

## Using Music in Instruction to Teach Non-Music Content: Teachers' Perceptions and Practices from across the Curriculum

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**ABSTRACT:-** In efforts to engage students in learning, teachers may engage in a range of instructional approaches, including using music. Music has been used effectively to teach reading and other skills and has been found to increase student learning and knowledge retention. However, K-12 teachers are no longer commonly prepared to teach using music and rely on music specialists for any music instruction. The lack of preparation led us to wonder, what are the perceptions and practices of K-12 teachers across the curriculum for using music for instruction. In our exploratory study, we surveyed 167 teachers and found low levels of preparation and comfort, support for using music in teaching, recognition of benefits to student motivation to learn, and increases retention of content. We found differences by grade levels and relationship to years of teaching and class size. Following our results, we discuss our findings, the implications, and considerations for practice.

**Keywords:** Teaching with Music, Instructional Innovation, Music across the K-12 Curriculum

### I. INTRODUCTION

Teachers can use a wide range of instructional tools to engage their students in learning [1], [2], [3]. Nontraditional or innovative instructional approaches may be used to raise student interest in learning and provide additional support for increasing student content comprehension and knowledge retention [4]. One non-traditional instructional approach involves the integration of song or music for teaching a range of non-music content [5], [6]. The use of songs or music may increase student engagement and provide an additional means for encoding ideas [7] or serve as a catalyst for the process of recall [8]. Through previous empirical studies, researchers have found that incorporating music to create a lighthearted learning environment helps foster students' learning and can be effective in decreasing emotions that may hinder student learning [9]. Music can also evoke psychophysiological changes in the body that are reflective of specific types of emotions [10]. Therefore, songs or music can be utilized by teachers to bring out positive emotions from their students. While integrating music and songs into instruction can be effective and has the potential to benefit students' learning, there is a lack of empirical documentation of the preparation, perceptions, and practices of teachers, concerning their use of music as an innovative approach to the instruction of content across the curriculum.

Given the potential for K-12 teachers to use song and music for the instruction of a range of content, the potential learning benefits, and the likelihood many K-12 teachers have not been formally prepared to use song and music as part of their instruction, there is justification for exploring teachers' perceptions and practices associated with using music and song in their teaching. There is research on the use of song and music to teach specific subject areas such as an additional language [11] or reading [12], but there is a lack of empirical evidence of how teachers across the K-12 curriculum and grades are using song and music in their instruction to teach non-music content. Our research addresses this gap in the literature.

### II. REVIEW OF LITERATURE

#### 2.1 Teacher Use of Music for Instruction

Music as a subject is not a new concept and neither is using music to teach subjects in the regular classroom. There is a history of K-12 teachers using music for instruction [13]. We are interested in exploring how K-12 teachers are currently using music in their instruction. We recognize that music can be used to teach a

wide range of subjects and therefore, it is likely to be considered as an effective instructional approach across the curriculum. Maestri [14], provides empirical support for using music in teaching to help increase students' interest and motivation to learn more about a wide range of topics. Further, the use of music for instruction has been documented in the teaching of content across the curriculum such as grammar [15],[16], mathematics [17], [18], economics [19], languages [20] and several others [21].

Using music for instruction has been implemented from kindergarten to high school [22] and in adult education [20], [23]. The wide range of music usage in teaching reinforces the potential for adaptability to a diversity of learning environments, different content, and range of age levels. According to Hash [24], while the majority of teachers agree that music can improve academic achievement, some are uncomfortable using music in the classroom and believe it should be left to professional music educators. Similarly, Weiss [25] reports teachers value the integration of music into education but did not feel they had the skills and self-efficacy to include music in their teaching of other subjects. Some classroom teachers are hesitant to incorporate music into their classroom because they feel their previous coursework does not apply or feel they have not had the necessary preparation [26].

Teachers can access music from several different sources to use within the classroom [21]. Post-secondary teachers have been found to heavily rely on online sources of music for their instruction [27]. There is an ever-expanding number of online sources of music including Youtube, GoNoodle, and online music stores such as iTunes or Amazon. Other sources of music that could be used for instruction include CDs, DVDs, or paper (e.g. printed lyrics).

Given the expanding possible sources, teachers are likely able to readily access music that could be used for instruction. A range of accessible resources suggests access to music is not a barrier to teacher consideration of using music for instruction. Thus, the lack of teacher consideration and use of music for instruction is likely due to several other factors, justifying examining teachers' preparation and their perceived barriers to using music for instruction.

## 2.2 Support for Using Music in Schools

Teachers are often encouraged to use a range of instructional approaches to engage their students in learning, including the use of music [28], [6]. However, it is likely necessary that others in the school be accepting of the use of song or music, otherwise, the instructional approach could be met with resistance and opposition. There may be predictable situations of acceptance such as in lower grades [17], [26], classes where students are learning to read [29], [30], or in music classes. However, there is a dearth of research detailing the culture of support for teachers to use song and music in instruction within and across the general K-12 curriculum.

In K-12 education in the United States and many other countries, music education is commonly part of the elementary curriculum and is taught by a teacher prepared in music. Similarly, in middle/junior high schools and high schools, music is commonly an elective that is also taught by a teacher prepared for music education. Thus, there is support in the schools for students to learn music. However, less is known about the culture of schools that is supportive of using song and music as part of the instruction in the general curriculum.

Teachers often perceive using music for instruction may divert time from focusing on the learning goal rather than adding to the educational experience [31]. In our search of the literature, we were not able to find any empirical studies of the association between the instructional use of song and music and the support for the approach associated with school culture. Thus, there is a warrant for determining if there is a link between teachers' use of songs and music for instruction and the extent of support that is part of the school culture.

## 2.3 Teacher Preparation and Music as an Instructional Approach

Teacher education programs are intended to prepare teachers to be proficient in their content area [32]. Most preparation programs focus on how to effectively teach students based on the grade level and corresponding curricular content. According to Greenberg and colleagues [33], preparation programs are not delivering new teachers with needed skills. As we began to research music in schools, we were intrigued by the lack of music instruction that regular classroom teachers receive while in their preparation program. Learning about how to teach using music, enhances the chances that teachers will teach using music. As Neokleous [34] shares, preservice teachers who receive singing tutorials have more confidence in their singing ability.

The use of music for instruction can be affected by the formal preparation a teacher receives. According to Hash [24], many educators feel comfortable using music to improve their instruction, but do not feel qualified to teach music education as a course. However, Martin [28] found in-service teachers felt ill-prepared to incorporate music into their teaching. Without proper preparation, teachers are less likely to achieve the goal of enhanced student learning through the instructional use of music. Thus, there is a need to determine

how prepared teachers feel in implementing music into their instructional approach, particularly concerning their level of comfort teaching non-music content using music.

#### 2.4 Measuring the Effectiveness of using Music for Instruction

Music can be used to alter moods and enhance the recall of information [35]. The nature of songs makes it easier to recall words that fit the rhythm and rhyme [36]. Wallace [37] found that differences in the structure and repetitiveness of melodies did have a different effect on recall. One study found that although using a familiar melody to teach did not have a significant effect on initial learning, it did help improve long-term memory better than with spoken presentation [38]. Even in studies where recall data was inconclusive, student enjoyment and improved motivation were evident [39].

Student engagement and motivation is crucial in improving student learning. On-task behavior can be increased by using music in the background [40]. Ellis and Fouts [41] argue that it is hard to find much empirical evidence that interdisciplinary curriculum integration with music is effective because of the difficulties involved in examining the multiple variables associated with the research. Given the importance and effectiveness of integrating music for instruction, there is justification for acquiring insight on how teachers measure the effectiveness of using music in the classroom, which in turn can help guide practices.

### III. METHODS

#### 3.1 Research Question

Our overarching question for our research was, “What are teachers’ perceptions and practices for using music for instruction?” To answer this question, we developed the following guiding research questions:

- i. How are teachers using music for instruction?
- ii. What is the school culture and support for using music for instruction?
- iii. What is teachers’ preparation for using music for teaching?
- iv. How do teachers perceive their students react to the use of music instruction?
- v. How do teachers gauge the effectiveness of using music for instruction?
- vi. What is the relationship between using music for instruction and teachers’ personal and professional variables?

#### 3.2 Participants

The participants in our research were K-12 teachers working in a region of south-central United States. We had 167 teachers complete our survey, of which 35 identified as male and 132 identified as female. Educators’ ages ranged from 23 to 76 years of age, with the average age being 43.04 years old ( $SD = 11.48$ ). The average teaching experience was 15.99 years ( $SD = 10.38$ ). Teachers’ classroom sizes ranged from three to 60 students, with the average class size being 22.15 students ( $SD = 8.23$ ). Seventy-six educators indicated teaching in an elementary school setting, 30 taught at the middle/jr high level, and 61 taught in a high school setting. The majority of the teachers identified as White (93.4%), followed by Black (1.8%), 1.8% identified as Asian, and the remaining identified as Native American or preferred not to answer (1.8%). Most of the educators indicated working in a suburban school setting (59.9%), followed by urban (27.5%), and the remaining indicated working in a rural setting (12%). Fifty educators indicated having a bachelor’s degree, 89 indicated having a master’s degree, 14 identified as an education specialist, 12 attained a doctoral degree, and two indicated other.

When educators were asked if they played a musical instrument, 58.7% indicated they did not play a musical instrument and 40.1% indicated they did play a musical instrument. The majority of teachers indicated that they did not and do not currently sing in a choir or band (62.3%) and the rest indicated that they did or currently do sing in a choir or band (37.7%). Using a scale of 0-10, with “0” being no knowledge and “10” being expert knowledge, teachers were asked to rate their knowledge level of music, which resulted in an overall knowledge level average of 4.81 ( $SD = 2.55$ ).

#### 3.3 Measure

We used the literature to frame our research and relied on evidence that indicates that teachers are likely to use music and song for instruction, but are unlikely to have experienced formal preparation to support this instructional approach. In our search of the literature, we were not able to locate an instrument that aligned with our research goals therefore, we determined it was necessary to develop an instrument.

Using our guiding research questions as a framework for our research, we generated several free and selected-response items. We developed multiple items for each area of influence and reviewed the items for redundancy, alignment, clarity, and complexity. Our goal was to have at least five survey items for each of our

guiding research questions. Our pool of items substantially exceeded our item per question goal, and therefore, we needed to reduce the number of items.

Through discussion and editing of items, we retained 23 selected-response items and three free-response items. Our selected-response items included items such as, “My administration allows teachers to use music in the classroom” and “I was taught how to use music for instruction in professional development,” which were to be responded on a five-point Likert like scale (i.e. Strongly Disagree to Strongly Agree) or a Likert-like scale (i.e. Never to Constantly). A “1” indicated responses on the lowest end of the range and a “5” indicated a response on the upper end of the range of potential answers. Our three free-response items included prompts such as, “What are some struggles you have with using music for instruction?” and “Why do you use or not use music in your instruction?”

Once we created a working version of our survey, we sought to establish the instrument validity. We shared the tool with several K-12 teachers and post-secondary faculty members in the college of education and asked them to consider each item and the instrument as a whole, through a lens of using music and song in teaching. Based on their feedback, we made minor adjustments to our instrument and prepared our survey for data collection. Our process assured us that we had established the content and construct validity of our tool. We assess the Cronbach’s alpha to be .88 ( $N = 167$ ), indicating an acceptable level of instrument reliability for our

23 selected-response items.

### 3.4 Data Collection

The population we were interested in collecting data from, were K-12 teachers working in a range of situations and across disciplines in a region of the southern United States. To collect the data, we distributed an invitation to participate in our research to teachers at multiple schools and districts, in which we had gained permission to conduct our research. We emailed approximately 1500 K-12 teachers and we had 167 of the teachers complete our survey.

### 3.5 Data Analysis

*Quantitative data.* Following our data collection, we downloaded our data from the online survey site and eliminated responses from the participants who did not complete at least 90% of the survey. We then imported the data into SPSS to preplace the occasional missing or skipped selected-response item with the series mean. To calculate the reliability of our tool we reverse coded the responses to the negatively stated items. For item comparison, we retained the original responses to all items. In preparation for the examination and interpretation of the participants’ responses, we proceeded with calculating the descriptive statistics of the items by research question group.

*Qualitative data.* We began the analysis of our qualitative data with a review of our a priori codes and discussed minor modifications. Once satisfied that our codes were likely to be aligned with our participants’ responses, we downloaded our data into a spreadsheet for analysis. To establish the interrater reliability for our coding, all members of the team coded the first 20 responses to our three free-response items in the data set. We found that many of the participants provided detailed and lengthy responses containing content aligned with multiple codes. Thus, the coding totals of the data for each of our open-response items were calculated using all the occurrences of each code, including the occurrences of multiple different codes tallied from a single response.

## IV. RESULTS

### 4.1 How Teachers are Using Music for Instruction

Our first research question asked, “How are teachers using music for instruction?” To answer this question, we examined the teachers’ mean responses to our items assessing their reasons for using music for instruction (see Fig. 1), their coded explanations for using or not using music for instruction (see Table 1), and the frequencies for each coded response (see Fig. 2). Our results indicated that teachers leaned toward agreeing that they use music in the classroom to energize their students ( $M = 3.64$ ,  $SD = 1.15$ ). Additionally, teachers reported sometimes playing background music in their classroom ( $M = 3.03$ ,  $SD = 0.99$ ) as well as sometimes using music to calm their students ( $M = 3.00$ ,  $SD = 1.16$ ). The teachers’ responses fell between seldom and sometimes to the statement, “I incorporate music to help my students remember facts”, indicating they sometimes use music to help facilitate their students’ retention of information ( $M = 2.61$ ,  $SD = 1.11$ ).

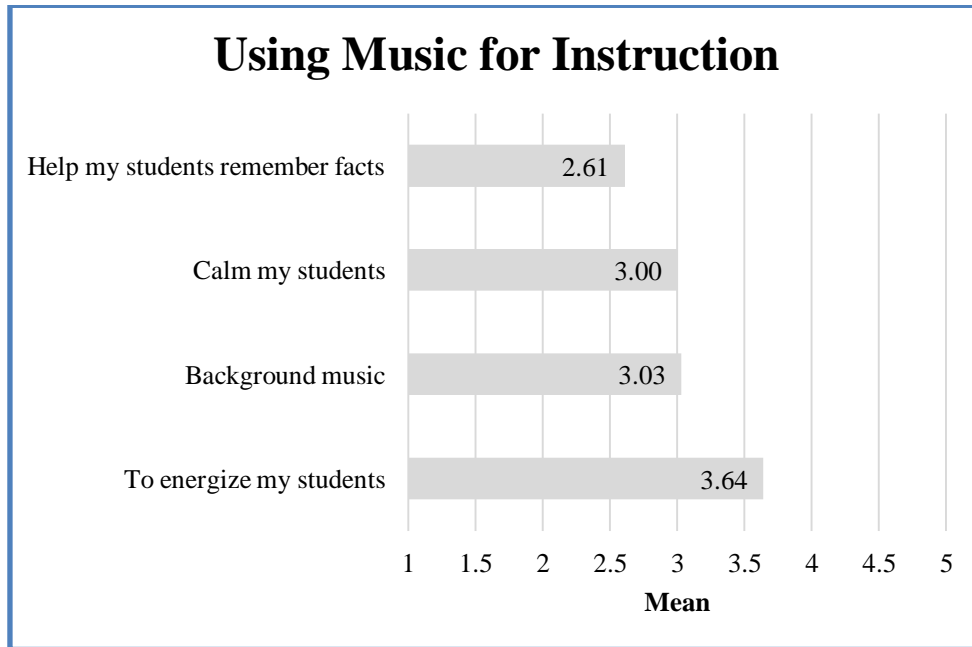


Figure 1. The participants’ mean responses for using music for instruction.

Teachers were asked to provide a written response to why they did or did not use music for instruction. We analyzed the frequency of the occurring codes within the 124 participants who provided responses (see Fig. 2). The teachers’ responses varied. The vast majority of teachers indicated that they use music for instruction to facilitate retention, to further engage their students, for motivation, or to establish a classroom climate. A moderate to low percentage of teachers indicated that they do not use music in the classroom due to the lack of knowledge in how to incorporate it into their instruction and because it becomes a distraction for their students. In contrast, only a few teachers indicated they use music to manage their classroom or that they do not use music in their classroom due to a lack of resources.

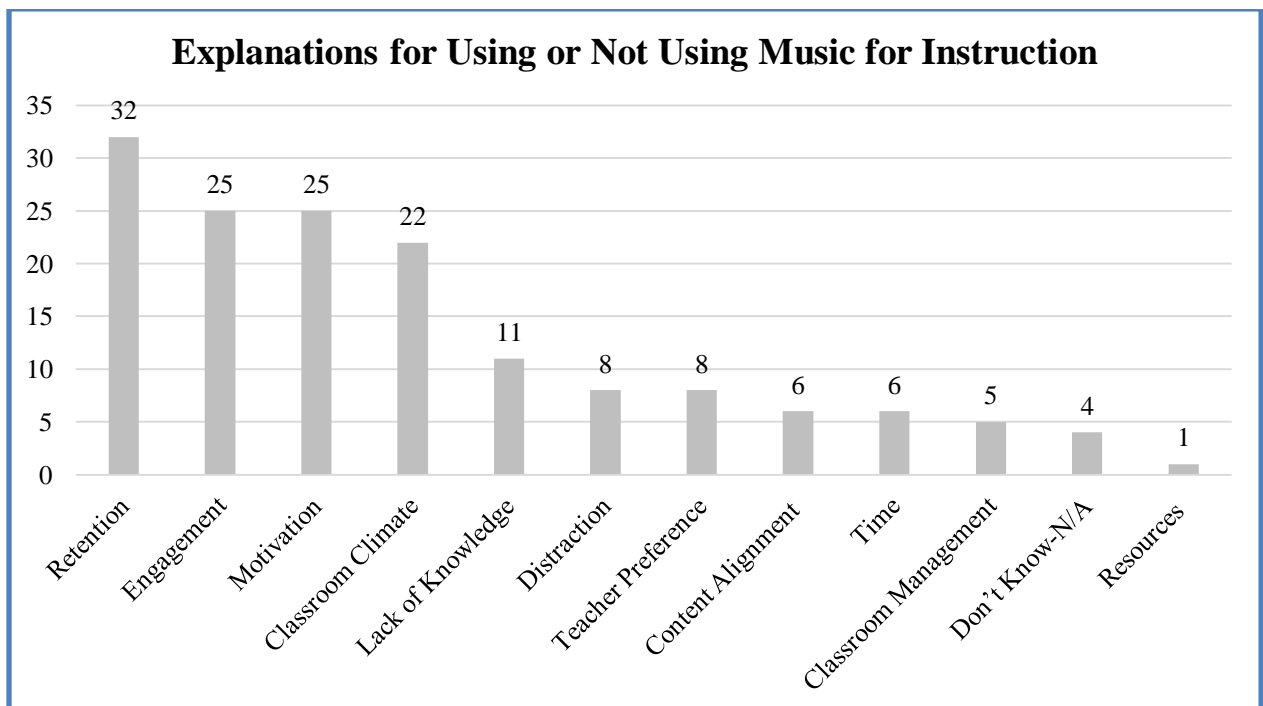


Figure 2. The frequency of free-response codes for the item asking teachers to explain why they do or do not use music for instruction.

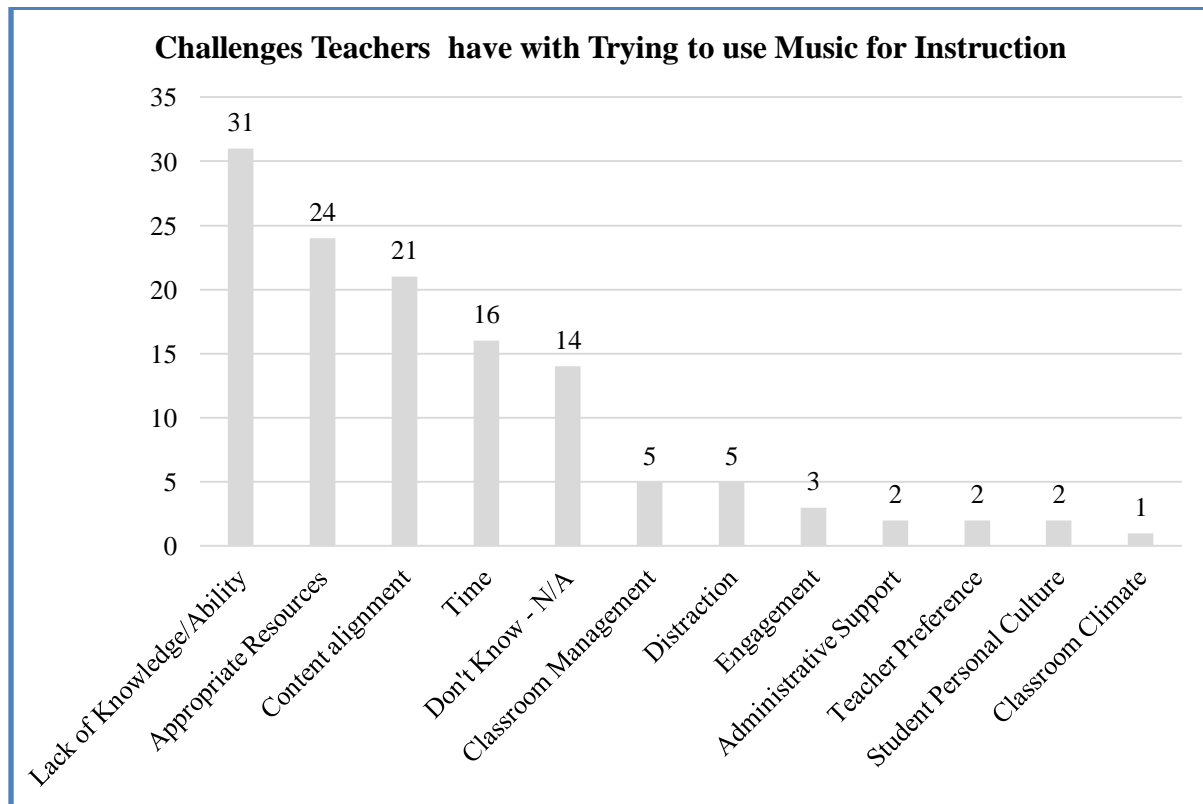
To further illuminate why or why not teachers are or are not using music in their instructional approaches, we identified a representative response for each of our codes (see Table 1). A review of the statements revealed a wide range of views associated with why the participants choose to use or not use music in their instruction. The answers also reflect a dichotomy in perspectives for the considerations of using music for instruction.

**Table 1 Codes and Representative Responses to the Participants' Explanations for Using or Not Using Music for Instruction**

Codes	Representative Responses
Retention	Music and lyrical/sing-song type repetition assists my students in retaining information
Engagement	I feel that students are more engaged and receptive to concepts that are introduced via song.
Motivation	Music is fun. Kids love it, adults love it. Why not?
Classroom Climate	Music soothes the soul. It calms overly excited children and invigorates lethargic students. Music helps to change the mood of the classroom.
Lack of Knowledge	Don't know how to incorporate it.
Distraction	Using music distracts my students whilst reading.
Teacher Preference	I personally love music.
Content Alignment	I use it when I have something applicable or appropriate.
Time	It is hard to find the time to find the music I need with all the other things that need to be done.
Classroom Management	I also use music when we are transitioning. So it's a cue for students. When the music is on, they can talk. When it's off, they wait for the next direction.
Don't Know - N/A	Not in a classroom.
Resources	Not sure what to use or where to find resources.

We continued our analysis by examining tallies of the codes for the 109 participants' who provided responses to our item asking them to share the challenges they encounter when considering using music for instruction (see Fig. 3). The three primary challenges were lack of knowledge/ability, having the appropriate resources, and determining how to align the use of music with the curriculum. To a lower frequency, but still common responses, were the lack of time and the lack of the ability to identify an explanation for the challenges, such as "I don't know". The challenges that were shared at a low frequency included maintaining an orderly classroom, the music is a distraction, engaging students in learning when using music, administrative support for using music for instruction, the preferences of teachers, alignment with the students' culture and interests, and influence on classroom climate.



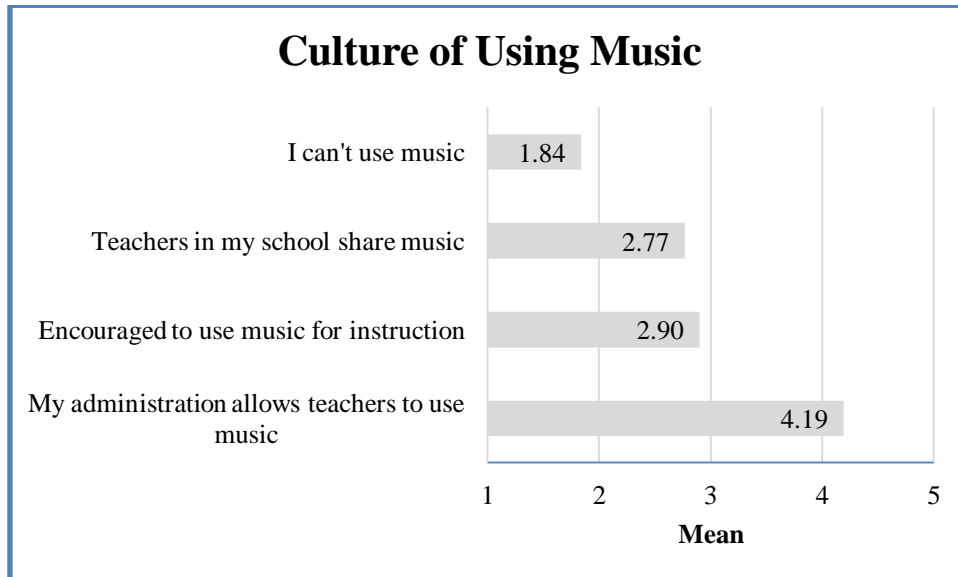


**Figure 3. The frequency of the responses provided by the participants for the challenges of using music for instruction.**

We also found the participants were neutral in their perceptions that only a small number of teachers used music for instruction ( $M = 3.26, SD = .97$ ). The teachers on average used music a little bit more than once a month for instruction ( $M = 3.35, SD = 1.66$ ). The participants' response to experimenting using music for instruction was near neutral ( $M = 3.11, SD = 1.06$ ).

#### 4.2 Culture and Support for Using Music in Schools

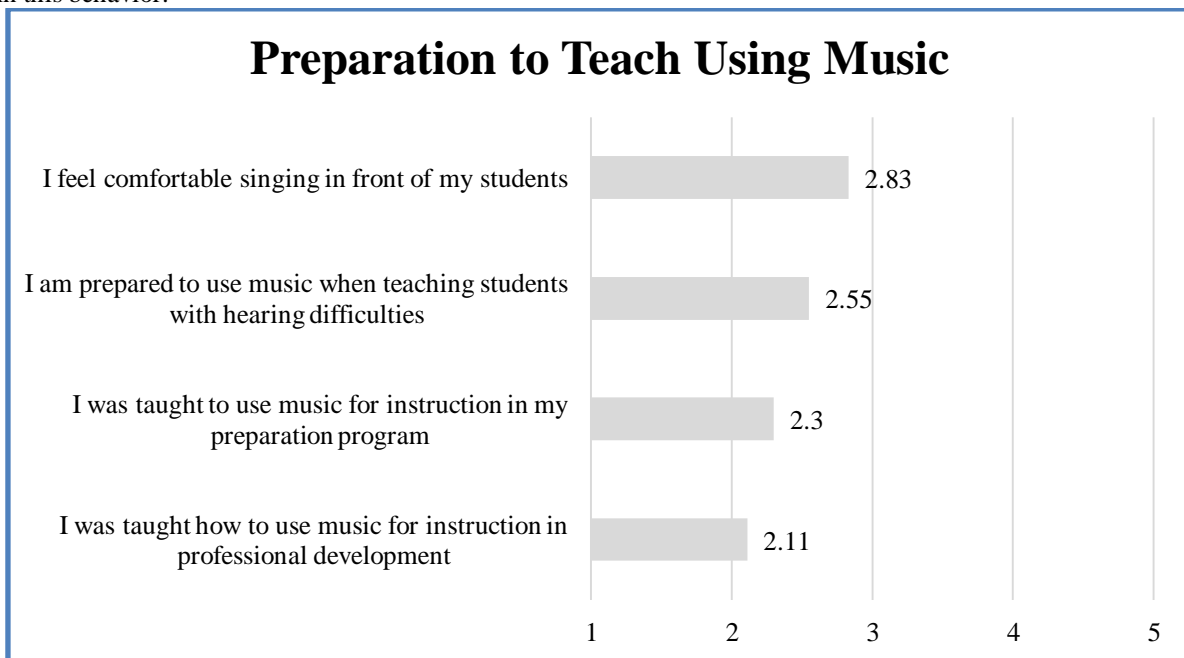
Our second research question asked, "What is the school culture and support for using music for instruction?" To answer this question, we examined the teachers' mean responses to our items assessing their perceived support for using music in their schools (see Fig. 4). Teachers agreed that their administration allows them to use music in their classroom ( $M = 4.19, SD = 0.99$ ). In contrast, teachers' responses were more neutrally inclined to the statement indicating that they are encouraged to use music for instruction ( $M = 2.90, SD = 0.67$ ) and to the statement indicating that teachers in their school share music with each other ( $M = 2.77, SD = 1.02$ ). On average, teachers disagreed with the statement "I can't use music" ( $M = 1.84, SD = 0.85$ ), indicating that they agree that they are permitted to use music in their classroom.



**Figure 4. Teachers' average responses for the perceived culture for using music in their classroom.**

#### 4.3 Teacher Preparation for Using Music as in Instruction

Our third research question asked, "What are teachers' preparation for using music for teaching?" To answer this question, we examined the teachers' mean responses to our items assessing their preparation to teach using music (see Fig. 5). On average, teachers indicated that they disagreed that they were taught how to use music for instruction both in their professional development ( $M = 2.11$ ,  $SD = 1.12$ ) and in their preparation programs ( $M = 2.3$ ,  $SD = 1.20$ ), indicating that teachers are not being equipped with the tools to effectively use music for instruction. The participants' average responses to the item that asked if they felt prepared to use music when teaching students with hearing difficulties, was split between disagree and neutral, indicating some level of disagreement ( $M = 2.55$ ,  $SD = 1.11$ ). Additionally, teachers' responses to the statement assessing whether they felt comfortable singing in front of their students, were more neutrally inclined ( $M = 2.83$ ,  $SD = 1.39$ ). Overall, the responses suggest that the teachers did not feel either comfortable or uncomfortable engaging in this behavior.

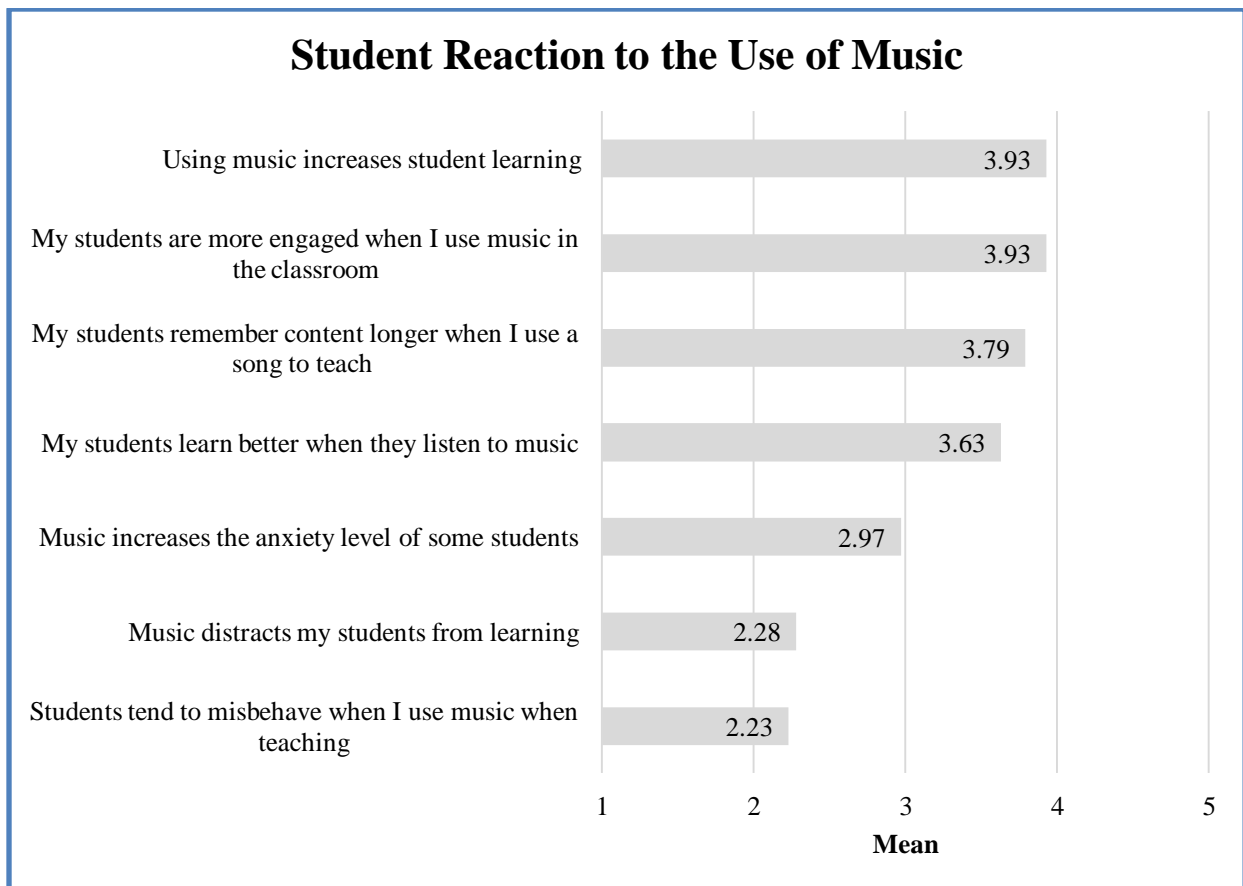


**Figure 5. Participants' average responses to preparation for using music for teaching.**



#### 4.4 Students' Reaction to when Music is used for Instruction

Our fourth research question asked, “How do teachers perceive their students react to the use of music instruction?” To answer this question, we examined the teachers’ mean responses to our items included to assess teachers’ perceived student reactions when they use music in the classroom (see Fig. 6). On average, teachers agreed that their students were more engaged when they use music in their classroom ( $M = 3.93$ ,  $SD = 0.63$ ) and that using music increases their students’ learning ( $M = 3.93$ ,  $SD = 0.69$ ). Similarly, teachers’ responses leaned towards agreeing that their students remember content longer when they use a song to teach ( $M = 3.79$ ,  $SD = 0.71$ ) and that their students learn better when they listen to music ( $M = 3.63$ ,  $SD = 0.71$ ). In contrast, the teachers’ responses were more neutral to the statement “Music increases the anxiety level of some students,” indicating they neither agreed or disagreed that music increases anxiety for some students ( $M = 2.97$ ,  $SD = 0.99$ ). Additionally, teachers disagreed that music distracts their students from learning ( $M = 2.28$ ,  $SD = 0.79$ ) or that students tend to misbehave when they use music when teaching ( $M = 2.23$ ,  $SD = 0.77$ ).

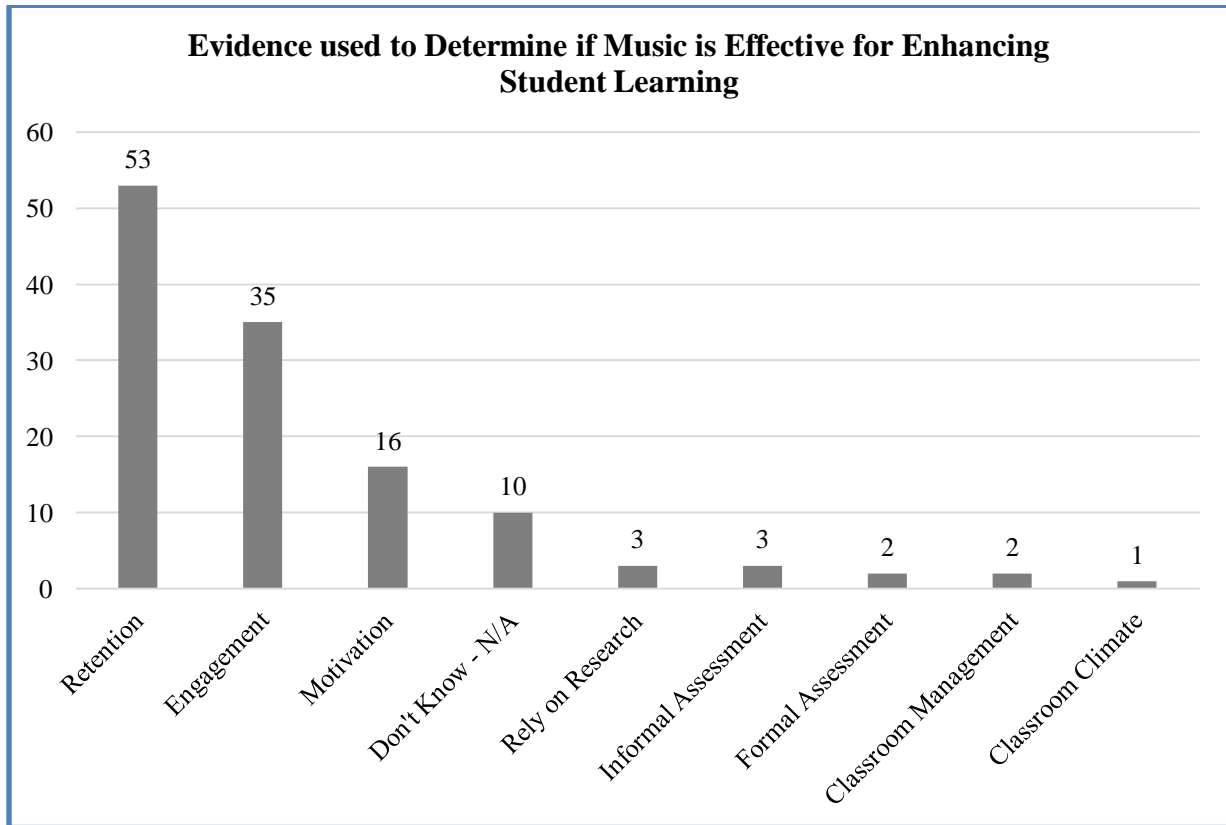


**Figure 6. The mean responses for students’ reactions when teachers use music for instruction.**

#### 4.5 Teachers’ Evidence that Music Influences on Student Learning

Our fifth research question asked, “How do teachers gauge the effectiveness of using music for instruction?” To answer this question we examined teachers’ coded responses for evidence of how they know that music is effective for enhancing student learning (see Table 2), and the frequencies for each coded response (see Fig. 7).

We asked the participants to share how they know that music is effective for enhancing student learning. We analyzed the frequency of the occurring codes established from the 110 participants’ who provided responses (see Fig. 6). The vast majority of teachers indicated that they knew music was effective for enhancing student learning due to the increased retention of content and engagement of their students in learning activities. A moderate to low number of teachers indicated that their students had increased motivation for learning when they taught with music or they simply did not know how to determine if their students were learning when taught using music. Very few teachers indicated that they know music is effective in increasing their students’ learning as a result of formal assessments, increases in classroom management, or due to the established classroom climate.



**Figure 7. The Frequency of the free-response codes to our item asking teachers how they determine if music is effective for enhancing student learning.**

We used a coding system we created to categorize how teachers determined if music was effective in enhancing their students’ learning. The codes and representative responses for each code can be found in Table 2. The table provides further empirical support for how teachers perceive teaching with music enhances their students’ learning.

**Table 2. Coded Representative Responses for Evidence to determine if Music is Effective in Enhancing Learning**

Codes	Representative Response
Retention	They retain concepts or ideas better. They have something they can cling to and come back to help them later.
Engagement	It's a powerful class management tool, I feel confident that I can get the students back on track and attentive by using a musical prompt.
Motivation	Since I make sure that it is an instructional tool, and the students are aware that it is not just for background noise, they use the music to guide their work and demonstrate their understanding of material by incorporating it into their products.
Don't Know - N/A	I don't. I have not conducted any studies in this matter. If I had to wager a well-educated guess, however, students don't perform any better when I let them listen to music. It distracts them. Their work is of the same quality whether they listen, or not.
Rely on Research	I would listen to it when studying. I have also heard from multiple studies the benefits of music as it activates more parts of the brain and can help with retention.
Informal Assessment	By talking with them and/or surveys about what helps them learn.
Formal Assessment	Tests
Classroom Management	Behavior change and focus is better.
Classroom Climate	Many of my students comment when I DON'T have music playing. And when asked, they always opt for music playing in my classroom.

#### 4.6 Relationship between Teaching using Music and Personal and Professional Variables

Our sixth research question asked, “What is the relationship between the teachers’ composite response on our assessment of using music for instruction and their personal and professional variables?” To answer this question we conducted a series of inferential tests of means and correlations.

We began our analysis by determining if there were any gender differences in the usage of music for instruction (see Table 3). Our results revealed no gender differences in the usage of music for instruction, which indicates that male and female educators hold similar perceptions about music and engage in using music for instruction at similar levels. Additionally, we examined the correlation between class size and culture for utilizing music in the classroom. We found that there was a significant negative correlation between class size and culture for using music ( $r = -.157, p = .045$ ), which indicates that as classroom size increases, the culture or likelihood for using music decreases. In contrast, our analysis revealed a significant positive correlation between the number of years spent teaching and the culture for using music for instruction ( $r = 2.68, p < .01$ ). These findings indicate that as the number of years teaching increases, so does the culture for using music. Similarly, there is also a significant positive correlation between the number of years spent teaching and the level of preparation to use music for instruction ( $r = .174, p = .025$ ), which indicates that as the number of years spent teaching increases the level of preparation to use music for instruction also increases. Likewise, our results revealed a significant positive correlation between age and culture for using music ( $r = .154, p = .047$ ), indicating that as age increases so does the culture for using music.

We continued our analysis through a comparison of means using the school level as the factor. We found a significant difference in how the teachers use music for teaching ( $F[4,162] = 9.85, p < .01$ ), with elementary teachers indicating a greater integration of music for instruction than high school teachers. We also found a difference in the culture for using music ( $F[4,162] = 8.49, p < .01$ ), again, with elementary teachers indicating a greater culture for using music for instruction in their schools than the high school teachers. Similarly, the elementary teachers indicated a higher level of preparation for using music than the high school teachers ( $F[4,162] = 7.69, p < .01$ ). The elementary teachers also expressed a higher level of motivation to use music for instruction than the high school teachers ( $F[4,162] = 3.28, p = .013$ ).

## V. DISCUSSION AND IMPLICATIONS

The goal of our research was to determine if, how, and why K-12 teachers use music for instruction. Again, in our search of the literature, we were unable to find any published empirical studies documenting the use of music for instruction by K-12 teachers from across the curriculum. To fill the gap we conducted an exploratory study, surveying a sample of K-12 teachers.

### 5.1 How Teachers are Using Music for Instruction

Our results indicate that the participants tended to be most positive about using music to energize students and as background music. Those who then described how they specifically used music in instruction, was focused on retention of content, engagement, motivation, and classroom content. Similarly, the participants shared challenges that were to why they did not use music. We speculate that the use of music for instruction is essentially a personal choice of teachers that is influenced by their perceived challenges and their instructional goals. The implications for our findings are that a teacher’s consideration of using music for instruction is not likely predictable and is most likely the personal choice of the teacher. Future research might further explore the personal history of teachers that leads them to use music as an instructional tool and how they overcome challenges in the process.

### 5.2 Culture and Support for Using Music in Schools

We found that teachers generally experience support for the instructional use of music but are more tentative about a supportive culture for using music in instruction. We speculate that while administrative barriers to the use of music may be uncommon, teachers don’t generally collaborate and support each other in the use of music for instruction. The implication is teachers are most likely going to have to work independently to develop the instructional knowledge and processes to effectively use music to help their students learn. Future research might explore how the differences in school culture and support for using music is related to other non-traditional and innovative instructional approaches.

### 5.3 Teacher Preparation for using Music as in Instruction

We had anticipated that most teachers had not been formally prepared to use music as an instructional tool, which is supported by our data. Yet, the teachers were neutral about feeling comfortable with teaching using music. We speculate that teachers who use music in their instruction likely taught themselves how to. Further, we posit that teachers who teach with music are likely to be more innovative in general with their instruction and more willing to experiment with a range of instructional approaches and tools. Future research

should explore the development of teacher knowledge for teaching with music, as there are likely multiple pathways.

#### 5.4 Students' Reaction to when Music is used for Instruction

The participants tended to agree that students are more engaged in learning, experienced increased retention of content, and overall seemed to learn better when music was used in the instruction. The participants also disagreed with the notion that the instructional use of music is distracting and leads to increased behavior issues of students. We speculate that the positive learning experiences of students when taught using music supports teacher motivation to integrate music into their instruction. The implications of our findings are students seemed to respond positively to the use of music for instruction, which provides support for considering the instructional approach. Future research might include the exploration of what kinds of music are most effective for student learning and how the effects may change with age and content area.

#### 5.5 Teachers' Evidence that Music Influences on Student Learning

The evidence that teachers use to determine the effectiveness of using music included the retention of content (shared by about half of the responding teachers) with about the same proportion indicating motivation and engagement as evidence. The responses lacked specific measures of effectiveness such as, assessments that reflected greater depth of knowledge and decreased instructional time to achieve similar learning outcomes. Thus, our data seem to indicate that teachers tend to rely on informal measures as measures of the effectiveness of using music for instruction. Future research may explore with teachers the development of formal assessments to explore how effective their use of music for instruction is for influencing student learning.

#### 5.6 Relationship between Teaching using Music and Personal and Professional Variables

We found several relationships between teachers' personal and professional variables and their engagement in teaching using music. Most apparent was the differences between teachers working at the elementary level compared to those working at the secondary level. Regardless of the predictor variable, our research findings revealed there are likely multiple influences on teachers' decision to use music for instruction, some of which may be relatively easy to shift while others would require significant investments in time and effort. We have contributed to the empirical documentation of the complexity of teachers' decision and engagement in the instructional use of music. The implication for our finding is that shifting teachers to the use of music to teach, may be a rather difficult endeavor. In our future research, we plan to examine the instructional use of music as our larger research project on teacher adoption of innovative approaches to teaching.

#### 5.7 Considerations for Practice

Our data expose evidence for several implications for practice. One consideration is the need to prepare teachers in the preservice programs to use music as an instructional tool. In the past, students preparing to become elementary teachers were required to take a music methods courses, but with shifting standards the courses have become uncommon in preservice programs. The preparation of preservice teachers to teach using music now has to take place in other courses in the curriculum. While potentially limited to brief lessons, teacher educators may want to consider integrating opportunities to prepare preservice teachers to the use of music for instruction and opportunities to practice the approach. There is motivation for supporting the instructional use of music given the potential benefit of the novel instructional approach for increasing student engagement and interest in learning [42].

For inservice teachers to be better prepared to use music for instruction, it is going to require self-motivation and engagement. Many websites contain ideas for practice that teachers may want to consider. Inservice teachers may have to be willing to take the risk and experiment with using music for instruction, perhaps as part of a larger effort to explore a range of instructional innovations.

Professional development providers are well-positioned to influence teacher consideration of using music for instruction. The providers could offer teachers resources, ideas, and perhaps a chance to practice the process. While potentially limited to those who are interested, there is a chance that teachers who engage in professional development will share and inspire their colleagues to also learn more about using music in their teaching.

#### 5.8 Limitations

The first limitation of our study is our data were collected from teachers working in a region in the southern United States. Teachers in other areas of the United States and other countries and cultures may hold different views, engage in different practices, and have different levels of preparation and expectations. We encourage other researchers to engage in replicating of our study with different populations of teachers.

The second limitation of our study is the nature of the data collection. Studies have shown that survey research is effective at gathering data representative of the population from which the information was drawn. However, we are not able to determine why the teachers answered the way they did and their actual engagement in using music for instruction. Our exploratory research has provided a foundation for future research that may involve teacher interviews and observations to further document the instructional use of music by K-12 teachers across the curriculum.

The third limitation is the teachers who responded to our survey may have been more or less inclined to use music than the teacher population as a whole, and therefore, our sample may be biased. While we seem to have received a diversity of responses, it may be the responses from all the teachers we invited to participate in our research could have resulted in different findings. Future research should be conducted to assure data is collected from as many teachers as possible in a sample.

## VI. CONCLUSION

Teachers' engagement in innovative approaches to instruction, such as the use of music to teach non-music content, may enhance student engagement in learning. Yet, as with other innovations in education, there is a need to empirically document the perceptions and practices associated with teacher use of music for instruction. Our exploratory research on teacher use of music for instruction has provided an empirical foundation for further exploration of what we have exposed to be a complex phenomenon and in need of additional research.

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