane
		Repeat and reprise signs	I6: Words of Reprise, Coda, cont., Repeat 4x, 1st ending, 2nd ending
		Finger numbers (Duate)	I7: Numbers above and below lines
	Rhythmic Structure	Measurement	I8: Long lines divided into four
	Melodic Structure	Pitches	I9: Upwards, downwards, and straight motions of lines
	Style and Form	Sentence, Section (Form)	I10: A1, B2, etc.
		Motif (Form)	I11: Linear visualizations

It is seen on Image 6 that the notes of the piano piece composed by Bartok over a Hungarian folk song and the map referring to the piece are matched (I2). The appearance of the map is similar to musical notation. Therefore, reading the map is the same as reading the note writing. The long lines on the plane describes the staff (I5), while the numbers above and below the lines indicate finger numbers corresponding to the notes for right and left hands (I7). Pitches are described through the upwards, downwards, and straight motions of the lines (I9). The letters (A1, B2, etc.) referring to the form of the piece over the notation are shown also on the map (I10). Likewise, repeat signs are also given on the map (I6). Table 7 contains the codes of "Graphical" and "Relational" in the category of "Style", while the codes of "Mental preparation" and "Professional" in the category of "Scope", under the "Structural

Content" theme of Music Map 6. It is also seen that the categories of "Terms-Concepts and Signs", "Rhythmic Structure", "Melodic Structure", and "Style and Form" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 6, it is seen that the mind map was prepared through graphical method with note-map association. In addition to this, it is understood that the map was prepared with the purpose of preparing for a composition mentally. The map was designed for use in occupational music education. It is possible to use mind maps to be prepared in a similar manner in the process of vocal and instrumental music education. It can be stated in the light of the findings that the map shows the musical terms and signs in the composition and reminds the melodic structure of the composition. Besides, it also presents information about the form of the composition. It can be said that mind maps can be prepared both by trainers and by students. Performance artists can also make use of such maps. Memory maps can be shown as an effective method for memorizing compositions.

Music Map 7:

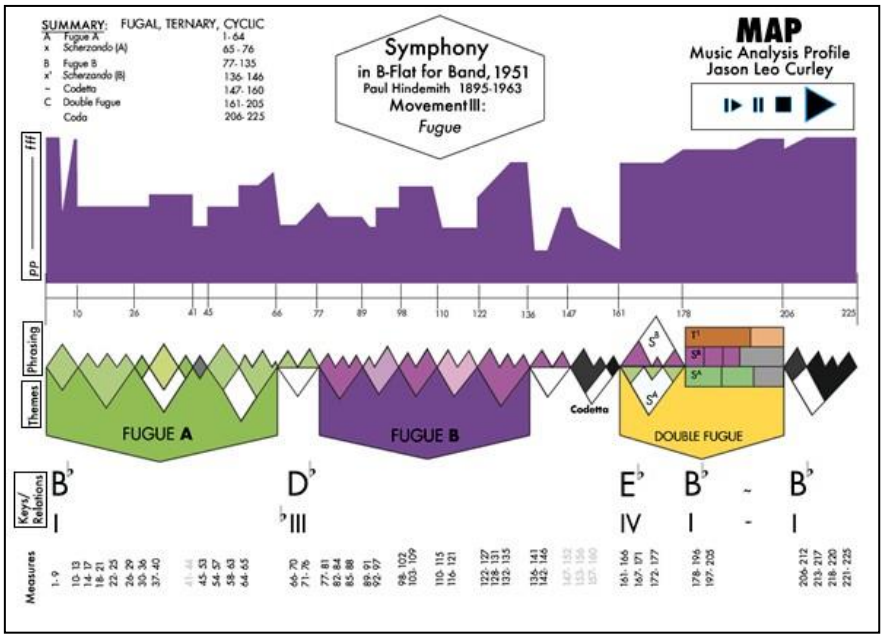

Image 7. Music Analysis Profile (Curley, 2010, p. 59)

Table 8. Structural and Musical Contents of Music Map 7

Themes	Categories	Codes	Indicators
Structural Content	Style	Computer, Animation	I1: Representations running with voice recording
		Diagram	I2: Interwoven graphical elements formed by the colors purple, green, and yellow
		Letter, Word, Number, Cipher	I3: B, D, E, etc…, Fugue, etc..., 1-64, etc..., I, III, IV, etc…
		Critic	I4: Measurement numbers below the diagrams
	Scope	Analysis	I5: Analytic graphical diagram
Musical Content	Expression	Nuance	I6: Representations of pp, ff – purple
	Style and Form	Form	I7: Representations of "Fugue A, Fugue B, Double Fugue"
			I8: Green and purple areas associated with the words of theme and phrasing
		Tonality	I9: Number and letter indicators associated with the words of key/relations

Image 7 shows the analysis map of Movement 3 of Hindemith's "Symphony in B-Flat Major for Wind Instruments". This analysis map is a kind of animated visual presentation where a piece is addressed in all its aspects and is analyzed in detail (I1, I2, I3, I4, I5). Prepared with computer utility, the map was created by means of inductive method. Firstly, maps for different elements in the piece were prepared, and then all the maps were combined on a single map (Curley, 2010). It is seen on the map that different musical elements of the composition are processed on the map (I6, I7, I8, I9). Besides, the stylistic changes in the composition are shown by matching them with measurement numbers (I4). Further, it is seen that the themes, phrases, and nuances in the composition are defined by the diagrams that are created in different colors (I2). Table 8 contains the codes of "Computer, Animation", "Diagram", "Letter, Word, Number, Cipher" in the category of "Style", while the code of "Analysis" in the category of "Scope", under the "Structural Content" theme of Music Map 7. It is also seen that the categories of "Expression" and "Style and Form" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 7, it is seen that the composition analysis map was created through animation method, with the use of various stylistic elements. The map allows for the visibility of the musical elements in the composition individually and in relation with each other. It is clearly understood that the map is used for composition analysis. In addition to this, it is also seen that expressive elements of the composition are also transmitted through the map. It can be said that this mapping method can be used for composition and theory lessons. Besides, it can also be stated that analysis maps can be created in simpler forms, depending on the structure of compositions. Composers, performers, orchestra and choir conductors can make use of such kind of analysis maps for composition analyses and for memorizing a composition in all its parts.

Music Map 8:

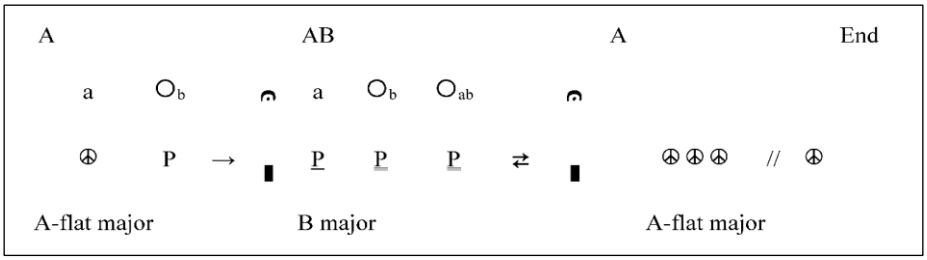

Image 8a. Musical Mind Map (Jordan-Miller, 2010, p. 69)

☮ Peaceful character initiated with relaxed breaths and a more delicate touch/tone
○ Refocus concentration
P Passionate character
P Increase in Passion
P Continued Increase in Passion (more agitated)
→ Keep the intensity going to the end of the section. Do not lose focus
⇄ Maintain a circular focus in order to keep the intensity flowing throughout the entire cadenza
▮ Complete stop/End of section. Focus should begin fresh at the start of the next section
𝄐 Pause. Keep the sonorities ringing from the previous section while preparing the mind for the next section
// Slight break in sound but not focus as the final, peaceful sonority is prepared

Image 8b. Musical Mind Map Symbol Key (Jordan-Miller, 2010, p. 69)

Table 9. Structural and Musical Contents of Music Map 8

Themes	Categories	Codes	Indicators
Structural Content	Style	Letter, Word, Symbol	I1: A, AB, etc…, A flat, (☮, ○, P, ⇄, etc.)
		Guideline	I2: Mnemonic symbols for the expression of the composition.
	Scope	Memory, Memorization	I3: Symbolic codes, ciphers
Musical Content	Expression	Articulation expressions	I4: (☮, ○, P, ⇄, etc.)
	Style and Form	Form	I5: A, AB, A, End
			I6: a, b, ab
		Tonality	I7: A-flat major, B major

Image 8a shows a musical mind map prepared for Liszt's "Liebestraum No.3". This map explains the general lines of the piece subjected to the study. The map contains sections of the piece's form and the tonalities of these sections (I5, I6, I7). One of the features of this map is that the expressions related to the performance of the piece are shown through symbols (☮, ○, P, ⇄, etc.) (I4). Each of the symbols gives the performer expressive instructions (I2). These instructions are targeted at certain playing expressions such as the quality, density, and character of the sound. Explanations of the symbols are given in the map key, which is prepared independently from the map itself (Image 8b). Table 9 contains the codes of "Letter, Word, Symbol" and "Guideline" in the category of "Style", and the codes of "Memory, Memorization" in the category of "Scope", under the "Structural Content" theme of Music Map 8. It is also seen that the categories of "Expression" and "Style and Form" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 8, it is understood that music mind mapping technique was created using letters, words, and symbols, and besides, symbol keys were utilized as a guide for the performer. In this sense, it can be said that the map is aimed for performers for memorization. It is thought that such kind of mapping methods will be a guide for performers, establishing the framework of a piece, and will contribute to memorizing the piece. In addition to this, it can be said that music mind maps can be utilized for vocal and instrumental music education lessons. It is possible to reveal the structures of a piece and create expressive symbols in the process of training. Then, the outputs prepared in all lessons can be transformed into a single map.

Music Map 9:

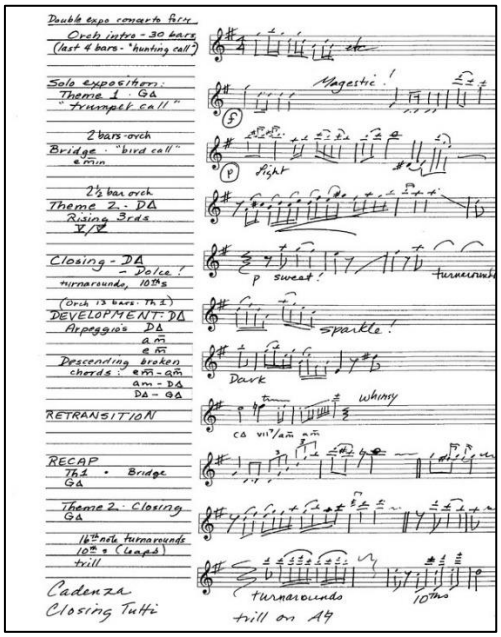

Image 9. Memory Map (Shockley & Colgin Abeln, n.d.)

Table 10. Structural and Musical Contents of Music Map 9

Themes	Categories	Codes	Indicators
Structural Content	Style	Relational	I1: Note image and text field
		Musical notes	I2: Short expressions related to composition
		Melodic passages	I3: Sections from notes
	Scope	Professional	I4: Technical terms and signatures for music field related to notation field
		Mind, Memory	I5: Mnemonic notation and mapping field for composition
Musical Content	Terms-Concepts and Signs	Musical terms	I6: Intro, Cadenza, Tutti, solo, etc.
	Rhythmic Structure	Measurement	I7: 30 bars
		Note and rest values	I8: Notation image
	Melodic Structure	Melody	I9: Notation image
	Expression	Nuance	I10: p, f, crescendo
		Expressive terms	I11: Dolce, Magestic, sweet, spankle
		Articulation technique	I12: trill
	Style and Form	Tonality	I13: V/V, e min, etc.
		Chord	I14: Arpeggios, DA, etc.
		Form	I15: Theme 1 GA, Theme 2 DA, development, etc.

Image 9 shows a memory map for the first movement of Mozart's "Flute Concerto in G Major, K.313". The memory map was designed to be usable for both seeing the notes and the mnemonic notes of the piece together (I1, I5). The notation section of the map contains some passages of the piece, which will help remember it (I3). Nevertheless, the symbols or words that describe the elements such as tonality, nuance, and expression are included in this section (I10, I11, I12, I13). The explanation section on the left part of the map shows the form and general structure of the piece in relation to the notes on the right, and contains mnemonic information on orchestral accompaniment, as well (I2, I5). For example, the information such as the number of bars comprising the orchestra intro, the point where the themes of the piece start, and the tonalities of these themes is placed in this section (I7, I15). Table 10 contains the codes of "Relational", "Musical notes", and "Melodic passages" in the category of "Style", and the codes of "Professional" and "Mind, Memory" in the category of "Scope", under the "Structural Content" theme of Music Map 9. It is also seen that the categories of "Terms-Concepts and Signs", "Rhythmic Structure", "Melodic Structure", "Expression" and "Style and Form" are reached under the "Musical Content" theme.

The findings obtained from Music Map 9 show that the musical memory map was prepared in the form of note-map association. It can be said that the map can be used for the lessons such as orchestrating, theory, and form analysis, particularly in occupational music education. Furthermore, memory maps can also be considered as materials that are quite convenient for individual use. Mapping can be started in the process of preparation for a piece, and, when considered necessary, corrections or additions can be made on the maps. In summary, memory maps can be seen as a roadmap that will contribute to revealing the general structures of pieces and to determining and memorizing the important parts of pieces.

Music Map 10:

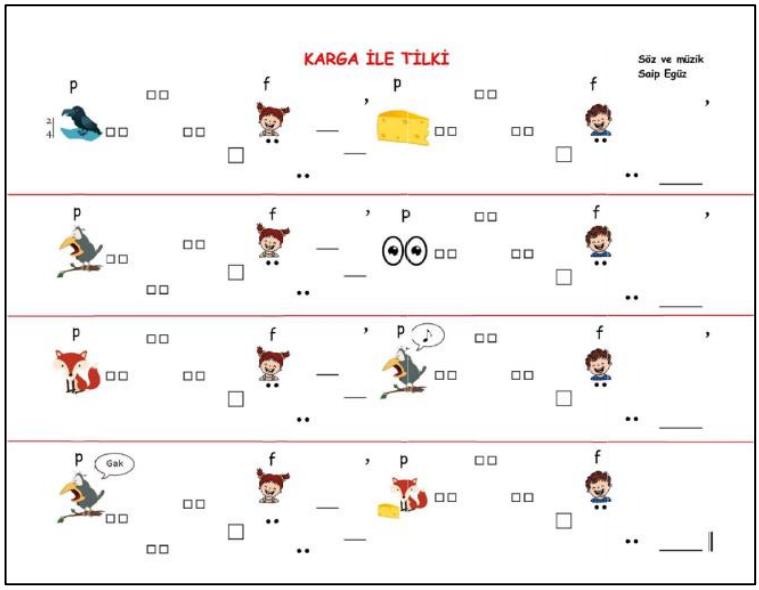

Image 10. Song Map (Yiğit, 2017, p. 96)

Table 11. Structural and Musical Contents of Music Map 10

Themes	Categories	Codes	Indicators
Structural Content	Style	Pictorial, Symbolic	I1: Picture, symbol,
	Scope	Child	I2: Name of nursery rhyme, colorful child, crow, fox figures
		Remembering	I3: Pictures associated with lyrics
Musical Content	Rhythmic Structure	Measurement number	I4: 2/4
		Note values	I5: Small/big square, short/long line, dot
	Melodic Structure	Pitches	I6: Lines, squares, and dots at different heights
	Expression	Articulation technique (Staccato)	I7: Dot
		Nuance	I8: f, p
		Breath mark	I9: (') sign

Image 10 shows a song map for a children's song. The top left section of the map, which was created using symbols and pictures in computer environment (I1), contains the name of the song, and the top right section contains the songwriter's and composer's names. The pictures on the map evoke the words to remember the lyrics of the song (I3). The note values on the map where bar indicator is indicated are expressed by small/big squares, short/long lines, or dots (I4, I5). It is seen that the dots also reflect the staccato articulation style (I6, I7). Pitches are clearly seen on the map, which also contains nuance signs and breath marks (I8, I9). The map consists of four rows, where the third row represents the second lyrics of the song. The melody is the same in this section, while the lyrics are different. Therefore, the symbols that represent the notes are the same, but the images are different. Table 11 contains the codes of "Pictorial, Symbolic" in the category of "Style", and the codes of "Child" and "Remembering" in the category of "Scope", under the "Structural Content" theme of Music Map 10. It is also seen that the categories of "Rhythmic Structure", "Melodic Structure" and "Expression" are reached under the "Musical Content" theme.

The findings obtained from the Music Map 10 show that this type of map can be used particularly for teaching children songs by ear. It is also seen that many musical content related to a song can be shown through these maps. It can be said that this type of maps can be prepared in computer environment, as well as using colored pencils and papers. Another method is to prepare such kind of

maps in classroom environment by active participation of students. Song maps, which can be used for classroom activities conducted with preschool and elementary students, can ensure that lessons are conducted in an active learning environment, catching the interest and attention of students. For example, the elements in a song can be discovered by students under the guidance of teacher, and can be marked on the board using color markers. Song maps can be prepared by teachers, as well as students can prepare their own song maps.

Music Map 11:

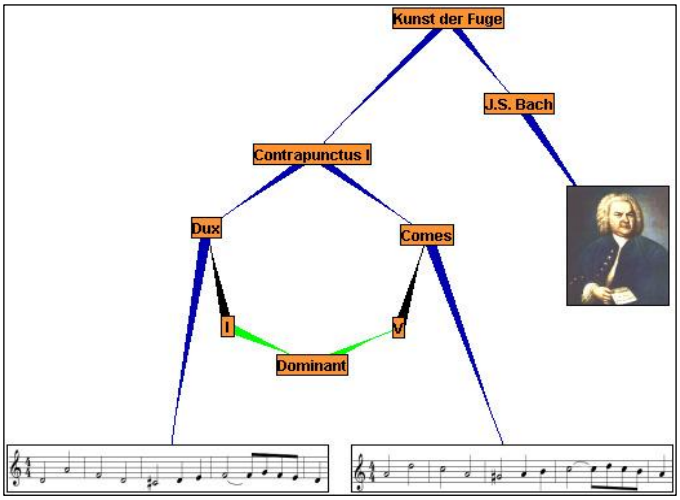

Image 11. Dynamic Musical Concept Map (Weyde & Wissmann, 2004, p. 5)

Table 12. Structural and Musical Contents of Music Map 11

Themes	Categories	Codes	Indicators
Structural Content	Style	Relational, Conceptual	I1: Images and words associated with note image
		Computer, Animation	I2: Images running simultaneously with notes of composition
	Scope	Professional	I3: Terms and concepts for musical field associated with note
Musical Content	Style and Form	Sonata form	I4: Exposition, Theme 1, Motif a, etc.
		Composer	I5: Picture image
		Tonality	I6: The numbers "I, V"

Image 11 shows the example of dynamic musical concept map created in the music mapping software. In the map, the notes of the piece are associated with its form and tonality elements (I1). Further, the map contains also an image of the composer (I5). The example map was designed to be compatible with the progress of sound and image simultaneously (I2). It is possible to synchronize the elements on the map with the music. In addition to this, it is possible to navigate on the images on the map, and to stress different aspects of the music by showing or hiding certain parts of the map (Weyde & Wissmann, 2004). Table 12 contains the codes of "Relational, Conceptual" and "Computer, Animation" in the category of "Style", and the code of "Professional" in the category of "Scope", under the "Structural Content" theme of Music Map 11. It is also seen that the category of "Style and Form" is reached under the "Musical Content" theme.

According to the findings obtained from Music Map 11, it is understood that the musical concept map was prepared particularly for occupational music education. The map shows conceptual relationships about the stylistic and formal features of the composition. Accordingly, it can be stated that such type of maps can contribute to theoretical courses such as the theory of music or history of music. It can be said that similar maps can be prepared both on a whiteboard without computer aid, and by means of colored pencils and cardboards. At the same time, it can also be stated that these maps can be utilized to show the conceptual relationships for different topics at different levels.

Music Map 12:

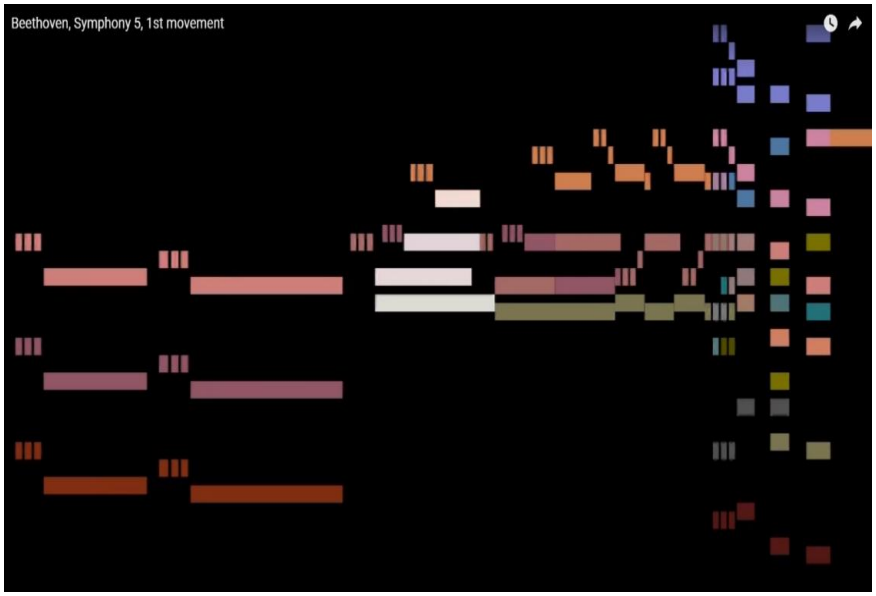

Image 12. Animated Graphical Score (Malinowski, n.d.)

Table 13. Structural and Musical Contents of Music Map 12

Themes	Categories	Codes	Indicators
Structural Content	Style	Computer, Animation	I1: Parallel representations running simultaneously with composition
		Graphical	I2: Column indicators associated with each other
Musical Content	Rhythmic Structure	Note values	I3: Short and long lines
	Melodic Structure	Pitches	I4: Lines at different heights
		Polyphony	I5: Visualization of sounds with different pitches that are heard simultaneously
	Sound-Tone	Instruments	I6: Graphical representations parallel with each other

Image 12 presents a music map example that was created using music mapping software. This map example is a screenshot from the animated map video of Beethoven's "5th Symphony", the movement named "Allegro con brio". The map, which was designed with a complete graphical approach, runs simultaneously with the music (I1, I2). The lightened pointer shown while the video is running allows tracking the composition. The short and long lines seen on the map represent note values, while the lines at different heights represent pitches (I3, I4). This mapping method is an animation of an orchestral score in a sense. Table 13 contains the codes of "Computer, Animation" and "Graphical" in the category of "Style", under the "Structural Content" theme of Music Map 12. It is also seen that the categories of "Rhythmic Structure", "Melodic Structure", and "Sound-Tone" are reached under the "Musical Content" theme.

According to the findings obtained from Music Map 12, it can be said that the Animated Graphical Partition prepared in computer environment is an effective method particularly for visualizing polyphonic music. Any rhythmic, melodic, and instrumental changes in a piece can be seen owing to this type of maps. It is possible to track the parts in notation visually as each color represents an instrument. Therefore, orchestra or choir conductors can make use of such type of maps while analyzing scores. Performers can also track their own parts by means of these maps. Nevertheless, this type of maps can support composition and conducting lessons.

Table 14. Structural and Musical Contents in 12 Music Map Examples

Themes	Categories	Codes
Structural Content	Style	"Relational" "Conceptual" "Line drawing" "Linear" "Symbolic" "Number" "Colors" "Geometric shapes" "Graphical drawing" "Guideline" "Computer" "Animation" "Diagram" "Letter" "Word" "Cipher" "Matching" "Symbol" "Musical notes" "Melodic passages" "Picture"
	Scope	"Child" "Professional" "Mental preparation" "Analysis" "Memorization" "Memory" "Mind" "Remembering"
Musical Content	Terms-Concepts and Signs	"Repeat and Reprise sings" "Finger numbers" "Musical terms"
	Rhythmic Structure	"Measurement time indicator" "Measurement numbers" "Unit beats" "Note and rest values" "Note durations" "Speed-motion"
	Melodic Structure	"Pitches (high and low pitch)" "Melody" "Descending melody" "Descending chromatic melody" "Polyphony"
	Musical Expression	"Nuance" "Articulation technique (Legato, glissando, tremolo, staccato)" "Articulation expressions" "Expressive terms" "Breath mark"
	Sound-Tone	"Instruments"
	Style and Form	"Motif, Sentence, Section (Form)" "Section repetition (Form)" "Tonality" "Chord" "Sonata form" "Composer"

Table 14 presents the findings of the analyses conducted under the themes of "Structural Content" and "Musical Content" for the 12 Music Map examples analyzed in the study. According to the data obtained from all of the maps within the scope of the theme of "Structural Content", the categories of "Style" and "Scope" were reached. The codes in the category of "Style" give ideas about what techniques and methods can be used to create music maps. Besides, it can be foreseen at what levels and for what purposes the maps can be used in the category of "Scope". The codes reached through the visual data on all of the maps within the scope of the theme of "Musical Content" show the elements of the field of music. The codes and categories reached in this framework show what musical contents can be included in maps, as well as they allow for reaching a conclusion about the purposes and application fields of maps.

Conclusion, Discussion and Suggestions

Art education expresses a unique environment of creation that gives the individuals the opportunity to express their own creations by instinct, beginning from the childhood period, and that cannot be limited by stereotypes. In this line, the quality of the education delivered is important, too. Thus, it is necessary to establish educational environments that will provide the individuals with the chance to discover music and create their own musical experiences in order to feature their creativity, and methods and techniques should be used in this regard. Constituting the main subject of this study, music maps are considered as the materials that can be used efficiently for making musical structure and concepts meaningful, and for analyzing and interpreting music as a whole, being one of the aforementioned technics and methods.

As a result of the information obtained within the scope of the relevant literature and the analyses performed on the example music maps, it is understood that the need for music mapping arose from the wish to make music meaningful by concretizing the abstract concepts. In this line, music maps face us as a method beyond the traditional note writing, by which learners, even in preschool period, can express their emotions and thoughts easily with different symbols and elements.

In this study, it was tried to determine the purposes, methods, and application fields of music maps, reaching the meanings of visual representations on the maps that were analyzed under the themes of "Structural Content" and "Musical Content". The category of "Style" under "Structural Content" in the analysis findings showed that music maps can be created through the following methods and techniques with the use of various equipment, representing the stylistic structures and elements included in the maps:

- Note-map association
- Concept matching
- Creating animation
- Using graphical drawings
- Using symbolic visualizations
- Using pictures and figures
- Using geometric shapes
- Use of letters, words, and numbers
- Use of lines and dots
- Use of ciphers
- Creating diagrams
- Use of colors
- Creating symbol key
- Using whiteboard
- Using papers and cardboards
- Using colored pencils
- Creating Guidelines
- Use of melodic passages

The category of "Scope" seen under the theme of "Structural Content" in the research findings expresses age groups, as well as educational fields and purposes. Besides, the categories under the theme of "Musical Content" showed the musical elements included in the maps, while indicating the type of musical contents that can be learned/taught through music maps. In line with these results, it was detected that music maps can be created for the following purposes in different age groups or at different levels of classes:

- Gaining and developing music listening skills
- Gaining and developing musical perception skills
- Creating and developing musical ideas in children
- Seeing the relationships between musical concepts and elements
- Memorizing and remembering a composition in mind
- Distinguishing the sounds and instrumental tones in a composition
- Teaching musical terms and concepts
- Teaching the theory of music
- Comprehending musical forms
- Performing composition analyses
- Teaching songs by ear
- Perceiving polyphonic music
- Developing musical expression
- Developing transposing skills

Considering the "Structural Content" and the "Musical Content" analyses of the music maps together, it was seen that music maps can be used by trainers and students in general, amateur, and occupational music education. In this direction, it was concluded music maps have various educative application fields presented below:

- In preschool music activities

- In general music education at primary and secondary education levels
- In occupational music education
- In composition and conducting lessons
- In music theory lessons
- In music history lessons
- In solfeggio and dictation studies
- In orchestration studies
- In vocal and instrumental music education process

It was seen when the example music maps were analyzed that there are both similarities and differences among the maps. This is related to the field of use and purposes of the music maps. For instance, some of the maps were created to develop listening skills in children and teach them certain basic music elements, while some of the maps were created to analyze or memorize the compositions. Besides, maps can be created individually or in group studies. Accordingly, map creation can be shaped completely depending on the needs of educators and learners. Thus, the use of music maps should be considered not in a limited area, but in a freer and wider scope. In addition, it is remarkable that each of the music maps was created as a result of creative activities, which makes them original. For example, a certain composition can be interpreted differently by different persons. This situation should be associated with the style of the persons who prepare the maps to perceive and interpret music.

According to Cassidy (2001), who observed the capabilities of form teacher candidates to follow various visual presentations in order to develop music listening experiences, the maps to be used for developing the listening skills of students should be comprehensible for the form teachers, too. The reason is that form teachers conduct music lessons when necessary and they have some challenges in tracking the listening maps. Hence, the listening maps to be used by form teachers should be prepared in a clear and distinct manner. Nevertheless, there should necessarily be a guide, whether music expert or not, for the listening maps prepared for educators. For example, while a piece is made listen, time indicators can be placed over the symbols on the guide map to show the time of the piece corresponding to that symbol, and besides, brief descriptive information on the musical elements to be taught to or on the musical behaviors the students should obtain can also be written at that points. The need mentioned by Cassidy (2001) can be in question for all music maps. Map guides can enable readily prepared music map examples for educative purposes to be understood more easily and correctly.

It was seen that the music mapping practices given in the studies by Kenney (2013), Conneely (2007), Blair (2006), Olson (2003) and Kerchner (2000) were performed in environments in which psychomotor, cognitive, and affective learning experiences were involved. At this point, it is possible to mention about the existence of experiential education. Experiential education contains a complex process of relation, which requires establishing a balance between the attention paid to students and subjects and the skill of thinking about the deep meaning of the ideas. In this line, the role of the educator is to develop and organize a series of behaviors in order to respond to the learning environment, including the requests of students and learning tasks (Kolb, 2015). Accordingly, it can also be stated that it should be emphasized to create experiential environments while making use of mapping methods in the process of music education.

It was seen when the studies by Yiğit (2017), Malinowski (2011), Curley (2010), Yu et al. (2010), Conneely (2007), Weyde & Wissmann (2004) were analyzed that the music maps were created using computer software. Mapping software can provide convenience for music map applications; however, it can be said that long and challenging works may be needed to create the software. In addition to this, creating mapping software may require cooperation with computer and software experts. In this line, there will be a need for accessing the relevant software. Such necessities and requirements can be met with the help of the researchers who create music mapping software, sharing the studies they develop. It is possible that such sharing activities to be made in musical platforms be a source for those who want to study with music maps, as well as contribute to developing music mapping systems.

The results of this study showed that music maps are creative and original materials that can be used effectively in music education. In addition to this, the elements in the maps revealed that music maps can be designed in accordance with different usage areas. In this case, music maps can be considered as materials that can be utilized individually by composers, orchestra-choir conductors, and performers. At the same time, it can be said that parents can make use of music maps to ensure musical development of their young children, in case they know about music maps.

The categories that are found particularly under the theme of "Musical Content" in the analyzed maps are remarkable. These categories revealed the basic structures of the field of music almost perfectly. This also reveals the variety of structural elements that can be addressed in music maps, as well as it will provide practitioners, who will study with music maps, with a rich sampling. Practitioners can have information about music mapping techniques and include music maps into their practices, investigating the music maps analyzed in this study and taking into consideration the conclusions of the research.

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