

# Expanding the Borders of Music-Based Qualitative Research Methods Through Graphic Scores

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**Abstract:** Although arts-based qualitative research initiatives have recently utilized standard musical notation (SMN) as a potent form of data transcription, extant literature into this approach has largely ignored the critiques of SMN that emerge from music scholarship and practice. To address this oversight, we use this paper to explore the following research questions: To what extent do the musicological critiques of SMN apply to qualitative research? And how can qualitative researchers address these critiques? In response, we begin by drawing parallels between experimental music literature and posthuman education scholarship, arguing that SMN limits the scope of qualitative inquiry and reinscribes the problematically humanist aims of education research. We then propose the use of graphic scores as a means to explore how sound and other non-anthropocentric bodies contribute to the construction of meaning within learning environments. To exemplify this approach, we conclude by providing two graphic score transcriptions of video data.

## Introduction

According to Daza & Gershon (2015), qualitative research “has a history of wrestling with the primacy of the ocular” (p. 639), both in terms of collecting/analyzing visual data and representing that data in visually transmitted forms. This dominance of the visual has in turn led to the undervaluing of important modes of inquiry, including the qualitative analysis of sound beyond human speech. Yet despite this blind spot, “sounds and silences have always shaped (research/er) possibilities” (Daza & Gershon, 2015, p. 639) by acting on qualitative inquiry in often unrecognized ways. Taking this assertion seriously, researchers need to think deeply about how methodological tools both illuminate and obscure sound within data collection and analysis. This proves especially valuable for learning sciences research because of the important but often overlooked role that sound plays in the construction of learning environments (see Gershon, 2017).

One possible means of foregrounding sound in qualitative research is through music or, more specifically, music-based qualitative inquiry. However, while the body of literature on arts-based research practices within qualitative inquiry continues to expand, the role of music within this intellectual tradition has remained limited throughout its lifespan. As Daykin (2004) notes, this may have to do with music’s reputation as an overly subjective art form: “Music certainly offers a powerful tool of expression, yet it may be difficult and even undesirable to pin down and exploit its meanings for research purposes” (p. 35). Yet despite this critique, a number of scholars have engaged music within qualitative inquiry by modeling their transcription process after western standard musical notation (SMN) by translating speech utterances and physical actions into a series of “musical notes.” However, as Bamberger (1991) contends, the creation of SMN as a means to externalize and communicate knowledge “succeeds in implicitly selecting for attention, and implicitly bounding by naming, particular elements and relations while ignoring others” (p. 15). In other words, SMN inherently rejects certain aspects of music and sound as meaningful or valuable to create socialized forms of communication. To this end, the use of transcription methods based on SMN may potentially limit the forms of knowledge that emerge from this approach because of this bounding process, despite the lived potential of music-based qualitative research.

With this problem in mind, we use this paper to explore the following research questions: To what extent do the musicological critiques of SMN apply to qualitative research? And how can qualitative researchers address these critiques? To address these questions, we first present an overview of extant music-based transcription methods, relevant critiques of SMN that emerge from musicological research, and education scholarship on the role of sound within learning. In doing so, we not only argue that SMN limits the scope of sonic qualitative inquiry, but reinscribes the problematically humanist core of education research by downplaying the importance of non-anthropocentric actors (such as sound). We then propose the use of graphic scores as an alternative form of transcription, briefly touching on this compositional method that emerged from the experimental music tradition in response to SMN’s dominance in the western canon. In doing so, we contend that graphic scores build on current uses of music within qualitative inquiry by creating space for sound as an agentic actor (and not only a byproduct of human action) to emerge. We conclude with two brief examples of graphic score transcriptions to illustrate this approach, proposing future lines of research through emergent findings.

## Theoretical context

### Towards a critique of standardized musical notation as transcription model

Within the expanding field of arts-based qualitative inquiry, scholars have been using musical notation (also known as partiture) as a tool for orchestrating interactions between utterances and nonverbal actions through transcription since the 1980s and early 1990s (Erickson & Shultz, 1982; Ehlick, 1993). This form of notation, which represents turns from different speakers (replacing instruments) by placing notes or note-like objects on different horizontal lines, is useful for highlighting the joint construction of speech among actors and foregrounding time and simultaneity (Edwards, 2005). For example, Erickson (1992) uses partiture to represent the interactions of eight speakers, highlighting the pitch, rhythm, and dynamics of their collaborative speech through SMN. Though he also notes and notates the actors' interactions with materials (such as lifting bowls or using forks and spoons), the participants remain the focus: objects are only represented in conjunction with one of the primary eight actors. Leander (2002) also uses SMN as a model for transcription while analyzing classroom conversation, representing both human speech and relevant movements in a way that foregrounds simultaneity with words instead of notes. The purpose of this score is to highlight the ways that individuals are interactionally silenced and he generates symbols to represent aspects of this silence, including silent participation, being silenced, and speaking while being silenced. Lastly, Hall (2013; 2015) uses musical transcription to represent the sounds and movements of students, as well as their interactions with technological tools. Breaking from the conventions of SMN, he uses different colors to show various types of verbal interactions, weighted lines to show duration and volume, and arrows between participants to show "overlapping bursts of talk distributed across the whole group" (2015, p. 5). This form of transcription highlights sounds that might not be privileged in a first viewing of the group activity: "the collective effect of these overlooked *ostinati* – talking, clicking and viewing – was revealed to have an impact on the youth's individual composing practices" (p. 5).

Although these examples provide meaningful ways of transcribing and articulating sonic data, they ignore the critiques of SMN that have emerged through musicological and music education literature. According to Bamberger (1991), this proves potentially problematic because it relies on dominant forms of socialized knowledge that remain inherently embedded within symbol systems. SMN in particular "conceals its power to shape and to organize our perceptions- to aggregate, bound, and determine what we see or hear." (Bamberger, 1991, p. 270). From a musical perspective, this results in both a reification of socialized roles and the dominance of certain musical technologies. On one hand, the use of SMN (especially within the context of western classical music) consolidates creative agency and, subsequently, power or control within the composer, since performers remain at least partially bound to these texts and audiences abdicate all creative agency while they sit and passively listen (Small, 1998). On the other hand, SMN also restricts the potential of music by valuing "pitch relationships and their occurrence in time (that is, rhythm)" (Small, 1996, p. 25) over any other quality of sound that might construct music (i.e. timbre, physical gesture, etc.). Returning to qualitative research methodologies, these critiques align themselves with the challenges posed by the recent turn towards posthumanism in education (see Snaza et al., 2014; Snaza & Weaver, 2015). SMN enacts a highly humanist understanding of music, one that focuses on the composer-as-creator and performer-as-messenger, and positions all meaningful sound creation as the result of human agency. Qualitative research that relies on SMN could unintentionally reassert this humanism while ignoring the contributions towards learning that come from non-human actors, including sound itself.

Taking these critiques to heart, sound becomes a particularly important lens through which researchers should explore learning contexts (see Daza & Gershon, 2015; Gershon, 2017; Lautenbach, 2014). According to Wargo (2019), the "sonic foundations of schooling" (p. 383) provide a valuable context for learning and means for engaging educational practices that often goes unnoticed. Building from this theorization, Brownell (2019) contends that sound also exists as a technology that regulates and constructs learning environments. In formal education contexts, authorities and institutions very explicitly and intentionally use sound to regulate the learning practices of students by policing which students can (and cannot) make sound and introducing other types of sound that further regulate student bodies and actions. To this end, if researchers only consider those sounds that fit within the frame of SMN, certain highly influential sounds (or valuable aspects of recognized sounds such as timbre) within learning contexts may go unnoticed. Returning to notions of posthumanism, sound also provides an important lens through which researchers in all social science fields can explore the relationship between human and non-human actors. According to Cecchetto (2013), sound acts as a medium through which humans and technologies interact because sound does not exist as a tangible or physical entity but instead arrives as a differential and relational body, one that communicates the interaction between physical entities without existing in a material form itself. Through this conception of sound, scholars can begin to explore the relationship formed between humans and technologies and, subsequently, better understand how sound shapes and informs the sonic ecologies of learning environments. However, by relying on SMN and the humanist assumptions that inform this

transcription process, scholars limit their ability to fully explore sound in educational research. To this end, new qualitative tools are needed.

## Reimagining transcripts through the lens of graphic notation

So how can arts-based qualitative inquiry move past SMN? Although researchers may find multiple approaches to addressing the critiques presented in this paper, we contend that one approach involves following the progression of western classical music into the 1950s and modeling music-based transcription practices after experimental music. As a genre, experimental music defines itself by rejecting the tenets of western classical music (the dominance of pitch relations, rhythm, repetitive structure, etc.) that sit at the heart of SMN (see Gottschalk, 2016; Nyman, 1974), positioning this genre as a highly valuable context for reimagining music-based qualitative inquiry. But to create new works without relying on the tenets of the western classical canon, composers needed to reimagine and reinvent how they scored music. In response, composers developed a wide array of graphic scoring techniques, using symbols, pictures, color, and text to communicate ways of organizing both intentional and unintentional sound. Although graphic scores still use visual symbols to transcribe music, the open-ended nature of these scores allows composers to highlight any number of relationships between or qualities of sound that make music. Oliveros' (1989) *Wind Horse for Chorus*, for example, breaks from the linear approach taken by SMN and foregrounds the relationship between musical tools and performers (see Fig. 1, far left). In another example, La Barbara (2012) uses sketched lines and text in *Persistence of Memory* to evoke gesture and mood while allowing for an open-ended interpretation of who might be the "performer" (see Fig. 1, center). Finally, Smith (2015) brings the use of both painting and color into his highly abstracted scores from *Kosmic Music: Four Symphonies* to again evoke sound as a material object and not necessarily a product of human agency (see Fig. 1, far right).

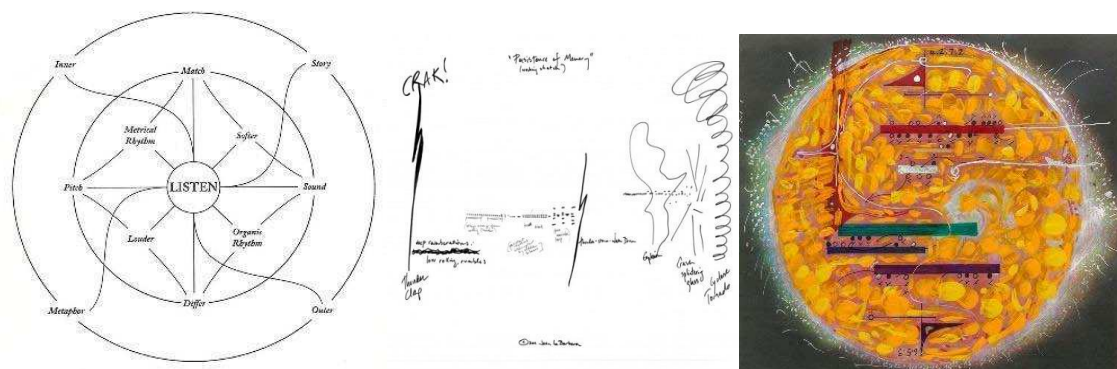


Figure 1. Three examples of Graphic Scores.

Within all three of these examples (and graphics scores more broadly), the notion of indeterminacy, or the relinquishing of creative control of composers over performers (and others) within a musical context (Nyman, 1974), plays a huge role and pushes experimental music away from the humanist core of western musical forms. This approach to composing allows any number of other actors (both human and non-human) to assert their own agency when making sounds within certain constraints. This emphasizes the process of meaning making that occurs through not only the intended sounds of an instrument but the intersecting collection of ambient and unexpected sounds that fill the space and come from all types of sounding objects. While indeterminacy as a compositional approach may not hold a direct parallel to qualitative research, the inclusion of all sound as part of the composition definitely does. Smith, Hall, & Sousanis' (2015) transcription of recordings from a design classroom (one of few extant examples of a graphic score transcription) exemplifies this approach, with various colors, shapes, and lines relating the relationships between not only speakers but the other objects in the room that make sound and the sounds themselves. As the authors note, this use of graphic notation "revealed new connections in the data, which in turn contributed to a nuanced understanding of" this specific recording (p. 5). In light of this example, it follows that graphic scores should hold a place for research when investigating the interactions between all actors in a given educational context and arts-based qualitative research more broadly.

## Graphic score as transcription methodology in practice

As a way to explore one of the possibilities afforded by this argument, we present two examples of graphic score transcripts based on two pieces of video data. To create these examples, we decided to use Oliveros' (1989) score for *Wind Horse for Chorus* (see Fig. 1, far left) as a model. In this score, performers in the chorus follow a self-

determined path around the mandala-esque score, performing the action in each node as they reach that portion of the score. In doing so, Oliveros sets up a set of unique relationships between sounds and actions: while all of the nodes connect to the center, labeled as “Listen,” the other nodes only connect to certain other actions on the score (i.e. “Story” only connects to “Listen,” “Inner,” and “Outer”). Although the musicians therefore have some choice of what to do at any given point during the performance, Oliveros limits those options through the construction of this score. Oliveros further explains these nodes by explicitly describing the action associated with each node. “Story,” for example, instructs performers to “tell about an experience with the wind or a dream or fantasy about the wind” (Oliveros, 1989, p. 3), adding both text and new vocal sounds to the performance. Importantly, Oliveros does not determine the length that each performer spends performing each node or the overall piece. In her words, “the total performance time is approximate and may be pre-determined or not” (Oliveros, 1989). In doing so, this particular graphic score opens up a space to reimagine music outside of a linear temporal model by foregrounding the relationship between specific actions and sounds rather than predetermining a sequence of rhythmic pitch relations. From a research perspective, this model allows scholars to focus on how sounds interact within learning (or other) environments rather than merely mapping them across time.

## Example 1: Sound occupies space

### Description of data and transcription methodology

The first video clip we chose to analyze originated from the conference “Learning how to look and listen: Building capacity for video-based transcription and analysis in social and educational research” (see Learning How to Look & Listen, 2017). The conference’s purpose was to bring together and document the analytic practices of a group of researchers trained in video analysis as they viewed a two-minute video clip of a science lesson in a bilingual primary classroom. Though nineteen scholars analyzed this short clip multiple times, both individually and as a group, very little attention was focused on the non-vocal sounds present in the soundscape of the classroom as a whole. We therefore decided to use this clip as a means to show how researchers can uncover new analytic findings by reimagining transcription processes, even for clips that have been exhaustively analyzed by multiple scholars.

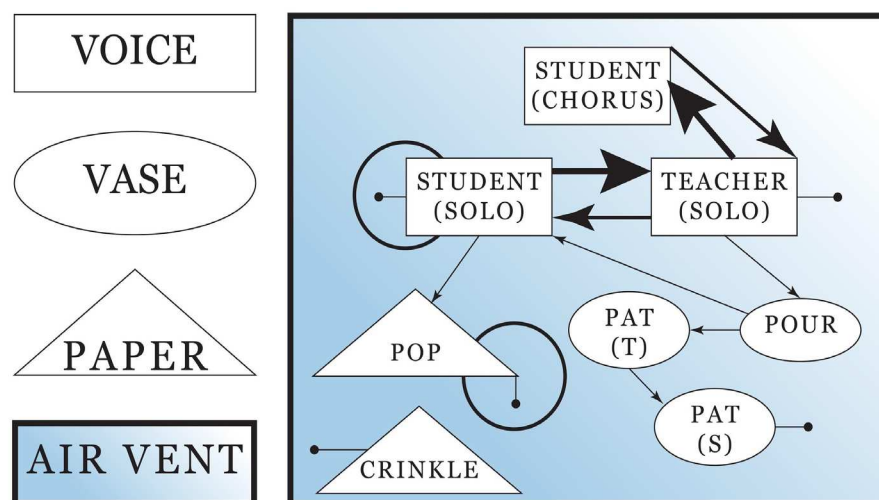


Figure 2. Graphic Score Inspired Transcription of “LHTLAL” video.

For the purposes of this transcription (see Fig. 2), we first coded all of the different sounds in the video utilizing what Saldaña (2015) describes as an open approach to descriptive coding. In doing so, we found four larger categories with subsequent and distinct sub-categories: ambient sound from (we assumed) the heating/air conditioning system, vocal noise in the form of talking (divided into teacher solo, student solo, and student chorus when students responded in unison), sounds from the vase (the pouring of the rocks and sand out of the vase, the sound of patting the vase), and paper sounds (the crinkling as students waved their papers, the popping from students hitting their papers from underneath). We used different shapes to represent each one of these sounds/sounding objects. Text inside of the shapes was used to describe the type of sounds being made (e.g. a chorus of students, a crinkle of paper). We also specifically relied on what Bogost (2012) defines as an object oriented ontology, one in which all actors within a given context exist as equal contributors (e.g. people do not hold a privileged status over non-human objects), to further the nonanthropocentric aims of this work. In response to this framing, we used different shapes to represent different types of sounding objects (e.g. rectangles represent

human voice, triangles represent pieces of paper, etc.) but did not distinguish between individual people. Instead, we treated them as we did any other actor (we did not, for example, distinguish between different pieces of paper either). We did, however, distinguish sounds from the teacher because of the significant sonic difference between her voice and the voices of her students (higher volume, lower pitch, etc.).

After assigning different shapes to sounding objects, we then placed the shapes into the score and used arrows to transcribe the relationships between these sounds. Specifically, we looked for moments where one sound triggered another sound in the space. Although this process of transcribing the relationships involves some interpretation on our parts (especially since we did not have the ability to discuss these relationships with students in interviews), we focused on those moments where the video communicated that relationship through temporal proximity of sounds, eye contact from the participants, physical contact between objects/participants, and/or the replication of a specific sound making gesture (i.e. a student patting the vase immediately after the teacher does). We used arrows between the different sounds in the score to communicate those relationships, creating a series of paths between nodes similar to those found in *Wind Horse* but now with an added element of directionality. When a sound triggered a repeated iteration of that same sound (i.e. one student popping the paper led to another student doing the same), we transcribed that as a circular line coming out of and returning to the same node. Moreover, we used different thicknesses for each line to describe how often these relationships emerged in the video with thicker lines representing more frequent interactions. Finally, we added in lines with circles at the end to represent a sound that did not trigger another sound, in essence ending a sonic conversation. Since the sound of the air ventilation system existed throughout the video, we made that the background of the score.

In developing this method, we specifically avoided transcribing these sounds across a temporal axis. While there is a certain sense of temporality (as causality implies one sound proceeding another), we took inspiration from experimental composers like Oliveros and Smith (see Fig. 1, far left and right) who created scores that did not rely on time as an organizing factor. In doing so, we produced a transcript that does not assume an overwhelming reliance on the relationship between actions and time (one that sits at the center of most other music-based transcription methods) and instead focused on the relationships between sounds and sounding objects. To this end, one can “start reading” this transcript from any point, moving about the image and examining the various relationships between sounds without prioritizing one relationship over another.

### Directions for future analysis

Although a single transcription of one two-minute video clip without any input from participants does not provide anywhere near enough data to draw definitive conclusions, the graphic score points to a few possible directions for future research. First, the verbal conversation between the teacher (as a solo sound maker) and the students (as both individuals and a chorus of voices) raises questions of power relations in the classroom. Specifically, who gets the last word, and when, in classroom conversations? The fact that the conversation never ended with students speaking as a group and only rarely ended with a student speaking at all indicates a hierarchical relationship between students and teachers and reinscribes the individual (not the community) as the locus of learning, reproducing what Snaza, et al. (2014) describe as the humanist aim of education.

The second emergent finding from this analysis points to ways in which sound acts as a pedagogical tool in itself. The initial popping of the paper, for example, leads to a cascading effect in which multiple students begin to explore this sound making technique. The students do not discuss this action in the video and the first student to use this technique does not explain how he creates the sound. Instead, these students react to the sound coming from the paper and use visual cues to replicate the sound (a similar replication process also occurs with the vase, as students do not copy the pouring sound but one student does copy the teacher and pat the vase, creating a similar percussive sound). Reframing this brief moment of play as a learning process (with students developing the knowledge of how to transform paper into a percussive instrument as new meaning emerges from this human/paper interaction), our analysis positions specific forms of sound as a pedagogical tool in and of itself. Without this initial percussive sound, students would not have learned how to manipulate the paper in this way (which contrasts with the student waving the paper around without anyone duplicating this action). The paper therefore becomes a meaningful object within this classroom (beyond that of a writing tool) because of its sonic affordances. Paper becomes a musical instrument of sorts, one that has a now emergent set of performance techniques that hold their own unique meaning within this community. However, only one type of sound (the sharp pop of hitting the paper and not the near constant rustling) initiated this pedagogical moment. In doing so, our analysis (and, more specifically, the use of graphic scoring as a transcription process) reveals a unique and, to use Brownell’s (2019) terminology, invisible component of the classroom’s sonic ecology, one that contained its own curriculum and pedagogical practices.

### Example 2: Intersecting sonic ecologies



In order to illustrate the feasibility of such transcription systems as well as its usefulness for more complex classroom situations, our second transcription focuses on two 90 second clips<sup>1</sup> that foreground a university classroom's sonic ecology. These clips feature small groups of pre-service English teachers engaging in a role-playing activity (the groups are positioned side-by-side). The groups each consist of five students: four players who are role-playing characters they have created, rolling dice to determine their character's actions, and one game master (GM) who acts as the narrator for the story by loosely following a script provided by the teacher and resolving player actions. Each student is dressed in costume and some students have props. Two clips were selected from the same time frame, ending when one of the groups finishes singing a few lines from the song "American Pie." The inclusion of this musical performance (with one group singing and another listening) showcases sonic interaction across the two groups, an interaction that is difficult to transcribe in traditional ways. This classroom context was selected because of its rich sonic elements (dice shaking & rolling, background music playing, papers and pencils moving) and because the groups participation structure mirrored the interpersonal relationships of Example 1 (one leader facilitating an activity for a chorus of students).

When coding these clips, we found similar sub-categories of sound: ambient sound from background music selected by a GM to set the scene, vocal noise in the form of talking (divided into GM solo, player solo, chorus all), sounds from the dice (the shaking of dice in players hands and the sound of rolling the dice on the desks), pencil sounds (the click of pencils being set down on the desk) and sounds from props (knitting needles clicking). Although the sonic qualities of the GM matched those of the players, we decided to separate them in the score to mirror the transcription from Example 1. These sounds were again placed in the graphic score and relationships were transcribed using arrows of varying thickness, again looking for moments where one sound triggered another sound in the space. The two groups of students, each with their own unique sonic ecology, are separated by a dashed line.

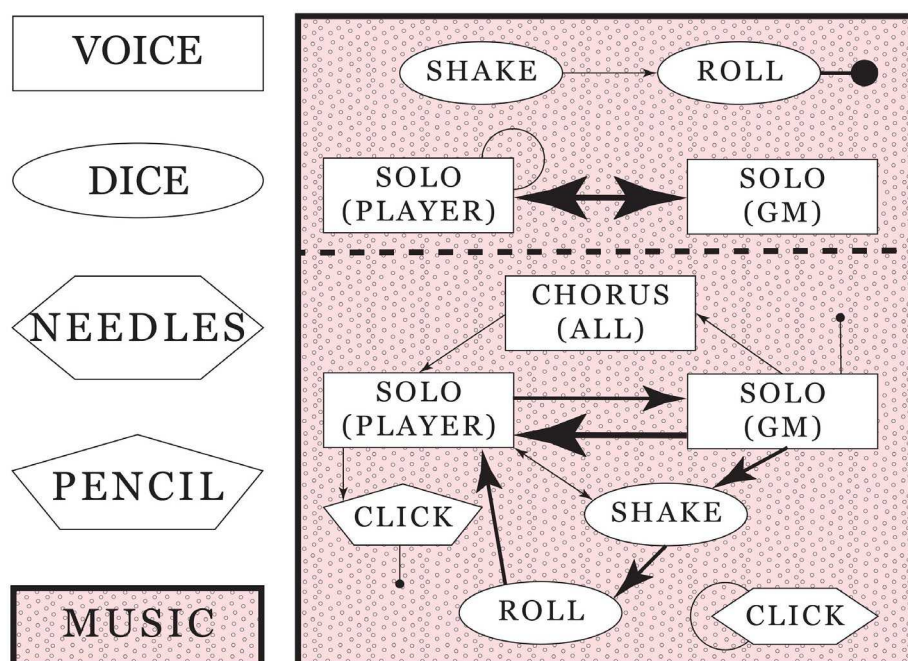


Figure 3. Graphic Score Inspired Transcription of Two Simultaneous Video Clips (Role-playing Side-by-side).

Within this transcription process, the score clearly highlights differences in the relationship between the leaders of the activity and their participant groups, as well as the interaction between different actors and materiality (see Fig. 3). In the group transcribed on the bottom half of Fig. 3, we can visually see that the GM has more control over the soundscape based on the thickness of the lines coming from the Solo (GM) node. This represents how the GM is giving directions to the players which they immediately follow. And although each player has their own set of dice, the GM interactionally controls when those dice are rolled, as players only roll their die when directed by the GM (he has less control over individual props like the needles). However, we see a different sonic relationship in the group transcribed on the top as the GM works with players to determine what actions they wish to take. Here, the GM also has less control over the material interactions of the player when one of the players rolls the die of his own initiative and without her prompting. In defining power as the ability to transition towards more full participation (Gholson & Martin, 2014) and operationalizing full participation in

D&D as the ability to initiate actions and complete them, we raise other questions about these particular interactions: how do the power dynamics differ in these two clips? What other factors influence the establishment of these power dynamics? Do these power dynamics remain consistent throughout the game, or are they representative of different participation structures within the game? Having uncovered this question through the graphic score we might use purposeful sampling to transcribe the sonic ecology at different points throughout the game or re-transcribe this excerpt with more attention to participation structures and power. Also, as the bottom group is led by a male student and the top group is led by a female student, this raises questions about power and gender and could lead us to a closer analysis of the ways that gender becomes salient in these interactions.

This transcription model also produced a unique finding about the interaction between sonic ecologies: even though there was no direct vocal connection between the two groups (students do not verbally interact across the groups), the two groups' presence in the overall sonic ecology does have an effect on the interactions within the groups. When the bottom group sings together, for example, the top group constrains their interactions as one student looks over to the bottom group. Though this group does not stop playing while the other group sings, their speech slows down and they do not engage in more interactionally complicated role-playing activities such as rolling to resolve decision-making, leading to a less complex transcript. The sonic effect of one group on the other is further implied as each group has one member that turns to look at the other group. As this sort of interaction between groups was not anticipated by the researcher, the visual data does not capture the space between the two groups or highlight overlaps in activity. However, this sonic transcript foregrounds the ways the groups might still interact with each other.

## Conclusion

Returning to Brownell's (2019) research into the sonic aspects of the classroom, sound plays an incredibly powerful role in shaping what and how students learn. However, more research needs to occur to fully understand how meaning emerges through the sonic interactions of actors (both human and non-human) within learning environments. To this end, we wonder alongside Brownell (2019) when she considers "how researchers and teachers might tune in to the acoustic happenings of classrooms in new ways" (p. 19). In this paper, we propose the use of graphic scores as one tool in further analyzing the sonic ecologies of educational contexts. By using Oliveros' (1989) work as a guide, we provide one example of a transcription process that centers the relationships between sounds as opposed to pitch, rhythm, or other atomized elements of music that, as Bamberger (1991) argues, sit at the center of SMN. In doing so, we expand on previously developed qualitative methodologies that utilize SMN as a model for transcription and forward the use of graphic scores as a means to shift away from the humanist core of not only SMN but educational research more broadly. Future research utilizing this particular method will not only produce insight into the role of sound within learning but also further refine this initial foray into "Oliverosian" transcription processes. However, just as there are multiple ways of conceptualizing graphic scores (see Fig. 1), a variety of approaches to using graphic scores as transcription methodology also exist. Although determining how the scores from Fig. 1 may translate into transcription methodologies exists outside the scope of this paper, we hope that this initial foray emboldens qualitative researchers to consider the myriad of possibilities proposed by these (and other) scores. By engaging in this exploration, researchers can further investigate the fullness of sound as an educational technology and develop new insight into music-based qualitative inquiry more broadly.

## Endnotes

- (1) The clips used in each section were short (two minutes or less) because these phenomena of interest (particular learning interactions) were short. Researchers who aim to study longer phenomenon can use longer clips.

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