

A Comparison of Musical Compositions of 3rd, 9th, 11th Graders and Undergraduate University Student Teachers

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Abstract

Creation is now included in most music curricula and learners of different ages and cultures are guided to explore their compositions skills. This qualitative study aimed at developing a better understanding of creative products of musicians of different ages and experiences while using R. Murray Schafer's pedagogy. Musicians in grades 3, 9 and 11, as well as generalist and music specialist student-teachers composed a soundscape and its visual representation in small groups. The characteristics of the musical products and of the visual representations were analysed through content analysis, as well as the relationships between the two. Results showed that having had more music learning experiences, rather than being older, was associated with the use of more diversified musical components. Additionally, some musical elements, such as beat, were visually represented using the same structural elements as in traditional western notation. Implications for music education for learners of different ages and cultures are discussed.

Keywords

Creative Products, Musical Compositions, Schafer, Soundscape

1. Introduction

Music creativity is a topic that generated sustained interest since the 1960s (Odena & Welch, 2009; Webster, 1992, 2016). Odena (2001) defines two ways of understanding creativity: the 'traditional' and the 'new'. The traditional way is the one present in adult artists providing a significant contribution to their field, whereas the 'new' way relates to 'imaginative thinking' and is the one used by children in school. They are also understood as 'big C' and 'small c' creativity (Odena, 2001;

Sawyer, 2012). In today's world of education that is student-centred and rooted in constructivism, music creativity through composition is included as part of the learning activities (Kaschub & Smith, 2009; Webster, 2016).

The actual music education curricula therefore include music creativity as part of their orientations. In Great Britain, the English National Curriculum incorporates the development of 'creative skills' in composition and improvisation (Odena & Welch, 2009); in the United States, the 2014 Music Standards for PreK to Grade 8 Music Education include: creating, performing, and responding to music (NAfME, 2014). In Canada, all provincial music education programs comprise some form of creative activities (Veblen et al., 2007). Due to this vision and integration of creativity in the schools, researchers have shown interest in different aspects of musical creativity.

Odena and Welch (2009) developed a theoretical framework to explain teachers' thinking of musical creativity. In their view, four elements are central to the perceptions of creativity: Pupil, Environment, Process and Product. These would be influenced by the teachers' personal musical experiences and their previous classroom teaching. Sawyer (2012), similarly, talks about the four "Ps": Product, Process, Person, and Press (external pressures). On the other hand, a contemporary way of looking at creativity turns to a more sociocultural explanation, in which the four previous elements are intertwined and always in interaction with one another within a given context (Sawyer, 2012). Nevertheless, Webster (2016: p. 7) argues that the study of an individual's role as a creator and the products themselves 'cannot be abandoned'. He states that both views are needed to best understand creativity.

2. Musical Process or Products

Many authors focused specifically on the process or on the product in their studies of music compositions (Barrett, 2012; Bunting, 1987; Davies, 1986; Doig, 1941, 1942a; Guthmann, 2013; Kratus, 1985, 1989; Loane, 1984; Morehouse, 2012; Nevels, 2013; Riley, 2008; Simmonds, 1988; Swanwick & Tillman, 1986; Tobias, 2013; Veloso & Carvalho, 2012; Viladot et al., 2010; Wallerstedt, 2013; Webster, 2012). Webster, in 1992, performed a first analysis of the available literature focusing on creative thinking in music. When looking at assessment studies, he organized the findings according to whether they concentrated on the creative process or product. He defines process studies as being interested in behaviors that occur during the act of creating, while the product studies centred on the end results and their musical characteristics. He also claims that "The formal assessment of children's compositions and their musical characteristics has received surprisingly little attention" (p. 273). In a later review of the literature on music compositions in schools, focusing on published work between 2008 and 2014, he reviewed and organized publications in "pathways" that might be of help to the reader's specific interest: teaching process, student composition, process/product, technology, assessment, collaboration, attitudes/perception, early childhood, motivation/gen-

der, and external variables (Webster, 2016). According to his analysis, the teaching process is the most documented topic, while only eight studies are identified as focusing on the composition process/product.

Many researchers who studied musical products were interested in understanding the development of the cognitive process of children through musical composition (Wilson & Wales, 1995). Cognitive development has been defined as follows: "...cognitive developmental progress is characterized as transformations that occur over time in how individuals organize their perceptions and the strategies they bring to bear in constructing their understandings of the world around them" (Bamberger, 2006).

Different authors have identified that by the ages of 7 to 11, children can understand and express through composition the concepts of melody, tonality, rhythm and meter (Bamberger, 1982; Cuddy & Badertscher, 1987; Davidson & Scripp, 1988; Dowling, 1988; Hargreaves, 1986; Krumhansl & Keil, 1982; Shuter-Dyson & Gabriel, 1981; Sloboda, 1988; Uptis, 1987; Wilson & Wales, 1995). Younger children tend to use more stepwise motions in their creations, while the older ones also include leaps (Doig 1941, 1942a, 1942b; Morehead & Pond, 1978). Additionally, while children of different ages all understand musical structure, older children make use of harmonic concepts in their compositions (Doig, 1941, 1942a, 1942b; Kratus, 1985). Additionally, it has been demonstrated that the level of complexity in the creations increases with the age of the children and with greater musical training (Henry, 1995; Kratus, 1989; Wilson & Wales, 1995). Children's explanations of their own work also provide an interesting view in their thought process when composing. Indeed, when children report that everyone in the group needs to get a turn to perform (Kaschub, 1999), it clearly illustrates how this type of consideration impacts the structure of their piece.

Meanwhile, Swanwick and Tillman (1986) created a theory of musical development based on the analysis of children's musical products. They analyzed 745 improvisations made by children aged 3 to 11 and derived from their investigation a spiral model of musical development. Based on Piaget's work and conceptual framework, they suggest a four-stage theory according to age: stage 1 (0 - 4 years), stage 2 (4 - 9 years), stage 3 (10 - 15 years), stage 4 (15+).

In the first stage, the child shows an interest in musical materials. [...] In stage two the child's attention shifts toward the expressive properties of music. [...] In the third stage the emphasis is on musical form. [...] In stage four yet another aspect of musical experience comes to the fore: metacognition. The individual becomes conscious of his thoughts and feelings with respect to music (Koopman, 1995).

On the other hand, the small differences in the characteristics of compositions of children and the ones of adults without formal training suggests a ceiling effect in the musical development (Scripp et al., 1988). Bamberger (1982) reports that children of 8 or 9 years old and adults without musical training tend to represent musical rhythms in groups (figural grouping), whereas only the ones with musical

knowledge represent the metric in their musical drawings. “Furthermore, figural drawings are blatantly rejected as ‘wrong’ by trained subjects, and yet they appear to be the only ‘natural’ description for those who do not read music” (Bamberger, 1982: p. 192).

This brings forward the question of the relevance of musical notation in studying children’s musical products. To use graphic representation, one needs to understand its encoding system, therefore this might be a measure of knowledge rather than of development (Goodnow, 1977). Some researchers (Wilson & Wales, 1995; Reese & Hickey, 1999) have used computers to alleviate this difficulty. In doing so, however, we lose some aspects of the creative product, the notation that emerges from the composer.

Although researchers have shown interest in music creativity of participants of different ages, they tend to compare them within the same age group and levels of knowledge: high schoolers (Fautley, 2004, 2005; Soares de Deus, 2006), elementary school children (Flohr, 1985; Pond, 1981) preschoolers (Barrett, 2012; Morehouse, 2012), professional composers (Kozbelt, 2005; Widmer, 2005) and university music students (MacDonald et al., 2006). Only one study was found that compared the musical creativity of students of different ages, experiences and cultures (Burnard & Younker, 2004). Looking at previous data collected in different studies from Australia, Canada and the UK, the researchers analyzed commonalities between the strategies used while composing, therefore looking at the process, or ‘composing pathways’ as they label it. This cross-case comparison of six student composers, aged between 11 and 20 years of age, allowed for identification of three pathways, each in a progression from simple to sophisticated: ‘floater’ to ‘linear’, ‘serial’ to ‘staged’ and ‘recursive’ to ‘regulated’. Their findings show “that students differ in confidence and tolerance of ambiguity” and their used of “divergent and convergent patterns of musical thinking” (Burnard & Younker, 2004: p. 70). This study suggests the possibility of comparing data coming from contrasting participants. Since traditional western notation can be seen as a limitation for untrained composers to graphically represent their creations, some educators and composers have used other tools to encode music.

3. Theoretical Framework: R. Murray Shafer’s Curriculum Centred on Musical Creation

One of the precursors of the teaching of music creativity in Canadian schools is composer R. Murray Shaffer (1933-2021). He offers an interesting option to explore the products of music creativity with music learners of different ages: the creation of soundscapes. “A soundscape is a sound or combination of sounds that forms or arises from an immersive environment [...] [it] includes all of the sounds from a particular environment that reach the human ear” (Canadian National Art Center, 2016: p. 4).

Since soundscapes include both musical and visual products, Schafer offers a form of notation that is different from the standard music on the staff.

Graphic notation refers to music that is written down in non-traditional ways.

Instead of notes lined up neatly on a staff, there are swirls, colours, pictures, scattered notes and musical symbols, or other elements of drawing or calligraphy meant to express the sound and character of the music. (Canadian National Art Center, 2016: p. 4)

In his writings, Schafer (1967, 1969, 1975a, 1975b, 1977, 1986) presents the work he did with university and school age students. His approach uses a variety of activities to support music learning, the development of musical creativity and the capacity to listen creatively. One of his publications entitled *Ear Cleaning: Notes for an Experimental Music Course* (1967) presents the content of a course he gave at the University of Toronto. He starts by offering a definition of the musical components to be taught (noise, silence, tone, timbre, amplitude, melody, texture, rhythm and the musical soundscape) and then shares activities to have students experience these components. Once the music concepts have been explored, he invites the students to create their own soundscapes:

We can now combine all the expressive potentials of which we have spoken during the first eight lectures and think of them as interacting within a cone of tensions.

A musical composition is a journey back and forth through this cone of tensions. (Schafer, 1969: p. 25)

The creation of soundscapes and their visual representation, using a non-traditional graphic notation, offers an interesting way of observing and understanding the characteristics of music composition, their visual representations and how they connect to one another. It also provides a tool for people of all ages, with or without musical training, to express themselves creatively with sounds and symbols.

4. Rationale and Purpose of the Study

In this research, we were interested in developing a better understanding of the musical and visual products of music makers of different ages and experiences. We therefore are using the word ‘musicers’, in the sense of the ‘musical doers’ (Elliot, 1995: p. 40), to be inclusive of these differences. Besides, one of the challenges of doing research on musical products is the participants’ limited knowledge of musical notation, which can lead researchers to underestimate the creative musical skills of the musicers (Davies, 1992). The use of a non-traditional notation system, the soundscapes, provides an alternative that allows an analysis of both the sound and visual creations. Moreover, most researchers have focused on creativity by similar age group and musical experiences and knowledge (Odena & Welch, 2009), except for Burnard and Younker (2004) who explored the creative process of diverse students. There are therefore few comparisons of creative products between musicers of different ages and experiences. Although some authors seek to assess the qualities of creativity, we intent to document the ‘characteristics of what is made’ (Odena, 2001). Additionally, since Schafer suggests that

creating is a way of learning the music components, we are interested in understanding if and how the sound and the visual components of the products were connected, and if they could provide some light into the musical understanding of these musical components.

To do so, we used a basic interpretive qualitative research method. The qualitative inquiry can provide ‘practical knowledge and pragmatic understandings [about] what is happening in programs and other human settings’ (Patton, 2002: p. 137). As described by Merriam (2002: p. 7), this type of study is descriptive in nature, uses inductive analysis to identify common themes, and the outcomes are descriptive. Results are interpreted within the context of the relevant literature framing the study (Patton, 2002: p. 434). The findings of our research are not to be understood as generalizable, the goal of the qualitative process being rather to study, reflect and generate some understanding of a phenomenon (Burnard & Younker, 2004; Forman & Damschroder, 2008).

Therefore, the goal of this qualitative inquiry was to develop a better understanding of the creative products by musicians of different ages and experiences when using R. Murray Schafer’s creative pedagogy. More precisely, we wanted to 1) determine the characteristics of musical products (soundscapes) by different age groups and experiences, 2) determine the characteristics of the visual representations associated with the musical products (soundscapes) by different age groups and experiences and 3) identify relationships between the musical products (soundscapes) and their visual representations.

5. Method

5.1. Research Sites and Participants

Our research was done in two phases: first, in a major Canadian university and second, in elementary, middle and high schools. Participants in phase 1 were recruited from two different populations. The first group were students in the Kindergarten and Elementary School Education program in a major Canadian University (n = 23) (designated as Generalists Teachers) registered in the course Music Curriculum and Instruction and doing their last field experience immediately after the end of the semester. The second group of participants were students in the Music Education Program of the same University (n = 13) (designated as Music Specialists) registered in the course Music Methods II and doing their final field experience immediately after the end of the semester. All participants signed a consent form before entering the research process.

The participants from the first phase of the study were invited to be part of the second phase during their field experience. Three music specialists chose to participate and obtained agreement from the school they were teaching in. Children were invited to participate, and parental permission was obtained. The participants were as follows:

1) Elementary School in a suburban area—One female music specialist student teacher and a class of grade 3 (n = 20) involved in a general music program, re-

ceiving a one-hour lesson weekly, and having traditional classroom percussions instruments and xylophones available.

2) Middle School in a suburban area—One male music specialist student teacher and a class of grade 9 ($n = 20$) involved in a wind and percussion ensemble program, receiving a 75-minute lesson weekly, and having access to music instruments (wood, brass and percussion).

3) High School in an urban area—One female music specialist student teacher and a group of grade 11 students ($n = 10$) with little previously music knowledge, involved in an introductory general keyboard music program, and receiving a 75-minute lesson weekly. For the purpose of the study, they were given access to a variety of small percussion instruments, ukuleles and sound objects.

5.2. Data Collection

All participants, whether they were student teachers or children/teenagers, were exposed to the same music lesson. In class activities included: listening to surrounding sounds followed by conversation and creative notation of those sounds (ear cleaning activity); sound exploration with different types of papers and collective creation and notation of a soundscape; listening to Shafer's *Once on a Windy Night* and discussion about the work and its notation. In groups of 4 to 5, students then composed their own soundscape with classroom instruments and objects and created a visual representation using a large sheet of paper, color pencils, pastels, crayons, colored papers and glue. Creations were performed to classmates and visual representations were explained. Then, students made comments on their own creation process. Finally, the three student teachers replicated the music lesson in an authentic classroom situation as they were doing their practicum.

Several types of data were collected: videotapes of the lessons, videotapes of the performance of the musical compositions, visual representations of the compositions, and recordings of explanations given by the students about their musical compositions and visual representations. In this article, we are focusing on the musical compositions and their visual representations.

5.3. Data Analysis

The musical and visual soundscapes were processed through content analysis. The three-step process, as described by [Forman and Damschroder \(2008: pp. 46-59\)](#) was used: data immersion, reduction, and interpretation. Immersion involves an engagement with the data to gain a sense of it before organizing it. Reduction implies breaking the data into themes and rearranging it into categories. Finally, interpretation allows us to generate conclusions, to bring meaning to the results and to interpret them through the chosen theoretical framework. If content analysis is most often used with textual data, it is now accepted as a technique that can be effective with visually and audio-based data ([Stemler, 2015](#)).

The first step was therefore an immersion in the data in which the performances

of soundscapes were experienced while looking at the visual representations. Second, even though Murray Shaffer's vision serves as the basis of our framework, his publications do not include a detailed co-analysis of sound and visual data of creative products. Therefore, we performed a search in the published literature to determine and define the musical and visual components used in arts education (Bergeron et al., 2009; Education Manitoba, n.d.). From this search, a list of the major components in music and visual arts was generated as a framework for the qualitative analysis of the creative products of our participants.

The videos of each soundscape and their visual representation were then individually coded using N'vivo R1. The first step of the coding process involved memoing (taking notes, sketching key words and concepts) from the immersion in the sound and visual data (Creswell & Poth, 2018). For the second step, the identification of codes, we researched the visual art and musical theory dictionaries to identify precise concepts from both fields that connected to the preliminary coding. New coding categories were then generated. At this step, the data (both video and pictorial) from all participants was coded with the new codes. During this phase of coding, additional categories emerged. To ensure coding trustworthiness, both authors independently coded approximately 20% of the data. Throughout the coding process, the two authors met regularly to discuss the categories and come to an agreement on the specific words and concepts to use in the analysis. Disagreements were resolved through discussion and by consulting the published literature defining the musical and visual components (Bergeron et al., 2009; Education Manitoba, n.d.). Once the final codes were set, all the data was reanalyzed by one of the authors one last time to make sure that all new codes were included in the analysis.

Once the coding was completed, a frequency count of the codes' occurrences was performed (Creswell & Poth, 2018) and compared between the different groups of participants. The data from the soundscapes and the visual products was finally triangulated to identify existing relationships between the two types of products.

6. Results

A total of 24 soundscapes, including sound and visual representations, were analyzed in this study. The results present analyzed cases, meaning the group soundscapes ($N = 24$). They are reported for each cohort, as follows: Grade 3 ($n = 6$), Grade 9 ($n = 5$), Grade 11 ($n = 3$), Generalists ($n = 7$) and Music Specialists ($n = 3$). The musicians' soundscapes represented different acoustical environments: sounds of nature ($n = 13$), sounds in everyday life ($n = 7$), and abstract art ($n = 4$)¹.

Among the different musical products, we identified the use of the following musical parameters: beat, rhythm, tempo, pitch, dynamics, tone, sound texture

¹For a detailed presentation of the different soundscapes, see Boucher and Moisey, 2019.

and structure. Throughout the following tables, the frequency counts represent the presence of the studied elements within each soundscape. The frequencies are counted within each cohort.

6.1. Characteristics of Soundscapes per Age Group/Experience

In **Table 1**, we observe that some concepts such as tone, rhythm and sound texture are the ones most often used by all groups. Music Specialists included most often the concepts of beat/tempo, rhythm, tone and sound texture in their musical products, while students in Grade 11 also included dynamics, which were less present in Specialists' compositions. Generalists, on the other hand, mostly used dynamics, tone and sound texture but, less rhythm and beat/tempo. It is interesting to observe that Generalists and Grade 9 groups are the only ones who used some sort of structural elements in their products, while Grade 3 students used fewer dynamics than other groups. Finally, pitch was barely used in Grade 3, Grade 11 and by Generalists. We saw from the video analysis that those groups used fewer melodic instruments, they mostly used percussion instruments, which explains this difference.

Table 1. Characteristics of the musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Beat	3	50%	3	60%	1	33%	4	57%	3	100%	14	58%
Rhythm	6	100%	5	100%	3	100%	6	86%	3	100%	23	96%
Tempo	5	83%	4	80%	3	100%	6	86%	3	100%	21	88%
Pitch	1	17%	4	80%	1	33%	2	29%	2	67%	10	42%
Dynamics	1	17%	5	100%	3	100%	7	100%	2	67%	18	75%
Tone	5	83%	5	100%	3	100%	7	100%	3	100%	23	96%
Sound Texture	6	100%	5	100%	3	100%	7	100%	3	100%	24	100%
Structure	0	0%	4	80%	0	0%	5	71%	0	0%	9	38%

The following analysis presents the different parameters in a more detailed way. First, in regard to the use of Dynamics (**Table 2**), we observe that Grade 3 musicians barely used any form of dynamics, except for one group that used a semblance of crescendo - decrescendo. Ninth graders mostly used contrasting dynamics (soft and loud) and some gradual variations (crescendo and decrescendo). Among Grade 11, only one group used dynamics. Generalist musicians used the most diverse palette of dynamics, the vast majority used crescendos (86%) and sudden changes (71%) and two thirds of the Music Specialist groups used dynamics in different ways.

Table 2. Use of dynamics in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Dynamics	1	17	5	100	3	100	7	100	2	67	18	75
Soft (piano)	0	0	5	100	1	33	3	43	2	67	11	46
Loud (forte)	0	0	4	80	1	33	3	43	1	33	9	38
Crescendo	0	0	3	60	1	33	6	86	1	33	11	46
Decrescendo	0	0	3	60	1	33	3	43	1	33	8	33
Cresc. - Decresc.	1	17	0	0	0	0	2	29	0	0	3	13
Sudden Change	0	0	1	20	0	0	5	71	1	33	7	29

In **Table 3**, we take a closer look at the presence of clear melodic patterns (melody), but also at the use of higher and lower pitches. Only one Grade 3 group used some elements of pitch and a small distinctive melody². Similarly, Grade 11 musicians and Generalist groups used little elements of pitch and melody. Specialist musicians are the ones that used the most of it in general, while Grade 9 groups offer variations between high and low pitches.

Table 3. Use of pitch and melody in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Pitch	1	17	3	60	1	33	2	29	2	67	9	38
Higher pitch	0	0	2	40	0	0	2	29	1	33	5	21
Lower pitch	0	0	1	20	0	0	1	14	0	0	2	8
Melody	1	17	1	20	0	0	1	14	1	33	4	17

As presented in **Table 4**, we observe that most musicians used sound effects, specifically percussive ones. In addition, guttural and mouth noises, such as “clicking the tongue”, were used by some groups. Surprisingly, the spoken or singing voice was the element less often used by most of the musicians.

As shown in **Table 5**, two thirds of the groups (67%) used distinguishable rhythmic³ patterns in their musical products, while a similar number (67%) of groups used arrhythmic⁴ elements. However, it is noteworthy to mention that music

²Melody is understood as a distinctive organized sequence of pitch variation and as a subcategory of the parameter of pitch.

³*Rhythmical* is used to define music that embodies clear rhythmic patterns (e.g., succession of two eighth notes and a quarter note). As mentioned by Whittal (2011), «[...] the primary quality of rhythm is as an immediate succession of duration and occasional accents, approached and quitted in ways which participate in the shaping processes of the entire musical fabric, and which may even, in certain very ‘rhythmical’ works, seem to dominate that fabric» (Section 4: Present-Day Attitudes to Rhythm).

⁴The expression *Arrhythmical* is used to characterize musical passages that do not include a clear and identifiable rhythm.

specialists all used arhythmical elements in their products. Rhythmic repetitions were also used quite often (92%), by Grade 9, Grade 11 and Music Specialists. Finally, the use of duration, distinctively shorter and longer sounds, is present respectively in 42% and 54% of the sound products.

Table 4. Use of tone and sound effects in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Tone	6	100	5	100	3	100	7	100	3	100	24	100
Sound Effects	6	100	5	100	3	100	6	86	3	100	23	96
Percussive effects	6	100	5	100	3	100	5	71	3	100	22	92
Guttural or Mouth Noises	1	17	0	0	1	33	2	29	2	67	6	25
Melodic instruments	1	17	3	60	3	100	2	29	2	67	11	46
Spoken or Singing Voice	1	17	0	0	2	67	0	0	1	33	4	17

Table 5. Use of rhythm in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Rhythm	6	100	5	100	3	100	6	86	3	100	23	96
Rhythmical patterns	5	83	4	80	1	33	5	71	1	33	16	67
Arhythmical elements	3	50	3	60	3	100	4	57	3	100	16	67
Repetition	6	100	5	100	3	100	5	71	3	100	22	92
Duration (Shorter Sounds)	2	33	1	20	2	67	3	43	2	67	10	42
Duration (Longer Sounds)	3	50	2	40	2	67	4	57	2	67	13	54

Table 6 presents data about sound texture and musical structure. We decided to present sound texture and musical structure together because some musical products seem to be structured according to the musical entries (i.e. when a musician starts or stops playing). In all groups, we observe that some form of sound texture in the musical products can be heard. In most of the groups (88%), all musicians played together at the same time, at some point during the soundscape. In some cases, we observed a true synchronised playing, following a common beat. This situation was most often observed in Grade 9 (40%). Different kinds of interactions in the playing were observed. Some groups begun their composition with alternating entries (one after the other) (60%). This was more often present in older and more experienced musicians (Grade 9, Generalists and Music Specialists). A different interaction, musicians alternating the playing throughout the whole composition (50%), was identified in Grade 3 musicians. Finally, some specific structure, or musical form, is present in most products of Grade 9 (60%) and Generalist (71%) musicians.

Table 6. Use of sound texture and structure in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Sound Texture	6	100	5	100	3	100	7	100	3	100	24	100
Playing in alternance	6	100	2	40	1	33	2	29	1	33	12	50
Starting in alternance	2	33	3	60	2	67	5	71	3	100	15	63
Playing together	4	67	5	100	2	67	7	100	3	100	21	88
Synchronised playing	0	0	2	40	0	0	1	14	1	33	4	17
Musical structure	0	0	3	60	0	0	5	71	0	0	8	33

Table 7 compiles data related to beat and tempo characteristics. First, the beat is present in more than 50% of the groups. Specialists are the ones that used it more frequently, followed by Generalists, Grade 3, Grade 9, while in Grade 11 only one group used a beat. If we look at the tempo characteristics (stable, unstable or modified voluntarily), we can see that a stable tempo is present in the same groups that include a clear beat in their musical product.

Table 7. Use of beat/tempo in musical products.

	Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Beat	3	50	3	60	1	33	4	57	3	100	14	58
Stable tempo	4	67	3	60	1	33	6	86	3	100	17	71
Unstable tempo	4	67	0	0	0	0	4	57	1	33	9	38
Controlled tempo variation	2	33	2	40	0	0	0	0	3	100	7	29

6.2. Characteristics of Visual Representations per Age Group/Experience

The following three tables show the main characteristics of the visual representations' analysis: principles of design, elements of design, and symbolic representation. **Table 8** presents the elements that structure the visual representation, called the principles of design—which can be described as “schema by which elements in artwork are planned, organized, and analyzed” (*Education Manitoba, n.d.: p. 6.*). Regarding the first subcategory (Position)—which treats the positioning of the different elements of design (e.g., lines, figures, objects)—we note that most of the groups used juxtaposition (83%), overlapping (79%) and parallel lines (88%).

Different perspectives are also used in the visual products; the horizontal perspective is more frequent (83%) than the vertical perspective (67%). We also note, in relation to the Organizational logic (i.e., the rules according to which the elements of design are organised) that a more coherent way of organizing the visual product seems to be more frequent (96%) than a random one (54%). Regarding

the scale of the visual objects used in the musical products, it seems that medium size objects are most frequently used (88%) by all the musicians. One of the characteristics that is often used is the repetition of elements of design (96%).

Table 8. Use of principles of design in visual products.

		Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Position	Juxtaposition ⁵	6	100	3	60	1	33	7	100	3	100	20	83
	Overlapping ⁵	3	50	4	80	3	100	6	86	3	100	19	79
	Parallel ⁶	5	83	4	80	3	100	6	86	3	100	21	88
	Perspective	5	83	3	60	1	33	7	100	2	67	18	75
Perspective	Horizontal	6	100	4	80	3	100	6	86	1	33	20	83
	Vertical	5	83	3	60	2	67	4	57	2	67	16	67
Organisational logic	Random	5	83	4	80	1	33	0	0	3	100	13	54
	Coherence	6	100	4	80	3	100	7	100	3	100	23	96
	Hierarchy	3	50	2	40	0	0	2	29	0	0	7	29
	Sequencing	4	67	1	20	3	100	2	29	1	33	11	46
Scale	Small scale	4	67	4	80	2	67	5	71	2	67	17	71
	Medium scale	5	83	4	80	3	100	7	100	2	67	21	88
	Large scale	4	67	4	80	1	33	5	71	3	100	17	71
	Scale variation	1	17	3	60	1	33	3	43	3	100	11	46
Recurrence	Continuity	4	67	1	20	0	0	4	57	1	33	10	42
	Pattern	3	50	4	80	1	33	4	57	2	67	14	58
	Repetition	6	100	4	80	3	100	7	100	3	100	23	96
	Unique	5	83	0	0	2	67	5	71	3	100	15	63

Table 9 shows the Elements of design—which are the “visual [...] parts of a composition” (e.g., colors, shapes, lines). Regarding the type of colors used in the musical product, both warm and cool colors are used in similar proportion (88%). Looking at the type of shapes used—i.e., “[an] enclosed area defined and described by elements such as color, value, line, and/or texture” ([Education Manitoba, n.d.: p. 4](#))—we see that irregular (i.e., an object or a representation with irregular, free-flowing) or organic forms (often a natural shape) are the most frequent types used by all the musicians (84%). Interestingly, our younger composers, Grade 3, used a greater number of geometric shapes (83%).

Finally, **Table 10** shows the presence of Symbolic representation—which addresses whether a visual product is representational (i.e., “something made [that]

⁵*Juxtaposition* and *Overlapping* refer to visual objects such as shapes or geometrical figures.

⁶*Parallel* refers to lines in the visual product that are parallel.

Table 9. Use of elements of design in visual products.

		Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Colors	Warm colors	4	67	4	80	3	100	7	100	3	100	21	88
	Cool colors	5	83	4	80	3	100	6	86	3	100	21	88
	Monochromatic	3	50	4	80	2	67	6	86	3	100	18	75
	Polychromatic	2	33	4	80	0	0	4	57	1	33	11	46
Shapes	Geometric shape	5	83	4	80	2	67	5	71	2	67	18	75
	Organic Shape	4	67	5	100	2	67	7	100	3	100	21	88
Line	Straight line	6	100	4	80	3	100	6	86	3	100	22	92
	Curve line	3	50	4	80	1	33	5	71	1	33	14	58
	Wavy line	6	100	3	60	2	67	6	86	2	67	19	79
	Spiral	5	83	2	40	0	0	3	43	2	67	12	50
	<i>Zig Zag</i>	3	50	1	20	1	33	3	43	1	33	9	38

may stand for, or bring to mind, some other thing”, Bell, 2001b), or abstract (i.e., “[...] which do not seem to represent other bodily objects”, Bell, 2001a). In general, musicians tend to use more representational elements in their products (88%) than abstract elements (56%). This distinction can be clearly observed in all groups, except in Grade 3 musicians, who used abstract and representational elements equally. If we look closely at what is represented in the visual products, various day-to-day objects (e.g., a school bus), are the most frequently used (60%) by all musicians. Eleven groups of musicians from Grade 3, 9, 11 and Generalists used the visual representation of distinctive musical objects (e.g., musical instrument) in their products, which was not the case for Music Specialists.

Table 10. Use of symbolic representation in visual products.

		Grade 3 (<i>n</i> = 6)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 3)		Total (<i>N</i> = 24)	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
General representation	Abstract	5	83	2	40	2	67	4	57	2	67	15	63
	Representational	5	83	5	100	3	100	7	100	2	67	22	92
Representational	Living being	1	17	2	40	1	33	1	14	0	0	5	21
	Object	2	33	5	100	2	67	4	57	2	67	15	63
	Score	5	83	1	20	2	67	3	43	0	0	11	46
	Scene	0	0	5	100	1	33	3	43	0	0	9	38

6.3. Relationships between Musical Products and Their Visual Representations

Following the analysis of the musical and visual products separately, we looked

at possible relationships between the two. Due to large amount of data available, we chose to focus on relationships that emerged during the coding: the concepts of beat and its visual representation and, the musical representation of abstract and figurative visual elements⁷. Looking at relationships between visual and musical products and the use of beat, we noted whether among the elements of design, disposition could represent beats. We then looked if some elements relative to the notation of beats in a musical score from the western tradition (e.g., alignment, juxtaposition, repetition of notational figures) (see **Figure 1**) could be found in the visual products. We noted that 80% ($n = 12$) of the musicians that included beats in their musical products also used some visual objects (e.g., geometrical shapes) and juxtaposed them to one another.

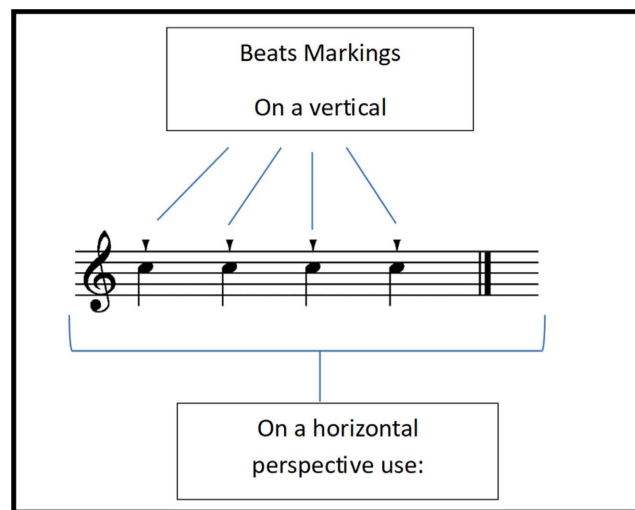


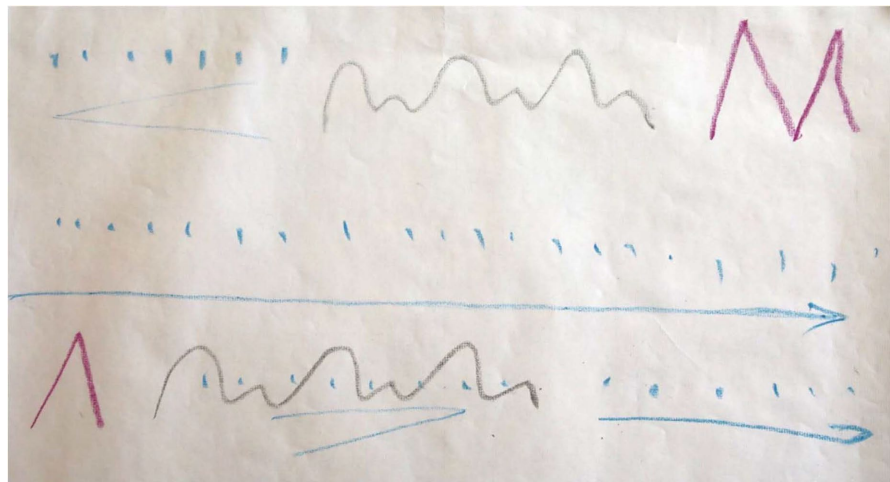
Figure 1. Musical score in traditional western notation and its principles of design.

Once we determined which visual principles characterize beats in a musical score, we then investigated the musical products that used beats. We found 14 of them ($n = 14$). **Table 11** presents the results of this inquiry. First, we note that all grade 3 and 11 groups using beats also used all the associated principles of design. If we look at one example (visual product of Gr11.2, see **Figure 2**), the beat is represented by the equidistant dots that are present throughout. In the audio recording, the beat is played by the egg shakers and is heard during the whole performance. In opposition, Grade 9 groups less frequently used the principles of the visual representation of beat (between 33% and 67%). Secondly, we can see that most groups using beats in their musical product used principles of design of juxtaposition and repetition (93% for both principles), especially in Grade 3, 11, Generalists and Music Specialists. Parallel lines are also strongly present when representing beats (86%). Thirdly, the principles of perspective are the ones less used by musicians (64% to 71%).

⁷A selection of audio and visual soundscapes is available at the following link.

Table 11. Representation of beats in visual products.

	Grade 3 (<i>n</i> = 3)		Grade 9 (<i>n</i> = 3)		Grade 11 (<i>n</i> = 1)		Generalists (<i>n</i> = 4)		Mus. Spec. (<i>n</i> = 3)		Total (<i>n</i> = 14)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Juxtaposition (Objects)	3	100	2	67	1	100	4	100	3	100	13	93
Parallel (Lines)	3	100	2	67	1	100	3	75	3	100	12	86
Perspective	3	100	2	67	1	100	4	100	2	67	12	86
Horizontal	3	100	2	67	1	100	3	75	1	33	10	71
Vertical	3	100	1	33	1	100	2	50	2	67	9	64
Repetition	3	100	2	67	1	100	4	100	3	100	13	93

**Figure 2.** Example of a representation of beats (Raining Night - Grade 11 - Gr11.2).

Another relationship we investigated was the one between the sound and the use of abstract and representational elements in visual products. Specifically, we analysed the use of sound effects (e.g., sound of wind obtained by blowing into a flute), melodic patterns and specific instruments were represented in an abstract drawing (e.g., only lines and forms) or in a more figurative (representational) drawing (e.g., scene of nature, drawing of an instrument). We found 15 soundscapes that included these as abstract elements (*n* = 15) and 22 as representational elements (*n* = 22). **Table 12** and **Table 13** show that melodic instruments are used most frequently as representational elements in Grade 9 groups, while other groups have similar ratios. Regarding the use of melody, the Music Specialists used it more frequently to represent abstract elements. Sound effects are more often used for representational elements, more specifically by Grade 3 and Generalists. Finally, percussive effects are more present in Grade 3 groups using representational elements, while guttural or mouth noises are used in a higher rate by Grade 11 as representational elements.

The following figures (**Figure 3** and **Figure 4**) show the wide range the visual products that were created by the musicians in terms of their degree of abstraction.

Table 12. Use of musical elements in visual products with abstract elements.

	Grade 3 (<i>n</i> = 5)		Grade 9 (<i>n</i> = 2)		Grade 11 (<i>n</i> = 2)		Generalists (<i>n</i> = 4)		Mus. Spec. (<i>n</i> = 2)		Total (<i>n</i> = 15)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Melody	1	20	0	0	0	0	1	25	1	50	3	20
Sound Effects	4	80	2	100	2	100	3	75	2	100	13	87
Percussive effects	4	80	2	100	2	100	3	75	2	100	13	87
Guttural or Mouth Noises	1	20	0	0	0	0	2	50	1	50	4	27
Melodic instruments	1	20	0	0	2	100	2	50	1	50	6	40

Table 13. Use of musical elements in visual products with representational elements.

	Grade 3 (<i>n</i> = 5)		Grade 9 (<i>n</i> = 5)		Grade 11 (<i>n</i> = 3)		Generalists (<i>n</i> = 7)		Mus. Spec. (<i>n</i> = 2)		Total (<i>n</i> = 22)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Melody	1	20	1	20	0	0	1	14	0	0	3	14
Sound Effects	5	100	5	100	3	100	6	86	2	100	21	95
Percussive effects	5	100	5	100	3	100	5	71	2	100	20	91
Guttural or Mouth Sounds	1	20	0	0	1	33	2	29	2	100	6	27
Melodic instruments	1	20	3	60	3	100	2	29	1	50	10	45

Figure 3 is a representational drawing of a sunset created by Generalists (Gen2) where we clearly distinguish the sky, the trees and the hills. From a sound perspective, we hear different instruments such as the snare drum, glockenspiel, egg shaker and woodblock played in a decrescendo. Different colors are used for the sunset representing different layers of sound, the trees are portrayed by the shakers, and the mountains are the beats that are always there, supporting both nature and music. On the other end of the spectrum, we observe the visual product of a group of third graders (Gr3.1); an abstract creation that includes only curves and wavy lines (**Figure 4**). The colors and shapes are chosen to reflect the choice of instruments children are using and the way they are being played. Even though the title seems evocative, *Five Night at Freddy boum 12*, is abstract, not depicting a specific scene.

7. Discussion

The objective of this qualitative study was to develop a better understanding of the creative products by musicians of different ages and experiences when using R. Murray Schafer's creative pedagogy. First, we analysed the characteristics of musical products. We found that the musicians with the least amount of musical training, Grade 3 and 11 overall used less diversity in the way they used their sound objects: both groups used few dynamics and included less variety in pitch. Music Specialists and Grade 9 groups included the most diverse elements of pitch,



Figure 3. Example of a representational visual product (Day's end - Generalists - Gen2).

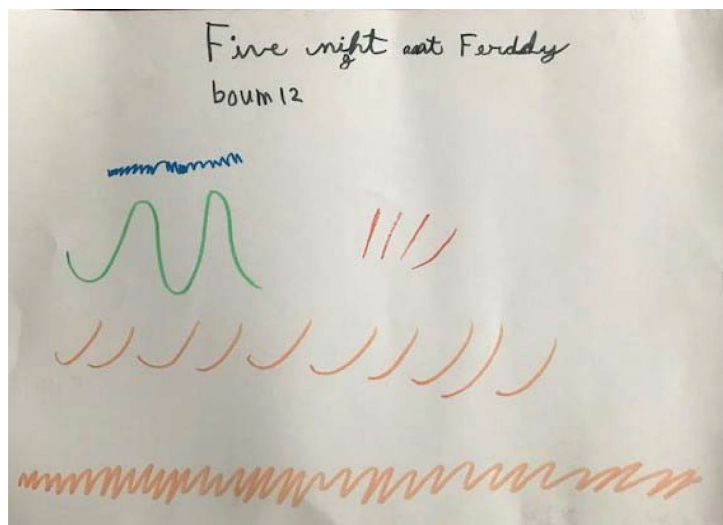


Figure 4. Example of an abstract visual product (Five Night at Freddy boum 12 - Grade 3 - Gr3.1).

it is worth noting that Grade 9 participants had access to woodwinds, which provided more opportunities to develop this musical component. Overall, percussion effects were highly used, while vocal ones were much less used. Some rhythmic components were generally present in soundscapes, taking the form of repetitions and identifiable rhythmical elements. In relation to sound texture, most compositions included players performing all at once, sometimes in a true synchronised matter. While Grade 3 mostly alternates during performances, the most experienced musicians used alternating entries and then some form of sound superposition. Finally, most soundscapes included the presence of a steady beat, except for Grade 11's.

Second, we investigated the characteristics of the visual representations generated by our participants. For the visual representations, within the principles of design category, the position of the visual components seemed important to most of our musicians and the horizontal perspective was used more frequently than the vertical one. They showed a coherent organizational logic, while they used mostly medium size objects and a high number of repetitions in their design. For the elements of design, warm and cool colors were used in similar proportions, while irregular forms were more frequently used except for the younger participants who used more often geometric figures. Regarding the symbolic representation, most musicians created representational objects, except for the younger ones who used them in equal proportion with abstract elements.

Finally, we identified relationships between musical products and their visual representations. We noted that most musicians that included beats in their musical products also used some visual figures to represent it and juxtaposed them to one another. Additionally, repetition and parallel elements were used to visually represent the beat. However, no clear links were possible between representational and abstract elements and sound effects used.

7.1. The Role of Musical Training in Creation of Musical Products

Through the analysis of the musical products generated in this study, we found that musical training seems to be associated with greater diversity in creative products. Indeed, the groups with fewest musical experiences, third and eleventh graders, had similar results. Researchers have explored how participation in a general music education, be it at home or in school, can support creation of musical products (Barrett, 2012; Bolduc, 2009; Kiehn, 2003; Veloso & Carvalho, 2012; Webster, 2012). Barrett (2012) studied how very young children took part in song making. Her participants were exposed to a rich musical life at home and in an early childhood music program. They were able to adapt material they had heard and to use it in their own music-making, suggesting that one can see ‘the beginnings of an individual and personal style’ through this process (p. 66). Similarly, Bolduc (2009) examined whether creative musical activities of 5- and 6-year-olds, offered as part of a musical training program and periods of free play, promoted the representation and understanding of two musical parameters (pitch and duration). Through the analysis of the musical products and children’s comments, he found that such program increased the development of their auditory discrimination abilities and their capacity of notating the musical elements.

On the other hand, Webster (2012) suggests that teachers should use revision as a teaching process to support children’s ability to create music. Through a review of the literature, he explains how the process of revising the students’ projects allows the teacher to be an agent in helping them develop a stronger understanding of music. He proposes a list of ‘building blocks’ to use revision as a pedagogy, among which: “Teach the formal properties of music at the appropriate time The simple fact that the more children know about something, the more creative

they can be” (p. 109).

Therefore, it seems that training is a relevant factor influencing the musicians’ musical products, maybe even more than age. As mentioned earlier, in our study, participants with less musical training, although of different ages, 8 and 17, did not show as much diversity in their use of musical elements compared to the other groups. Additionally, the students in Grade 11 did not include the beat as often as the other musicians. This seems to be in contradiction with [Swanwick and Tillman’s \(1986\)](#) theory of musical development based on age. In the light of our research that compared musicians of different ages and experiences, it seems important to recommend that this theory be revisited to develop a better understanding of the music learning of diverse learners. Since music in the community has flourished in the past years, with several adults delving in lifelong learning opportunities, we now see people of different ages and experiences interested in developing their musical skills ([Elliott, 2012](#)). As [Myers \(2012\)](#) points out, this requires great flexibility from teachers, an ability to understand diverse personal and professional motivations, while drawing on a wide range of performing, creating and listening experiences. It therefore seems important to expand our understanding of musical development.

7.2. Music Notations

While planning this study, we chose Schaffer’s creative process focusing on soundscapes which provided both sound and visual products. Although offering access for notation to musicians without formal training in music, this specific form of notation generates a precise type of creative product that tends to be more representational of the surrounding sounds (rain, wind, cafeteria, bus). Because our participants were introduced to the work of Murray Schaffer, through listening to his work and looking at scores, they tended to use the same type of notation that they were introduced to. Similarly, [Bolduc \(2009\)](#), who used invented musical notation with preschoolers, provides examples of notation that are highly inspired by the traditional western notation, which is connected to the training those children received.

Therefore, the creative proposition that learners are given seems to lead to specific visual representations. This brings up the question of music exposure and culture and their roles in music creation. All our participants were part of the western world, surrounded by western music and receiving a music education centered on the western tradition (including notation). Interestingly, the way they chose to represent the beat visually used the same characteristics as traditional western notation: a repeated visual figure, using parallel elements, and juxtaposed to one another. This questions how well this cultural element is integrated or if it is a shared element of music within cultures. An important step would now be to explore how people from other cultures interact with the creation of musical and visual soundscapes. How would their life experience interact with this proposition? Since many cultures favoured an oral transmission in which notation does

not have the same importance, can this approach translate into other cultures? Teachers in the 21st century must be aware of these realities and will need to navigate through them as they teach children from diverse backgrounds.

7.3. Strengths and Limits

The strengths of this study rely on the possibility to compare musickers of different ages and musical knowledge due to the use of Shafer's soundscaping and visual representations. Not using traditional western notation opens the possibility of creating music to a much larger group of participants and allows us to observe how they generate creative products, including both sound and visual components.

However, some limits also arise from our research. First, we had groups of participants that were not proportionate in numbers. This means that we must interpret the results carefully, mostly for the categories that include fewer participants. Additionally, the different contexts in which our participants developed their creations, as well as the musical materials available, were different and sometimes difficult to compare. For example, only the Grade 9 students had access to a variety of melodic instruments (woodwinds), the others mostly used percussion instruments. This, of course, influences the analysis of the melodic components but also others such as sound effects. Another limit to our study is that, by its qualitative nature, generalisation is not possible. Research is needed to further understand the creative process and products of a variety of musickers in a more controlled environment (similar instruments, same number of participants in groups).

7.4. Conclusion

This study opened the possibility of studying musical products of musickers of different ages and experiences. It brought light to the role that music exposure and training plays in developing creative musical skills. Since our study included a short intervention that generated one creative product, future research could focus on how these skills developed over time, and in diverse cultural contexts, allowing different musickers to explore how they 'think in and with sound' (Webster, 2012).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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