

## Evaluation of Students' Cognitive and Conceptual Learning Levels in Middle School Music Lessons

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### ABSTRACT

This research aims to reveal secondary school students' cognitive and conceptual learning levels in music lessons. In the research, cognitive and conceptual learning competencies in music lessons were discussed in line with students' musical literacy and other musical learning contexts. In this direction, the musical symbol, term, and concept achievement test (MSTCA) were applied to 206 students in a sample group of 12-year-old students from three different schools. The data obtained in the test were categorized and tabulated according to subheadings "duration of the note values, musical expressions, measure indicator." As a result of the research, it was revealed that most students could not conceptualize symbols, terms and concepts especially those related to note duration values. According to the results of the research, it is seen that secondary school students do not understand the musical symbols, terms, and concepts they encounter in the music lesson to a large extent, they have misconceptions, and their learning levels in this field are not at the desired level. Similarly, it is observed that the students need help to fully embody the terms and concepts such as unit beat, tempo, staff, and measure indicator in music. It has been determined that the 6<sup>th</sup> grade students are not at the level of essential preparedness required for music literacy.

**Key words:** Musical Symbols, Musical Terms, Cognitive and Conceptual Learning, Music Literacy

### INTRODUCTION

Music education is generally thought of as a field based on playing and singing. However, a complex cognitive process occurs in the background of these acts. Much of this process is about the perception of musical writing. Unlike other branches of art, the field of music uses a different language consisting of certain symbols, terms, and concepts. For this reason, the students' correct understanding of these elements in music textbooks is crucial in achieving the purpose of music education. Learning in this field is especially important for students to become musically literate, to learn the language of music, to adapt what they learn in music classes to their musical lives outside of school, and to understand the unique musical language of the art of music. Music education is defined as a symbolic learning area because of the distinctive symbols it uses (Walker, 1985; Sadek, 1987). Similarly, as indicated by Imhoff (2003), music is indeed a knowledge-rich domain. This makes it necessary to understand 'how musical symbols, terms, and concepts create a conceptual pattern' in our minds.

Concepts are abstract thought units where objects, events, people, beings and thoughts are grouped according to their similarities. The concept is a mental structure or representation of an individual's organized knowledge of things,

such as an object, event, action, quality, and relationship (Klausmeier, 1992, p. 268). According to Duman (2008), concepts are formed by the experiences of people in the integrity of their feelings, thoughts, and actions. Cooper and Martorella (1982) classified the concepts into four categories according to the degree of concreteness and abstractness, the context in which they are learned (formal or informal), their distinctive features (unidimensional, multidimensional and relational), and the way they are learned (operational and symbolic). Conceptual learning can be defined as learning a subject based on interrelated facts and concepts, teaching and developing thinking skills, and organizing information and emotions in memory by sorting them in a certain hierarchy (Wiig & Wiig, 1999, p. 1; Duman, 2008, p. 39). 'Conceptual learning' is an essential phenomenon in terms of both cognitive learning theory and constructivist learning theory. According to Bozdoğan (2003), cognitive learning theory involves three learning processes. These are cognitive learning, latent learning, and the information processing approach. Malatyali and Yılmaz (2010) describe the constructivist learning theory as follows:

In the education process based on the constructivist learning theory, it is important for students to establish a relationship between their previous knowledge and experiences and the learning situations they have just

encountered, to construct and own the knowledge instead of memorizing it, in order for meaningful learning to take place. Concepts that constitute the basic building blocks of the cognitive structure of the individual play a key role in the realization of effective and permanent learning based on the constructivist approach. (p. 320)

Being able to put objects, events, or people in a class and react to this class as a whole is described as concept learning (Gagné, 1977). According to Sadek (1987, p. 149), "the formation of concepts, like memories and images is a psychological process rather than a psychological product. In other words, concepts are hypothetical constructs inferred from concrete observable behaviors by which the concepts are expressed". In order to apply high-level skills cognitively, concepts must be structured in mind following scientific facts. The foundation of scientific and cognitive thinking and learning is conceptual learning. Learning the fundamental concepts of education and training at a conceptual level is critical for reasoning in that field, as it is in all disciplines (Özyürek, 2019). Teachers' ability to provide good, permanent, effective, and efficient teaching and the students' realization of fast, permanent, and meaningful learning is achieved more effectively with the creation of concepts and the acquisition of concepts (Duman, 2008, p. 35).

According to Uçan (1997, p. 124), in the whole music education, there is a 'musical language' and 'musical communication' between the student and the music and also between the teacher and the student. An essential dimension of this musical language in music education is the concepts of music, terms, and symbols that meet the concepts. Uçan (1997) defines the part of music education that includes conceptual learning as 'verbal/conceptual music field language'. Music terms are words that meet specific concepts related to music. Every musical term corresponds to a limited, precise, and distinct musical concept. The musical concept is the meaning covered by the relevant musical term. In the conceptual music language, musical signs can be said to have two functions: 'phonic' and 'conceptual'. In music education, musical concepts, terms, and symbols form the building blocks of the information to be taught to the student, and musical facts and events only hold a permanent place in students' minds thanks to concepts and terms.

The primary and secondary education music lesson curriculum was shaped with a constructivist approach on four basic learning areas: 'Listening-Playing-Singing', 'Musical Perception and Information', 'Musical Creativity', and 'Music Culture'. The achievements are tried to be created in conjunction with these learning areas (Albu & Akpınar, 2009, p. 7). These learning areas are completely interlocked with each other in terms of their content.

Teaching a musical language consisting of musical concepts, terms, and symbols in music education is directly effective in students' musical perception and information process. Uçan (1997, p. 124) groups musical language into three areas:

- Audial music language
- Audial/verbal musical language
- Verbal/conceptual music domain language

In this grouping, the 'verbal/conceptual music field language' consists of music-related concepts, terms that compensate for these concepts, and words expressing these terms. An individual musical language is taught in music education, consisting of concepts, terms, and symbols that meet these concepts. This whole, called music manuscript, constitutes the symbolic-conceptual dimension of music. The secondary school music curriculum contains concepts such as "measure, beat, note values, tempo and loudness expressions, scale, rhythm, tone, mode, syncopé, limping measure, syllable tie, note value tie, bar lines" and terms- symbols related to these concepts. Listed concepts, terms, and symbols appear as abstract patterns that students need to learn to develop certain musical behaviors during primary and secondary school, with or without a particular unit. The correct establishment of musical communication at all stages of music education depends on the correct understanding and use of the musical language, which consists of music-specific concepts and symbols. Some studies on the verbal/conceptual field in music education show that the cognitive gains in music education are not at the desired level.

In this context, a subject of great interest in music education is children's ability to learn and use basic music concepts (Zimmerman & Sechrest, 1970; Pflederer, 1967). It has been suggested before that Piaget's concept of conservation could be related to the musical experience. Essentially, conservation in music refers to an individual's insistence on maintaining the same idea of a complex musical stimulus despite its temporary deformation. For example, the inability to perceive a rhythmic pattern, tonal changes, tempo changes, or harmonic variations can be related to the law of preserving the first created schema. The creation of correct schemas is directly related to the mental organization of old knowledge and new knowledge or new situation. The formation of musical concepts is possible by establishing correct analogies between symbols, terms, and concepts. Like other concepts, musical concepts are often described with words. The experimental psychology literature on concept formation has for a long time been engaged with the problem of concept verbalization. However, verbal language is not the only viable method of explaining musical concepts. For musically trained individuals, concepts are expressed symbolically through musical notation. Many people without musical training must express musical concepts through movements (Sadek, 1987, p. 149). Walker (1985) suggested a visual mode for expressing musical concepts. However, sometimes the problem is not only the teaching practice but the fundamental misunderstanding of the factors and the nature of the concepts at work in concept formation (Imhoff, 2003, p. 42). For the concepts to be learned correctly in music lessons, the meaning of musical notation and symbols must be accurately conveyed to the students. Incorrect visuals and analogies in music books can cause students to form incorrect information schemes. In music lessons, it is necessary to present the meaning of musical notation and symbols correctly to the students in order to learn the concepts correctly. Incorrect visuals and false analogies in textbooks can cause students to form incorrect information schemes. The cognitive and

psychomotor process of establishing analogies between musical writing (symbol/notation) and terms and concepts in music education is given in Figure 1.

As seen in Figure 1, the last two steps -the conceptualization and vocalization of the symbol or term-, have a continuous interaction in the practice of making music. When we look at the literature, it is seen that there are various studies on musical concept development. However, when these studies are examined as a whole, it is seen that the relationship of musical elements with the conceptual learning field needs to be clearly defined. Some studies mention melody, rhythm, and harmony elements for musical concepts (Sheehy, 1959; Leonard & House, 1959). Other authors add the form and organization of music to these three elements (Bergethon & Boardman, 1963; Pfloderer, 1967, p. 41; Monsour & Perry, 1963; Hartshorn, 1963, p. 21; LaRue, 1966). While Ernst and Gary (1965) add the timbre element to these elements, Hoffer (1965) lists melody, harmony, dissonance, modulation, syncopation, phrase, timbre, and many more as components of music (as cited in Andrews & Deihl, 1967). However, most of these listed studies need to be updated to understand the misconceptions experienced by students in music education. Because today, with the constructivist education approach, how students construct knowledge is a more up-to-date research area. The creation of wrong schemas, especially regarding symbols in music education, will repeat wrong schemas in new learning. Incorrect schemas lead to a learning environment where musical information is inconsistent, and misconceptions increase. In music lessons, students often confuse terms such as measure, beat, and tempo. Likewise, terms such as eighth, quarter, and dotted note are often susceptible to misconceptions, both symbolically and as real-life sound equivalents. There are many studies that try to predict conceptual learning and the causes of misconceptions in science education. While some of these studies are aimed at understanding the misconceptions experienced by students in science education (Blanco et al., 1989; Hwang & Liu, 1994; Yenilmez & Yaşa, 2008; Aydoğan et al., 2003; Thompson & Logue, 2006), others have suggested solutions to eliminate misconceptions (Tezcan & Yilmazel, 2004; Sezer, 2008; Raviolo, 2001; Goodwin, 2002). The most commonly used methods to eliminate misconceptions can be listed as follows:

- Creating Concept Maps
- Using Animations
- Doing Experiments
- Using Analogies
- Using the Drama Method
- Associating information with daily life
- Using Grid Method

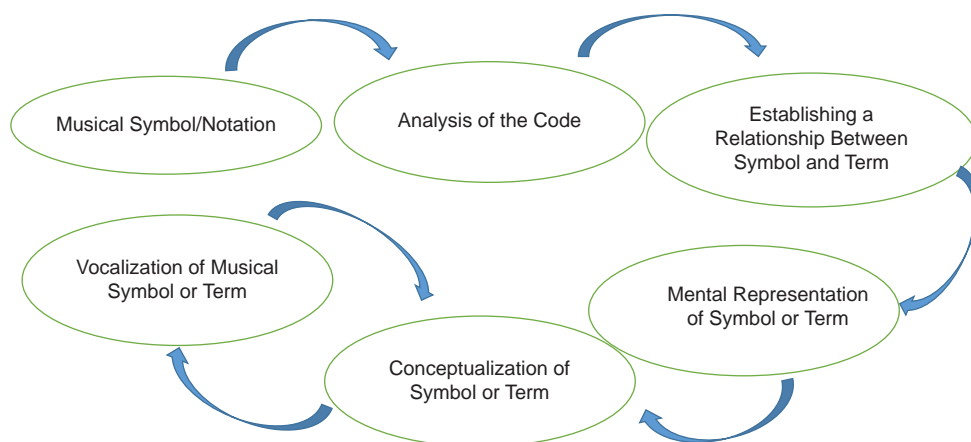
### Objectives and Research Questions

In line with the conceptual framework explained above, it can be said that a music lesson is not a process of constructing an act that can be summarized as playing and singing. Music lessons are also a rich learning process. For the reasons discussed, this research aims to reveal students' cognitive and conceptual learning levels and conceptual learning difficulties experienced by students in secondary school music lessons. For this purpose, answers to the following research questions were sought in the research:

1. What is the level of understanding of musical symbols used in music lessons of 6th-grade students?
2. What is the level of understanding of the musical terms used in the music lesson of the 6th-grade students?
3. What is the level of 6th-grade students' understanding of musical concepts used in music lessons?
4. Do 6th-grade students have misconceptions about musical symbols, terms, and concepts in the music lesson?
5. What is the musical literacy level of 6<sup>th</sup> grade students?

### METHOD

This research employs quantitative and qualitative research methods in a mixed manner. In the research, "the musical symbol, term, and concept achievement test" (MSTCA test) developed by the researcher was used to determine the misconceptions experienced by secondary school students in the music lesson. The research sample consists of 6th-grade students studying in 3 secondary schools in the central districts of Samsun/Turkey in the 2022-2023 academic year. Sub-factors of the misconceptions experienced in music lessons were scored, and the sub-dimensions of the misconceptions experienced by the students were revealed.



**Figure 1.** Cognitive construction of musical elements

### Musical Symbol, Term, and Concept Achievement Test (MSTCA Test)

In the research, MSTCA Test' (Appendix 1-Data Collection Tools) developed by the researcher was applied to determine the cognitive and conceptual learning levels of secondary school music students. During the formation of test items, the researcher examined the secondary school music lesson curriculum's 6th-grade, 7th-grade, and 8th-grade subjects. Questions about learnings and achievements related to musical symbols, terms, and concepts were created in the subjects designed as multiple choice, matching, and fill-in-the-blank. For the content validity of the test items, expert opinions were obtained from 2 professors working in the music education department, three music teachers working in Samsun, and one professor who is an expert in the Turkish Language and Literature field. Davis's (1992) technique was used for content validity. There is a four-point rating in Davis's (1992) content validity technique used to evaluate the content validity: Each item in the test is as follows:

1. 'Appropriate.'
2. 'The item should be slightly revised.'
3. 'The item should be seriously reviewed.'
4. 'The item is not suitable'.

In this technique, the number of experts who chose options (a) and (b) is divided by the total number of experts to obtain the 'scope validity index' for the item, and a value of 0.80 is accepted as a criterion instead of comparing it with a statistical criterion (Yurdagül, 2005). In Davis's (1992) content validity formula, the content validity index of the test was found to be 0.86 (5.16 points/6 experts).

Studies for the reliability measurements of the test were applied to a total of 140 students as a pilot application in 4 secondary schools in Samsun in 2022. The test developed for 6th-grade students consists of 36 questions. For the reliability studies of the test, item difficulty and discrimination indexes were calculated for each item in line with the results obtained at the end of the pilot application. Before starting the item analysis, it was examined whether there were univariate and multivariate outliers in the data set. For univariate outlier analysis, z scores were calculated, and whether the  $\pm 3$  value was exceeded was checked. There was no value exceeding the  $\pm 3$  limit among the z values obtained as a result of the analysis. From this point of view, it was determined that there was no univariate outlier in the data set (Hasançebi et al., 2020). Corrected item-total correlation and Cronbach  $\alpha$  if item deleted values are given in Table 1 for each item. Corrected item-total correlation values express the correlations between the relevant item and all other items in the scale. If these values are low, the contribution of the relevant item to the scale is low. Items with minimal and negative corrected item-total correlation values should be removed from the scale. Thus, the reliability of the scale is increased (Hasançebi et al., 2020). The item-total correlation values of the scale items of Musical Term, Symbol, and Concept Test are given in Table 1.

After these calculations, six questions were removed from the test. In the statistical analysis for the reliability coefficient of the test with the remaining 30 items, the

**Table 1.** Corrected Item- Total Correlation and Cronbach  $\alpha$  if item deleted values for items

Questions (items)	Corrected Item-Total Correlation	Cronbach $\alpha$ if Item deleted
Q 1	0.437	0.916
Q 2	0.476	0.913
Q 3	0.560	0.912
Q 4	0.495	0.912
Q 5	0.518	0.914
Q 6	0.593	0.917
Q 7	0.422	0.913
Q 8	0.386	0.914
Q 9	0.362	0.918
Q 10	0.486	0.913
Q 11	0.543	0.910
Q 12	0.335	0.918
Q 13	0.604	0.917
Q 14	0.518	0.914
Q 15	<b>0.220*</b>	0.918
Q 16	0.510	0.915
Q 17	0.603	0.918
Q 18	<b>0.183*</b>	0.910
Q 19	<b>0.215*</b>	0.917
Q 20	0.640	0.911
Q 21	0.580	0.914
Q 22	<b>0.218*</b>	0.916
Q 23	0.539	0.917
Q 24	0.612	0.918
Q 25	<b>0.205*</b>	0.910
Q 26	0.483	0.917
Q 27	0.518	0.910
Q 28	0.537	0.916
Q 29	0.602	0.914
Q 30	<b>0.290*</b>	0.915
Q 31	0.446	0.912
Q 32	0.427	0.912
Q 33	0.512	0.911
Q 34	0.601	0.910
Q 35	0.383	0.913
Q 36	0.396	0.913

\* Extracted items

Cronbach-alpha value of the test was calculated as 0.91. The sub-factors to be measured in the tests and the items measuring these factors are listed in Table 2 according to their sub-dimensions.

As seen in Table 2, the MSTCA test consists of eight sub-dimensions. When considered in terms of musical subject contexts, the sub-dimensions in the test can be listed as follows: Note values, pitch heights of notes, tempo, musical dynamics, elements of musical expression, augmentation dot and tie in music, and measure indicator.



## Participants

A total of 206 students studying in Samsun province participated in the research. The study groups of the research and the number of students are given in Table 3.

As seen in Table 3, the sample consists of 206 students studying in 6 different classes in 3 schools. The average age of the participants is 12 years. In order to minimize the difference in readiness levels among students, schools were selected from the same district and branches with similar student numbers. After obtaining the legal permissions for the research from 19 Mayıs University and the Ministry of National Education, the conceptual knowledge test was given to Atakum Denizevler Secondary School 6<sup>th</sup> Grade Students (2 classes), Atakum Mimar Sinan Secondary School 6<sup>th</sup> Grade (2 classes) and Omu Foundation College 6<sup>th</sup> Grade (2 classes) students. The researcher evaluated and reported the data obtained in the research according to the sub-dimensions in the musical concept test.

## Analysis of Data

A two-stage method was used to evaluate the data. Firstly, the sub-dimensions, total correct, incorrect and unanswered answers in the musical symbols, terms and concepts achievement test were tabulated. At this stage, the total average achievement levels of all students in the school were revealed. In the second stage, students' answers to comparative and fill-in-the-blank question types were analyzed, and misconceptions and learning deficiencies regarding musical symbols, terms, and concepts were described categorically.

## Ethical Procedures

Since the study group consisted of young children, the necessary ethics committee applications were made to the relevant committees on 24.02.2022 to apply the MSTCA test questions. All the procedures that were conducted with human participants in this research were performed under the ethical committee that was approved upon the decision of

**Table 2.** Sub-factors of musical symbols, terms, and concepts achievement test

<b>Musical Symbols, Terms, and Concepts Achievement Test</b>	
<b>Sub-factors Measured in the Test</b>	<b>Items</b>
Symbols Related to the Duration of the Notes	(1, 5, 12, 28)
Terms Related to the Duration of the Notes	(2, 9, 14, 15, 30)
Concepts Related to the Duration of Notes	(3, 7, 8, 20, 22)
Symbols Related to the Places of the Notes on the Staff	(4, 16, 27)
Terms Related to Tempo	(17, 23)
Terms Related to Elements of Musical Expression	(10, 11, 13)
Symbols Related to Augmentation Dot and Tie	(6, 19, 26, 29)
Symbols and Concepts Related to the Measure Indicator	(18, 21, 24, 25)

the institutional research committee dated 25.03.2022 and numbered 2022/162. Following the ethics committee report received by 19 Mayıs University, a similar application was made to the Samsun Education Directorate. After all the necessary processes, the MSTCA test was carried out voluntarily and through the application of the test forms by the school's music teachers.

## RESULTS

According to the results of the Musical Symbols, Terms and Concepts Achievement Test of the sixth-grade students, their knowledge levels were evaluated by dividing and grouping them in terms of sub-factors of the test.

### Students' Learning Situations of the 'Symbols' Related to the Values of the Notes

The sixth-grade students' answers to the questions regarding the symbols related to note values are given in Table 4.

Considering the rate of primary school sixth-grade students answering the questions containing the 'symbols related to the values of the notes', 51% of the students gave wrong answers to the questions related to this field, and 8% did not answer the questions. From the open-ended and matched answers (59%) in the test answer sheets, it was seen that most of the students could not conceptualize the 'beat' element in music. The responses indicate that the function of note stems is an element that many students need help understanding or conceptualizing. The mappings for note values and symbols also show that correct analogies cannot be established between these two elements. In line with these data, it can be said that most of the students cannot conceptualize the musical symbols related to the duration of the notes.

**Table 3.** Study groups of the research

<b>School</b>	<b>Class</b>	<b>Number of students in each class</b>	<b>Total number of students</b>
A	6 <sup>th</sup> Grade (A classroom)	27	55
	6 <sup>th</sup> Grade (B classroom)	28	
B	6 <sup>th</sup> Grade (A classroom)	40	80
	6 <sup>th</sup> Grade (B classroom)	40	
C	6 <sup>th</sup> Grade (A classroom)	37	71
	6 <sup>th</sup> Grade (B classroom)	34	
Sum		206	206

**Table 4.** Students' responses to the symbols expressing the duration of the notes

<b>Schools</b>	<b>Correct Answers</b>	<b>Incorrect Answers</b>	<b>Unanswered</b>
A	45%	50%	8%
B	42%	53%	10%
C	38%	52%	6%
Mean	41%	51%	8%

**Students' Learning Situations of the 'Terms' Related to the Values of the Notes**

Table 5 shows sixth-grade students' answers to the questions about the duration of the notes, including musical terms.

According to the results, 57% of the sixth-grade students gave incorrect answers, and 30% gave correct answers to the questions containing the terms related to the duration of the notes. Also, 13% of the students did not answer the questions related to this field. When the test responses are analyzed, it is seen that most students (70%) cannot conceptualize terms such as quarter, eighth, and hexadecimal notes. When the answer sheets are analyzed by considering all the answers, it is also noteworthy that an analogy (questions 14, 15) between the value of a note and its symbol cannot be established.

**Students' Learning Situations of the 'Concepts' Related to the Duration of the Notes**

Table 6 shows sixth-grade students' answers to the questions about the concepts related to the duration of the notes.

As can be seen, 59% of the sixth-grade students gave wrong answers, 34% gave correct answers, and 7% of the students did not answer the questions about the concepts related to the duration of the notes. When the answers to this sub-dimension are analyzed (Questions 3, 7, 8, 20, 22), it is seen that the students cannot conceptualize the concept of beat and unit beat in music. Questions on concepts such as note value - beat, beat - time, and unit beat were mostly not answered (66%). In line with these data, it is observed that most of the students cannot learn the musical concepts related to the duration of the notes at the sixth-grade level.

**Students' Learning Status of the Symbols Related to the Places of the Notes on the Staff**

Table 7 shows sixth-grade students' answers to the questions related to the places of the notes on the staff.

**Table 5.** Students' responses to the terms expressing the values of the notes

Schools	Correct Answers	Incorrect Answers	Unanswered
A	32%	59%	15%
B	28%	56%	12%
C	30%	56%	13%
Mean	30%	57%	13%

**Table 6.** Students' responses to the concepts expressing the duration of the notes

Schools	Correct Answers	Incorrect Answers	Unanswered
A	32%	59%	8%
B	35%	62%	7%
C	34%	56%	7%
Mean	34%	59%	7%

Results showed that 45% of the sixth-grade students gave wrong answers, 31% gave correct answers to the questions, and 24% of the students did not answer the questions. In line with these data, it can be said that most students do not learn the musical concepts related to the pitch heights of the notes at the sixth-grade level.

**Student's Learning Situations of Terms Related to 'Tempo'**

The 6th-grade students' answers to the questions about the 'tempo' are given in Table 8.

As can be seen, 38% of the students gave incorrect answers, 58% gave correct answers to the questions, and 4% of the students did not answer the questions about the terms related to the speed steps. In line with these data, it can be said that most students learn the terms related to 'tempo' at the sixth-grade level.

**Students' Learning Situations of Terms Related to the Elements of Musical Expression**

Table 9 shows sixth-grade students' answers to the questions (10<sup>th</sup>, 11<sup>th</sup>, and 13<sup>th</sup> questions) containing terms related to the Elements of Musical Expression.

Among the sixth-grade students, 54% gave incorrect answers and 41% gave correct answers to the questions containing the terms related to the elements of musical expression, but 5% of the students did not answer the questions related to this field. In line with these data, it is observed that most students do not learn the terms related to elements of musical expression at the sixth-grade level.

**Students' Learning Situations of Symbols Related to Augmentation Dot and Tie**

Table 10 shows sixth-grade students' answers to the Augmentation Dot and Tie.

**Table 7.** Sixth-graders' responses to the questions related to the places of the notes on the staff

Schools	Correct Answers	Incorrect Answers	Unanswered
A	32%	40%	26%
B	30%	51%	24%
C	30%	46%	23%
Mean	31%	45%	24%

**Table 8.** Students' learning situations of terms related to the 'tempo'

Schools	Correct Answers	Incorrect Answers	Unanswered
A	58%	40%	4%
B	57%	36%	5%
C	60%	37%	4%
Mean	58%	38%	4%

Results showed that 70% of the sixth-grade students gave incorrect answers and 25% gave correct answers to the questions containing the symbols related to the ‘augmentation dot and tie.’, and 5% of the students did not answer the questions. When the answers to this question type are analyzed, it is seen that the function of the augmentation dot and the augmentation tie and their effect on the sound cannot be conceptualized cognitively in most students (75%). In line with these data, it can be said that most sixth-grade students cannot learn the symbols related to augmentation dot and augmentation tie.

### Students’ Learning Situations of Symbols and Concepts Related to the Measure Indicator

Table 11 shows sixth-grade students’ answers to the questions containing the symbols/terms/concepts related to the measure indicator in music.

As can be seen, 61% of the sixth-grade students gave incorrect answers and 31% gave correct answers to the questions containing symbols, terms, and concepts related to the measure indicator. However, 8% of the students did not answer the questions related to this field. When the students’ answers in this question category were examined, it was seen that they needed help to make correct analogies between the symbol terms and concepts, such as the measure line, the measure indicator, and the measure in music.

**Table 9.** Students’ Learning Situations of Terms Related to the Elements of Musical Expression

Schools	Correct Answers	Incorrect Answers	Unanswered
A	38%	57%	4%
B	37%	52%	5%
C	47%	56%	7%
Mean	41%	54%	5%

**Table 10.** Sixth-graders’ answers to the Augmentation Dot and Tie

Schools	Correct Answers	Incorrect Answers	Unanswered
A	25%	70%	3%
B	27%	69%	5%
C	25%	72%	7%
Mean	25%	70%	5%

**Table 11.** Students’ responses to the symbols, terms, and concepts related to the ‘measure indicator’

Schools	Correct Answers	Incorrect Answers	Unanswered
A	30%	58%	10%
B	28%	69%	6%
C	34%	58%	7%
Mean	31%	61%	8%

## DISCUSSION

According to the results of the research, it is seen that secondary school students do not understand the musical symbols, terms, and concepts they encounter in the music lesson to a large extent, they sometimes misunderstand them, and their learning levels in this field are not at the desired level. It has been determined that the 6<sup>th</sup> grade students are not at the level of essential preparedness required for music literacy. In addition, sixth-grade students’ learning levels of symbols (41%), terms (30%), and concepts (34%) related to the duration of the notes values were low. It was determined that the symbols representing note values in music were generally mislearned by the students. Considering the level of secondary school sixth-grade students answering the questions about the ‘symbols related to the pitch of the notes, it was seen that 69% of the students gave wrong answers or did not answer the questions. This indicates the need for more learning about the music literacy of the students at the 6<sup>th</sup> grade level of secondary school. This finding is in parallel with the research results of Çimen (2018) and Aslan and Deniz (2011). According to Çimen (2018), the musical literacy levels of secondary school graduate students are insufficient.

In the study, sixth-grade students’ learning of symbols related to augmentation dot and tie was also relatively low (25%). When the answers to the questions related to this sub-dimension were examined, it was concluded that the students could not conceptualize the augmentation dot and tie sign, which is used to extend the duration of musical notes. The sixth-grade students’ learning levels of symbols, terms, and concepts related to the measure indicator in music were also relatively low. According to the test results, it can be said that students often confuse or fail to conceptualize concepts such as time indicators, unit beat, and tempo in music.

When all the data obtained in the research are evaluated together, it is seen that 6<sup>th</sup>-grade students have some misconceptions about the music lessons. One of the critical reasons for this is the Turkish equivalent of the hierarchical structure of note values. In almost all countries that provide education according to the Western classical music tradition, the longest note name is ‘whole note.’ The duration of this note is four beats. Then, note values are reduced according to this unit beat, and their value equivalents are determined. For example, two beats are called half notes and one beat is called a quarter note. However, despite the use of conventional notes in Turkish during the early Republican period, a different method was used in the Turkishization of the names of the notes. A one-beat note used as a unit beat in Turkish is called a ‘quarter note.’ An eighth note with a shorter duration than that is called an eighth note, even though it has half a beat. In this case, an inverse analogy is established between the duration and names of the notes. This causes a schema opposite to the mental schema that students set up in primary and secondary school mathematics lessons. In the research, an important reason for the missing information and misconceptions about the symbols, terms, and concepts related to note durations is due to the translation error in Turkish.

The secondary school music lesson curriculum is based on a constructivist learning approach and has a spiral

structure. It requires a specific process for students to learn musical terms, symbols, and concepts. For this reason, some questions in the 'musical symbols, terms and concepts achievement test' were used in different forms. However, considering the success levels in these areas, it was observed that students experienced similar misconceptions in the same sub-dimension question groups (i.e., questions about the measure indicator). This may indicate that students have chronic learning difficulties in learning symbols, terms, and concepts related to the duration values/pitch of sounds and symbols related to the measure indicator. In addition, it is seen that at the sixth grade level of secondary education, students have difficulties perceiving and interpreting the symbols related to the pitch of sounds, terms related to elements of musical expression, and symbols related to augmentation dot and tie.

Music instruction must improve music literacy awareness. Through musical practices, children learn to associate sounds with symbols and create links to word recognition and decoding skills necessary for musical reading. Incomplete or misunderstanding of musical elements does not only affect the field of musical perception and knowledge learning. Ignorance of music literacy can cause some negativities in the students' musical lives. This is in line with Lehmann and McArthur's (2002) approach to the cognitive steps of the note-reading process. According to Lehmann and McArthur (2002, p. 135), "from a psychological viewpoint, sight-reading involves perception (decoding note patterns), kinesthetics (executing motor programs), memory (recognizing patterns), and problem-solving skills (improvising and guessing)". The authors also state that sight reading skills appear to be highly trainable, and variations in sight reading ability can be accounted for by variations in the breadth and depth of relevant experience. As Lowe and Belcher stated, "the aim of music education is not just to prepare students for post-compulsory music courses. the real aim of music education is to develop musically literate students equipped with the skills and knowledge to experience the satisfaction, fulfilment and enrichment that a deeper level of musical engagement can bring to their lives" (2012, p. 12). The hypothesis that the shortcomings experienced in the cognitive process in music education will directly affect the psychomotor domain has also been empirically addressed in the study of Kopiez and Lee (2008). Kopiez and Lee (2008) point out in their research that "selected elementary cognitive skills and practice variables are potential correlates of sight-reading ability." An inadequate understanding of musical symbols, terms, and concepts makes students dependent only on songs that the music teacher will teach by ear. The correct learning of musical symbols, terms, and concepts specific to the art of music will directly impact students' orientation to amateur and professional music education. In music education, to the extent that the field of 'playing-singing-listening' is integrated with the field of musical perception and information, musical activities turn into a structure with a direction, purpose, and quality. Students' inability to learn musical symbols, terms, and concepts in the music lesson does not indicate a failure in the entire music lesson. Students can be in musical

production and communication without knowing the specific written language of musical art or the verbal/conceptual music language. However, a minimum level of musical literacy is a requirement in solfeggio studies, instrument training, and singing together activities in music lessons. In addition, incomplete or incorrect learning of the language of music may cause problems in students' transferring cognitive learning to the psychomotor field. The Non-Solfege Mixed System Approach to reading and understanding music can be used as an alternative to conventional notation system. Students reinforce music reading through labeling notes by their actual alphabetical (fixed) names. As stated in the study of Brown (2003), this skill strengthens students' ability to recognize notation within various key signatures and modes.

## CONCLUSION

In the secondary education music curriculum, the field of music theory should be narrowed down, especially at the 5<sup>th</sup> and 6<sup>th</sup>-grade levels. Music teaching methods such as Kodaly, Dalcroze, and Orff Schulwerk can be used in the first two years of secondary school music lessons. As students' musical practice improves, their conceptual learning will increase in the following years.

It should be ensured that the topics in the music lesson do not directly contain a terminological or conceptual element. Students can reach the targeted learning gains with the language of music, which is the language of the art of music. For this, it can be suggested to use the unique language of music as a teaching material, such as the Kodaly method, which is widely used worldwide. Music literacy can be increased with methods such as Tonik Sol-Fa by reducing conceptual charges in music education.

The research shows that students need to correct their schemas of symbols, terms, and concepts, especially the duration of the notes. The terminological system in which the duration and name values of notes are inversely proportional to the Turkish language should be changed, and a terminological system similar to that in English or German music education should be adopted. In secondary school music lessons, students should be able to understand music with all its elements. This is a requirement for students to be able to perform the act of making music with consciousness and awareness also in their musical lives outside of school.

In music education, the cognitive/conceptual aspect of music should be supported by appropriate teaching strategies, and students should be provided with achievements in this subject. In addition, it is recommended to investigate secondary school students' misconceptions about polyphony, tonality, syncopé, and accidentals in music.

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APPENDIX

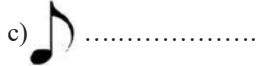
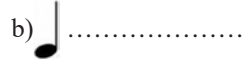
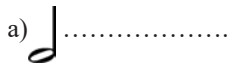
The Musical Symbol, Term, and Concept Achievement Test” (MSTCA test).

- 1) List the notes given below in mixed order according to their duration, from short to long.



.....

- 2) Write the number of beats of the following note durations in the space next to them.



- 3) Which of the following is the definition of a beat?  
 a) Beats are the movements we make with our hands and feet while vocalizing the notes.  
 b) Signs that indicate changes in loudness in a musical piece.  
 c) Regular movements made with the hand or foot to measure the duration of notes.  
 d) The beat is the downward movement of our hand while performing a piece of music.

- 4) What is the name of the note on the next staff?

- a) Do      b) Si      c) Fa d) Mi



- 5) Which of the following is equal to the note duration indicated by the arrows on the side?  
 (Each arrow is equal to half a beat.)



- 6) In which option are the note durations on the staves numbered below of equal duration given correctly?

1)

2)

3)

4)

5)



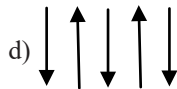
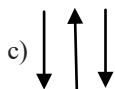
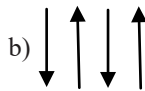
a) 1, 2, 3, 5















b) 1, 3, 4, 5















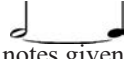





c) 1, 2, 3, 4

d) 2, 3, 4, 5

- 7) Which of the following is equal to the note duration given next?



- 8) Which of the following information is incorrect?  
 a) As the numerical names of the note values (fourths, eighths, etc.) get larger, the duration values get longer.  
 b) A quartet note is one beat.  
 c) As the numerical names of the note values (fourth, eighth, etc.) get larger, the duration values get shorter.  
 d) An eighth note is one half beat.
- 9) What is the function of the dot (augmentation dot) placed on the right side of the note in music?  
 a) It indicates that the note it is placed next to should be sounded faster than it is.  
 b) It extends the value of the note it is placed next to by half the value of that note.  
 c) It shortens the value of the note placed next to it by half the value of that note.  
 d) It indicates that we should sound the note it is placed next to more strongly than it is.
- 10) Which of the following lists the change in loudness from piano to loudest?  
 a)  $ff < p < mf < pp$                       b)  $pp < p < mf < fff$   
 c)  $fff < ff < f < mf$                       d)  $ppp < mpf < ff < mf$
- 11) Which of the following matchings is given correctly?  
 a) forte - play loudly                      c) crescendo - quiet period  
 b) piano- play fast                      d) largo - play in a fun way
- 12) Which of the following is the option whose total value in beats of the note durations given below is not equal to one beat?  
 a)                       b)   
 c)                       d) 
- 13) What does the symbol on the right represent in music?   
 a) Increasing speed of sound    b) Lengthening of sound    c) the music is getting louder    d) Fading of the voice
- 14)  In which option is the name of the note given on the left and its duration in beats given correctly?  
 a) Whole Note - Two beats                      b) Eighth Note - Half beat  
 c) Quarter note - Half beat                      d) Half Note - Two beats (\*In Turkish doubled note)
- 15) Match the note values below with the relevant options.  
 1. Quarter Rest                      a.   
 2. Eighth Note                      b.   
 3. Quarter Note                      c.   
 4. Half Note                      d. 
- 16) Write the names and durations of the notes below.  
                        
 .....  
                        
 .....
- 17) Which of the following is not a slow tempo term?  
 a) Largo    b) Adagio    c) Presto    d) Andante

- 18) What does a measure line mean in music?  
 a) Lines that separate the measures from each other.  
 b) Five lines parallel to each other.  
 c) The numbers at the beginning of a song.  
 d) The thick line at the end of a song.
- 19) Which of the following is equal to the duration of the dotted quarter note? ()  
 a)       b)   
 c)       d) 
- 20) How many beats is the whole note ? ()  
 a) 4 beat      b) 1 beat      c) 2 beat      d) 3 beat
- 21) Which option is the correct definition of measure in music?  
 a) Measure is the name given to the duration of the notes.  
 b) The measure is the division of music into equal parts of time.  
 c) It is the unit that indicates the length of a musical piece.  
 d) It is the distance of each note from each other.
- 22) Which of the following note durations has the greatest value in beats?  
 a) Quarter note      b) Eighth notes  
 c) Hexadecimal note      d) Dotted eighth note
- 23) Which of the following happens when we sing a melody faster?  
 a) We shout more.      c) We make our voice louder.  
 b) The tempo of the song speeds up.      d) The song continues by slowing down.
- 24) Which of the following options is incorrect in terms of the given meter pattern and the sum of the note values in it?  
 a)       b)   
 c)       d) 
- 25) Which of the following shows two – four time signature?  
 a)       b)       c)       d) 
- 26)  The next two notes are connected by an augmentation tie. In which option is the total value of these two notes given correctly?  
 a) Two beats      b) Three beats      c) Four beats      d) Two and a half beats
- 27) What is the name of the note on the staff?   
 a) Do      b) Sol      c) Mi      d) Fa
- 28) In which of the following options are the note durations given in order from short to long?  
 a)       b)   
 c)       d) 



29) In which option is the dotted eighth followed by a sixteenth note shown correctly?



30) Which of the following note values has the shortest duration?

- a) Eighth note      b) Quarter Note      c) Half Note      d) Whole Note

\*\*\*\*\*