MUSICAL SPATIAL AWARENESS AND ITS EFFECT ON YOUNG INSTRUMENTALISTS' PERFORMANCE

by

ASHLEY NOLAN FLOYD

(Under the Direction of Mary Leglar)

ABSTRACT

The organization of music education on musical elements has a long history in the United States, although musicians have periodically held various opinions about how music is conceived in terms of its constituent parts. From Lowell Mason, who organized lessons in the *Boston Manua*l according to pitch, rhythm, and dynamics, to Jerome Bruner, who promoted a method of conceptual transference in a spiral-shaped curriculum, the elements of music have informed both large scale curricular decisions as well as the daily lesson plans of classroom teachers.

Although the list of basic elements has evolved and changed over time, the concept of music spatialization and its implications for music education has yet to be fully considered. Despite the fact that spatialization has become a frequent topic in music technology and music theory journals and dissertations in recent years, it has not often found its way in curricular discussion either at the primary or secondary level.

This study explores the potential benefits of including spatialization as a basic element of music by examining the effect it has on the musical performance of eighth-grade band students. Participants engaged in a series of eight classroom lessons exploring spatialization through listening and musical performance. At the conclusion of the lessons, the students recorded two short musical selections featuring contrasting textures using a standard band seating before taking an active role in adjusting and determining four different spatial possibilities for four subsequent performances. Qualified band judges scored the recorded performances using the Georgia Music Educators Association Large Group Evaluation rubric as a standard to determine whether the students' spatial decisions resulted in a more

musically pleasing performance. The students also completed a survey on their experience, with spatialization as a topic of study.

INDEX WORDS: Spatialization, Basic elements of music, Middle school band,
Students attitude surveys, Performance evaluation, Instrumentalist performance

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DEDICATION

This document is dedicated to the friends and family who have supported and encouraged its completion. Above all, it is dedicated to my wife, Rebecca, who supported its long creation and tolerated its author.

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CHAPTER ONE

INTRODUCTION

> What [we] should strive for, then, is a more *active* kind of listening. Whether you listen to Mozart or Duke Ellington, you can deepen your understanding of music only by being a more conscious and aware listener - not someone who is just listening, but someone who is listening *for* something. (Copland, 1957, p. 9)

In the quotation above, Aaron Copland identified what separates an educated listener from a novice: "listening *for* something." The "conscious and aware listener," Copland continued, pays attention to five basic elements that constitute music: melody, rhythm, harmony, timbre, and form. Identified elements of music similar to those Copland listed have determined the structure of content and curricula for music education in the United States for nearly two centuries. However, music is influenced by philosophical, technological, and political trends, and as musical styles change, the list has varied to reflect these changes. For example, Lowell Mason (1838) identified only three elements: rhythm, melody, and harmony. The Manhattanville Curriculum Project (1965) and the Hawai'i Curriculum Project (1968) were based on seven: tone, rhythm, melody, harmony, form, tonality, and texture.

Musical trends in recent decades have brought into consideration an additional factor, one that has always affected the performance and perception of a musical work, but has now assumed greater importance: spatialization. As electronic amplification and playback became a greater component of musical life, composers and performers began to experiment with spatial possibilities. Gradually, the stereo field grew into a quadrophonic field and then beyond. Musicians began to treat the movement of sound within a space with the same careful consideration as pitch or rhythm or texture. Greater consideration was also given to the venue or environment in which music was to be heard. Edgar Varese's sound installation *Poème électronique* at the Philips Pavilion in Brussels in 1958 is viewed as a seminal work using these considerations. Most recently, John Luther Adams has crafted works that are

specifically designed to their performing space. His works *Inuksuit* and *Sila: The Breath of the World* place musicians in particular positions in a space to take advantage of the sonic nuances at a specific site. While radically unique in their individual approaches, these relatively new developments can be readily traced to spatial musical elements in other style periods and cultures, as in the antiphonal vocal works of Gabrieli and Schütz, or the orchestral off-stage theatrics of Berlioz, Wagner, and Beethoven.

Accepting spatialization as one of the primary elements of music would have important consequences for music educators. Just as with Copland's five standard elements, students would be taught to become "conscious and aware," that is, to listen for and evaluate the effects of spatialization in their listening experiences and musical performances.

Purpose of the Study

This study sought to examine the possible benefits of including spatialization as a basic musical element. The purposes of the study were: 1) to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization; 2) to examine students' feelings and motivation toward lessons designed around the spatialization concept; 3) to identify practical challenges to implementing such a lesson unit to a middle school band classroom.

Delimitations

This research primarily addressed the effect of spatial awareness on musical performance. While there are other means of expressing musical awareness, such as the listening awareness models developed by Madsen and Geringer, and though Edwin Gordon stated that high musical awareness and aptitude do not always demonstrate themselves in musical performance, the fact remains that the majority of music instruction across the United States is concerned with producing musical performers. As such, this research sought to find indications of improved musical performance as a result of spatial awareness in students.

Methodology

Subjects for the study were 8th grade band students ($N = 20$) enrolled in a rural southeastern middle school. To examine the effect that instruction on spatialization had on musical performance, a series of eight 70-minute lessons designed to heighten sense of spatial awareness were presented to the subjects over a period of four weeks (see Appendix A). At the conclusion of the lesson unit, the students performed a short concert in which they explored the spatial aspects of their performance by repeating the two short musical selections five separate times in five separate seatings: one standard arrangement and four created by the students.

Using the *Georgia Music Educators Association Large Group Evaluation* rubric as a standard (see Appendix B), qualified adjudicators scored the recorded performances to determine whether the students' spatial decisions resulted in a more musically pleasing performance. Three experienced judges of middle school bands were present at the live concert. To determine reliability, recordings of the performances were presented in random order to eight additional judges for scoring. An Analysis of Variance statistical test was used to examine the performance scores given by the band judges to determine any significant differences in criteria scores.

After the performance, students voiced their feelings and preferences regarding spatialization training and subsequent performance via a survey administered following the performance (see Appendix C).

Organization of the Document

The document was organized as follows:

Chapter 1. Introduction

- Rationale
- Purpose of the Study
- Delimitations
- Methodology
- Organization of the Document

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Consideration of spatialization as a musical element is a relatively recent development in scholarly inquiry. It has been examined primarily in music theory research, in particular as it relates to electro-acoustic music. A number of dissertations have explored the topic in the analyses of particular works or genres. In her 1994 dissertation, Maria Harley examined spatialization in relationship to the 20th century music of Ives, Boulez, Stockhausen, and Cage. Works by these 20th-century composers were examined according to the philosophies of musical space or place as given by Xenakis, Henry Brant, and R. Murray Schaefer. Similarly, Julie Licata (2007) considered the use of spatialization as a thematic device in the examination of a work for percussion by Roger Reynolds.

Jason Solomon (2007) provided a more analytical approach to examining spatialization as it relates to electronic as well as acoustic works. His dissertation used a labeling system derived from contour-theory as a means of examining structural relations between spatial gestures. Solomon's discussion of performance practice and ensemble seating plans as means of musical interpretation of spatialization was of particular interest to this study because of its implications for use in the musical classroom.

Other research on the topic of spatialization has been conducted primarily by electroacoustic music composers and scholars. Many articles on spatialization, published in the *Computer Music Journal* or *Organized Sound,* focused on technological development or the works of specific composers. Still, the presence of such recent and prolific scholarship pointed to the need for spatialization to be addressed by music educators in order to keep instruction current. The following research demanded the attention of educators.

A survey conducted by Canadian researchers found that almost half of the composers or sound artists surveyed described spatialization as “very important” or “extremely important” to their compositions (Peters, Marentakis, & McAdams, 2011, p. 21). Fifty-eight percent of those surveyed stated that spatialization enhanced the listening experience while forty-four percent claimed to use spatialization as a compositional paradigm. The authors concluded that “[t]he spatial structure of a work may be of equal importance as its organization in terms of pitch, timbre, or rhythm” (pp. 12-13).

Felipe Otondo (2008) used a similar survey mechanism to explore modern composers’ use of spatialization. His main interests were in the types of technology used by composers for spatial formatting, as well as detailing some of the spatial considerations composers bore in mind while creating pieces. Otondo noted that, over the past decade, composers have increasingly preferred 5.2 surround and eight-channel systems over stereo playback. For further detail, in a 5.2 surround system set-up five speakers are arranged so that two speakers would be placed at the left-rear and right-rear respective to the listener. Two more audio speakers would be placed to the left-front and right-front, with the fifth speaker placed directly to the front of the listener. The .2 of the 5.2 refers to the presence of two low-range specific speakers, termed subwoofers, placed to the right and left of the listener and intended to sound only the lowest frequencies of the audio recording. Otondo attributed composers’ preference for these particular speaker arrangements to the greater availability of cheaper and more sophisticated spatialization technologies. This growing preference was worth noting for educators as composers and musicians continue to explore the possibilities of spatialization.

Echoing Otondo’s attention to the evolution and proliferation of speaker technology, Robert Normandeau (2009) placed the emergence of spatialization as a legitimate compositional element with the development of multichannel diffusion through speakers. In his article, he traced a brief history of spatialization as a musical concept starting with the St. Mark’s Basilica antiphonal works of Giovanni Gabrieli, moving to Hector Berlioz’s orchestrational tricks, and eventually to the experimentation of spatialization of acoustic ensembles in the 1960s (p. 277). However, Normandeau argued that spatialization only reaches its true potential as a compositional tool with electroacoustic works. He

posited that, despite the ability of acoustic instruments to be spread out in a concert space, the instrument can only project the particular timbres of itself. Speakers can likewise be spread out in a concert space, but are not limited to one set of timbres. In particular, he writes of *timbral spatialization*, in which "the entire spectrum of sound is recombined only virtually in the space of the concert hall" (p. 278).

Peter Lennox (2008) cautioned against taking mere locationism in the stereo field as a truly meaningful musical element. In particular, he gave numerous examples of spatial ideas that are interesting from a technological or theoretical standpoint (pitch sweeps, reversal of a created space) that fail to be aurally interesting, according to Lennox, in performance. However, he indicated that it is simply a matter of time before compositional creativity and user-friendly technology meet in designing a truly meaningful compositional space. "Rather than thinking of spatial planning as essentially an exercise in cartography, we should admit that we are really hoping to plan an environment to be occupied by humans, admitting that *spatial* perception is actually *place* perception" (p. 270).

Spatialization and Student Musical Performance

Music education research touching on spatialization most frequently has dealt with the efficacy of ensemble arrangements and placements in performance. Researchers in choral music education have been the most active in this area. Early research in choral blend frequently mentioned the spacing and arrangement of the ensemble as a factor in blending the individual tones of the singers (Wyatt, 1968; Bolster, 1983; Smith, 2002; Spurgeon & Peter, 2010). Instrumental educators also explored how ensemble stage placement and seating can affect musical performance. Frederick Fennell is perhaps most notable in exploring the instrument arrangement of his Eastman Wind Ensemble, particularly noting the differences between his new seating preferences and more traditional concert band formations. Robert Garofalo and Garwood Whaley (1976) thoroughly explored the advantages and possibilities offered by various wind ensemble instrument arrangements. It is interesting to note that Garofalo and Whaley took the approach of a composer when considering possible instrument placements. To them, this composerly approach took into account all possible timbral and tonal colors as well as intonation. A possible element

of musical movement within a performance space was not considered. Additionally, Garofalo and Whaley's approach was experiential, not necessarily experimental. They came from the perspective of passing along years of experience working with bands and tweaking the ensemble placement to ultimately find what they considered to be the best, most musical setup.

Other research regarding instrumental seating arrangement was concerned with the director's concept of the most musical tone. Mark Fonder wrote: "The seating of the band has to be analyzed to maximize success in realizing the band's ideal tone. Grouping the bass voices, irrespective of whether they are brass or woodwind, can boost confidence. Experimentation with acoustic shells and clouds, risers, and upstage and backstage placement can have a huge effect on the ensemble tone" (1998, p. 25). Once again, this consideration of spatial musical effect was explored only in regard to achieving a unified group sound, not for maximizing spatialization as its own musical element.

Debra Spurgeon and Sandra Peter (2010) discussed seating arrangements and stage formations as they relate to tonal blend within the choral realm. They highlighted the usefulness of changing formation and spacing as a rehearsal tool and as a means of achieving the best choral sound. However, much like Fonder, and Garofalo and Whaley, Spurgeon and Peter did not address the musical possibilities of spatialization for its own musical effect. However, they reported very positive overall musical effects using different spacings and formations in performance as well as in rehearsal.

> In mixed formation, the singers report the following: they can hear all the parts, are more independent, accountable, and try harder, and meet somebody new. After mixing up, singing a familiar piece, and then discussing, the singers know the piece has been transformed. They want to react. They quickly jump from what just happened in rehearsal to the openness and flexibility the process emulates. (Spurgeon & Peter, 2010, p. 36)

Other researchers, such as Lambson (1961), Daugherty (1999), Ekholm (2000), and Atkinson (2010), adopted a more systematic approach to just how much ensemble seating and placement made a demonstrable effect on musical performance. Though none of these researchers were looking toward musical spatialization as an element in its own right, there was much to take away from their experimental research designs. In particular, Daugherty (1999) developed a research design that was quite useful to the

spatialization research proposed here. Daugherty examined the musical preferences of both choir members and musical auditors in three different choir spacings and two different choral formations. Drawing on his own previous research, Daugherty used a short, homophonic musical example (30 seconds) and recorded it using all six choral spatial combinations. One hundred sixty auditors were then given the recordings in 10 random example pairings. The auditors were then given a choice of which performance they preferred, or they could indicate no preference.

Of particular interest to this research was Daugherty's use of recorded examples as opposed to live performance judging, and his recording of only a relative few examples from which the judges indicate a preference. According to Daugherty, these choices were made to improve his earlier research designs wherein auditors indicated fatigue and wandering attention due to many formation changes and a large number of aural examples.

Daugherty also gave the performers a voice in the results by having them complete a survey regarding their experiences in the different formations. This additional step influenced this study by reminding that music performance preferences were as much about those on stage as those in the audience.

Ultimately, Daugherty found that the spacing between choristers was of significant difference to the preferred musical performance of both the singers as well as the auditors. However, choral formation itself did not show a significant difference in preference of musical performances either by the auditors or by the performers.

Elizabeth Ekholm (2000) used a research design similar to Daugherty's. However, her stated goals were to find differences in individual vocal technique used by choristers when exposed to different arrangements and spacings. Though Ekholm's research concerned the physical and technical differences singers reported when performing from different stage formations, she made an important observation about ensemble blend. Ekholm posited that non-vocal musicians and/or sophisticated music listeners were more open to musical concerns outside of blend and balance than were choral conductors or vocal teachers evaluating the same performances.

Development of the Accepted Basic Musical Elements and Their Effect on Teaching Methodology

Currently, the basic elements of music identified by the National Association for Music Education consist of pitch, rhythm, harmony, dynamics, timbre, texture, and form. These are the items listed in the Glossary under *Elements* in NAfME's *The School Music Program: A New Vision* (1994). It is important to note that this listing differs from earlier lists of the basic elements of music.

The earliest example in American education of dividing music into its component parts came from Lowell Mason's *Boston Manual* (1834). This touchstone work would form the bedrock of American music education for the next century. In it, Mason gave music three divisions "to be pursued separately, until one division can no longer dispense with the other" (p. 34). Mason's three divisions consisted of pitch, rhythm, and dynamics. Herbert Wrightson (1937) would later expand slightly on these elements by dividing music into four constituent elements based on tone: the quality of tone (timbre), loudness or intensity, duration, and pitch.

The 20th century saw a trend of viewing education from a much more scientific paradigm. This scientific approach gave rise to new methods and theories for educators. It also brought taxonomic organizations to concepts and ideas in music. Spurred on by the Cold War's educational race, this period also saw many new writings on how teachers should approach music. A noted music education scholar of this time, James Mursell, listed the

> structural or constitutive elements of a piece of music - its intensity (loud, soft, medium, changing), its tempo (fast, slow, medium, changing), its characteristic rhythm (strongly accentuated or smooth meter), its pitch (high, low, up and down), its style (dramatic, lyric, florid, etc.), its broad structure or architecture, and so forth. The point, however, is that it is by no manner of means necessary to give systematic instruction in musical form, but simply to lead the listeners to notice elements of beauty and expressiveness in the music which they enjoy, and thus to enhance that enjoyment. (1951, pp. 166-167)

William Newman similarly sought fit to address the best ways for the student and layperson to understand music. His *Understanding Music* (1953) mapped out music's fundamental nature in terms of rhythm (including tempo), pitch, harmony and tonality, and texture and sonority. He then included a lengthy discussion of common musical forms as governed by "inner laws of music" and "extramusical factors" including text and program music. This examination of how to approach music also brought

many of the prominent composers of the day to speak out. In a collection of lectures from 1949, Roger Sessions spoke of music's ability to communicate in precise language. The stuff of this language consists of "rhythm, tempo, pitch, accent, dynamic shading, tone quality, and others sometimes even more subtle" (1950, p. 25). Of note in terms of the evolution of basic elements, Sessions took pains to point out that the element of harmony, which was not considered a tool for compositional development until the 17th or 18th century (p. 33), is itself a relatively new element in comparison to rhythm and pitch.

In his 1957 book, *What to Listen for in Music*, Aaron Copland gave his own idea on the four musical elements to which listeners should attend: rhythm, melody, harmony, and tone color. He also gave a thorough account of musical forms and textures, but does not title these concepts as basic elements.

Allen Winold published his own text of musical elements in 1966, setting out to provide "a definition [of music] that is general enough to cover all the facets of music and yet specific enough to give us a concrete conception of its nature and purpose" (p. 3). His elements, while based on the physical nature of sound, used terms derived from traditional music theory. The list numbered five: temporal, tonal, timbre-dynamic, textural, and formal.

In his 1963 publication *The Process of Education*, educational theorist Jerome Bruner posited that children are capable of learning even complicated concepts provided the *fundamental structure* of the material is presented first, and then built up through progressively more complicated structures. This spiral curriculum became the basis of the Manhattanville Curriculum Project beginning in 1965 and the Hawai'i Music Curriculum Project in 1968. The Manhattanville Music Curriculum provided five fundamental musical concepts—timbre, pitch, dynamics, form, and rhythm—which were to be developed along the spiral until they unfolded to more complicated concepts of harmony and texture, etc. (Thomas, 1991). Meanwhile, the Hawai'i Music Curriculum gave seven basic music concepts—tone, rhythm, melody, harmony, form, tonality, and texture—which were then divided into five zones (Mark, 1996).

Michael Mark also gave a great deal of credit to Charles Gary's *The Study of Music in the Elementary School: A Conceptual Approach* (1967) for promoting a conceptual underpinning to music

education. Mark stated: "One of the major contributions of *The Study of Music* is its discussion of concepts about rhythm, melody, harmony, form in music, forms of music, tempo, dynamics and tone color" (1996, p. 70).

From that point on, the majority of classroom music materials have been based on these elements in some form. Elementary music curricula and music appreciation textbooks, in particular, have found this elemental approach very useful. Frank Hill and Roland Searight (1966) produced a workbook entitled the *Elements of Music* that clearly outlines nine total elements. Rhythm, pitch, melody, harmony, and form are considered elements of composition, while tempo, dynamics, and phrasing are designated elements of performance. Timbre was also indicated as an element of music but did not receive consideration in the workbook.

Many of the most recent publications for elementary teachers still utilized the elemental organization system based primarily on the same five to seven musical elements. In *Using Music to Enhance Student Learning: A Practical Guide for the Elementary Classroom Teacher*, the authors organized their approach around the elements of rhythm, melody (or pitch), harmony, form, and expressive qualities (including timbre, dynamics, tempo, texture, style, and articulation) (Fallin & Tower, 2011). The elementary music text *Music Fundamentals, Methods, and Materials for the Elementary Classroom Teacher* listed the elements as rhythm, melody, timbre, form, texture, harmony, and expressive qualities such as tempo, dynamics, and articulations (Boyer-Alexander & Rozmajzl, 2012). Similarly, the Australian elementary music publication *Integrating Music into the Elementary Classroom* used "fundamentals of music" such as melody, rhythm, texture, tone color, dynamics, and musical forms to unify its curriculum (Anderson & Lawrence, 2004).

Music appreciation textbooks also frequently used the basic elements of music as curricular organization. Perhaps the most commonly utilized textbook in music appreciation classes over the last few decades, *The Enjoyment of Music* by Joseph Machlis and Kristine Forney (2003), was arranged according to the elements of melody, rhythm, harmony, texture, form, tempo, and dynamics. Other music appreciation texts such as *The Listening Experience* by James O'Brien (1995) followed suit.

Use of the elemental approach also increased in instrumental music classes. Robert Garofalo's *A Blueprint for Band* (1976) designed its lessons to always include skills that would aid in discriminating the structural elements of music: pitch, duration, timbre, intensity, and texture.

The basic elements have also been applied recently in the field of music therapy. Schneck, Berger, and Rowland (2006) state that "since music is an analogue of physiological function, it is useful to adopt physiological terms to emphasize parallels between human function and corresponding aspects of the behavior of music, which is viewed as an extension of human behavior" (p. 33). They named six fundamental elements of music, listed from simple to complex: periodicity, melody, harmony, dynamics, timbre, and form. It is most interesting to note that these are the only authors to link pitch and rhythm together under the same category (periodicity). In the authors' view, rhythm represents a repeating cycle and pitch is simply a faster version of a repeating cycle as measured by frequency.

Inclusion of the Basic Elements in Common Teaching Methodologies

As the basic elements of music inform how we think of music, they also inform how music is taught. In an early example of this, Emile Jacques-Dalcroze listed melody, harmony, and rhythm as the basic elements for any teaching method (1921, p. 40). His eurhythmics approach, combined with rigorous aural training, was initially developed to improve specifically these areas in students.

Similarly, Edwin Gordon's Music Learning Theory, published in his book *Learning Sequence and Patterns in Music* (1976), featured at its core the awareness and understanding of specific musical elements. Gordon stated, "In order to understand music, one must first be aware of its basic aural elements" (1976, p. 1). In his earliest research, Gordon sought to prove that those with the best propensity to learn music were not always those present in a music classroom. Drawing on the work of psychologists and previous musical researchers such as Carl Seashore and Herbert Wing, Gordon surmised that musical aptitude consists of tonal imagery, rhythmic imagery, and musical sensitivity (including aesthetic expressive-interpretive qualities) (Gordon, 1971). He would later conclude that the

basis of musical awareness derived from the development of "a sense of tonality and a sense of meter" (1976, p. 1).

Gordon's eventual development of his thorough Music Learning Theory was based on the focus of rhythmic and tonal patterns. In moving through these patterns and providing rote verbal clues to musical phenomena, Gordon suggested that other musical elements will gather more experiential meaning. He stated:

> As suggested previously, various elements of music function at the aural/oral level of learning: the rote audiation of a vocabulary of tonal patterns and of rhythmic patterns, and tonality, meter, music form, and music style. A syllabic vocabulary of tonal patterns as well as the proper names of tonalities, meters, music form, and music style are also learned by rote at the verbal association of learning. (1976, p.11)

Criticism of the "Basic" Elements

As evidenced by the variety of elements that were either included or excluded by different authors and publishers, there were discrepancies and debate over what elements should be considered fundamental to music education. Bennett Reimer, a proponent of music education as a form of aesthetic education, argued that "unless one perceives the aesthetic elements in the auditory realm - melody, harmony, rhythm, tone color, form - the experience cannot be considered aesthetic" (1968, p. 28). Other scholars argued that some "basic" musical elements such as form are not even perceptible to the listener and, therefore, cannot be considered vital to the musical experience (Levinson, 1997).

Still others argued that the choice of basic elements is decided based on their ability to be assessed in a precise way. However, rather than ignoring or changing existing elements, George Pratt called for an expansion of the concepts or phenomena that should be considered fundamental. He advocated for curricula that addressed the following:

> 1. the range and tessitura of instruments and voices;
> 2. the density and distribution of sounds and the textures within which they are performed;
> 3. the range of timbral colours, of dynamics, articulations and phrasing of which they are capable;
> 4. *where sounds are positioned in space and how they relate to each other structurally* [italics mine];
> 5. above all, the variations in pace at which all these elements may occur. (1990, p. 2)

The concerns about the generally accepted teaching model based on the elements were perhaps best summarized in David Elliott's seminal *Music Matters* (1995). Elliott argued that, though the musical elements can be useful for discussion, we don't actually perceive them in the way that we present them. He explained that "[o]ur conscious awareness of sounds consists not in isolated elements heard one by one but in identifiable patterns clearly separated into greetings, warnings, questions, statements, melodic phrases, and rhythms" (p. 81). Elliott went on to reject a structural approach out of hand because it is based on the faulty premise that "all knowledge in all fields can be reduced to some sort of verbal description" (p. 246). Furthermore, he attacked an elemental approach to teaching music as "deprofessionalizing" to teachers in that it limits them to "acting out scripts and managing information" (p. 246).

Indeed, Elliott rejected the notion that a structural approach to music education is helpful or even healthy. Rather than a "structure-of-disciplines" in which a learner tries to understand via verbal thinking, Elliott instead proposed a more holistic "knowledge by doing" that he termed praxialism. This praxial philosophy of education is still being developed 20 years later and remains a major source of debate in the world of music education.

Whereas Elliott still found a place for the "structural elements" of music (which he lists as melody, harmony, rhythm, tone color, texture, dynamics, and formal strategies), other music educators are harsher in their condemnation of an elemental approach (p. 90). Robert Cutietta stated that "the actual processing of music is largely holistic, intuitive, and nonverbal. We boast that music is exceptional in the school curriculum for its emphasis on this latter type of processing, yet, by and large, we negate the medium's inherent uniqueness by the way we teach it" (1993, p. 50). Cutietta suggested five completely different elements of music based upon a more accurate representation of how music is actually perceived: motion, energy, flow, fabric, and color.

Similar concerns are shared by Canadian scholars Leslie Stewart-Rose and June Countryman. Using language that echoed the noted Brazilian education critic Paolo Friere and his *Pedagogy of the Oppressed* (1968), Stewart-Rose and Countryman stated that "[i]n our view, the traditional *pedagogy of*

the elements is an oppressive pedagogy which devalues diversity, limits access, and denies individuality" [italics original] (2013, p. 48). In particular, the authors were troubled by the tendency of the traditional elements to show preference, intentional or otherwise, to Western art music. This had an effect of "othering" music outside of the Western canon, as teachers most often chose to present musical selections which best exemplified the pre-determined musical element and/or over-simplified musical selections which did not as easily conform to the musical element at hand.

In critiquing the elemental approach as atomistic and limiting, Stewart-Rose and Countryman echoed the praxial philosophy:

> With a focus on the elements in the curriculum, it is easy to forget to explore our relationships with music, the relationships created through the complex dance among sound, composer, performer, listener and context. To focus on student agency in music class is to focus less on the music itself and more on our relationships with music and to ask how we create opportunities for adolescents to speak their truths. (p. 50)

Ultimately, they offered three broad observations of musical engagement based upon their experiences teaching high school students. First, students were already hearing many complex musical phenomena even if they had used their own words to verbalize them. Second, students had already explored their relationship with sound and its relationship with others. Third, students craved opportunities to investigate music's role in their lives (p. 55).

The authors summarized their critique as follows:

> We suggest that when music educators create a space where performing, creating and listening are happening in community, shaped by a pedagogy that recognizes the limitations of such curriculum fixtures as the elements and that builds on what students bring to the experience, it can make an enormous difference to students' sense of themselves, their peers, and their world. Given our goals to provide a context for the growth of healthy, resilient, agentive learners, we critique the elements curricula for continuing to encourage transmissive pedagogy which denies opportunities for identity-work, self-expression, connection and community. (p. 60)

Bonnie Wade attempted to address the criticisms of "otherness" while still using the elemental approach in her *Thinking Musically: Experiencing Music, Expressing Culture* (2009). In her introduction, Wade described her organization of this text's initiating unfamiliar students to an entire world of musical cultures via anecdote:

> Turning to my experience of studying North Indian music, I remembered that my teachers initially focused on *raga* (melody), and one of the first things I had to do was learn how to play the drone ("harmony") and simultaneously sing melody. Then came *tala* ("rhythm"), and I was taught to sing in a *raga* according to a certain formal structure. That experience resonated with the established order of presentation of Western-style music scholarship, and I drafted the book on that model. (2009, p. xiii)

No reader could possibly accuse Wade of not having shown concern for the othering of non-Western styles of music or of bearing a bias toward the Western canon. Nonetheless, she actively used the elemental approach as a useful tool in music education for exploring a large variety of musical styles and cultures.

The use of elements as an organizing force for the majority of music education curricula did not appear to be diminishing even if it was the source of criticism and in need of evaluation. The consensus moving ahead for the future of music education, according to most modern day scholars, seemed to be that the musical elements were in need of further refinement, not in need of abolishment. The goal of this researcher was to help further this re-evaluation of the elements by considering spatialization as a possible new path.

CHAPTER THREE

METHODOLOGY

Restatement of Research Purpose

The purposes of this study were: 1) to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization; 2) to examine students' feelings and motivation toward lessons designed around the spatialization concept; 3) to identify practical challenges to implementing such a lesson unit to a middle school band classroom.

Participants

The participants in this study consisted of students enrolled in the researcher's 8th grade band class ($N = 20$). The school was located in a rural county in northeast Georgia with Title I socioeconomic status. Total school enrollment was 852, and the ethnic makeup of the school was: Caucasian (54%), African-American (33%), Hispanic (9%), Multi-racial (2.4%), Asian (.008%).

The participants consisted only of wind instrumentalists, as percussionists were taught in a separate class section. Additionally, as one of the research purposes was to identify practical challenges a lesson unit might present, the researcher reasoned that adding percussion students as participants would have overly complicated the daily spatial activities. In particular, the moving of large equipment like bass drums, marimbas, and timpani would have necessarily limited the ability of percussionists to quickly or thoughtfully complete many of the class's spatial activities or explorations.

All students enrolled in band received instruction every other day for a period of 70 minutes. Students attended band class three times in one week followed by two times during the next week because of the strict nature of this alternating day schedule. Additionally, the school's testing schedule as given by the state department of education caused a one-week gap in band instruction for this project.

Approval and Permission

Before beginning the study, approval was obtained from the participating school principal, as well as the Office of the Vice President for Research at the University of Georgia through the Institution Review Board (IRB). Parental consent and student assent forms were also obtained and are contained in Appendices D and E.

Lesson Unit

Though initially intended as a unit of 15 lessons exploring spatialization that would enhance the concert music preparation for the 8th grade Spring Concert, mitigating factors necessitated the lesson unit be cut down to 8 lessons on spatialization. Among these mitigating factors were a state-wide testing window that prevented all 8th grade students from having any non-academic classes during one entire school week; a carnival in which students who had exhibited good behavior over the course of the year could elect to spend their non-academic class time at a carnival (all students participating in this study were eligible for this carnival); and an 8th grade class field trip.

Though modified in its length from 15 to 8 lessons, the lesson unit was designed to include the three artistic processes of Creating, Performing, and Responding as described in the Core Music Standards created by the National Association for Music Education. Plans for these lessons can be found in Appendix A.

Spatial Presentations

From the material studied in class, two selections from Anne McGinty's *Chorale and Canon* (1985), a standard work for young musicians, were chosen by the researcher as the material for the study's performance evaluation. This work was chosen based upon the observations concerning research on ensemble arrangement and placement by James Daugherty. As stated earlier, Daugherty (1999) noted that short performance examples prevented judge "fatigue" and provided a better range of data. Anne McGinty's composition easily broke down into small sections (each around 55 seconds in length) and

also featured two contrasting textures, one homophonic and the other a polyphonic canon, that would allow for a more complete picture of spatialization's role in the musicality of the performance.

During the last two lessons of the unit, the students experimented with performing *Chorale and Canon* in various spatial arrangements in a large, flat, rectangular auditorium (100 x 150 ft) filled with movable cloth-backed chairs. The students then selected the four arrangements they thought to be most interesting spatially. These were to be presented to three judges, preceded by a performance using the band's standard spatial arrangement (Example 1). The four student-designed spatial presentations were as follows: two horizontal lines of performers flanking the judges and strictly separated by brass or woodwind (Example 2); two horizontal lines of performers flanking the judges and separated by part or voice (bass, tenor, etc.) (Example 3); musicians scattered across the auditorium on all sides of the judges and irrespective of instrument family or voice (Example 4); musicians circling the judges in equal spacing and grouped together by part or voice (Example 5). Diagrams of each example are found in Appendix F.

Each of these in-class spatial presentations was recorded and listened to during the last lesson in the unit. The class performance was recorded via *Audacity* audio software contained on the researcher's MacBook Pro running Mac OS X using a Blue Yeti microphone. The microphone and audio recording equipment were placed in the center of the auditorium with the microphone set on an omnidirectional recording mode to capture an image of the spatial effects each student presentation would create. Each of the students' spatial examples were designed to be performed toward the microphone in the center of the auditorium.

During the last class lesson, students listened to each spatial example, although they were presented a stereo recording due to the limitations of the classroom's stereo playback. After listening to their recording, the students voted to determine which spatial arrangement they thought was the most musical overall. The spatial arrangement in Example 5 was voted by the class as the most musically pleasing. The result of the student vote was not made known to the judges.

Summative Performance and Data Collection:

Three qualified judges evaluated the summative performance, which took place in the same large auditorium described earlier. Each evaluator had completed at least two years as a band teacher at a Georgia public school. The judges were asked to listen and score each performance in the five categories that are standard on the Georgia Music Educators Association Band Large Group Performance Evaluation Judges Form (Appendix B). These scored categories are: Tone, Intonation, Technique, Balance, and Musicality. Each category was given a score of 1 through 5, with 1 signifying a Superior performance, 2, Excellent; 3, Good; 4, Fair; and 5, Poor. Thus a lower score represented a more favorable evaluation.

The participants first performed the chorale section, which had a mostly homophonic texture. Following a short (less than 60 seconds) break, the students then performed the *stretto* section to the end of the canon, which had a more active polyphonic texture. After performing both parts of each selection (chorale as well as canon) in one spatial arrangement, the students moved to the next spatial arrangement processing in order from Example One through Example Five. This movement therefore occurred a total of five times, resulting in a total of ten performances: five of the chorale section, and five of the canon.

The judges, seated at the center of the auditorium, determined their scores for each category for both the chorale and canon in each spatial arrangement before the performers moved on to their next spatial presentation. By the end of the summative performance, each judge had given a total of 50 scores.

The summative performance was also recorded via *Audacity* audio software contained on the researcher's MacBook Pro running Mac OS X using a Blue Yeti microphone. The microphone and audio recording equipment were placed near the judges so that, insofar as possible, the performance recording would duplicate the experience of the the live judges. The microphone was set on omnidirectional recording mode and adjusted on a microphone stand set to the same head level as the center judge. Eight additional experienced evaluators of band performances were asked to evaluate the recordings according to the same criteria. Despite the steps taken to record an omnidirectional, or surround sound, version of each performance, the practical difficulties of securing eight qualified evaluators into a room where surround sound playback was possible necessitated the use of stereo playback. The audio files were

randomized in performance order and uploaded to a Soundcloud audio hosting website. The judges evaluating the recorded performances were asked to wear stereo headphones to simulate the spatial effects as closely as possible.

Following the summative performances, student participants completed a written survey regarding their engagement with and enthusiasm for the lesson unit as a whole. This survey was adapted from student attitude surveys using Likert scales as described in *A Competency Based Approach to Music Education: Observation and Field Manual* by Cornelia Yarbrough and Clifford Madsen (1976). The survey is found in Appendix C.

Analysis of Data

In order to satisfy the first research purpose (to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization), mean scores from evaluators were analyzed and compared via a one way Analysis of Variance (ANOVA). Significant effects between scoring of the chorale (homophonic) versus the canon (polyphonic) textures, differences in scoring between the judges present at the performance versus those scoring via recording, and any ultimate differences between scores in each of the five spatial presentations were determined via a 2 x 2 x 5 Analysis of Variance and post-hoc pairwise comparisons.

To address the second research purpose (to examine students' feelings and motivation toward lessons designed around the spatialization concept), the data from Student Attitude Response surveys were evaluated using mean scores from the Likert-scale scoring.

The third research purpose (to identify practical challenges to implementing such a lesson unit to a middle school band classroom) was addressed by examining the researcher's own personal observations during the implementation and execution of this action research.

CHAPTER FOUR

FINDINGS

The purposes of this study were: 1) to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization; 2) to examine students' feelings and motivation toward lessons designed around the spatialization concept; 3) to identify practical challenges of implementing such a lesson unit to a middle school band classroom.

In this research design, the independent variable was five spatial arrangements (Example 1 - 5). Example 1 was a control variable as it presented the music in a standard band seating arrangement. Examples 2 through 5 were spatial presentations created by and decided upon by student participants where Example 5 was determined by students to be the most musical presentation. The five dependent variables were based on the Georgia Music Educators Association Large Group Performance Evaluation judging criteria. Specifically, these are Tone, Intonation, Technique, Balance, and Musicality. Performance results were measured for each dependent variable category for both the chorale and the canon in every spatial arrangement. A five point scale was used by evaluators with 1 representing a Superior performance; 2, Excellent; 3, Good; 4, Fair; and 5, Poor. Thus a lower score represented a more favorable evaluation.

Evaluators ($N = 11$) for each performance were drawn from experienced band teachers (defined as having at least two years of band teaching experience) in Georgia. Because of the practical difficulties in scheduling a large number of live evaluators to attend the performance, judges' scores were separated into two groups, Live (N=3) and Recorded (N=8), and similarly treated as an independent variable. Two

contrasting textures of music, a homophonic chorale and a polyphonic canon, were also used as independent variables to control for any effects that music selection might create in the judges' scoring.

Spatial Presentation Example Data Analysis

Table 1 lists the mean scores and standard deviation for each category and spatial arrangement. Note that lower scores indicate better performance. Figure 1 is a plot of mean scores for each of the five spatial presentations where Example 1 was performed in standard band seating arrangement (control group) and examples 2 - 5 were experimental spatial arrangements as decided by the students. The spatial arrangement used in Example 5 had been previously chosen by students as their most musically effective arrangement.

In order to address the first research purpose (to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization) the total mean scores for each dependent variable produced by each spatial presentation were analyzed via a one-way Analysis of Variance (ANOVA). The results of this ANOVA are summarized in Table 2.

A significant interaction was detected ($p = .02$) and a post-hoc test using Bonferroni comparisons of means revealed that Example 5 (the students' self-identified best spatial presentation) was the only example scored significantly lower than all other presentation examples. In all Example 5 ($x = 1.92$) was scored significantly lower (i.e., better) than the following: the control group, Example 1 ($x = 2.234$), $p = .02$; the brass/woodwind horizontal split, Example 2 ($x = 2.291$), $p = .009$; the group-assigned horizontal split, Example 3 ($x = 2.209$), $p = .038$; and, the scattered arrangement, Example 4 ($x = 2.376$), $p = .001$.

A separate ANOVA tested for interaction within scoring category and spatial arrangement. It is summarized in Table 3. These results suggested a significant difference takes place between the spatial presentation and Technique scoring ($p = .007$). A post-hoc comparison was made for Technique as demonstrated in Table 4. These results suggested a significantly lower rating for the students' preferred spatial arrangement (Example 5) to the Technique scores of Example 1 ($p = .029$), Example 2 ($p = .013$), and Example 4 ($p = .001$).

The dependent variable, Balance also approaches significance (p = .068) in this ANOVA. A post-hoc analysis detailed in Table 5 revealed a significant difference between the standard concert band seating (Example 1) and the student designed presentation of horizontal lines arranged to the left and right side of the judges in Example 2 (p = .006) and Example 3 (p = .023). Likewise, the students' most preferred arrangement (Example 5) also approached a significantly lower (better) scoring than Example 2 (p = .07).

Follow Up Analyses

Subsequent analyses were also conducted for significant differences in scoring between judges present at the summative performance (N=3) and those judges listening via recording (N=8) as well as for differences in scoring between textures, chorale versus canon (Table 6).

In order to determine any significant interaction between the scoring of the three judges present for the spatial presentations and the scoring of judges who were evaluating via recording, a test of between-subjects effects was administered. A mixed ANOVA of between-subjects factors indicated the simple main effects for live scoring versus recorded scoring. The simple main effects suggested significance for Tone [F (1,9) = 6.479, p = .031, partial η^2 = .419], as well as for Balance [F (1,9) = 4.756, p = .057, partial η^2 = .346]. In the example of tone, judges listening to a recording gave scores with a mean difference .608 higher than their live counterparts (p = .031). Similarly, judges listening to a recording gave a mean score for Balance that was .571 higher than the live judges (p = .057).

Table 7 demonstrates the results of an ANOVA comparing within-subject factors between dependent variables of the two textures (homophonic chorale and the polyphonic canon) as well as against the spatial arrangement examples.

Results from this comparison implied a significant interaction within the Balance category. Post-hoc pairwise comparisons between the two textures and spatial arrangements for Balance are detailed in Table 8. Simple effects for Balance were noted between the chorale and canon scores in spatial examples 2 and 3 (the horizontal presentations) as well as the students' preferred presentation, example 5.

Specifically, Balance tended to be scored significantly higher in performances of the canon as opposed to the chorale during spatial presentations 2 and 5 (p = .049 and .016, respectively). The opposite was true in spatial presentation 3, in which the chorale was scored somewhat significantly higher than the canon (p = .058).

Student Attitude Survey Results

To satisfy research purpose 2 (to examine students' feelings and motivation toward lessons designed around the spatialization concept), Student Attitude Surveys were given to each student at the conclusion of the summative performance. This survey was adapted from the student attitude surveys as described in *A Competency Based Approach to Music Education: Observation and Field Manual* by Cornelia Yarbrough and Clifford Madsen (1976) and scored according to a five-point Likert scale. The survey contained four statements regarding the students' feelings of positivity toward four topics from the unit on spatialization: 1) their positive feeling toward the music performed during the unit; 2) their enjoyment of rehearsal during the unit; 3) their positive feeling toward the standard seating arrangement versus the experimental seating; 4) their level of personal engagement with the lesson unit. The survey can be found in Appendix F. Mean score results are listed in Figure 2.

Mean score results from each of the four topics demonstrated that student attitudes (N=19 due to one student absence) toward the lesson unit were quite positive as demonstrated in Table 9.

For the topics of music performed and rehearsals, the mean and modal scores indicated that the majority of the class agreed or strongly agreed that they enjoyed each of these items during the spatial lesson unit. The lower mean score (x = 2.32) and modal score (Mo = 1) showed that the majority students disagreed and strongly disagreed that they preferred the standard band seating arrangement over the modified arrangement when rehearsing during this unit. Students rated their level of personal engagement very positively during this unit. The modal score of 5 indicated that most

students rated themselves as “Totally Engaged” while the mean score of 4.53 indicated overall class engagement as between “Totally Engaged” and “With It.”

Table 1. Means and Standard Deviations of Each Spatial Arrangement Example

Musical Selection	**Tone**	**Intonation**	**Technique**	**Balance**	**Musicality**	**Total Mean Score for Spatial Arrangement (Chorale with Canon)**
Chorale Ex. 1	2.27 (.786)	2.45 (.522)	2.36 (.674)	1.91 (.701)	2.64 (.505)	
Canon Ex. 1	1.81 (.603)	2.27 (.647)	2.45 (.522)	2.00 (.632)	2.18 (.603)	2.234 (.262)
Chorale Ex. 2	1.55 (.522)	1.90 (.301)	2.27 (.467)	2.09 (.302)	2.18 (.603)	
Canon Ex. 2	2.18 (.750)	2.55 (.522)	2.82 (.603)	2.82 (.751)	2.55 (.522)	2.291 (.403)
Chorale Ex. 3	1.82 (.603)	2.27 (.647)	2.55 (.934)	2.45 (.820)	2.73 (.647)	
Canon Ex. 3	2.09 (.539)	2.18 (.603)	2.00 (.775)	1.91 (.302)	2.09 (.539)	2.209 (.291)
Chorale Ex. 4	2.00 (.894)	2.45 (.688)	2.73 (.647)	2.67 (.924)	2.64 (.809)	
Canon Ex. 4	2.00 (.775)	2.27 (.786)	2.73 (.905)	2.00 (1.00)	2.27 (.905)	2.376 (.309)
Chorale Ex. 5	1.64 (.674)	1.82 (.405)	1.91 (.701)	1.82 (.874)	2.36 (.505)	
Canon Ex. 5	1.73 (.467)	2.00 (.775)	1.73 (.647)	2.18 (.874)	2.00 (.632)	1.92 (.222)

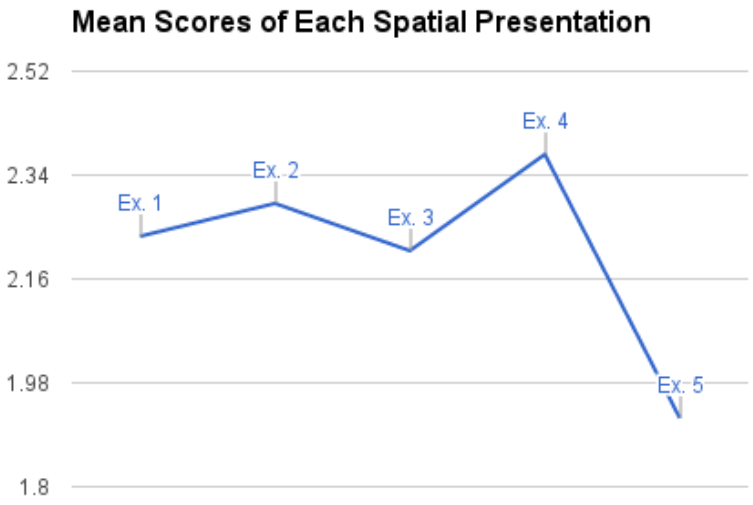

Figure 1. Mean Score of Five Spatial Arrangements

Table 2. ANOVA Summary for Example Mean Score Between Spatial Arrangement

Mean Example Ratings	**DF**	**SS**	**MS**	**F**	***p***
Between Groups	4	1.193	0.298	3.236	0.02
Within Groups	45	4.147	0.092		
Total	49	5.340			

Table 3. ANOVA Summary for Scoring Category Between Spatial Arrangement

Category	**DF**	**SS**	**MS**	**F**	***p***
Tone	4	.777	.194	.622	.650
Intonation	4	1.851	.463	1.381	.260
Technique	4	8.245	2.061	4.171	.007
Balance	4	3.739	.935	2.399	.068
Musicality	4	1.473	.368	1.060	.390

Table 4. Post-hoc Bonferroni Pairwise Comparison of Spatial Presentation and *Technique*

Pairwise Comparisons

Measure: Technique

(A) Spatial Example	(B) Spatial Example	Mean Difference (A-B)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.094	.158	.568	-.452	.264
	3	.250	.178	.195	-.154	.654
	4	-.271	.266	.335	-.872	.330
	5	.615*	.236	.029	.080	1.149
2	1	.094	.158	.568	-.264	.452
	3	.344	.239	.183	-.196	.883
	4	-.177	.229	.460	-.696	.342
	5	.708*	.230	.013	.187	1.229
3	1	-.250	.178	.195	-.654	.154
	2	-.344	.239	.183	-.883	.196
	4	-.521	.289	.105	-1.174	.132
	5	.365	.317	.280	-.352	1.081
4	1	.271	.266	.335	-.330	.872
	2	.177	.229	.460	-.342	.696
	3	.521	.289	.105	-.132	1.174
	5	.885*	.192	.001	.452	1.319
5	1	-.615*	.236	.029	-1.149	-.080
	2	-.708*	.230	.013	-1.229	-.187
	3	-.365	.317	.280	-1.081	.352
	4	-.885*	.192	.001	-1.319	-.452

Table 5. Post-hoc Bonferroni Pairwise Comparison of Spatial Presentation and *Balance*

Pairwise Comparisons

Measure: Balance

(A) Spatial Example	(B) Spatial Example	Mean Difference (A-B)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.552*	.155	.006	-.903	-.202
	3	-.365*	.133	.023	-.665	-.064
	4	-.250	.195	.233	-.692	.192
	5	-.031	.245	.901	-.586	.523
2	1	.552*	.155	.006	.202	.903
	3	.188	.106	.109	-.051	.426
	4	.302	.249	.257	-.262	.866
	5	.521	.253	.070	-.052	1.094
3	1	.365*	.133	.023	.064	.665
	2	-.188	.106	.109	-.426	.051
	4	.115	.208	.594	-.355	.584
	5	.333	.201	.131	-.121	.788
4	1	.250	.195	.233	-.192	.692
	2	-.302	.249	.257	-.866	.262
	3	-.115	.208	.594	-.584	.355
	5	.219	.292	.474	-.443	.880
5	1	.031	.245	.901	-.523	.586
	2	-.521	.253	.070	-1.094	.052
	3	-.333	.201	.131	-.788	.121
	4	-.219	.292	.474	-.880	.443

Table 6. Mean Scores and Standard Deviations separated for Live Judge Scoring (N=3) and Recorded Judge Scoring (N=8)

Musical Selection	Tone	Intonation	Technique	Balance	Musicality
Chorale 1 (Live)	1.33 (.577)	2.33 (.577)	2.33 (1.155)	1.33 (.577)	3.00 (.000)
Chorale 1 (Recorded)	2.63 (.518)	2.50 (.535)	2.38 (.518)	2.13 (.641)	2.50 (.535)
Canon 1 (Live)	1.67 (.577)	2.33 (.577)	3.00 (.000)	1.67 (.577)	2.33 (1.155)
Canon 1 (Recorded)	1.88 (.641)	2.25 (.707)	2.25 (.463)	2.13 (.641)	2.13 (.354)
Chorale 2 (Live)	1.00 (.000)	2.00 (.000)	2.33 (.577)	2.00 (.000)	2.33 (.577)
Chorale 2 (Recorded)	1.75 (.463)	1.88 (.354)	2.25 (.463)	2.13 (.354)	2.13 (.641)
Canon 2 (Live)	1.33 (.577)	2.33 (.577)	3.00 (.000)	2.33 (.577)	2.67 (.577)
Canon 2 (Recorded)	2.50 (.535)	2.63 (.518)	2.75 (.707)	3.00 (.756)	2.50 (.535)
Chorale 3 (Live)	1.67 (.577)	2.67 (.577)	2.33 (1.528)	2.67 (.577)	2.33 (.577)
Chorale 3 (Recorded)	1.88 (.641)	2.13 (.641)	2.63 (.744)	2.38 (.916)	2.88 (.641)
Canon 3 (Live)	1.67 (.577)	2.00 (.000)	2.00 (1.00)	1.67 (.577)	2.33 (.577)
Canon 3 (Recorded)	2.25 (.463)	2.25 (.707)	2.00 (.756)	2.00 (.000)	2.00 (.535)
Chorale 4 (Live)	1.33 (.577)	2.33 (.577)	3.00 (.000)	1.67 (.577)	3.33 (.577)
Chorale 4 (Recorded)	2.25 (.886)	2.50 (.756)	2.63 (.744)	3.00 (.756)	2.38 (.744)
Canon 4 (Live)	1.33 (.577)	2.00 (1.00)	2.67 (1.155)	1.33 (.577)	2.67 (.577)
Canon 4 (Recorded)	2.25 (.707)	2.38 (.744)	2.75 (.886)	2.25 (1.035)	2.13 (.991)
Chorale 5 (Live)	1.67 (.577)	2.00 (.000)	2.00 (1.00)	1.00 (.000)	2.33 (.577)
Chorale 5 (Recorded)	1.63 (.744)	1.75 (.463)	1.86 (.641)	2.13 (.835)	2.38 (.518)
Canon 5 (Live)	1.67 (.577)	2.00 (1.00)	2.00 (1.00)	2.00 (.000)	2.33 (.577)
Canon 5 (Recorded)	1.75 (.463)	2.00 (.756)	1.63 (.518)	2.25 (1.035)	1.88 (.641)

Table 7. ANOVA Summary of Within Subject Effects (Texture and Spatial Arrangement)

Category	**DF**	***SS***	***MS***	**F**	***p***
Tone	4	1.343	.336	1.461	.234
Intonation	4	1.964	.491	2.128	.097
Technique	4	2.904	.726	1.387	.258
Balance	4	6.428	1.607	3.855	.010
Musicality	4	2.252	.563	2.337	.074

Table 8. Post-hoc Bonferroni Pairwise Comparison of Texture Within Balance Scores

Pairwise Comparisons

Measure: Balance

Spatial Example	(A) Chorale	(B) Canon	Mean Difference (A-B)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
1	1	2	-.167	.291	.581	-.826	.492
	2	1	.167	.291	.581	-.492	.826
2	1	2	-.604*	.266	.049	-1.205	-.003
	2	1	.604*	.266	.049	.003	1.205
3	1	2	.688	.317	.058	-.029	1.404
	2	1	-.688	.317	.058	-1.404	.029
4	1	2	.542	.394	.202	-.349	1.432
	2	1	-.542	.394	.202	-1.432	.349
5	1	2	-.563*	.191	.016	-.995	-.130
	2	1	.563*	.191	.016	.130	.995

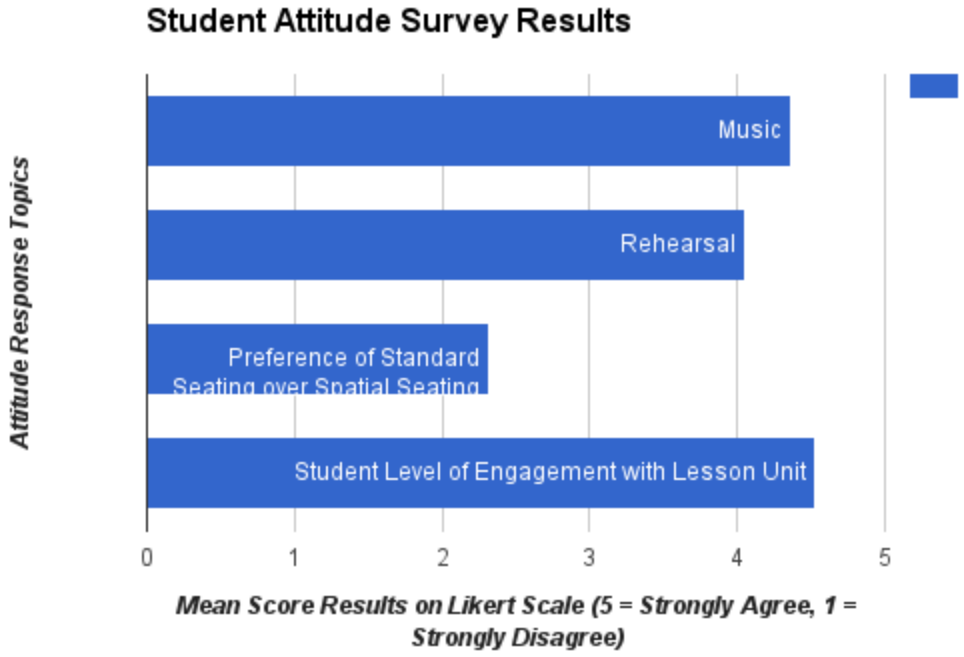

Figure 2. Student Attitude Survey Results Bar Graph

Table 9. Mean and Mode of Student Attitude Survey Results

	Enjoyed Music Performed	Enjoyed Rehearsing Music	Preferred Original. Standard Seating Arrangements	Student Level of Engagement During Class Rehearsal
Mean score ($\underline{x}$) (N = 19)	4.37	4.05	2.32	4.53
Mode score (Mo)	5	4	1	5

CHAPTER FIVE

SUMMARY, CONCLUSIONS, NEED FOR FURTHER STUDY

Summary

The purposes of this study were:1) to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization; 2) to examine students' feelings and motivation toward lessons designed around the spatialization concept; 3) to identify practical challenges to implementing such a lesson unit to a middle school band classroom. Participants ($N = 20$) were 8th grade band students engaged in an eight-lesson unit involving spatialization. At the completion of that unit, students designed four spatial arrangements in which they performed two selections from Anne McGinty's *Chorale and Canon* alongside a fifth control group presentation in standard concert band seating. The students voted on one spatial arrangement as their most musical. Eleven experienced judges gave scores for each performance in five categories (Tone, Intonation, Technique, Balance, and Musicality) as are standard on the Large Group Performance Evaluation Judging Form from the Georgia Music Educators Association.

To determine students' feelings and motivation toward lessons designed around the spatialization concept, a Student Attitude Survey was given to each participant. This survey was adapted from the student attitude surveys as described in *A Competency Based Approach to Music Education: Observation and Field Manual* by Cornelia Yarbrough and Clifford Madsen (1976), and was scored according to a five-point Likert scale.

Significant differences in scoring were found between the most musical presentation as determined by the participants and the other four spatial presentations. Specifically, the judges scored the student-preferred presentation significantly lower (i.e., better) than all other presentations, including the control group. This indicates that the unit's exercises and experimentations with spatialization did result

in significant improvement in the musicality of their performance. The performance categories Technique and Balance were most significantly improved.

Follow up analyses revealed that there was interaction between the scoring of judges present at the performance and judges scoring via recorded example, suggesting that other methods of evaluating the performances may lead to different conclusions. In particular, the practical limitations that necessitated the judges scoring via a stereo recording could have resulted in different outcomes had they scored to a recording that gave more fidelity to the surround sound aural effects. There was also interaction determined between the spatial presentation and the texture of the music presented, suggesting that another selection of music similarly may lead to another result.

Results gleaned from the Student Attitude Survey were decidedly positive toward the spatialization unit. Student participants indicated a preference for experimenting with spatial seating arrangements over staying in their standard concert band seating. They also responded positively to rehearsing the music selected for the spatial presentations. Additionally, the students self-reported high levels of engagement during the spatialization lesson unit.

Conclusions

Findings related to the first research purpose (to determine any measurable improvement in performance due to a lesson unit based on the musical concept of spatialization) seem to support the hypothesis that the teaching of this newly-considered musical element did measurably improve musical performance. The student-determined spatial presentation that the participants chose as the most musical was scored significantly lower (i.e. better) than the other student-designed presentations or the control group presentation, particularly in the categories of Technique and Balance.

This result is tempered somewhat by the finding of significant interaction between the scoring of judges present at the performance (n = 3) and those listening via recording (n = 8). Though steps were taken in the recording process to achieve a recording that was true to the spatial effects occurring in

performance, it is certainly possible that different results may have been found if all judges had been present at the performance or all had listened via recording.

Similarly, there was significant interaction between the performance category of Balance and the two textures of music selected. A polyphonic and homophonic chorale example were each used in the study to try and account for this effect, but it is possible that different selections of music from a different time period, or using a different texture such as melody with accompaniment, would have born out different results.

For the second research purpose (to examine students' feelings and motivation toward lessons designed around the spatialization concept) the results were decidedly positive. The mean and modal responses indicated that the participants enjoyed many aspects of the lesson unit and rated their engagement level with a mean score halfway between "Totally Engaged" and "With It." The indications to both research purposes point toward a positive effect of spatialization's inclusion as a point of emphasis in teaching, both from students' attitudes in engaging with it, as well as with the measurable gains in musical performance that result from it.

The third research purpose (to identify practical challenges to implementing such a lesson unit to a middle school band classroom) was determined via personal observation and reflection by the researcher. The largest practical difficulties in implementing spatialization activities into band rehearsals involved balancing time between rehearsing music for an upcoming concert and introducing, refining the understanding of, and creating experiences with the spatialization concept for the students. This was made particularly difficult with lost instructional days due to end of year events and celebrations. Unfortunately, this hurdle of scheduling and decreased class time for music and other fine arts is one with which music instructors across the country are becoming increasingly familiar. Shortening the activities and spreading them out over a longer lesson unit would improve this difficulty, especially given the positive results in performances and the positive response towards the activities from students.

The implementation of percussion instruments in spatialization activities is also a practical concern for any teacher. Larger melodic percussion instruments such as marimba, xylophones or timpani

take both extra time to move and more physical space than most instruments. Moving this equipment three or four times during the same class period would drastically slow down the students' allotted time to explore different spatial arrangements during rehearsal. Leaving the instrument in one place or having the percussionists simply switch to another instrument would be a possible solution, yet the percussionist would not truly be having the same experience of the spatialization concept as the other students. With these practical considerations in mind, and because 8th grade percussionists had their own class period, the researcher decided to omit percussionists from the study.

Need for Further Study

The results of this study suggest that teaching a unit based upon the concept of spatialization in music will increase the musicality in a subsequent performance. However, though research into spatialization is becoming increasingly common in music theory and computer music scholarship, it has yet to be studied for applications in music education in any but the most tangential ways. Most of spatialization's prior application to music education research has been in regard to ensemble blend and placement, as in the choral studies by Lambson (1961), Daugherty (1999), Ekholm (2000), and Atkinson (2010).

Future studies should include: 1) as Ekholm suggests, using judges from other musical backgrounds, or even unsophisticated listeners, to evaluate a similar spatially-designed performance; 2) changing the recording approach to specifically address spatial recording of the ensemble, including a specified and standardized listening environment for evaluators scoring by recording to more accurately approach the experience of the live evaluators; 3) comparing results from using only live evaluators and evaluators listening only via recording; 4) examining the effects of a spatialization unit in other performance ensembles such as choir or orchestra; 5) examining the effects of a spatialization unit in a non-performing context, such as a general music class.

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APPENDIX A

LESSON PLANS

Class: 8A

Title of Lesson	Spatialization Lesson 1
Standards	Core Music Standard MU:Pr4.2.E.Ia Demonstrate, using music reading skills where appropriate, how compositional devices employed and theoretical and structural aspects of musical works impact and inform prepared or improvised performances MU:Re7.2.E.8a Describe how understanding context and the way the elements of music are manipulated inform the response to music.
Behavioral Objectives	#1 TSWBAT Identify and describe the effects room size, shape, and materials have on sound and performance. #2 TSWBAT Predict and Apply the sound effects of room size, shape, and material have on performing music for concert.
Needed Materials	video clip of David Byrne's TED talk (https://www.youtube.com/watch?v=Se8kcnU-uZw), projector and stereo playback. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) show a video clip of David Byrne's TED talk (https://www.youtube.com/watch?v=Se8kcnU-uZw) on the importance of architecture and acoustics in music. Lead class discussion regarding physical spaces in the school that might be used to perform various styles of music. Assign the students to play their instrument in three different places in their house or neighborhood. Assign them to make note of the results and their preferences for each. 2) Lead class discussion regarding the physical attributes of the band room. Discuss the effects on sound that a) size of the room; b) shape of the room; c) materials in the room. 3) Rehearse closing sections of Carmen and Best Day of My Life for spring concert. Apply themes from the class discussion by working to achieve a long ring in the room at the release of the last note. **Summary:** "Pepper" the students with questions about what aspects of the band room architecture might contribute to making the release of the closing note ring longer or shorter.
Assessment(s)	Informal Questioning by "Pepper" activity

Class: 8A

Title of Lesson	Spatialization Lesson 2
Standards	Core Music Standard MU:Pr6.1.E.5b Demonstrate an awareness of the context of the music through prepared and improvised performances MU:Pr4.2.E.5a Demonstrate, using music reading skills where appropriate, how the setting and formal characteristics of musical works contribute to understanding the context of the music in prepared or improvised performances.
Behavioral Objectives	#1 TSWBAT Identify and compare the effects performance location, room size, shape, and materials have on sound and performance. #2 TSWBAT Predict and Apply the sound effects of room size, shape, and material have on performing music for concert.
Needed Materials	Homework Worksheet, Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Rehearse and review spring concert music sections from previous class lesson. Informally question students about the factors within the room's architecture that might affect the ensemble's performance. 2) Move class into auditorium next door. Lead class discussion having students describe and compare the features of the auditorium with those of the band room. Have students speak with their stand partner to make predictions about how the features of the auditorium will affect our sound and performance 3) Rehearse beginning sections of Carmen and Best Day of My Life for spring concert. At relevant stopping points, ask the students to listen and compare the ring time of releases with those found earlier in the band room. **Summary:** Rehearse same closing sections of Carmen and Best Day of My Life for spring concert. Discuss with class their predictions about the effect of the auditorium's architecture and its actual result.
Assessment(s)	Students self-assess by comparing their expected results of the effects of architecture with the actual results. Homework Assignment

8A Lesson 2 homework assignment

Over the weekend, play your instrument in 4 different places in or around your home. I recommend playing your instrument in the kitchen, the bathroom, your bedroom, and outside of your home. Pay close attention to how the different places change the sound of your instrument. Then, answer the questions below:

ROOM OR SPACE #1

Name of room or space (bathroom, living room, outside, etc): _____

1) Circle all of the adjectives that describe your tone or sound in this first space:

DULL VIBRANT SOFT LOUD DARK BRIGHT

2) On a scale of 1 - 7, rate how long the sound rings in the space after you stop playing a note.

1 - 2 - 3 - 4 - 5 - 6 - 7

ROOM OR SPACE #2

Name of room or space (bathroom, living room, outside, etc): _____

1) Circle all of the adjectives that describe your tone or sound in this first space:

DULL VIBRANT SOFT LOUD DARK BRIGHT

2) On a scale of 1 - 7, rate how long the sound rings in the space after you stop playing a note.

1 - 2 - 3 - 4 - 5 - 6 - 7

ROOM OR SPACE #3

Name of room or space (bathroom, living room, outside, etc): _____

1) Circle all of the adjectives that describe your tone or sound in this first space:

DULL VIBRANT SOFT LOUD DARK BRIGHT

2) On a scale of 1 - 7, rate how long the sound rings in the space after you stop playing a note.

1 - 2 - 3 - 4 - 5 - 6 - 7

ROOM OR SPACE #4

Name of room or space (bathroom, living room, outside, etc): _____

1) Circle all of the adjectives that describe your tone or sound in this first space:

DULL VIBRANT SOFT LOUD DARK BRIGHT

2) On a scale of 1 - 7, rate how long the sound rings in the space after you stop playing a note.

1 - 2 - 3 - 4 - 5 - 6 - 7

Lastly, tell me which room or space sounded the best to you for your instrument.

What are the features of this best room or space that affected the sound of your instrument (for example: thick walls, big open space, metallic or ceramic objects for the sounds to echo off of)?

Class: 8A

Title of Lesson	Spatialization Lesson 3
Standards	MU:Pr6.1.E.8a Demonstrate attention to technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music representing diverse cultures and styles MU:Pr4.2.E.5a Demonstrate, using music reading skills where appropriate, how the setting and formal characteristics of musical works contribute to understanding the context of the music in prepared or improvised performances.
Behavioral Objectives	#1 TSWBAT Identify and compare the effects instrument arrangement and placement has on performance. .
Needed Materials	Homework Worksheet, Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty)
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Articulation exercises; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Review the previous lesson's homework assignment by having students share and demonstrate their findings for their instrument. 2) Students predict what effects changing the placement and arrangement of instruments would have on performance. How would the room's architecture effects on sound be highlighted or hidden based on instrument placement? 3) Have students move places and sit next to an instrument they do not normally sit next to. Rehearse the warm-up chorale again and have students verbally analyze the differences in sound. Repeat this process once or twice more, having different students verbalize and evaluate the results. 4) Begin rehearsal of Chorale and Canon. Rehearse relevant sections of Carmen and Best Day of My Life for spring concert. **Summary:** Rehearse relevant sections of Carmen and Best Day of My Life for spring concert in the new student-selected seating. Choose a section and have the students move back to their normal seating and verbally compare the results.
Assessment(s)	Students verbally self-assess by comparing their expected results of the effects of seating arrangement change with the actual results.

Class: 8A

Title of Lesson	Spatialization Lesson 4
Standards	MU:Pr6.1.E.5b Demonstrate an understanding of the context of the music through prepared and improvised performances. MU:Pr6.1.E.IIa Demonstrate mastery of the technical demands and an understanding of expressive qualities of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods.
Behavioral Objectives	#1 TSWBAT Articulate the historical usage of spatialization in music. #2 TSWBAT Design spatial ensemble arrangements based upon musical factors.
Needed Materials	Stereo Recording of *Sonata Pian' e Forte* by Giovanni Gabrieli. Stereo playback. Projector. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Listen to a stereo recording of the Gabrieli instructing students to pay close attention to the right and left stereo field. Students verbally predict how they imagine the instruments would be placed to create these effects. 2) Show pictures of St. Mark's Cathedral on the projector and have students discuss with their stand partner how the architecture might have affected instrument placement and sound qualities. 2) Rehearse the warm-up chorale using an antiphonal arrangement. Compare this with a circular arrangement. Have selected students act as audience rather than play and have them evaluate the results and make spatial arrangement suggestions. 3) Rehearse relevant sections of Chorale and Canon, Carmen, and Best Day of My Life for spring concert. Rehearse these in both antiphonal and circular spatial arrangements, **Summary:** Students should evaluate and decide which spatial arrangement was the best fit for each piece rehearsed.
Assessment(s)	Informal questioning via "pepper" activity

Class: 8A

Title of Lesson	Spatialization Lesson 5
Standards	MU:Pr6.1.E.5b Demonstrate an understanding of the context of the music through prepared and improvised performances. MU:Pr6.1.E.IIa Demonstrate mastery of the technical demands and an understanding of expressive qualities of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods. MU:Re7.2.E.Ia Explain how the analysis of passages and understanding the way the elements of music are manipulated inform the response to music.
Behavioral Objectives	#1 TSWBAT Compare and Contrast the usage of spatialization in varying styles and periods of music. #2 TSWBAT Document spatial movement within a small selection of music
Needed Materials	White Board. Personal listening station with head phones. Recording of *Wave Edge* by Barry Truax. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Articulation Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Demonstrate a spatial movement map on the whiteboard while listening to the Gabrieli example from the previous class. 2) Have students use the personal listening station one at a time. Each student will listen to the selected short example of *Wave Edge* and draw their spatial movement map for the selection. 3) Rehearse relevant sections of Chorale and Canon, Carmen, and Best Day of My Life for spring concert as students go one at a time to the listening station to complete their maps. **Summary:** Students exchange their spatial movement maps with their stand partners to compare results. Listen to *Wave Edge* selection as a class and complete a spatial map on the whiteboard.
Assessment(s)	Peer Assessment: Students assess their neighbor's spatial map compared to the class example.

Class: 8A

Title of Lesson	Spatialization Lesson 6
Standards	MU:Pr6.1.E.5b Demonstrate an understanding of the context of the music through prepared and improvised performances. MU:Pr6.1.E.IIa Demonstrate mastery of the technical demands and an understanding of expressive qualities of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods. MU:Re7.2.E.Ia Explain how the analysis of passages and understanding the way the elements of music are manipulated inform the response to music.
Behavioral Objectives	#1 TSWBAT Compare and Contrast the usage of spatialization in varying styles and periods of music. #2 TSWBAT Document spatial movement within a small selection of music.
Needed Materials	White Board. Stereo recording of *Concerto for Brass* by John Harbison. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Review spatial movement maps from the previous lesson on the whiteboard while listening to a short listening example from the Concerto for Brass. 2) Rehearse the Chorale section of Chorale and Canon. Have one student listen rather than play and produce a spatial movement map for the chorale section on the whiteboard. Have the students move to an antiphonal arrangement and repeat the section, producing another spatial movement map. 3) Repeat this activity with the Canon section. Following the completion of the next spatial movement map, the class verbally compares the maps of the chorale with the map of the canon. Have students move to a place in the room they think would result in an interesting spatial movement. 4) Rehearse relevant sections of other concert pieces (Carmen and Best Day of My Life) while in this new seating arrangement. **Summary:** Students verbally compare the results of the last spatial arrangement with the spatial movement it creates for each of the three concert pieces. Discuss which piece was most successful when performed in the spatial arrangement.
Assessment(s)	Student verbal self-assessment of musical results within the new spatial arrangement.

Class: 8A

Title of Lesson	Spatialization Lesson 7
Standards	MU:Pr6.1.E.5b Demonstrate an understanding of the context of the music through prepared and improvised performances. MU:Pr6.1.E.IIa Demonstrate mastery of the technical demands and an understanding of expressive qualities of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods. MU:Pr6.1.E.IIb Demonstrate an understanding of intent as a means for connecting with an audience through prepared and improvised performances. MU:Re7.2.E.Ia Explain how the analysis of passages and understanding the way the elements of music are manipulated inform the response to music.
Behavioral Objectives	#1 TSWBAT Compare and Contrast the usage of spatialization in varying styles and periods of music. #2 TSWBAT Design and evaluate spatial decisions.
Needed Materials	youtube video of John Luther Adams' *Breath of the World* (https://www.youtube.com/watch?v=rUDjOyacZoU). projector. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Review spatial arrangements by completing the warm-up activities in different seatings each time. 2) Watch the video excerpt of *Breath of the World*. Have students discuss the musical effects for the listener and the performer. 3) Have students decide which of the three spring concert selections would be most effective in a setting like the one in the video. Students should evaluate their answer by forming a scattered arrangement similar to the one in the video and rehearsing the piece that was selected. Discuss the results. 4) Rehearse relevant sections of other concert pieces (Carmen and Best Day of My Life) while in this new seating arrangement and compare. **Summary:** Students verbally compare the results of the last spatial arrangement with the spatial movement it creates for each of the three concert pieces. Discuss which piece was most successful when performed in the spatial arrangement.
Assessment(s)	Student verbal self-assessment of musical results within the new spatial arrangement. Students design a spatial arrangement for the class to try during the next class lesson.

Class: 8A

Title of Lesson	Spatialization Lesson 8
Standards	MU:Pr6.1.E.5b Demonstrate an understanding of the context of the music through prepared and improvised performances.
Behavioral Objectives	#1 TSWBAT Compare and Contrast the usage of spatialization in varying styles and periods of music. #2 TSWBAT Design and evaluate spatial decisions. #3 TSWBAT perform concert music with mastery
Needed Materials	microphone and recording software. Spring Concert Music (Carmen arr. Saucedo, Best Day of My Life arr. Kazik, Chorale and Canon by Anne McGinty).
Procedure	**Warm-up Activity**: 1) Breathing Gym; 2) Long Tone and Scale Warm-up; 3) Intonation Exercise 4) Warm-up Chorale (J.S. Bach) **Lesson Sequence:** 1) Have students vote on the four most intriguing student examples of spatial arrangements. 2) Move the class to the auditorium and rehearse the short selections of Chorale and Canon in each of the four arrangements. Record each example. 3) Return to the band room and listen to each of the spatial arrangement recordings. Have the class verbally evaluate each example. Take a class vote on which arrangement represents the best, most musical arrangement. 4) Rehearse relevant sections of other concert pieces (Carmen and Best Day of My Life). **Summary:** Full run-throughs of performance pieces.
Assessment(s)	Student self-evaluation via listening to a recording of their performance in each of their spatial arrangements.

APPENDIX B

GEORGIA MUSIC EDUCATORS ASSOCIATION

LARGE GROUP PERFORMANCE EVALUATION RUBRIC

BAND LARGE GROUP PERFORMANCE EVALUATION

Date: _____ **Classification:**_____ **No of Players:**_____

School and Name of Performing Group:_____

Selections: 1. _____

2. _____

3._____

Final Rating

Use no Plus or Minus in final rating

Adjudicator will grade principal items **A, B, C, D or E** or numerals in the respective squares **for each selection**. Comments must deal with fundamental principals and be constructive. Minor details may be marked on music furnished to adjudicators.

	1.	2.	3.
TONE (beauty, blend, control)_____	☐	☐	☐
INTONATION (chords, melodic line, tutti) _____	☐	☐	☐
TECHNIQUE (articulation, facility, precision, rhythm) _____	☐	☐	☐
BALANCE (ensemble, sectional) _____	☐	☐	☐
MUSICALITY (expression, phrasing, style, tempo, artistry, fluency)_____	☐	☐	☐
OVERALL	☐	☐	☐

*May be continued on other side

OTHER FACTORS (not included in the graded evaluation)
Choice of music, appearance, stage presence

Signature of Adjudicator: _____

APPENDIX C

STUDENT ATTITUDE SURVEY

Attitude Survey for Performance Groups in Spatialization Units

As adapted from A Competency Based Approach to Music Education Observation and Field Manual by Cornelia Yarbrough and Clifford Madsen

Circle the number that best expresses your agreement or disagreement with each of the statements below:

A. I like this music.

5	4	3	2	1
Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

B. I enjoyed rehearsing this music.

5	4	3	2	1
Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

C. I preferred rehearsing this piece in our normal seating over our modified seating.

5	4	3	2	1
Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

D. During this rehearsal I was

5	4	3	2	1
Totally Engaged	With it	Participating	Attending	Daydreaming

APPENDIX D

PARENTAL CONSENT FORM

UNIVERSITY OF GEORGIA
PARENT or GUARDIAN CONSENT FORM

Musical Spatial Awareness and its Effect on Young Instrumentalist Performance

Researcher's Statement
I am asking you and your student to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask Mr. Floyd if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Mary Leglar, Professor of Music Education
Hugh Hodgson School of Music
Phone: 706-542-2755
Email: mleglar@uga.edu

Purpose of the Study
Mr. Floyd is currently completing his dissertation toward his doctorate in music education at the University of Georgia. As part of his dissertation, he is researching the effects of location of sound on the quality of musical performance. Music has a long history of having musicians perform in different locations around the audience to create musical effects called spatialization. Think of it like the surround sound system on your home theater. We are trying to see if learning more about spatialization will help young musicians perform more musically overall.

Study Procedures
If you agree to participate, your student will be asked to engage in 10-12 classes over 4-5 weeks where we will learn about "spatialization" in music. This means we will be learning about and experimenting with the location of sounds in different rooms and spaces. We will perform, listen, and discuss how changing the location of sound might affect our performances. We will also explore rehearsing our music in various seating arrangements to see how our instrument's location affects our performance. At the end of the unit, we will perform and record a short

concert (10 – 15 minutes) for some other band directors and musicians. At the concert, we will perform the same two short pieces of music, but we will perform them differently each time by moving our sound locations or positions to try and give the best, most musical performance we can. Your student will also get the chance to voice their feelings or opinions about the lessons by taking a short survey after every few lessons. For example, you will be able to state whether you found the lesson to be engaging or boring or let me know whether or not the lesson helped you to enjoy a piece of music more than you did before.

Risks and discomforts
Your student should have little to no risk of discomfort in this research since much of our class lessons will feel exactly the same as they normally do in a band class. Your student might experience a bit of the discomfort that comes with trying something new. However, the surveys will give them a chance to voice this discomfort, if necessary, and you may always back out of participating without penalty if they choose to do so.

Benefits
There are no direct benefits to you for participating, however, this research will help both Mr. Floyd and other future music educators to become better, more informed teachers.

Incentives for participation
Students will receive the occasional donut or snack treat for agreeing to participate.

Audio/Video Recording
At the end of our lesson unit, we will perform and record a short concert where we will be playing the same two pieces of music in a standard seating and then in four different experimental seatings. This recording will be sent to area band directors and musicians to rate our performances based on the same scoring system that we used at Large Group Performance Evaluation (LGPE). They will be destroyed after the judges have completed their scoring so as to insure your student's confidentiality.

Privacy/Confidentiality
All of the data collected from this research is anonymous. Neither the surveys your student provides, nor the recorded performance at the end of the unit will have any information that identifies the student to the researchers. The recordings will be made random using a code kept by Mr. Floyd and his professor at the University of Georgia. The coded recordings help us to make sure the judges are scoring our performances fairly. Keep in mind that the recording is of the entire 8th grade band performing at one time, not as individual students so that even the recordings have no information that could identify your student.

Taking part is voluntary
Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled.

If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions

The main researcher conducting this study is Mary Leglar a Professor of Music Education and Ashley Floyd, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Mary Leglar at mleglar@uga.edu or at 706-542-2755. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date

_____	_____	_____
Name of Parent or Guardian of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

APPENDIX E

STUDENT ASSENT FORM

UNIVERSITY OF GEORGIA
STUDENT ASSENT FORM

Musical Spatial Awareness and its Effect on Young Instrumentalist Performance

Researcher's Statement
I am asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask Mr. Floyd if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

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Study Procedures
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moving our sound locations or positions to try and give the best, most musical performance we can. You will also get the chance to voice their feelings or opinions about the lessons by taking a short survey after every few lessons. For example, you will be able to state whether you found the lesson to be engaging or boring or let me know whether or not the lesson helped you to enjoy a piece of music more than you did before.

Risks and discomforts
You should have little to no risk of discomfort in this research since much of our class lessons will feel exactly the same as they normally do in a band class. You might experience a bit of the discomfort that comes with trying something new. However, the surveys will give you a chance to voice this discomfort, if necessary, and you may always back out of participating without penalty if you choose to do so.

Benefits
There are no direct benefits to you for participating, however, this research will help both Mr. Floyd and other future music educators to become better, more informed teachers.

Incentives for participation
Students will receive the occasional donut or snack treat for agreeing to participate.

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Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled.

If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions

The main researcher conducting this study is Mary Leglar a Professor of Music Education and Ashley Floyd, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Mary Leglar at mleglar@uga.edu or at 706-542-2755. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

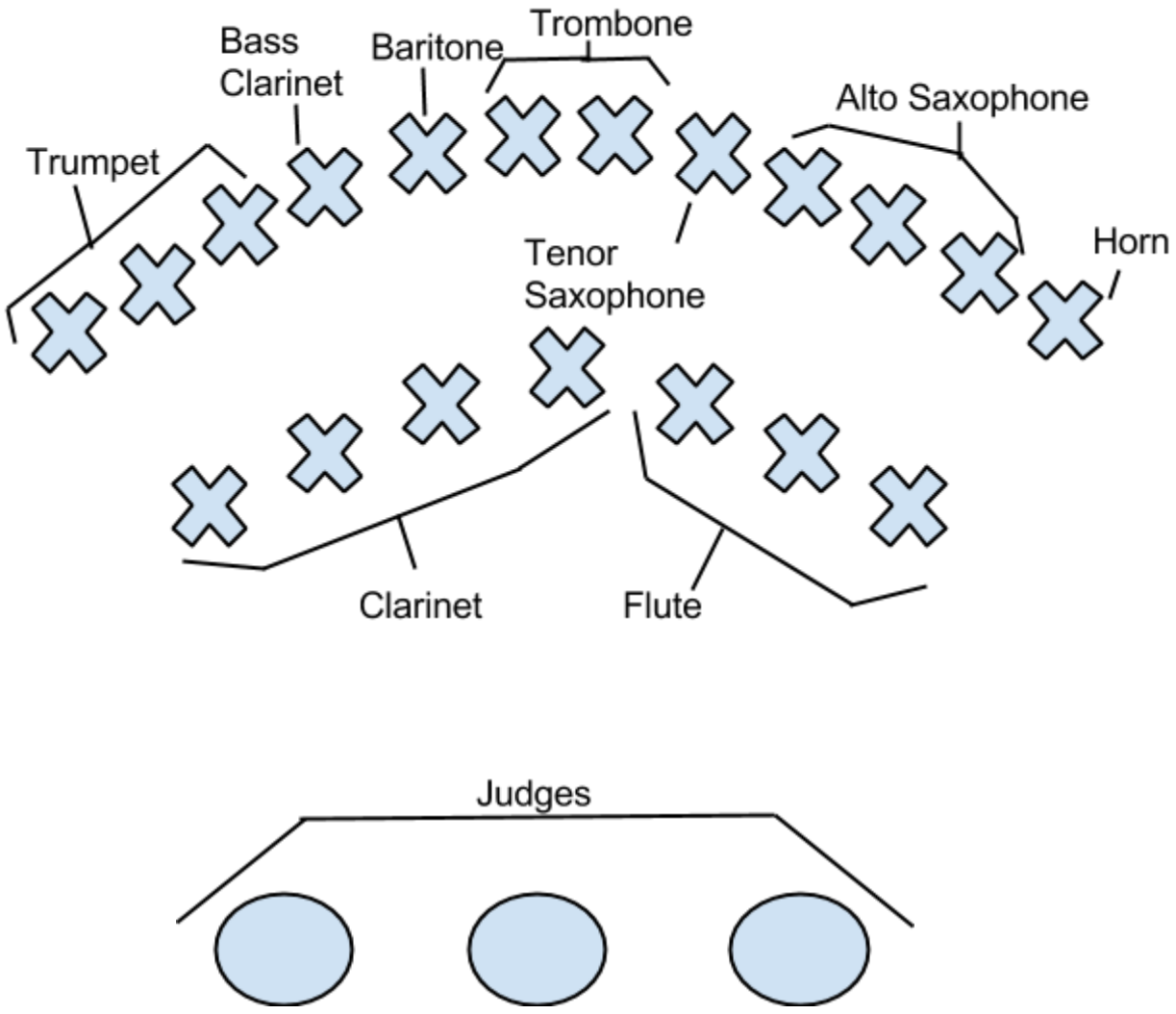
_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

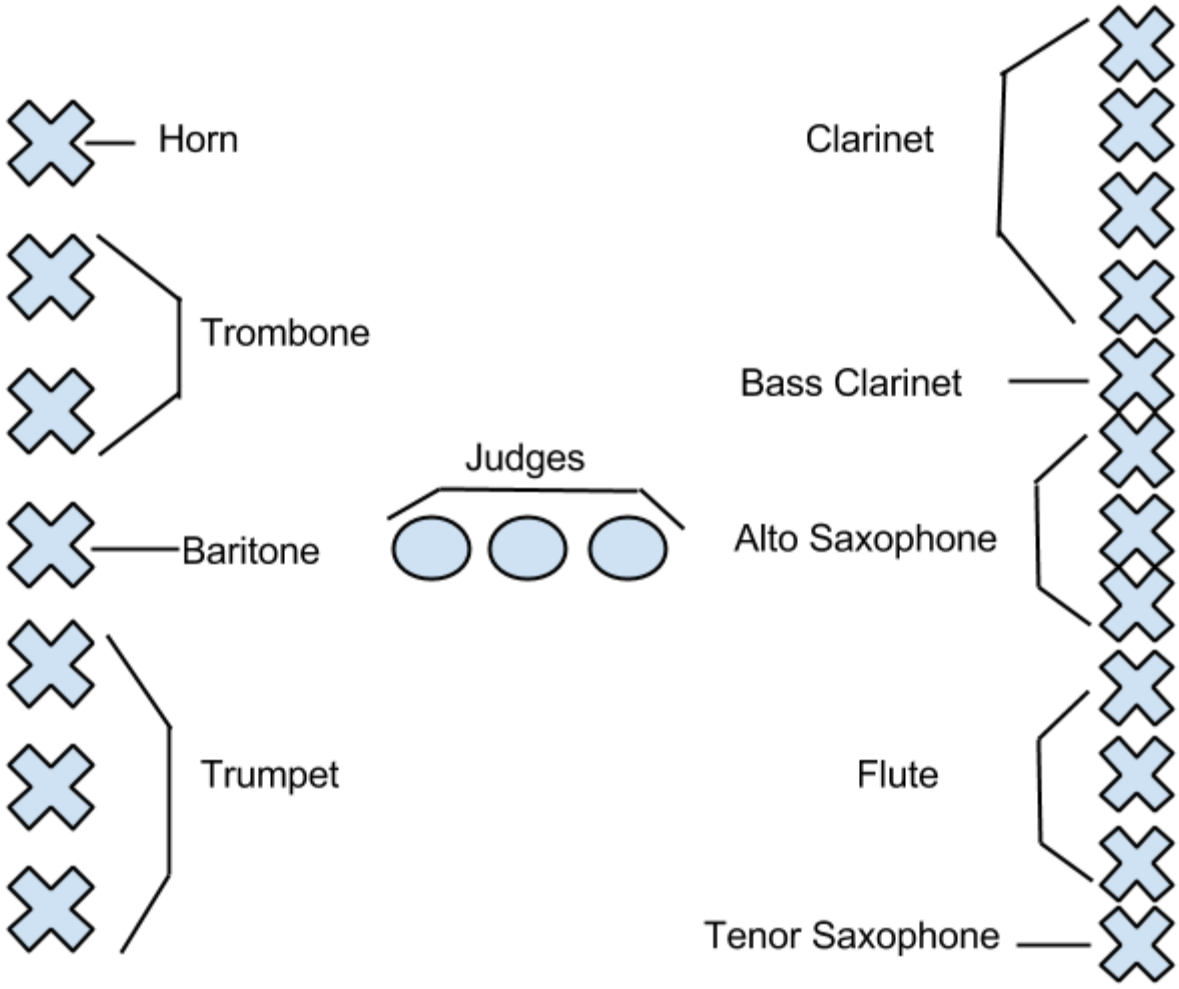
APPENDIX F

SPATIAL PRESENTATION DIAGRAMS

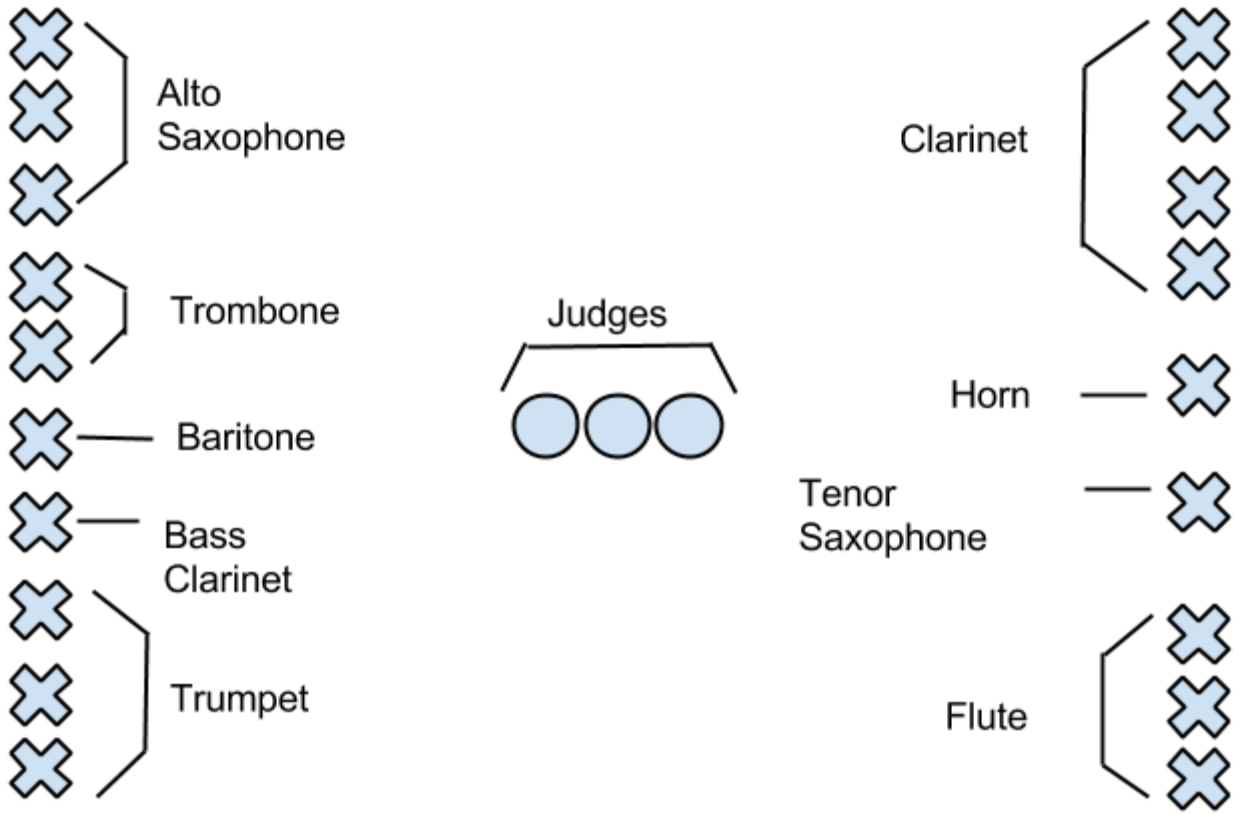
Spatial Presentation Example 1 (Standard Band Arrangement)



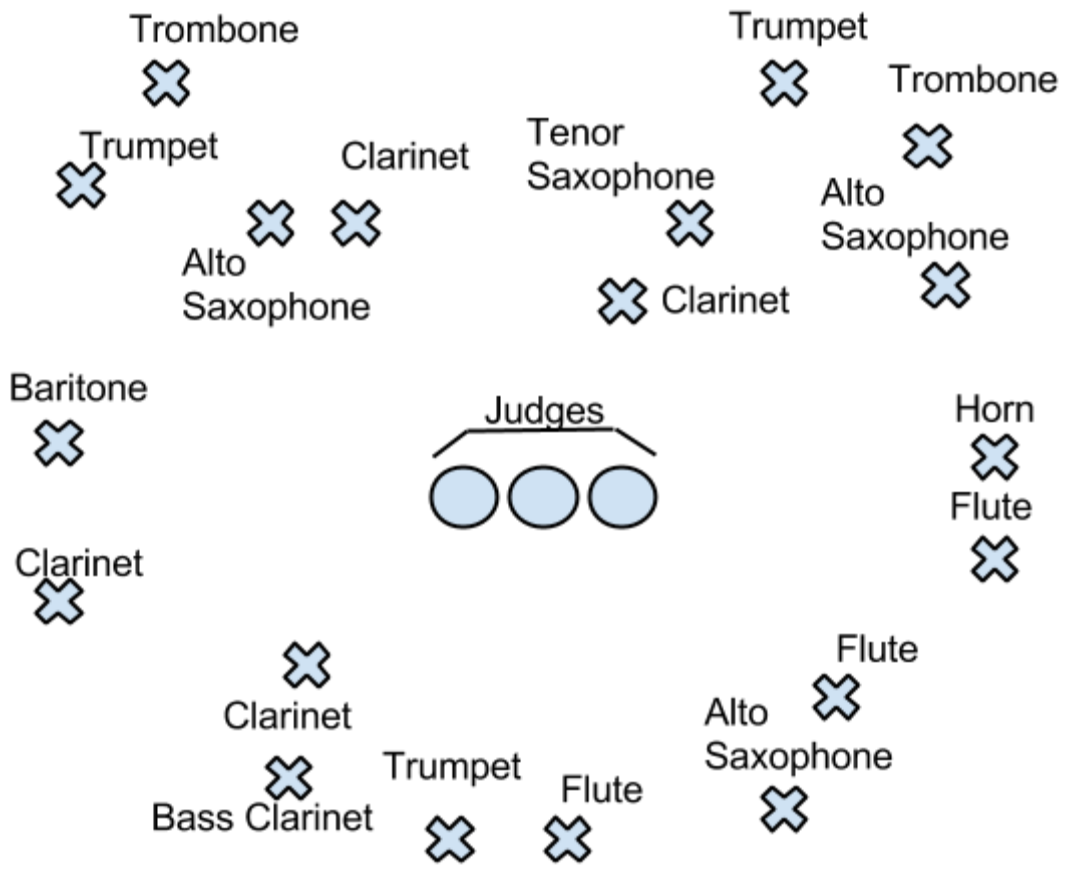
Spatial Presentation Example 2 (Brass/Woodwind Split in Horizontal Alignment)



Spatial Presentation Example 3 (Like Groupings based on Polyphonic Canon, Horizontal Alignment)



Spatial Presentation Example 4 (Scattered Spatial Alignment)



Spatial Presentation Example 5 (Students' most preferred example)