The Effects of Transmediation on Students’ Creativity Through Collaborative Composing

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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Abstract
The purpose of this action research was to investigate the process and the effect of the transmediation (translation of content from one media to another) on students’ creativity. The goal was achieved by focusing on: (a) students’ collaborative strategies of translating non-musical sources to musical compositions; (b) the effects of the level of abstraction of the sources on students’ creative processes and products; and (c) the effects of transmediation on students’ general and domain-specific creativity compared to the general music classes.

This study was conducted in a Grade 8 beginner strings’ class of thirteen students. The study was divided into two phases: the teacher taught six classes, then the students were divided up into groups of four or five to compose musical pieces through transmediating the given source. Six classes were spent translating verbal, visual, and video sources, with each mode containing one direct and one abstract source. Students were tested three times throughout the study (before and after phase 1, and after phase 2) with two tests on musical and general creativity.

The results revealed that students were able to use multiple modes of communication effectively to face the challenge of transmediation: verbal expression to describe and give precise directions; musical sound to demonstrate musical ideas; and gestures to point, demonstrate, and express rejection or acceptance of ideas. Second, when students were working with more abstract
sources, the number of interactions significantly increased, and the products demonstrated more complex level of transmediation. Third, the increase of the test scores was significantly greater after the transmediation unit, suggesting that it had greater positive effects on students’ creativity than the general music classes. Overall, the findings suggest that the right level of transmediation task is effective in fostering students’ domain-specific and general creativity.
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Table of Contents

Acknowledgements........................................................................................................ iv
Table of Contents........................................................................................................... v
List of Tables ................................................................................................................ viii
List of Plates .................................................................................................................. ix
List of Figures ................................................................................................................ x
List of Appendices ......................................................................................................... xi

Chapter 1: Introduction ................................................................................................... 1
  Background to the Study................................................................................................. 1
  Need for the Study ......................................................................................................... 4
  Statement of the Purpose .............................................................................................. 5
  Research Questions ...................................................................................................... 5
  Definition of Terms ...................................................................................................... 6
  Chapter Organization .................................................................................................. 7

Chapter 2 ......................................................................................................................... 8
Review of Literature ....................................................................................................... 8
  Part I: Creativity .......................................................................................................... 8
    Historical Overview .................................................................................................. 8
    The Four P Framework ............................................................................................. 10
      Person ...................................................................................................................... 10
      Process ................................................................................................................... 10
      Wallas’ stages of creative process: ............................................................... 10
      Product .................................................................................................................. 12
      Press ..................................................................................................................... 12
      The two new Ps: persuasion and potential: ................................................. 12
    The Four C Model of Creativity ............................................................................. 14
      Big-C ..................................................................................................................... 14
      Little-c ................................................................................................................... 14
      Pro-C ..................................................................................................................... 15
      Mini-c .................................................................................................................... 16
    Domain Specificity of Creativity ............................................................................ 16
      Domain generality ................................................................................................. 17
      Domain specificity ................................................................................................. 18
    Sociocultural Creativity ......................................................................................... 19
      Systems view of creativity .................................................................................... 20
      Componential theory of creativity ...................................................................... 21
    Group Creativity ...................................................................................................... 21

Table of Contents
Chapter 3: Methodology and Design .............................................................................. 45

Chapter Organization ........................................................................................................... 45

Part I: Method .......................................................................................................................... 45

  Restatement of the Purpose .................................................................................................. 45
  Methodological Overview ..................................................................................................... 45
  Rationale for Using Action Research Method ....................................................................... 48

Part II: Design ........................................................................................................................ 49

  Overview of the Design ........................................................................................................ 49

    Rationale for using numerical data .................................................................................... 49

  Participant Selection ............................................................................................................ 50
  Procedures for Recruiting and Obtaining Permissions ........................................................ 51
  Confidentiality and Access to Data Retention ..................................................................... 52
  Role of the Researcher .......................................................................................................... 52
  Clarification of Research Biases ........................................................................................... 53
  Preliminary Phase ................................................................................................................ 53

  Designing the Test Instruments ............................................................................................ 53

    TVVC (Test of Verbal and Visual Creativity) ...................................................................... 54

Group creative process .............................................................................................................. 22
  Preparation in group creative process .................................................................................. 22
  Elaboration in group creative process .................................................................................. 23

Summary: Conceptions of Creativity ...................................................................................... 23

Construct Definition for this Study: Creativity ....................................................................... 24

Musical Creativity ..................................................................................................................... 25
  Webster’s model of creative thinking process in music ......................................................... 26
  Musical creativity: head-and-shoulders model ..................................................................... 27

Construct Definition for This Study: Musical Creativity ......................................................... 28

Assessment of Creativity ......................................................................................................... 28

Divergent Thinking Tests ......................................................................................................... 29

  Tornnace Test of Creative Thinking (TTCT) ........................................................................ 30
  Remote Associates Test ......................................................................................................... 31
  Consensual Assessment Technique ...................................................................................... 31
  Self assessments .................................................................................................................... 32

Creativity Tests in Musical Domain .......................................................................................... 33

Summary of Part I: Creativity .................................................................................................. 35

Part II: Transmediation ............................................................................................................ 35

  Transmediation and Multiliteracies ...................................................................................... 35
  Importance of Transmediation in Educating Creativity ........................................................ 37
  Use of Transmediation in the Classrooms ............................................................................ 39
  Strategies for Designing Transmediation Tasks .................................................................. 41
  Assessment of Transmediation ............................................................................................. 42

Musical Creativity: head shoulders model .............................................................................. 52

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Test</td>
<td>54</td>
</tr>
<tr>
<td>Modified MCTM</td>
<td>55</td>
</tr>
<tr>
<td>Selection of the Transmediation Sources</td>
<td>56</td>
</tr>
<tr>
<td>Data Collection and Analysis Method</td>
<td>57</td>
</tr>
<tr>
<td>Tests</td>
<td>57</td>
</tr>
<tr>
<td>Phase 1</td>
<td>57</td>
</tr>
<tr>
<td>Phase 2</td>
<td>57</td>
</tr>
<tr>
<td>Reflection</td>
<td>60</td>
</tr>
<tr>
<td>Chapter 4: Results and Analysis</td>
<td>61</td>
</tr>
<tr>
<td>The Stages of Collaborative Creative Process</td>
<td>61</td>
</tr>
<tr>
<td>Stage 1: Exploration</td>
<td>62</td>
</tr>
<tr>
<td>Stage 2: Verification</td>
<td>64</td>
</tr>
<tr>
<td>Stage 3: Incubation</td>
<td>68</td>
</tr>
<tr>
<td>Stage 4: Illumination</td>
<td>68</td>
</tr>
<tr>
<td>Stage 5: Elaboration</td>
<td>69</td>
</tr>
<tr>
<td>The Effects of the Level of Abstraction on Transmediation</td>
<td>71</td>
</tr>
<tr>
<td>Students’ perception of difficulty</td>
<td>71</td>
</tr>
<tr>
<td>Amount of literal and imaginative transmediation</td>
<td>73</td>
</tr>
<tr>
<td>Creativity Scores of the Compositions</td>
<td>80</td>
</tr>
<tr>
<td>The Affect of Transmediation on Students’ General and Domain-specific Creativity</td>
<td>82</td>
</tr>
<tr>
<td>Students’ Level of Engagement</td>
<td>85</td>
</tr>
<tr>
<td>Chapter 5: Discussion</td>
<td>88</td>
</tr>
<tr>
<td>Themes</td>
<td>88</td>
</tr>
<tr>
<td>Students’ transmediation process</td>
<td>88</td>
</tr>
<tr>
<td>Level of abstraction</td>
<td>89</td>
</tr>
<tr>
<td>Effects of transmediation on students’ creativity</td>
<td>89</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>90</td>
</tr>
<tr>
<td>Recommendations for Practice</td>
<td>91</td>
</tr>
<tr>
<td>Recommendations for Future Research</td>
<td>93</td>
</tr>
<tr>
<td>References</td>
<td>95</td>
</tr>
<tr>
<td>Appendices</td>
<td>110</td>
</tr>
</tbody>
</table>
List of Tables

Table 1: Use of MCTM-II in Independent Research Studies ........................................ 34
Table 2: Sources ............................................................................................................. 56
Table 3: Group Assignments ....................................................................................... 58
Table 4: Comparison of Wallas' Stages of Creative Process and the Result of This Study .... 62
Table 5: Student's Instrument Choice ........................................................................ 63
Table 6: Number of Interactions by Mode ................................................................... 64
Table 7: Sources ............................................................................................................. 71
Table 8: Examples of Literal Transmediation ............................................................. 75
Table 9: Examples of Imaginative Transmediation ..................................................... 75
Table 10: Composition #2, Group 3 .......................................................................... 76
Table 11: Similar Motives from Lesson 3 .................................................................... 77
Table 12: Composition #4, Group 3 .......................................................................... 78
Table 13: Composition #4, Group 2 .......................................................................... 79
Table 14: Composition #4, Group 1 .......................................................................... 79
Table 15: CAT Scores .................................................................................................. 80
Table 16: Fueyo Scores ............................................................................................... 81
Table 17: CAT and Fueyo Scores Combined ............................................................... 81
Table 18: TVVC Scores ............................................................................................... 83
Table 19: MCTM Scores .............................................................................................. 84
List of Plates

Plate 1: Written notation from group 1 ................................................................. 70
List of Figures

Figure 1: The Design of the Current Research ................................................................. 49
Figure 2: Spearman's Rank Correlation of TVVC and TTCT ........................................ 55
Figure 3: Number of Interactions ..................................................................................... 72
Figure 4: Number of Incubation Moments ..................................................................... 73
Figure 5: Question #3, TVVC Version C ........................................................................ 74
Figure 6: Question #3, TVVC Version B ......................................................................... 74
Figure 7: Creativity Scores of the Compositions over Time ........................................... 82
Figure 8: TVVC Scores ..................................................................................................... 84
Figure 9: MCTM Scores .................................................................................................... 85
List of Appendices

Appendix A: Test for Verbal and Visual Creativity (TVVC).......................................................... 110
Appendix B: Modified MCTM.......................................................................................................... 114
Appendix C: Lesson Plans............................................................................................................ 120
Appendix D: Consent Letters & Ethics Approval Letter..................................................................... 127
Appendix E: Questions for the Class Discussion & Teacher Interview............................................. 131
Chapter 1
Introduction

The objective of this study was to find an effective way to develop creativity for young students in the music classroom. Thirteen Grade 8 Music students in an Ontario school were investigated for the effectiveness of practicing translation between different media through collaborative composition on the development of their creativity. In this chapter, I present background to the study, highlighting research on creativity education in both general and music education, and the need for the study. Also, statement of the purpose and research questions are presented, followed by definition of key terms, and the description of chapter organization of this paper.

Background to the Study

The shift in working, public, and private lives happened prominently around the arrival of the new millennium, and therefore the term ‘21st century’ has been widely used to denote such changes. This is the year of 2017, and we are almost two decades into the century. The excitement and fear of going into the new millennium has faded, and the active discussion of the ideal ‘21st century learning’ as “a student-centred approach to deepening learning, enabled by technological tools, that results in healthy, active citizenship in global society” (Grose, 2014, p. 8) has receded. The invention of interactive devices and the immense variety of educational computer software seemed to promise a drastically futuristic education. However, nothing much has been changed in schools (Gardner, 2007; Jenson, Taylor, & Fisher, 2010; Russel, Bebell, O’Dwyer, & O’Connor, 2003). The traditional way of books and handouts, one-way lectures, and written test evaluation is still prevalent. In the field of music education in North America, large ensemble performance preparation is still the predominant means of engaging young people with music, and regardless of whether in one-on-one studio lessons or school ensembles, young musicians “prepare for performance by doing what the score in front of them and the teacher beside them tell them to do” (Bolden, 2014, p. 2).

In contrast, the world outside the school is changing at an incomparably faster speed. Society demands more skills and experiences, and globalization has set fierce competitions between people over the entire world. While schools strive to equip students with the skills “valued by the wider community” (Gardner, 1991, p. 127), they cannot catch up the speed of the changing world. In North America, the long tradition of hard-boundaried paradigm in the single-
disciplinary system (Detels, 1999), and the strong focus on the traditional literacy pedagogy that emphasizes the canonic use of written English are disparate from students' lives in the 21st century. In public lives, advanced technology allowed fast communications and travelling between different parts of the world. Means of communication is no longer bound to languages, and students need to be able to negotiate “different visual and iconic meanings; and variations in the gestural relationships among people, language, and material objects” (The New London Group, 1996, p. 69).

In the workplace, the industrial production line model of highly excluded, hierarchical structure faded near the end of the 20th century, and the era of the "postFordism" (Piore & Sable, 1984) began. As machines and computers replaced human labour with better precision and productivity, humanity’s role has shifted from simple labour to “expert thinking or complex communication—tasks that computers cannot do” (Levy & Murnane, 2004, p. 54). People are asked to reach out to resources or to pull out the required skills to solve the challenges that are accelerating in complexity. In the study conducted by International Business Machines Corporation (IBM, 2010), 1541 CEOs from 60 countries and 33 industries named “creativity” as the single most important leadership competency for enterprises to face the complexity in the global environment (IBM, 2010, p. 3), which confirmed that being a global leader requires to work with ambiguity and create solutions for the unique situations. In addition, the importance of collaboration is greater. Most creative individuals in the 20th century depended heavily on collaboration for their inspirations, relied on close colleagues on an intimate, day-to-day basis while they engaged in their own work (John-Steiner, 2000). It is getting harder in the 21st century to imagine creativity with less amount of collaboration, as “solo practices are insufficient to meet the challenges and new complexities of classrooms, parenting, and the changing workplace” (John-Steiner, 2000, p. 3–4).

In accordance with the new needs of the century, The Partnership for 21st Century Skills (P21, 2009), a national organization in the United States that promotes 21st century readiness for every student, proposed the “The Four Cs” as essential 21st century skills beyond the disciplinary knowledge: critical thinking and problem solving, communication, collaboration, and creativity and innovation. Similarly, in the autumn of 2013, the Ontario Ministry of Education, Canada, gathered education, policy, and research experts to discuss how to best renew Ontario’s vision for education to help students develop the 21st century competencies they need to succeed
(Ontario Ministry of Education [OME], 2016, p. 3). These competencies, defined as “critical thinking, communication, collaboration, and creativity and innovation” (OME, 2016, p. 12), resulted in a number of new activities and initiatives in Ontario school boards including creativity training and experiential learning projects.

While the government organizations and educators in North America agree that these 21st century competencies are important, they are “rarely incorporated deliberately throughout the curriculum” (Kay, 2010, p. xx) because “high-stakes tests do not assess these competencies” (Dede, 2010, p. 54). Instead of critical thinking, communication, collaboration, and creativity which are hard to define, instruct, and measure, many schools are focusing on what seems more important and evident—literacy. The requirements for the Ontario Secondary School Diploma clearly show such priority. First, among the 15 compulsory credits in high school, English (4 credits), math (3 credits), and science (2 credits) require the most number of credits, followed by the rest (Canadian history, civic and career studies, French, geography, health and physical education, and the arts) which each requires one credit. Notice that music, visual arts, dance, and drama are bundled up in “the arts,” which implies that each of them is not recognized as distinct and important form of knowledge. Such structure of requirements is similar in the United States (Education Commission of the States, 2007). In addition, students in Ontario must score more than 75% on the Ontario Secondary School Literacy Test (OSSLT) administered by the Education Quality and Accountability Office (EQAO) to graduate, which consists of reading comprehension and writing. The OSSLT score has been a significant indicator of the competency of the school. The gap between the ‘core’ subjects and ‘the rest’ widened as schools tried to improve students’ reading comprehension and writing even if it required sacrificing other programs: for example, adding 20 to 30 minutes of D.E.A.R. (Drop Everything And Read) into timetable by shortening regular period duration. Consequently, major crisis in students’ creativity has been reported. Kim’s (2011) study of 272,599 TTCT scores from K–12 students in the United States revealed that the scores have significantly decreased since 1990, while IQ test and SAT scores have increased.

In 1996, The New London Group, a group of ten educational researchers and practitioners from different English speaking countries, proposed a better model of literacy for the 21st century. The group coined the term “multiliteracies,” representing “the multiplicity of communications channels and media, and the increasing saliency of cultural and linguistic diversity” (The New
London Group, 1996, p. 63), to argue that meanings are conveyed through multimodal symbols, such as image, writing, layout, music, gesture, speech, moving image, soundtrack, and 3D objects (Kress, 2010, p. 79). The group’s definition of multiliteracies implies that each of the various disciplines such as language, math, or music has its unique way of symbolizing patterns of human life. The 21st century learning has to start from the premise that no one symbol system is better, or more important than the others.

The concept of multiliteracies has important implication not only to the literacy education but to the education of creativity. Creativity does not develop in vertical silos, because significant part of creativity is the ability to make horizontal connections (this will be explained in more detail in Chapter 2). Such creative ability can only be developed through the practice of making connections and creating across the modes, so that one can potentially pull up the solution in a fluent and original manner in response to the problem. “Transmediation,” which is “the process of rethinking something that is known in one symbol system (like print) through another symbol system (like art or music)” (Harste, 2000; Suhor, 1992), is an effective way of practicing creativity since it “requires one to invent a link that does not already exist” (Siegel, 1995, p. 455–456).

Need for the Study

Among researchers, there has been a long-standing debate about whether creativity is domain-specific or general (which will be discussed further in Chapter 2). The notion of a “creative person” implies creativity as a general trait, that it is a set of skills that can be applied across domains, such as the ability to come up with multiple/alternate solutions, imagine possible causes/outcomes, making decisions in ambiguous situations, or making connections between distant concepts and objects. Standardized tests for creativity such as Torrance Test for Creative Thinking (TTCT) were designed to measure the generalized mental strategies that cut across domains. In contrast, researchers who studied creative products claimed that creativity is domain-specific. Studies have found that there is low correlation between one’s creative product in one domain to another (Baer, 1993; Conti, Coon, & Amabile, 1996; Runco 1989; Ruscio & Amabile, 1998), which suggests the importance of domain-based ability in creative performance. The conclusion is that creativity is not exclusively one or the other but consists of both general and domain specific elements. There had been attempts to nourish one side more heavily than the
other, for example, to spare a section of class time to train divergent thinking skills, or focus on domain-specific creativity like creative writing practice. However, creativity education has to take more integrative approach that acknowledges both domain- and creativity-relevant skills. This study attempted to effectively address both domain-specific skills (musical composition) and the general strategies (making connection between distant objects) using transmediation.

Despite its potential, there had been a sparse amount of research that focused on transmediation as an integrative pedagogy for creativity education. Education Resources Information Center (ERIC) search showed only 25 scholarly works on transmediation up to date. Most of them focused on literacy learning, and none of them were situated in music classrooms. Therefore, this action research tried to implement transmediation as a new teaching method for creativity in the music classroom. Since transmediation is based on the concept of multiliteracies which acknowledges both the multiplicity of communications channels and cultural diversity, it might have been more appropriate to include both cultural and multimodal variables. However, this study is not designed to explore all aspects of multiliteracies, but to focus on its multimodality and how it relates to students’ creative process and products.

In addition to verify the effectiveness of transmediation, this study investigated: (a) how much more (or less) effective transmediation is in comparison to the current performance-oriented method in music classrooms; (b) how students respond to the challenges of transmediation in a collaborative setting; and (c) the correlation between the amount of ambiguity and the quality of creative product. Findings of this study would help understand transmediation as an effective intervention to understand, evaluate, and nurture creativity.

**Statement of the Purpose**

The purpose of this action research was to investigate the process and the effect of the collaborative transmediation on students’ creativity, which was achieved by: (a) examining students’ process as they work collaboratively to produce musical compositions through transmediation; and (b) investigating how the effects of this training are reflected on different creativity assessments.

**Research Questions**

Main research question:
How does collaborative transmediation affect students’ creativity?

Subquestions:
1. What strategies do students use for transmediation?
2. How does the level of abstraction in the task affect students’ creative process and product?
3. How does transmediation affect general and domain-specific creativity compared to the general music classes?

**Definition of Terms**

Although some of the terms have various definitions that are debated among the researchers, the following definitions have been selected for the purpose of this study. Each term will be discussed more in detail in Chapter 2.

Creativity: The ability to produce a perceptible product that is both novel and useful as defined within a social context, which is a result of an individual or group’s interaction among aptitude, process, and environment (Plucker, Beghetto, & Dow, 2010)

General creativity: Domain-transcending set of mental strategies for creative achievement that can be productively deployed in any domain (Baer, 2010)

Domain: The discipline or area that shares the same symbolic system, such as music, chemistry, mathematics, or visual art (Baer, 2010).

Domain-specific creativity: Creative performance skills within a domain

Multiliteracies: Literacy that acknowledges “the multiplicity of communications channels and media, and the increasing saliency of cultural and linguistic diversity” (The New London Group, 1996, p. 63)

Musical creativity: The ability to think in sound to produce new and valuable musical outputs, such as compositions, performances, and improvisations, in the context of its musical space and praxis (Elliott & Silverman, 2015; Merker, 2006; Webster, 2002)

Transmediation: “The process of rethinking something that is known in one symbol
system (like print) through another symbol system (like art or music)” (Harste, 2000; Suhor, 1992)

Chapter Organization

Chapter 1 has presented the background and need for the study, purpose statement and research questions, and definition of terms. Chapter 2 contains the review of related literature. The first section summarizes conceptions and assessment of creativity, and the second section presents theories and practices of transmediation. Chapter 3 explains the methodology and design, procedures, and data gathering and analysis processes. Chapter 4 contains the results and the analysis of gathered data. Chapter 5 contains a summary of the study, its findings, and recommendations for practice and future study.
Chapter 2
Review of Literature

The goal of this chapter is to review research literature in two main fields that are related to this study: creativity and transmediation. The first part explores the field of creativity: its conception and assessment. The conception section discusses various perspectives, frameworks, and theories of creativity in both general and musical perspectives. The assessment section first explores the four major approaches to measuring creativity: divergent thinking tests, remote associates test, rating of creative products, and self assessments. Creativity tests in musical domain are also discussed. The second part explores the field of transmediation: its definition, importance, and strategies to implement in the classrooms.

Part I: Creativity

Creativity is a vast field. It is not the goal of this chapter to cover all creativity research and theories. The aim of this section is to provide an overview of the areas that are closely related to this study. Four main areas are addressed, namely: individual creativity, sociocultural creativity, musical creativity, and assessment of creativity. The first part explores the conceptual framework of creativity: a brief history of its conception, research areas of interest, different types and levels, and the debate about its domain specificity. The second part focuses on the sociocultural theories which claim that creativity cannot be studied without its sociocultural context. Confluence theories of creativity explain the relationship between an individual’s creativity and his/her sociocultural surroundings, and group creativity explores the collaborative aspect of creativity, of the advantages and disadvantages of collaboration on creative process. The second part concludes with the construct definition of creativity for this study. The third part features the processes, products, and social contexts of musical creativity, followed by its construct definition. The last section examines the assessment of creativity, which provides an overview of widely used tests, measurements, and assessment techniques for creativity on both general and domain-specific level.

Historical Overview

Glaveanu (2010) identified three paradigms which sum up the history of Western creativity theory and research: he-paradigm, I-paradigm, and we-paradigm. The he-paradigm is the earliest approach of understanding creativity, which viewed creativity as an exclusive trait of geniuses
that were disconnected from the mass. In the early twentieth century, creativity was a topic that psychologists “have feared to tread” (Guilford, 1950, p. 444). Studying creativity posed challenges to the prevalent behaviorist practice at the time. Human behaviors were studied scientifically through a logical schema developed from observed data of various stimuli. However, insight, which is closely related to creativity, was hard to observe directly and almost was nonexistent in animals on whom the experiments were often conducted (Guilford, 1950). Measuring creativity was also challenging, because it required evaluating one’s creation which is more subjective and difficult than scoring convergent tasks such as multiple choices. Therefore, creativity research was focused on the observable behavior of creative geniuses (“he”) rather than a layperson’s creative process or potential. In this paradigm, creativity was viewed as the “chance occurrence of the genius” (Razik, 1970, p. 156) or a “byproduct of high intelligence” (Sawyer, 2012, p. 16).

The end of World War II brought changes to American society to move away from conformity and understand the full potential of individuals. The unit of creativity analysis changed from “he,” the creative genius, to “I,” every person (Glaveanu, 2010). The beginning of the I-paradigm was marked by J. P. Guilford’s presidential speech at the American Psychological Association in 1950, which stressed the importance of creative potential in every person. Psychometric approaches to the measurement of creativity started to bloom. Many creativity tests were developed to measure divergent thinking skills or to find personality traits of creative persons (will be discussed further in the Assessment section). Nonetheless, I-paradigm generated theoretical models that assumed creativity occurs within individuals “in a social vacuum” (Glaveanu, 2010, p. 82).

The we-paradigm focuses on the influence of social factors on creativity, from the assumption that “creativity takes place within, is constituted and influenced by, and has consequences for, a social context” (Westwood & Low, 2003, p. 236). Primary interests were the interactive effects of social institutions and culture (Csikszentmihalyi, 1988), the influence of one’s motivation and domain/creativity-relevant skills (Amabile, 1983), and the dynamics of collaborative creativity (Paulus, 1999; Sawyer, 2003). The changing conception of creativity produced vast amount of definitions, theoretical frameworks, and assessment methods, which will be summarized in the following sections.
The Four P Framework

In 1961, as creativity research came into a bloom, Rhodes (1961) gathered various existing definitions and research on creativity and categorized them into four areas of focus: person, process, product, and press (environment). His four P framework illustrates different views on what constitutes creativity, and how researchers have attempted to investigate each area.

**Person.** Studies in the *person* category focus on the person who generates the creative products. One of the earlier approaches was to identify common traits of well-known artists, scientists, or experts of different domains who produced wildly recognized creative product. An example of the approach was the study by Institute for Personality Assessment and Research (IPAR) after World War II in the United States, which extensively identified the common traits of peer-nominated creative people from various fields. The result revealed a number of traits that were believed to highly correlate with creativity, such as above-average intelligence, discernment, observance, alertness, openness to experience, balanced personalities, a relative absence of repression and suppression mechanisms that control impulse and imagery, pleasant and materially comfortable childhoods, and a preference for complexity (MacKinnon, 1978). Such traits have been adapted to many creativity tests under the premise that a person is more creative if he/she possesses more of them (see Self Assessment section for examples).

**Process.** Studies in the *process* category aims to understand the nature of the mental processes that occur when a person is engaged in creative thinking or creative activity (Kozbelt, Beghetto, & Runco, 2010). The process theories typically describe “different stages of processing or particular mechanisms as the components of creative thought” (Kozbelt et al., 2010, p. 24). The foundation of this area has been laid by Wallas (1926) in his attempt to track “a single achievement of thought—the making of a new generalization or invention, or the poetical expression of a new idea” (p. 79). Note that the term *creativity* was not widely used back then, but Wallas’ concept closely matches the modern definition of creativity.

**Wallas’ stages of creative process.** Wallas identified four stages of creative process: *preparation, incubation, illumination*, and *verification*. The four stages are sequential, but are recursive and often repeated in parts during the creative process. Preparation is the initial stage of a creative process. In this stage the problem is investigated and analyzed in all directions
(Wallas, 1926). In this stage, one collects “data and information, searches for related ideas, and listens to suggestions” (Sawyer, 2006, p. 58).

The incubation stage is “the delay between preparation and the moment of insight; during this time, the prepared material is internally elaborated and organized” (Sawyer, 2006, p. 58). The delay often looks like the person is detached from the task or stuck on the problem. In the educational context, the students in this phase can be easily misunderstood by the teacher to be distracted or off-task. Incubation is the phase where the person is “not consciously thinking about the problem” (Wallas, 1926, p. 80). The period of “voluntary abstention from conscious thought on any particular problem” could be spent “either in conscious mental work on other problems, or in a relaxation from all conscious mental work” (Wallas, 1926, p. 86). Incubation is perceived to be the most mysterious part of the creative process, because it is an internal process that leads to the new ideas. The mind “works freely during this stage, either completely unconscious or partially conscious” (Wallas, 1926, p. 87). A number of things are possibly happening, such as new combination of mental elements that are already in the possession of the mind (Bain, 1855/1977; Sawyer, 2006), or cross-fertilization (Koestler, 1964; Simonton, 1988).

When the new combination comes to the surface of consciousness, it leads to the third stage, illumination, or also called insight, which is the subjective experience of having the “aha” moment. It is “the appearance of the ‘happy idea’ together with the psychological events which immediately preceded and accompanied that appearance” (Wallas, 1926, p. 80). This moment “cannot be influenced by a direct effort of will” (Wallas, 1926, p. 93).

The last stage is verification, which includes two substages: “the evaluation of the worth of the insight, and elaboration into its complete form” (Sawyer, 2006, p. 59). The evaluation stage is a fully conscious process of testing the validity of the idea (Sawyer, 2006; Wallas, 1926). This stage takes a whole new dynamic when it becomes a group effort (which will be discussed in detail in the Group Creativity section). The ideas that are validated to be useful enter the elaboration stage, which “executes the idea into exact form” (Wallas, 1926, p. 81). In this stage, domain-relevant skills largely influence the quality of the elaboration (Amabile, 1983). Many other scholars in the creativity research field have proposed stage theories similar to Wallas’ (Bransford & Stein, 1984; Burnard, Craft, & Grainger, 2006; Gordon, 1961; Isakesen, Dorval, &
Treffinger, 2000; Kelley, 2001; Sawyer, 2012; Scott, Meritz, & Mumford, 2004; Sternberg, 2006).

**Product.** Studies in the *product* category focus on creative products such as works of art, inventions, publications, musical compositions (Kozbelt et al., 2010). The underlying mechanism of the product approach is to quantify how creative products are, which enables: evaluating the effectiveness of an intervention on creativity development; exploring the correlation of domain-specific creativity; or providing relative measure of one’s creativity. The most widely used method to evaluate a creative product is Consensual Assessment Technique (CAT), which two or more experts in the domain give a numerical score (CAT will be discussed more in the Assessment of Creativity section). The evaluation of a creative product inevitably involves another’s opinion, which defines creativity as a “sociocultural concept” (Sawyer, 2012, p. 11).

**Press.** Studies in the *press* category focus on the “external forces or pressures acting on the creative person or process, such as the social and cultural context” (Sawyer, 2012, p. 11). Here, creativity is defined as “the outcome of certain kinds of forces playing upon certain kinds of individuals as they grow up and as they function” (Rhodes, 1961, p. 308). Research in this area focuses on the external forces or pressures that could interfere or support creativity. Despite the individual differences in reacting to surrounding environment, some general traits of the environment such as opportunities for exploration and independent work, or support for originality, have been found to foster creativity (Amabile, 1990; Witt & Boerkem, 1989). Press category is closely related to sociocultural theories of creativity such as Csikszentmihalyi’s (1988) systems theory or Amabile’s (1983) componential theory (which will be discussed more in the Sociocultural Creativity section).

**The two new Ps: persuasion and potential.** As the conception of creativity developed, two more P frameworks have been offered as newer perspectives: *persuasion* and *potential*. The *persuasion* studies take the premise that creative people change the way others think, so they must then be persuasive to be recognized as creative (Simonton, 1990). According to Simonton’s (1990) findings from his massive studies on geniuses in the history, creativity requires the ability to convince others that one’s idea is novel and useful, and therefore persuasion is “the ultimate arbitrator” of creativity (p. 99). Based on his definition of a leader, “the group member whose influence over group performance or decision making exceeds that of the typical member of the
group” (Simonton, 1994, p. 411), he argued that creativity represents a special form of leadership. He viewed creative individuals as intellectual or aesthetic leaders who possess mental operations, personality traits, and creative products to influence others into “concluding that creativity has in fact been exhibited” (Simonton, 1985, p. 99). Although persuasion seems similar to the person approach, it expands creativity to the social level. Simonton suggested that social psychology of creativity must be developed to completely understand creativity, because it is “a social behavior, one that entails successful persuasion” (Simonton, 1985, p. 98).

Studies in the potential category explore the educational side of creativity which acknowledges everyone’s, especially children’s creative potential that requires educational support to reach its full expression (Runco, 2008). Runco (2008) argued that educators should move away from focusing on creative product or performance which does not help with the fulfillment of potential, but to view creativity as thinking or problem solving that involves the construction of new meaning at the personal level which does not necessarily produce manifest product. One has creative potential if he/she has the capacity for originality and the ability to direct thought and action towards some goal, but cannot integrate the two. Such behaviors that are “original and not creative” (Runco, 2008, p. 111) can be observed a lot in children. Runco (2008) asserted that in order to fulfill creative potentials, educators need to teach how to direct and control one’s creative tendencies through appropriate reinforcement opportunities to construct their own original interpretations, and show models of such originality.

The four P framework is one of the most frequently cited framework of creativity (Glaveanu, 2012). It has been criticized to be inadequate to capture all research, ignoring “key intersections among the various person, place, process, and product perspectives” (Runco, 2008, p. 108). However, researchers are trying to refine the framework by addressing more perspectives, like the addition of persuasion and potential. Despite the criticisms, the four (or six) P framework is still helpful to organize the massive theories and research in the field of creativity. Each element of the framework addresses key areas of interest in creativity, and one must consider all perspectives rather than focusing on one to understand the multifaceted and complex nature of creativity.
The Four C Model of Creativity
If the four (or six) P framework described different types of creativity research, Kaufman and Beghetto’s (2009) four C model of creativity describes different levels of creativity. The four C model (Big-C, little-c, Pro-C, and mini-c) expands the prevalent dichotomy of eminent/everyday creativity (or Big-C/little-c) through conceptualizing and classifying “various levels of creative expression points to potential paths of creative maturation” (Kaufman & Beghetto, 2009, p. 6).

**Big-C.** Big-C creativity consists of “clear-cut, eminent creative contributions” (Kaufman & Beghetto, 2009, p. 2). Big-C creativity is heavily domain-specific and product-oriented. Examples of Big-C creativity are winning a prestigious award or being included in an encyclopedia, or works of eminent musical composers which lasted centuries. The final gradation of Big-C is a *legend*, the superb level of achievement at which a person has become an emblem of their field and has likely crossed over so that nearly everyone knows about his or her achievements (Kaufman & Beghetto, 2009). Studies in Big-C are centered around the people who reached the *legend*—their characteristics, personalities, or biological factors such as age and gender. For example, Gardner (1993) associated eminent creators with the Faustian bargain with the devil, in which a creator is willing to sacrifice everything in their life (e.g., isolation, madness) for the use of their creative gifts. Simonton’s (1991) study on the relationship between age and achievement of 120 Classical composers is another example of Big-C research.

The caveat of focusing on Big-C is that it “leads to the ideas that only certain people can be creative, the only creativity that matters is that of the Big-C kinds, or that creativity involves negative forms of deviance (e.g. drug use, mental illness)” (Simonton, 1991, p. 3). Researchers argue that Big-C detracts attention from everyday creativity, creative potential, and more subjective forms of creative experiences (Kozbelt et al., 2010; Plucker & Beghetto, 2003).

**Little-c.** Little-c is “focused on everyday activities, such as those creative actions, in which the non-expert may participate each day” (Kozbelt et al., 2010, p. 2). Little-c creativity is both general and domain-specific, and like the Big-C, it requires evidence of creativity such as a novel solution to a problem or a creative product. Kozbelt et al. (2010) described various paths that little-c leads to. Little-c can reach the level of professional creator through an informal apprenticeship, such as working with more experienced person or mentor. If the person is not motivated enough to develop the creative skills to the professional level, or restrained by other
factors (e.g., fear of criticism) to share the product to be recognized as Big-C, then it reaches the end destination called reflection, which is to create “for its own sake” regardless of how a creative product may be reviewed or received by a larger population (Kozbelt et al., 2010).

Areas of research that focus on little-c creativity often are aimed at illustrating how creative potential is widely distributed. Little-c helps underscore the important role that creativity plays in everyday life and points to the importance of identifying and nurturing creativity in everyday settings such as schools and classrooms, workplace, home, and social settings (Richards, 2007).

**Pro-C.** Pro-C (Professional-C) represents “the developmental and effortful progression beyond little-c but that has not yet attained Big-C status” (Richards, 2007, p. 5). The problem of the Big-C/little-c dichotomy is that it divides all creative achievements into few Big-Cs and everything else, while the concept of little-c alone cannot represent all the other types of creativity. For example, can one’s discovery of the shortest path from home to the subway station be considered the same level of creativity as a professional composer’s infamous Sonata? Pro-C was designed to distinguish the works of professionals in a creative domain from everyday creativity. Therefore, Pro-C is mostly domain-specific, and the focus is on the creative product.

The product of Pro-C can be classified under the propulsion theory of creative contributions (Sternberg, Kaufman, & Pretz, 2002) according to how much impact it made on the field. The first four contributions, which are replication, redefinition, forward incrementation, and advanced incrementation, describe different degrees of change made within the existing paradigm/framework. Replication represents the reproduction of past work, such as remakes. Redefinition does not necessarily push the domain forward, but tries to present a different perspective. Forward incrementation pushes forward the domain just a little, like adding a new component. Advance forward incrementation pushes the domain ahead “two steps instead of one” and the creator often suffers for it (e.g., harsh criticism during his/her lifetime).

The next four contributions, redirection, reconstruction, reinitiation, and integration represent the “attempts to reject and replace the current paradigm” (Sternberg et al., 2002, p. 5). Redirection represents an attempt to redirect the domain to head in a new direction, while reconstruction tries to move the starting point back to where it once was before the redirection happens. Rather than going back to where it was, Reinitiation tries to move the field to a new
starting point and then progress from there. Lastly, Integration is a creation of a new idea that merges two diverse domains.

Kaufman and Beghetto (2009) described the three destinations of Pro-C: stasis, greatness, or Big-C. The creator can settle into creative stasis and finish the professional career without making any significant contributions, or remain productive and reach the peak to be considered at greatness which may be subsequently recognized by future generations to have reached the Big-C.

**Mini-c.** Mini-c is defined as “the novel and personally meaningful interpretation of experiences, actions, and events” (Beghetto & Kaufman, 2007, p. 73). In other words, mini-c is the creativity for self-transformation in informal learning. Mini-c emphasizes the importance of nurturing the creative potential. It describes the creativity inherent in the learning process, like when children discover something for the first time (Kaufman & Beghetto, 2009). This view of creativity aligns with the Vygotsky’s (1930/2004) conception of cognitive and creative development, which posits that all individuals have the creative potential that starts with an “internalization or appropriation of cultural tools and social interaction . . . not just copying but rather a transformation or reorganization of incoming information and mental structures based on the individual’s characteristics and existing knowledge” (Moran & John-Steiner, 2003, p. 63). Mini-c is similar to Runco’s (2008) concept of potential which focuses on one’s creative potential that has not yet reached the level of effective communication or a tangible form. Mini-c is the starting point of one’s creative potential which can take two paths: formal apprenticeship or tinkering. Formal apprenticeship is the learning experience mostly happening at the academic institution that will lead to Pro-C, usually taking approximately “10 years consistent with the literature on expertise” (Runco, 2008, p. 7). The alternative path is tinkering, which is described as “playing with one’s creativity in a domain and improving through such experimentation, even without a structured mentorship” which leads to the little-c (Runco, 2008, p. 7).

**Domain Specificity of Creativity**

The definition of creativity, “the generation of a product that is judged to be novel and also to be appropriate, useful, or valuable by a suitably knowledgeable social group” (Sawyer, 2012, p. 8), implies both domain generality and specificity. The concept of “novel,” meaning being new and original, and “useful,” meaning the creative product fits the constraints of given context, are both
somewhat domain-transcendent criteria (Lubart & Guignard, 2004, p. 44). Meanwhile, the processes of generating a product using domain-specific skills and being judged by a group of people that often belongs to the field, suggest strong domain-specificity. Therefore, the long-standing debate on domain specificity of creativity is a natural consequence. Researchers from both sides have produced solid evidences, but the problem is that each had different focus of investigation:

Domain generality would be supported by high inter-correlations among different creative behaviors and a common set of psychological descriptors for those behaviors, while domain specificity would be supported by relatively low correlations among different behaviors, and a diverging set of psychological descriptors of those behaviors (Ivcevic, 2007, p. 272).

Therefore, the debate is not sufficient enough to state whether creativity is general or domain-specific. The answer itself is not an important one, because “creativity is partly a generalized ability, partly a set of domain-specific abilities, and partly a set of task-specific abilities” (Lubart & Guignard, 2004, p. 43). However, it is essential to explore both views in order to “find the effective interventions, to better understand, assess, and nurture creativity” (Baer, 2010, p. 322).

**Domain generality.** In contrast to the expression “skillful,” which is mostly followed by limited range of skill or knowledge (e.g., a *skillful* carpenter), “creative” is often used without reference to a specific domain (e.g., “He is very creative”), which implies the common conception of creativity as a domain general trait (Baer, 2010). Researchers that view creativity as a general trait argue that there is a domain-transcending set of skills that can be productively deployed in any domain (Baer, 2010; Gardner, 1988). These skills could be “exceptional versions of familiar mental operations such as remembering, understanding, and recognising” (Perkins, 1981, p. 274), or certain way of thinking. Regardless, the premise is that if creativity has high inter-correlations among different creative behaviors, then there should exist a common set of psychological descriptors for those behaviors (Ivcevic, 2007).

J. P. Guilford and E. P. Torrance are the early pioneers of the psychometric research on creativity. Guilford believed that creativity is different from intelligence in a way that intelligence is the ability to find out a convergent answer to a problem, whereas creativity is the ability to devise divergent ways of solving a problem. Divergent thinking, or “the capacity to
generate many diverse ideas from a given starting point” (Lubart & Guignard, 2004, p. 46), became the foundation for assessing general creativity. E. P. Torrance (1981) built on Guilford’s idea of assessing one’s divergent thinking abilities and designed the most widely used creativity test called Torrance Test for Creative Thinking (which will be discussed in detail in the Assessment section). Another approach to study general creativity is through personality data. 

Here, self-report on the creative traits or personality measures are used rather than performance-based evaluations. Studies on established creative people revealed common characteristics such as open to new experiences, less conventional and less conscientious, more self-confident, self accepting, driven, ambitious, dominant, hostile, and impulsive (Feist, 1998). The supposition of general creativity research is that “a creative person could be creative in any domain he or she chose” (Feist, 2004, p. 57), like the well-known polymath Leonardo da Vinci.

**Domain specificity.** Although it is possible for one to be a polymath that is creative in multiple domains, mastering domain-specific skills requires substantial amount of time. Approaching from the product-oriented view, creativity is highly domain-specific because a creative product requires a certain level of proficiency in the domain (Amabile, 1983), and one can only attain such level in a few (if not just one) domains. In this view, “the skills, dispositions, aptitudes, traits, propensities, and motivations that lead to creative performance vary from domain to domain” (Baer 2010, p. 321). Advocates of domain specificity argue that if creativity is a general trait, then one’s creative products should display a similar level of creativity in different domains, while many studies have shown low correlations among the creative products in different domains (Baer, 1993; Palmiero, Nakatani, Raver, Belardinelli, & Van Leeuwen, 2010; Ruscio, Whitney, & Amabile, 1998). Consensual Assessment Technique (CAT) is the prevalent method of evaluating domain-specific creative products, which asks domain experts to rate the creativity of the product (more detail will be discussed in the Assessment section). Researchers that claim the domain specificity of creativity often supported their view through comparing CAT scores of creative products in different domains created by the same person.

Baer (1993) studied 50 eighth-grade students’ creative products such as poem, story, math problems, and math equations, and found low correlations ($r = .06$) across the domains. Similarly, Ruscio et al. (1998) studied 151 undergraduate students’ structure building, collage making, and poetry which revealed low mean correlation ($r = .08$). More recent study by Palmiero et al. (2010) with 25 young adult participants showed that visual and verbal creativity
are mostly domain-specific processes, and predominantly related with abilities within the same domains (p. 375). In addition, studies on same domain-based creative products revealed high correlation. Conti, Coon, & Amabile (1996) analyzed the results of overlapping participants from their past three studies which examined verbal (study 1 & 3) and artistic creativity (study 2). In study 1, participants were asked to write three short stories from three different pictures, and in study 3 they wrote a story involving two of the characters they had previously read about in a learning passage. In study 2, they were asked to make collage, draw with colored pencils using only straight lines, and paint picture using sponges. They found a highly significant correlation between measures taken in the same context and the same domain (e.g., between the three stories from study 1). They also found significant correlation even when the tasks were substantially different (e.g., the collage, drawing, and painting from study 2), or when the context was different (e.g., between study 1 and 3) as long as they were in the same domain, confirming the influence of domain-relevant skills on creativity. In contrast, there was marginally significant correlation between measures taken from different domains (e.g., between study 1 and 2). While there are studies that found higher correlation between creative products in different domains (Chen, Himsel, Kasof, Greenberger, & Dmitreiva, 2006), but it has been argued that those correlations were due to non-creativity factors such as intelligence, conscientiousness, or poor design and conduct (Baer, 2010).

Domain specificity contributes to an important approach for creativity education. Baer (2012) suggested that when creativity training is targeted at improving divergent-thinking skills in a particular domain, only creativity of that domain increases. Similarly, domain-specific performance assessments correlate poorly with each other, and task-specific training programs tend to show only task-specific benefits (Baer, 1998).

**Sociocultural Creativity**

A sociocultural approach to creativity stemmed from the realization that “nothing is, or is not, creative in and of itself” but it is “inherently a communal or cultural judgement” (Gardner, 1993, p. 36). Two major streams of sociocultural creativity are confluence theories and group creativity. Confluence theories view creativity as a complex interactive system between an individual and his/her social contexts, while group creativity focuses on interactions between a group of people when they collaborate to achieve common creative goals.
Confluence theories of creativity shift the focus from the “Ptolemaic view of creativity, in which the person is at the center of everything, to a more Copernican model in which the person is part of a system of mutual influences and information” (Csikszentmihalyi, 1988, p. 336). Two main theories of sociocultural creativity are Csikszentmihalyi’s (1988) systems theory and Amabile’s (1983) componential theory.

**Systems view of creativity.** Csikszentmihalyi’s (1988) systems model of creativity suggested interactive effects of open systems on individual creativity between culture, person, and social system. He viewed creativity as the product of three main shaping forces, namely, domain, individual, and field. Although the systems model is cyclical, the domain is viewed as the starting point of the creative cycle, because “without a culturally defined domain of action in which innovation is possible, the person cannot even get started” (Csikszentmihalyi, 1988, p. 326). Domain is the culture that shares the same symbol system which stores and transmits structured information and action to the individual. Within a domain exist microdomains (Karmiloff-Smith, 1992), which represent more narrow and specialized area. For example, music theory, music education, or conducting are microdomains within the musical domain. The structure of the domain is closely related to the generation and transmission of creative ideas. Csikszentmihalyi argued that it should be easier to establish creativity in mathematics, music, or physics than philosophy, visual arts, or biology because “the more precise the notation system, the easier it is to detect change and hence to evaluate whether or not the person has made an original contribution” (Csikszentmihalyi, 1988, p. 329).

The individual then produces variation in the domain using one’s personal experience and creative skills. The variations are then registered to the field. The field is the social system that consists of “all those persons who can affect the structure of a domain” (Csikszentmihalyi, 1988, p. 330). This includes those who pass on the specialized symbolic information to the next generation (e.g., teachers), who establish the reputation of the individual’s creative work (e.g., critics), people who support and sustain the creative work (e.g., collectors or sponsors), and the peer generators. The field acts as “gatekeepers” which sift the variations to select promising ones to incorporate into the domain. Each field differs in the “the stringency of their selective mechanisms, the sensitivity of their gatekeepers, and the dynamics of their inner organization” (Csikszentmihalyi, 1988, p. 330).
**Componential theory of creativity.** Amabile’s (1983) componential theory of creativity further investigated what constitutes an individual’s creativity and the effects of domain in one’s stages of creative process. She classified three components of creativity: domain-relevant skills, creativity-relevant skills, and motivation. Domain-relevant skills refer to the knowledge about the domain, technical skills, and domain-relevant talent which largely depends on innate cognitive abilities, innate perceptual and motor skills, and formal and informal education (Amabile, 1983, p. 362). In relation to Wallas’ stages of creative process, domain-relevant skills are used in the preparation stage to retrieve relevant information. In the evaluation stage, domain-relevant skills are used to form the generated ideas into valid and relevant outcome. Therefore, “the popular notion that a great deal of knowledge in a given domain can be detrimental to creativity is incorrect” (Amabile, 1983, p. 364), because more depth and variety of the domain-relevant skills provide greater number of alternatives available for producing new and useful combinations.

Creativity-relevant skills represent the skills related to the generation of new ideas. They consist of (a) cognitive style characterized by a facility in understanding complexities and an ability to break set during problem solving, (b) knowledge of heuristics for generating novel ideas, and (c) personality characteristics related to self-discipline, perseverance, independence, and an absence of conformity (Amabile, 1983, p. 364–365). Creativity-relevant skills can be improved through training, experience in idea generation, and research on the creative personality (Amabile, 1983, p. 365).

Motivation describes one’s attitudes toward the creative task, which depends on two factors: intrinsic and extrinsic stimulus. Intrinsic stimulus derives from one’s baseline attitude toward the properties of the task, therefore is closely related to the learning process of domain-relevant skills. If the existing preference matches with the creative task, then intrinsic motivation is generated. In contrast, extrinsic stimulus represents the presence or absence of salient constraints (e.g., reward, pressure, or evaluation).

**Group Creativity**

Group creativity is defined as “the creation, development, evaluation, and promotion of novel ideas in groups” (Paulus, 1999, p. 779). In the history of creative achievements, it is hard to find individuals who did not collaborate with others (Dunbar, 1997; John-Steiner, 2000; West, 2002).
Studies of group creativity reveals “a complex dynamical system, with a high degree of sensitivity to initial conditions and rapidly expanding combinatorics possibilities from moment to moment” (Sawyer, 2003, p. 12).

**Group creative process.** Although the sequence of creative process is similar for both individual and group, working in group involves cooperation, conflicts, and negotiation among individuals. There is greater potential for diverse ideas as the amount of skills and knowledge is greater, but there are also inhibiting factors in collaboration process. This section will use Wallas’ (1962) four stages of creative process as a guideline to explore the characteristics, advantages and disadvantages of creative process in groups, particularly in the preparation and the elaboration stage.

**Preparation in group creative process.** Prior to diagnosing the problem and searching for the relevant data in group, the group needs to be formed first. The forming of a group can occur informally in interactions among friends or colleagues, or in more structured settings such as scientific research laboratories and corporate project teams (Paulus, 1999). The length of time needed to accept and getting to know the group members varies depending on the level of acquaintance. Paulus (1999) summarized Tuckman and Jenson’s (1977) four stages of team development:

1. Forming: Team members come to an understanding as to the nature of the task, commit to the task, and accept the team members.
2. Storming: Conflict arises in regards to both tasks and relationships among team members. Individuals often begin to question objectives, authority, or the way in which tasks are carried out.
3. Norming: Cooperation. Individuals openly share ideas and opinions. There is also an increased willingness to give and receive feedback.
4. Performing: The synergy makes it possible for team members to focus their efforts on the task (Paulus, 1999, p. 784).

Because each member brings a different level of skills and intrinsic/extrinsic motivation to the task (Amabile, 1983), members must communicate and negotiate to fully understand and commit to the task. If positive atmosphere is achieved at this stage, group members can collaborate to enhance acceptance and understanding of solutions, and arouse greater interest in the task (VanGundy, 1984). Also, a group can be more effective if the task can be resolved through
division of labor. However, depending on the group dynamic, the group may engage in unproductive conflict, and take more time to work through the task than would a single individual.

**Elaboration in group creative process.** A group’s elaboration stage is affected by multiple social factors as suggested by Paulus (1999):

In the elaboration process, the creator needs to actively persuade colleagues and other consumers of ideas or products of the value or utility of the new ideas. This may involve considerable feedback from peers and experts in relevant domains as ideas are sharpened or elaborated… The prior reputation of the innovator, the apparent novelty of the ideas, and the consistency of the ideas with prior conceptual systems will likely influence this judgment process. Groups can be helpful in catching logical or conceptual mistakes, especially if these can be clearly demonstrated (p. 784).

The advantages of working in groups at this stage is that they possess more knowledge, ideas, and skills, make fewer mistakes, develop more unique perspectives on problems (VanGundy, 1984). However, one problem with groups is “the tendency toward conformity” (Paulus, 1999, p. 780). Group members tend to focus on what they have in common rather than unique ideas mainly because of the fear of critical reactions. Depending on the group atmosphere, personality and motivation level, one can choose to or not to contribute to the elaboration process.

**Summary: Conceptions of Creativity**

Researchers in the field have explored creativity in many ways, but they can be synthesized into three essential elements: the creative process, creative product, and its social perception. A creative process begins with a stimulus, such as “sensing difficulties, problems, gaps in information, missing elements, something askew” (Torrance, 1988, p. 47). Regardless of the discipline, creative thinking is “driven by a problem and a need for its solution” (Webster, 2002, p. 28). Creative efforts are distinguished from other making or doing by being “intentional actions” to achieve particular kinds of results (Elliott & Silverman, 2015, p. 344). An individual or a group goes through a mental system of “interrelated forces operating at multiple levels” (Hennessey & Amabile, 2010, p. 571) to search for solutions, combinations, hypothesis, or products. Multiple skills interact in this process: motivation, imagination, convergent and divergent thinking, and domain- and creativity-relevant skills. This creative thinking process
often repeats itself, constantly generating, revising and retesting the guesses and hypotheses, and it involves communication and negotiation in a group setting. The creative process eventually forms a “perceptible product that is communicated to the world” (Torrance, 1988, p. 47), which could be ideas, solutions, artistic creations, or tangible objects. In the individualistic view, the product is considered creative if it is “new to the creator” (Sawyer, 2012, p. 8).

The sociocultural view, however, suggests that social perception of the creative product is essential in determining one’s creativity. In this view, a product is creative only when it is perceived to be so by the society or the cultural setting. To be deemed creative, the product must possess “a certain stated uncommonness in the particular group being studied,” but also “to some extent adaptive to reality” (Barron, 1995, 274–275). In other words, the product must be different enough from its previous creative achievements in the domain (Elliott & Silverman, 2015), yet has to fit into the task constraints so that it is useful, not bizarre (Lubart, 1994). In the sociocultural view, creativity is determined by “a product that is judged to be novel and also to be appropriate, useful, or valuable by a suitably knowledgeable social group” (Sawyer, 2012, p. 8).

Kaufman and Beghetto’s (2009) four C model of creativity, and Runco’s (2008) concept of creative potential add another dimension to the conception of creativity by describing creativity at different levels. They suggest that (a) creativity exists in many forms, from creative potential (mini-c) yet to be developed to eminent creation (Big-C), and (b) everyone possess creative potential, which can and should be taught.

**Construct Definition for this Study: Creativity**

The construct definition of creativity for this study must reflect various facets of creativity that the study is focused on: creative process, product, its evaluation and collaborative nature. Among the numerous definitions of creativity, the closest one that met such purpose was Plucker, Beghetto, and Dow’s (2010):

Creativity is the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context (p. 90).
This definition is comprehensive: it describes the components of creativity, acknowledges both individual and group as the subject of creativity, and includes social conception as important criteria of a creative product. However, the word “interaction” gives the impression that creativity is a phenomenon—something that is observed as a result of creating a product—rather than a skill that can be developed. Therefore, I have rephrased the definition as:

Creativity is the ability to produce a perceptible product that is both novel and useful as defined within a social context, which is a result of an individual or group’s interaction among aptitude, process, and environment (Plucker et al., 2010).

It is important to specify what I mean by ‘social context.’ The caveat of defining a creative achievement as “a tangible accomplishment that knowledgeable people consider original and significant within a definite domain of practice” (Elliott, 1995, p. 222) is its implication that children will never be creative since they cannot produce something eminent that can impact the whole domain, which is not appropriate for this study. In studying students’ creativity, the social context does not expand to the whole domain (e.g. music), but stays within the microdomain of education (e.g. music education). In other words, students’ creative achievements are considered in terms of their progress and potential, not of the product’s value or impact on the whole domain.

Musical Creativity

To study creativity in musical domain, it is essential to understand that music is a performing art. In contrast with visual arts or literature where the artistic message goes directly from the producer to the receiver, music, especially in the Western culture, is a threefold event which involves the performer delivering the composition to the audience (Deliege & Richelle, 2006). A creative composition is generated through an “art of organizing sounds that by themselves do not have clear semantic associations in an original way that acquires or induces meaning either or for both the composer and the listener” (Brattico & Tervaniemi, 2006, p. 290). The same composition can convey different artistic meanings depending on the interpretation of the performer. A performance of written music could be creative if the performer “reinvents the music within the limits dictated by the overall structure of the piece in order to convey emotions to the listener” (Brattico & Tervaniemi, 2006, p. 290). Another form of musical performance is improvisation. In contrast to composition and performance of written music which are time-
independent, improvisation uses creativity “in the moment” (Webster, 2002, p. 29). In improvisation, musical structures are often not specified in advance, and musical creativity is exercised in the course of an ongoing musical performance (Merker, 2006).

**Webster’s model of creative thinking process in music.** Webster’s (2002) model of creative thinking process in music describes the three components of musical creativity: product intention, thinking process, and creative products. A musical creative thinking is driven by a problem, which is more a “force in the creator that inspires or drives the creative spirit” (Webster, 2002, p. 28). The force leads to musical product intention, such as to compose, or perform the music of others, listen repeatedly, listen once, or improvise. Through the thinking process, these intentions become creative products such as composed music scores-recordings, recorded performances, written analysis, mental representations of the music heard, or recorded improvisation.

The thinking process is divided into four stages: *preparation*, *time away*, *working through*, and *verification*. These stages are similar to Wallas’ (1962) stages of preparation, incubation, illumination, and verification, but vary slightly. First, Webster renamed the incubation stage as “time away” since it seemed to make more conceptual sense. Also, he got rid of the illumination stage since he believed that it “is not as much a stage as a qualitative event that occurs many times in the creative process” (Webster, 2002, p. 30). Moreover, he divided Wallas’ verification stage into two: *working through* and *verification*, to distinguish the generative and selective process from the final polishing that is reflective in nature. He explained that these stages progress in a circular way, both clockwise and counter-clockwise, and the time away stage is absent in “in the moment” creativeness such as improvising or single-time music listening.

The thinking process does not just happen, but is a constant interplay of convergent and divergent thinking. Divergent thinking involves the imaginative thought of the music creator:

> Here the creator is exploring the many possibilities of music expression, always cataloging, sifting through, rejecting, accepting only to change yet again. Small kernels of musical thought, which might be a melodic or rhythmic phrase, a harmony, a timbre, or even longer and more complex patterns of music, are all imagined and possibly realized on some musical instrument. These primitive gesturals (PGs) are all part of the
exploration process that often characterizes the opening periods of creative thought (Webster, 2002, p. 28).

In contrast to the divergent thinking, convergent thinking contributes to the linear and analytical process of making aesthetic decisions, such as accepting, rejecting, and polishing musical ideas. Convergent thinking usually happens later in the divergent thinking process. Central to the musical thinking process is audiation, the process of “hearing and comprehending in one’s mind the sound of music that is not or may never have been physically present” (Gordon, 1997, p. 361). While audiation is often compared to musical imagination for its generative nature, it is a more profound process than imagining “a figurative picture of what the sound of music might represent” (Gordon, 1997, p. 4). Audiation involves meaning making of the musical sound through actively responding, remembering, anticipating, predicting, and creating. The thinking processes are aided by enabling conditions and sets of enabling skills.

Enabling skills are more likely influenced by formal education, such as aptitudes, conceptual understanding, craftsmanship, and aesthetic sensitivity. Enabling conditions fall “largely outside of the influence of formal education” (Webster, 2002, p. 29) which can be divided into two levels: personal and social/cultural. The personal conditions include subconscious imagery, motivation, and personality. The social/cultural conditions include context, task, peer influence, and past experience.

Musical creativity: head-and-shoulders model. Elliott’s (1995) head-and-shoulders model of musical creativity is in line with Csikszentmihalyi’s (1988) systems model, in the way that sociocultural context such as its field and domain is placed in the centre of studying any creative products. As the name “head-and-shoulders” suggests, this model places a creative musical product to stand on the “shoulders of previous musical processes and products that his predecessors and colleagues composed” (Elliott & Silverman, 2015, p. 339). This model focuses on conditions for a musical product to be determined creative, which makes it closer to an assessment model rather than a procedural model (McLennon, 2002). In discussion of how something is valued to be creative, Elliott and Silverman (2015) asserted that:

…Originality seems to be a necessary condition for calling something creative, though it’s not sufficient. For when we focus exclusively on a product’s foreground of unfamiliar features, we overlook the product’s background of familiar features, including its links
with past achievements. As we’ve emphasized, without some relationship to other achievements—without the context or “background” of past achievements—new productions would merely be bizarre, not original (p. 339).

Past achievements, “in relation to a specific context of doing and making—in elementary school classrooms, middle school rock bands, secondary school song writing workshops, as well as all forms of amateur and professional music making” (Elliott, 2015, p. 337), provide standard to judge how similar or different a product is. To be deemed creative, a product has to be similar enough to its relevant ancestors to be one of its kind, yet different, unusual, or extraordinary in a way. In addition, a creative product “must make a significant contribution within a specific domain of effort” (Elliott & Silverman, 2015, p. 341). The task of judging a new compositions’ significance requires careful comparison of the “new composition’s musical design, musical expressiveness, and so on to previous compositions in the same praxis” (Elliott & Silverman, 2015, p. 341), which is more challenging if the composition is more deviant from its predecessors (refer back to the Pro-C section for more details on a creative product and the varying degrees of its impact on the field).

Construct Definition for This Study: Musical Creativity

While musical creativity shares many properties with the creativity in general, the unique properties of music must be reflected in the definition. Musical creativity involves imagination and production of sound, various forms of products, and different social context of where it happens. Several definitions of musical creativity have been combined to provide devise the construct definition: Webster’s (2002) description of creative thinking process in music as “think in sound” (p. 19); Merker’s (2006) notion of diversity in performance-based forms of creativity; and Elliott and Silverman’s (2015) perspective of musical praxis and space as a part of social context in musical creativity. Summarizing these features of general and musical creativity, I define musical creativity for this study as “the ability to think in sound to produce new and valuable musical outputs, such as compositions, performances, and improvisations, in the context of its musical space and praxis” (Elliott & Silverman, 2015; Merker, 2006; Webster, 2002).

Assessment of Creativity

The extensive variety of creativity theories engenders a similarly vast number of approaches to assess creativity. Hocevar (1981) presented a taxonomy for existing creativity assessments into
ten categories: (a) tests of divergent thinking; (b) attitude and interest inventories; (c) personality
inventories; (d) biographical inventories; (e) ratings by teachers; (f) ratings by peers; (g) ratings
by supervisors; (h) judgments of products; (i) eminence; and (j) self-reported creative activities
and achievements. These creativity measures aim to: (a) identify creative potential; (b) examine
and understand factors that relate to creative performance; or (c) determine the impact of
creativity interventions (Clapham, 2011). This paper cannot possibly cover all assessment
techniques but only highlight those that are widely used and relevant to this study. The first
section covers creativity assessments across domains, which are: (a) divergent thinking tests; (b)
Remote Associates Test; (c) the Consensual Assessment Technique; and (d) self assessments.
The second section focuses on the creativity assessment in the musical domain.

**Divergent Thinking Tests.** The divergent thinking (DT) tests view creativity as a
cognitive ability which can be measured through testing. Guilford (1967) developed the
foundation for the creativity assessment, by identifying four abilities that constitute divergent
thinking (DT): fluency, flexibility, originality, and elaboration. Fluency is the number of
solutions that one can provide; flexibility is the number of different kinds of solutions provided;
originality is how original the solution is in comparison to the statistical data; and elaboration is
the amount of detail included in the solution. In Guilford’s (1967) view, a greater number of
solutions that are more descriptive, different from each other, and are unique, indicated one’s
higher divergent thinking skills. The actual problems were not too important as long as they
allow room for imagination, connection, and multiple number of possible answers.

In their Unusual Uses Test, Guilford, Merrifield, & Wilson (1958) ask people to think of as
many possible uses for a common house hold item, like a brick or a paper clip. Similarly,
Wallach and Kogan’s test (1965) ask people to name as many possible items that contain the
given element, like a wheel. Another common type of DT task is to give an improbable situation
(e.g., what if everyone could fly?) and ask people list as much possible consequences (Guilford
et al., 1953; Torrance, 1981). In contrast to the tests that use verbal material, the Test of Creative
Thinking Drawing Production (TCT-DP) by Urban and Jellen (1996) uses drawing to test both
quantity and quality of the response, and to be “culture-fair” (Urban, 2005, p. 273). In this test,
people are asked to complete a drawing from the combination of unfinished figures. Then the
judges are asked to score the drawing with fourteen criteria, such as continuations, completion,
new elements, boundary breaking, perspective, speed, unconventionality and more.
**Torrance Test of Creative Thinking (TTCT).** Torrance Test of Creative Thinking (TTCT) is the most widely used DT test (Davis, 1997). TTCT is a standardized written test with a time limit for each section. TTCT has been translated to more than 35 languages, allowing researchers outside the English-speaking countries to use it. TTCT measures creativity in two domains (verbal and figural). Each comes with two alternative versions (Verbal-A, Verbal-B, Figural-A, and Figural-B), and there is also Abbreviated Torrance Test for Adults (ATTA) which is a shorter version of TTCT for adults. The verbal TTCT allows 45 minutes to answer six questions. The first three questions are related to a given picture, such as guessing causes (what happened before the picture) and effects (what will happen after). The second set of questions involves three different tasks: (a) suggesting ways to improve a toy (e.g., a stuffed animal), (b) generating alternate/unusual uses of an object (e.g., a cardboard box), and (c) writing hypothesis to an improbable situation. In the figural TTCT, subjects are asked to (a) create a picture using given basic shapes, (b) complete given incomplete drawings and title them, and (c) come up with as many alternative shapes as possible by expanding the series of same shapes (e.g., triangles or parallel lines). Figural TTCT is given 30 minutes to complete. ATTA combines two verbal and one figural task(s), and is given 15 minutes to complete.

Completed TTCT can be either sent to the publisher (Scholastic Testing Services Inc.) for scoring or can be scored using the scoring manual. The verbal TTCT is scored on three categories: **fluency** (number of answers), **flexibility** (number of different types of answers), and **originality** (number of answers that are not found on the statistical data). The figural TTCT is scored similarly, except the removal of flexibility category (due to its high correlation with fluency) and the addition of elaboration (the number of added ideas), abstractness of titles (the degree beyond labeling), and resistance to premature closure (the degree of psychological openness) (Kim, 2009). The publisher provides normative data upon request, which contains norm tables with standard scores and national percentiles by grade and age for each scoring area.

Validity studies show that divergent thinking tests measure a construct that is distinct from intelligent tests, and the scores correlate with other types of creativity assessments such as CAT (Clapham, 2011). However, the correlation of DT tests in different domains is not high (e.g., \( r = .36 \) for the Verbal and Figural TTCT), which supports domain specificity of creativity (Clapham, 2011; Sawyer, 2012). While the use of standardized measurement for creativity is debated among many researchers (Kaufman, Plucker, & Baer, 2008; Kim, 2006; Sawyer, 2012),
it still provides a valid measure of divergent thinking ability and presents reasonable reliability considering the complexity of creative thinking (Treffinger, 1985).

**Remote Associates Test.** Remote Associates Test (RAT) is created by Mednick (1962) with the premise that “the more mutually remote the elements of the new combination, the more creative the process of solution” (p. 221). RAT consists of word sets, where each set has three words (e.g., rat/blue/cottage) that are remotely associated with the fourth word (cheese), which the participant is supposed to find (more RAT tasks are available online for free at https://www.remote-associates-test.com). There are different difficulty levels assigned for each problem. The difficulty is determined by the associative hierarchy, which distinguishes two different types of association: steep hierarchy and flat hierarchy (Mednick, 1962). Steep hierarchy represents the drop of associative strength after making one or two immediate conventional associations. In contrast, flat hierarchy represents the ability to generate multiple associations even with the very remote concepts, which is considered more creative. In contrast to DT tests, RAT tasks are convergent, which means there is one right answer for each question. Participants get one point for each right answer.

RAT has a high internal validity of $r = .70$ (Dailey, 1978), and has been conceived as an alternative to DT tests in measuring general creative thinking ability. However, some weaknesses of the test include that non-native speakers of English find the tasks difficult (Estrada, Isen, & Young, 1994), and it highly correlates with verbal intelligence tests ($r = .49$) which weakens its discriminant validity (Sawyer, 2012, p. 46).

**Consensual Assessment Technique.** Some researchers have argued that a standardized test cannot measure one’s creative ability because the product is restricted into written form with strict parameters. In contrast, Consensual Assessment Technique (CAT) allows more freedom in how creative product is created and scored. Subjects are asked to create a product (e.g., painting, musical composition, or poem), which is then evaluated by two or more experts in the field. The expert judges independently rate the creativity of the product on a scale of scale of 1–5 (the scale can be varied if it has more than three points to have the diversity of ratings) (Baer & McKool, 2009). The average of the judges’ ratings is used as the score. There is no need for the judges to provide justification for the ratings. CAT attempts to assess creative product as they are evaluated in real-life setting, and therefore no context is to be given in detail. While the method
could raise the concern of subjectivity, studies have shown that the ratings of experts generally correlated highly while novice ratings were not (Amabile, 1982; Kaufman, Baer, & Cole, 2009).

**Self assessments.** The premise of self assessments is that there are common personality traits or characteristics that can be found in creative people. First type of self assessment is personality tests. Most commonly used personality test for creativity is the NEO Personality Inventory (NEO P-RI; Costa & McCrae, 1992). NEO P-RI has 240 questions which the participants answer using the Likert scale. The test components were taken from their Five Factor Model (FFM): neuroticism (having emotional stability), extraversion (being outgoing and sociable), conscientiousness (being disciplined and rule-oriented and having integrity), agreeableness (being friendly and good-natured), and openness to experience (having intellectual and experiential curiosity) (Kaufman et al., 2008). Among the five factors, openness to experience is found to be related to creativity the most. Openness to experience is split into several underlying facets: imagination (love of fantasy), artistic interests (love beauty in arts and nature), emotionality (well-aware of feelings), adventurousness (trying new things), intellect (open-minded about new ideas and brain exercises), and liberalism (ready to challenge status quo) (Goldberg et al., 2006). International Personality Item Pool (IPIP) website provides a free online test based on the NEO P-RI (http://www.personal.psu.edu/~j5j/IPIP/).

Another widely used personality test is the Creativity Personality Scale (Gough, 1979). The Creativity Personality Scale (CPS) derived from the Adjective Check List (Gough & Heilbrun, 1965), which was a general personality instrument used at the Berkeley IPAR during the 1960s (Sawyer, 2012, p. 44). Gough chose 18 items from the Adjective Check List that he believed to be closely related to creativity. There are 30 items on the CPS which the participant checks the ones that apply to him/her. 18 among the 30 items are positively associated with creativity (e.g., reflective, unconventional) while the remaining 12 items are negatively associated (e.g., conservative, narrow interests). Score is given according to the number of positively associated items checked.

Other self assessment tests focus on creative behaviors or accomplishments rather than personality traits. Runco Ideational Behavior Scale (Runco, Plucker, & Lim, 2000–2001) focuses on ideational behaviors that are closely related to creativity. Using the Likert scale, subjects are asked to rate how much they agree with the 23 given statements (e.g., “I have many wild ideas”).
The Creative Achievement Questionnaire (Carson, Peterson, & Higgins, 2005) assesses one’s past creative achievement across ten domains of creativity (visual arts, music, dance, creative writing, architectural design, humor, theatre and film, culinary arts, inventions, and scientific inquiry). The questionnaire uses a checklist of 96 items divided into three parts: areas of talent, actual accomplishments in each area, and self-perception of creative characteristics. In the accomplishments section, answers are weighted differently, with more points assigned for bigger accomplishments (e.g., one point for “I have taken lessons in this area”; six points for “I have won a national prize in this field”).

Creativity Tests in Musical Domain

Earlier works of creativity tests in musical domain include the Test of Musical Creativity (Vaughan, 1971), Measures of Musical Divergent Production (Gorder, 1980), Measures of Creativity in Sound and Music (Wang, 1985), and Measures of Musical Problem Solving (Vold, 1986). More recent measurements include the revised version of Measure of Creativity Thinking in Music (MCTM-II; Webster, 1994), and Music Expression Test (Barbot & Lubart, 2012).

Webster’s Measure of Creativity Thinking in Music (MCTM; Webster, 1986/1994) which was designed to measure children’s potential creative ability in music, is one of the most widely used tests in music education research. Since 1985, MCTM has been used in 16 independent research studies (Table 1).

The test consists of ten scored tasks divided into three sections: exploration (getting familiar with the instrument), application (creating simple music on one instrument), and synthesis (creating music using combination of instruments in a less structured setting). The participant is given three sets of instruments (a spongeball, a microphone, and temple blocks), and is asked to create various musical products such as composition, performance, and improvisation within given sources and parameters. The responses are videotaped, analyzed, and scored according to the four criteria:

- Musical Extensiveness: clock time involved in the task
- Musical Flexibility: the extent of musical parameters manipulated
- Musical Originality: the extent of being unusual and unique
- Musical Syntax: the extent of musically making sense
Table 1: *Use of MCTM-II in Independent Research Studies*

<table>
<thead>
<tr>
<th>Study Author</th>
<th>MCTM –II Use in Design</th>
<th>Subjects</th>
<th>Major Variables of Interest in Addition to Creative Thinking in Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swanner (1985)</td>
<td>Correlation</td>
<td>69, 3rd graders</td>
<td>Personality, gender, music aptitude, intelligence</td>
</tr>
<tr>
<td>Schmidt/Sinor (1990)</td>
<td>Correlation</td>
<td>N = 47, 2nd graders</td>
<td>Cognitive style, music aptitude, gender</td>
</tr>
<tr>
<td>Baltzer (1990)</td>
<td>Correlation</td>
<td>N = 90, 1st, 2nd, 3rd graders</td>
<td>Age, gender, music achievement, academic achievement</td>
</tr>
<tr>
<td>Wolfe/Linden (1991)</td>
<td>Correlation</td>
<td>N = 40, 3rd grade</td>
<td>Intrinsic motivation, music aptitude</td>
</tr>
<tr>
<td>Racana (1991)</td>
<td>Pre-post Test</td>
<td>4th graders</td>
<td>Effect of computer-based music lessons</td>
</tr>
<tr>
<td>Amchin (1995)</td>
<td>Pre-post Test</td>
<td>N = 129, 4th and 5th graders</td>
<td>Student and Teacher Interactions</td>
</tr>
<tr>
<td>Hagedorn (1997)</td>
<td>Descriptive</td>
<td>N = 20, 1st, 2nd, 4th, and 5th graders</td>
<td>Hearing-challenged vs. hearing students, family environment, gender,</td>
</tr>
<tr>
<td>Fung (1997)</td>
<td>Post test</td>
<td>N = 66, 1st, 2nd graders</td>
<td>Effect on exposure to sound exploration program</td>
</tr>
<tr>
<td>Boehm (1999)</td>
<td>Pre-post test</td>
<td>N = 39, 1st graders</td>
<td>Effect of compositional teaching approach (invented notation), test of visual contours, music aptitude, music background, music achievement</td>
</tr>
<tr>
<td>Dingle (2006)</td>
<td>Correlation</td>
<td>N = 90, 7th, 8th graders</td>
<td>Music aptitude</td>
</tr>
<tr>
<td>Koutsoupidou (2008, 2009)</td>
<td>Post test</td>
<td>N = 25, 1st graders (6-year olds)</td>
<td>Effect of teaching style that included music improvisation in teaching</td>
</tr>
<tr>
<td>Baek (2009)</td>
<td>Pre-post test</td>
<td>N = 39, 4 and 5 year-olds</td>
<td>Effect of picture books with creative music activities, music aptitude, reading ability</td>
</tr>
<tr>
<td>Yannon (2011)</td>
<td></td>
<td>N = 75, 5th graders</td>
<td>Instructional style (algorithmic/heuristic) music aptitude, composition ratings</td>
</tr>
<tr>
<td>Dingle (2014)</td>
<td>Reliability assessment</td>
<td>N = 90, 7th, 8th graders</td>
<td>Grade level</td>
</tr>
<tr>
<td>Crawford (2016)</td>
<td>Post test</td>
<td>N = 48, 3rd and 5th graders</td>
<td>Effect of computer-mediated vs. acoustic composition experience, music aptitude, composition process ratings, grade, gender</td>
</tr>
</tbody>
</table>

*Note. From “Assessment of Creative Potential in Music,” by P. Webster, 2016, The Oxford Handbook of Assessment Policy & Practice in Music Education (Forthcoming).*
The test is administered individually in a private room, which requires about 20 to 25 minutes per person to complete. More detail on the test procedure will be discussed in the Methods chapter.

**Summary of Part I: Creativity**

Research on creativity and its assessment suggest that creativity is not a congenital or mysterious trait that only selected geniuses possess. Everyone has creative potential which “can be encouraged or discouraged” (Sternberg, 2007, p. 3). Creativity is comprised of convergent and divergent thinking, domain-relevant skills, creativity-relevant skills, influenced by intrinsic/extrinsic motivation and sociocultural context. Its multifaceted nature has significant implications for educators who are interested in promoting students’ creativity, that there are many ways to shape students’ creativity—through teaching domain-relevant and creativity relevant-skills, motivating students by designing engaging tasks or right amount of reward, or providing safe environment that fosters original ideas. The next part of this chapter will focus on teaching creativity in classroom, particularly on using transmediation to promote students’ ability to generate cross-modal associations, and develop disciplinary knowledge including literacy.

**Part II: Transmediation**

Transmediation, defined as “translation of content from one sign system to another” (Suhor, 1984, p. 250), has been closely linked to semiotics and literacy education. Kress (2010) used the term “transduction” to describe the similar process of “moving meaning-material from one mode to another” (p. 125), but I chose the term “transmediation” since it is more convenient to understand as a “translation of media.” The goal of this section is to: (a) explain and situate transmediation in relation to the multiliteracies; (b) explain the importance of transmediation in creative education; (c) overview the use of transmediation in the classroom; and (d) discuss the challenges and strategies of implementing transmediation in the classroom, including task design and assessment.

**Transmediation and Multiliteracies**

Although the term transmediation was coined in 1984, it did not receive much attention until 1995 when the need for new literacy education started to emerge (Michel et al., 2011). The world of communication in the 21st century became much more complex due to the “vast web of
interwined social, economic, cultural and technological changes” (Kress, 2010, p. 5), and fluency in written language became only one of the ways of communication. As a result, these changes required a new definition of literacy apart from reading and writing, so in 2003, United Nations Educational, Scientific and Cultural Organization (UNESCO) redefined literacy as the following:

Literacy is about more than reading and writing—it is about how we communicate in society. It is about social practices and relationships, about knowledge, language and culture. Literacy—the use of written communication—finds its place in our lives alongside other ways of communicating. Indeed, literacy itself takes many forms: on paper, on the computer screen, on TV, on posters and signs. Those who use literacy takes it for granted - but those who cannot use it are excluded from much communication in today’s world. Indeed, it is the excluded who can best appreciate the notion of ‘literacy as freedom.’ (“Literacy, a UNESCO Perspective,” 2003)

While the existence of multiple communication channels is not new to the 21st century, the challenge is that those means of communications are often used simultaneously to enhance the delivery of the intended message, because the range of intended audience is much wider than the local population who share the same language and the culture. Therefore, the ability to use different symbol systems effectively and to critically judge the conveyed meanings must be learned as a part of the new literacy.

The New London Group, a group of ten educational researchers and practitioners from different English speaking countries, proposed a better model of literacy for the 21st century. The group coined the term ‘multiliteracies’, which describes “the multiplicity of communications channels and media, and the increasing saliency of cultural and linguistic diversity” (The New London Group, 1996, p. 63). Multiliteracies recognize that meanings are conveyed through 'multimodal’ symbols, such as “image, writing, layout, music, gesture, speech, moving image, soundtrack, and 3D objects” (Kress, 2010, p. 79). Thus, the “verbocratic” (Fueyo, 1991) concept of reading and writing has to be expanded to reflect the complexities of the multiliteracies. Luke and Freebody (1997) suggested the four resources model that presents practices necessary for a full literacy development:
• Code Breaking: decoding written texts; understanding basic features of language including the alphabetic principles; and understanding broader cultural codes or ways of talking and acting within various communities
• Meaning Making: constructing meaning through oral language, visual representation, digital technology, movement, and music
• Using written texts: composing texts to express one’s opinion
• Critical analysis: understanding that texts are constructed in particular ways that can be accepted or rejected; questioning, considering different perspectives, and resisting the inclination to be positioned to think or believe in a particular way

Although this model is focused on literacy in the traditional sense, by replacing what has been referred to as ‘texts’ with any symbol systems, it presents the full facets of being literate: to be able to decode, understand, convey intended meaning, and criticize. In multiliteracies, each symbol system is acknowledged as a unique language of symbolizing patterns of human life. Transmediation, then, can be understood as how translation works in written/spoken languages: based on the fundamental principle of semiotics that “all representation or communication shares the common ground of sign” (Mavers, 2015, p. 283), transmediation is the translation one symbol system (language) to another.

A transmediating process begins with speculating about the source, analyzing “semiotic ingredients and how they are brought together as a coherent assemblage in the source” (Mavers, 2015, p. 286). Then one chooses meaning-materials from the source and imagine how they can be represented in the new mode. In this process, one must enlarge and expand the meaning, “negotiate interpretations, forge new connections, and represent meanings in new ways” (Siegel, 1995, p. 473), since each mode has its specific materiality (e.g., sound, movement, or graphic), history of social uses, and entities (Kress, 2010). Because not every sign offers the direct link that can be substituted, one needs to re-articulate and reconfigure the meaning in order to invent the link.

**Importance of Transmediation in Educating Creativity**

Transmediation is closely related to cross-modal association, and since creativity involves “forming of associative elements into new combination which either meet specified requirements or are in some way useful” (Mednick, 1962, p. 221), educators would agree that transmediation
would benefit students’ creativity. However, is teaching transmediation (or even creativity) worth the effort despite the possible distraction to the disciplinary contents? Studies on synaesthesia provide some convincing answers to why teaching cross-modal associations in classrooms is significant from the perspective of neurology.

Synaesthesia is “a neurological condition which stimulation of one sensory pathway leads to automatic, involuntary experiences in a second sensory pathway” (Murgia, 2015, p. 307). The reason that this condition received the attention of creativity researchers was the curiosity of whether synaesthetes, who have automatic cross-modal connection of various sorts, were more creative. Study results showed that synaesthetes outperformed non-synaesthetes on the Remote Associates Test (Mednick, 1962), suggesting that the strong cross-modal connection contributes to the ability to make remote connections (Dailey, Martindale, & Borkum 1997; Sitton & Pierce, 2004; Ward, Thompson-Lake, Ely, & Kaminski, 2008). These findings led to the next question of why some people have synaesthesia while others do not. There are two strong hypotheses, both supported by solid evidences. First is the Neonatal Synaesthesia Hypothesis (Maurer & Mondloch, 2005), which proposes that all humans are born with synaesthetic perception, but it gets lost in most people (except the synaesthetes) due to neural pruning (Maurer & Mondloch, 2006). The other hypothesis is that synaesthesia is learned, and that synaesthetes were able to build strong cross-modal connections during childhood and successfully retained them (Beeli, Esslen & Jäncke, 2007; Smilek, Cariere, Dixon, & Merikle, 2007; Witthoft & Winawer, 2006).

What is of importance from these hypotheses is not which one is right, but that the influence of school education on students’ ability to generate cross-modal association is immense either way. If the synaesthetic perception is lost due to the neural pruning as the neonatal hypothesis suggests, then school education must have played a part in devaluing the cross-modal connections, because the elimination of wasteful neural connections peaks at the age of five until puberty (Chechik, Meilijson, & Ruppin, 1998). If synaesthesia is learned as the latter hypothesis proposed, then it means that a strong cross-modal connection could be built through enforcement. Therefore, use of transmediation is a great way to acknowledge and enhance students’ creative potential, thus preserving and developing it. In the next section, different examples of using transmediation in classrooms will be explored.
Use of Transmediation in the Classrooms

In the language arts classrooms, transmediation is often used to enhance meaning making, create context, or teach critical literacy (Crafton, Silvers & Brennan, 2008; Leland, Odiepka, & Wackerly, 2015; McCormick, 2011). Leland et al. (2015) used “Sketch to Stretch” (Short, Harste, & Burke, 1996) strategy, which students were invited to sketch what a book meant to them. The study was conducted in the third-grade class that one of the authors taught. Three picture books were used, each addressing social issues that are often seen as difficult to address with children: poverty, racism, and homophobia. The teacher read the book aloud to the class, and then the students were divided into three groups with one researcher per group as the facilitator. The study was divided into two phases. In phase 1, students were asked to individually retell the story to the facilitator, then drew a picture that connected the book to their own lives. In phase 2, the retelling phase was removed, and students were asked to draw a picture that symbolizes the meaning of the story immediately after. The drawings were tallied according to the preliminary taxonomy that the research team developed, which had four levels:

- **Level 1**: Literal picture or explanation of the text
- **Level 2**: Personal connection to the text (e.g., drawing a personal event that the book reminded him/her of)
- **Level 3**: Common icons used symbolically (e.g., use of hearts, smiley faces, or other icons to convey meaning)
- **Level 4**: Symbols go beyond the text to send a larger message (e.g., generating original symbols that transcend the text)

Their results revealed that when children were given the narrow task (phase 1), all the drawings were classified as level 1 and 2. In contrast, most of the drawings from phase 2 belonged to level 3 and 4 where the task was broader and multimodal. Another finding suggested that collaboration played a big role in their transmediation. Conversation among peers fueled more drawing and deeper thinking, and engaged them in a generative process of constructing new meaning through exchanging and building on each other’s ideas (Leland et al., 2015, p. 623).

In the music classrooms of the Western cultures, transmediation is often done through drawing listening maps or graphic scores, creating musical response to a story, or expressing music through body movements. Non-musical media, such as artworks or a picture books are often
used as source of inspiration to student composition. Bespflug and O’Neil (2013) examined students’ emergent creative process through collaborative song writing using sculptures. Participants were 44 students in two Grade 6 music classes in British Columbia, Canada, who had just started to learn to play ukulele. From an art exhibition, students were asked to select one sculpture that was meaningful to them. Either individually or in pairs, students were asked to write an original song with chords and lyrics using the sculpture as a source of inspiration. The teacher, and a visiting singer-songwriter worked with them as facilitators. At the end of the project, students performed their compositions and completed a final reflection and questionnaire that measured perceptions of their experience. Findings from the self assessment revealed that the experience heightened their transformative music engagement, their sense of belonging to the community of learners, their competence beliefs for song writing, and the experience allowed students to see community art as a catalyst for song writing. Students also felt that the song writing process allowed them to be creative and to try out their own ideas.

In contrast to the two examples where students were mostly left on their own to make cross-modal connections, Murgia (2015) took a different approach of explicitly teaching synaesthesia. In her first-year college course on fashion design, she introduced the class to the phenomenon of synaesthesia. To apply the idea to practice, she gave the “multiple sensory” assignment, which each student chose an inspirational image and created a visual representation of a multi-sensory experience evoked by that image. To guide the multi-sensory experience, she asked a series of questions:

- How does the image make you feel?
- Do you feel this sensation or emotion in a particular part of your body?
- What memories surfaced from looking at the images?
- If you could make a soundtrack based on your image, what would it sound like?
- What type of media best represents your image? (Murgia, 2015, p. 310)

Students were asked to present their work in front of the peers following the assignment. They showed deeper personal connection to the artwork, and were confident to share the experience. She noticed that students’ artwork was more abstract, which surpassed the level of replicating the likeness of an object. Although this study was not strictly an example of transmediation since visual images were translated into another type of visual art, the process clearly involved imaginative transmediation which resulted in more creative products.
While these examples demonstrate great use of transmediation, challenges still remain to put transmediation into classroom practice. Creative activities in classrooms are often done as a single-time event or as a special unit, with less rigorous assessment structure. However, in order to thoroughly integrate transmediation practice in the classroom, it is important to develop series of tasks that are somehow progressing, along with the appropriate assessment criteria that can provide constructive feedback. In the next section, strategies to design and assess students’ transmediation will be discussed.

**Strategies for Designing Transmediation Tasks**

In an educational setting, it is important for the teachers to make sure that each creative task leads to the intended educational objects, since students’ nature of creative process depends on the nature of the task (Wiggins, 2002). Each time, the level of the task should be just beyond students’ current levels of understanding to further their skills, because safe increases in complexity do not take students far enough (Elliott & Silverman, 2015). Theories and related research suggest that some type of transmediation can be more challenging than the other (Kandel, 2016; Mavers, 2015; Neckar & Bob, 2014), implying that educators should progress from the simple to more complex tasks.

First, abstract representations are more challenging to transmediate than direct representations. Abstract representations are nonrepresentational, non-figurative, non-descriptive, and indirect, all of which requires more rigorous top-down processing to interpret. Top-down processing describes the process of perception through contextual information, previous knowledge and experience (Gregory, 1970), as opposed to the bottom-up processing, which is the automatic data-driven processing of information from the sensory stimulus (Gibson, 1966). For example, when someone sees an apple on a table, the bottom-up processing interprets it as an apple and the perception process terminates there. In contrast, the top-down processing generates contextual information to interpret the data (e.g., Who put the apple there? Does it mean I can eat it?). More abstract, ambiguous representation requires more complex top-down connections (Kandel, 2016), thus making the transmediation process more complex.

Similarly, Mavers (2015) described two types of transmediation: imaginative and literal. Literal transmediation represents a literal translation of each element in media to another, like “constructing a raft that was described in Mark Twain’s *Huckleberry Finn*” (Suhor, 1984, p.
Imaginative transmediation is when a “given communicated entity is deliberately remade with the resources of a different mode” (Mavers, 2015, p. 285), like creating free writing in response to a musical piece. Transmediation tasks should progress from the literal transmediation of close concepts where conventional association can be easily found (e.g., represent the word “angry” into a color), to the imaginative transmediation of more remote concepts (e.g., translate the painting of a blue square into a musical expression) which stimulates students’ imagination to intentionally generate the link.

In addition, research suggests that certain domains correlate higher than the others, which implies that different combination of domains can generate transmediation tasks of various difficulties. For example, a factor analysis of the results of the Creative Achievement Questionnaire showed that the domains of creative accomplishment tend to group into three related areas: expressive creativity (visual arts, writing, humor), performance creativity (dance, drama, music), and scientific creativity (invention, science, culinary) (Carson et al., 2005), which suggests that transmediation task could be easier within the related areas. Studies on synaesthesia, a neurological condition that “the translation of attributes of sensation from one sensory domain to another” (Marks, 1975, p. 303), suggest another possibility. There are more than 60 different types of synesthesia reported (Neckar & Bob, 2014), and some are found more frequently than the others. The most frequent type of synesthesia (18%) occurs between seeing colors and hearing verbal words (Beeli et al., 2007), suggesting that visual and aural modes are in close proximity to each other.

Assessment of Transmediation

The complexity of transmediation requires a comprehensive method of assessing both the process and the product, but the existing creativity measures are not sufficient. The biggest problem is that those methods of rating creative product such as the Consensual Assessment Technique, do not take account of the context. The context of the source, including the whole process of decoding the source, generating meanings, re-configuring and elaborating in the new mode is a significant part of transmediation which should be part of the assessment. In light of the need for an assessment method that can effectively evaluate transmediation, Fueyo (2002) suggested evaluation criteria for transmediation that can be applied to classrooms:
**Problem-Posing/Risk-Taking:** What is the nature of the problem the student initiates, safe or risk-taking?

**Expressiveness:** Does the work convey emotion/mood for either maker and/or viewer?

**Repleteness:** Does the work exploit the potentials of the medium?

**Collaborative Nature of Invention:** Is the student growing the contributions that others have made to his work?

**Care:** Is the student invested in the idea, the process, the product?

**Time/Effort:** Does the student appreciate that time/effort are intrinsic to most good work?

**Self-Evaluation:** Does the student evaluate work in light of criteria being developed as a meaning-maker and as one who "sees" others' meanings? (p. 32–33)

*Problem-Posing/Risk-Taking* refers to the difficulty of the problem that the student initiates to execute. Fueyo compares it to the scoring of figure skating, that “the level of difficulty matters in assigning value to the execution” (Fueyo, 2002, p. 32), and that taking risk is valued more than making safe choices. Connecting this idea to Maver’s (2015) literal and imaginative transmediation, the imaginative transmediation is valued more than the literal one in this criterion. *Expressiveness* refers to the extent of effectively conveying emotions to the others. *Repleteness* refers to the extent that the student manipulated the potentials of the medium. For example, if the student was supposed to create a sculpture out of clay, creating a three-dimensional figure would be considered more replete than the two-dimensional one. In music, repleteness can be applied to measure the extent of the way students manipulate musical parameters such as rhythm, pitches, harmony, and articulation, or their use of the instrument in its full potential, like tapping and sliding the strings on a cello than only bowing. *Repleteness* is particularly important in transmediation, since recognizing the full capacity of the medium allows diverse channels for more detailed and thorough translation.

The remaining four criteria, *Collaborative Nature of the Invention, Care, Time/Effort,* and *Self-Evaluation* are all closely related to the confluence theories of creativity (Amabile, 1983; Czsikszentmihalyi, 1988), that creativity is influenced by surrounding environment, intrinsic/extrinsic motivation, and the field. These criteria measure the extent of the student’s ability to connect to the sociocultural context, invested time and effort into the creative task, and the ability critically evaluate one’s own work, which are all important benchmarks of students’
creativity. Fueyo (2002) did not suggest that teachers should seek all these criteria in every students’ work, but to keep these in mind as ways to name and value students’ transmediation.
Chapter 3
Methodology and Design

Chapter Organization

This chapter is divided into two sections: methodology and design. The method section begins with the restatement of the purpose and research questions. The methodology of action research is explained briefly with its definition and characteristics, followed by rationale for using the action research method for the current research. In the design section, design of the study, participant selection and recruiting process are explained, and role of the researcher is identified. The preliminary phase of designing test instruments is reported, followed by explanation of the procedures and the data collection and analysis method.

Part I: Method

Restatement of the Purpose

The purpose of this action research was to investigate the process and the effect of the collaborative transmediation on students’ creativity, which was achieved by: (a) examining students’ process as they worked collaboratively to produce musical compositions through transmediation; and (b) investigating how the effects of this intervention were reflected on different creativity assessments.

Main research question:
How does collaborative transmediation affect students’ creativity?

Subquestions:
1. What strategies do students use for transmediation?
2. How does level of abstraction in the task affect students’ creative process and product?
3. How does transmediation affect general and domain-specific creativity compared to the general music classes?

Methodological Overview

An action research is a type of qualitative inquiry which the primary goal is to improve practice (Holly, Arhar, & Kastel, 2009). Kurt Lewin is considered the first to develop a theory of action research, who believed that “knowledge should be created from problem solving in real-life
situations” (Herr & Anderson, 2005, 11). Lewin’s (1946) model of action research is centred on the cyclical steps of observing, reflecting, acting, evaluating, and modifying (McNiff & Whitehead, 2006). According to John Elliot (2003), an action research begins with “a feeling—a sense of frustration, or, better yet, a sense of creative possibilities for action, and the pronounced commitment to ‘do it differently,’ to bring one’s practice in line with one’s values and aspirations” (Holly et al., 2009, p. 4). Then the researchers design an activity, series of activities, or other interventions to improve the situation (Costello, 2011). After the implementation of the plan, the consequences of the action are observed and reflected to investigate its impact. Depending on the result, the researchers can stop there and share the findings, or plan another series of actions. In summary, action research is organized in a “cyclical process of identifying a problem through careful observation, reflecting on the dimensions of the problem, designing a change that addresses the problem, implementing the change, and assessing its effectiveness through careful observation” (Hitchcock & Hughes, 1995, p. 29).

Characteristics of action research in education are its focus on practical solution, cyclical and dynamic process, researchers’ collaboration with others such as educators, students, administrators, or practitioners, and the public sharing of the result to those who can benefit from it (Creswell, 2012; Denscombe, 2007; Holly et al., 2009). Cohen, Manion, and Morrison (2011) suggested various areas of education that action research can be applied, including:

- Teaching methods: replacing a traditional method by a discovery method
- Learning strategies: adopting an integrated approach to learning in preference to a single-subject style of teaching and learning
- Evaluative procedures: improving one’s methods of continuous assessment
- Attitudes and values: encouraging more positive attitudes to work, or modifying pupils’ value systems with regard to some aspect of life
- Continuing professional development of teachers
- Management and control: the gradual introduction of the techniques of behaviour modification
- Administration: increasing the efficiency of some aspect of the administrative side of school life (p. 226)
A review of the major literature in education showed two major types of action research design (Mills, 2011): participatory, often known as participatory action research (PAR), and practical, which I selected for the current study. Participatory action research (PAR) is “a philosophical approach to research that recognizes the need for persons being studied to participate in the design and conduct of all phases of any research that affects them” (Vollman, Anderson & McFarlane, 2004, p. 129). One of the pioneers, Paulo Freire (1970), viewed PAR as a “highly inductive process in which research is seen as a form of social action” (Herr & Anderson, 2005, p. 15). Research interests of PAR are often emancipatory in nature, which takes “action against the oppressive elements of reality” (Freire, 1970, p. 19). Central to PAR is the democratic relationship between researcher and participants. Participants are called to be co-researchers to participate, take action, and reflect to improve the quality of people’s organizations, communities, and family lives (Hinchey, 2016; Stringer, 2007). In education, the focus of PAR is on “improving and empowering individuals in schools, systems of education, and school communities” (Creswell, 2012, p. 583).

In contrast to PAR which is centred around problems at the social level, the aim of practical action research is to “enhance the practice of education through the systematic study of a local problem” (Creswell, 2012, p. 579). It is the teacher, individually or often in collaboration with others, that finds the research problems in his/her own educational setting to improve students’ learning and his/her own professional performance (Creswell, 2012). Therefore, the research is often designed and conducted by the teacher, without necessarily involving students as co-researchers.

There are varying degrees of collaboration between the insider of the setting (often teacher) and the outsider (researcher), which Herr and Anderson (2005) summarized as the continuum of positionality:

1. Insider (researcher studies own self/practice)
2. Insider in collaboration with other insiders
3. Insider(s) in collaboration with outsider(s)
4. Reciprocal collaboration (insider-outsider teams)
5. Outsider(s) in collaboration with insider(s)
6. Outsider(s) studies insider(s) (p. 31)
Category 1, also called *practitioner research* or *teacher research*, is common in the field of education, where the teacher is the researcher at the same time, studying his/her own setting. While this type of research brings practical and immediate benefit to the particular setting, the teacher-researcher position had raised some issues. First, the teacher’s tacit knowledge of a site tends to be “impressionistic, full of bias, prejudice, and unexamined impressions and assumptions that need to be surfaced and examined” (Herr & Anderson, 2005, p. 35). Such bias includes the teacher’s subjectivity toward his/her own practice and students. However, taking an *outsider-within* (Collins, 1990) stance, pretending to be an outsider, is a flawed approach to deal with the bias which “ignores the presence of researcher’s ongoing actions and shifting perceptions within the setting” (Herr & Anderson, 2005, p. 47). Instead, teachers must acknowledge their presence in the study and build in self-reflection (Herr & Anderson, 2005), and collaborate with others if possible to get multiple perspectives (Holly et al., 2009).

**Rationale for Using Action Research Method**

The goal of this study was not to describe the trends (e.g., teacher’s use of transmediation) or to test hypotheses in a controlled setting, but to try transmediation as the new way to approach creativity in music education where there has been sparse research on it. Although I am not currently teaching in classroom to commit as a full-time doctoral student, I was an intermediate/senior (Grade 6–12) teacher in music and math. The interdisciplinary nature of transmediation and its potential for student creativity appealed to me greatly, and I wanted this study to produce practical knowledge that could be shared to other educators. Also, I wanted to be actively involved in the whole process of designing, implementing, and reflecting process than merely observing, so that the experience could improve my future teaching practice. Therefore, action research, which is “a small-scale intervention in the functioning of the real world and a close examination of the effects of such an intervention” (Cohen et al., 2011, p. 345), seemed the best method for this study. Since the focus on enhancing the teaching of creativity than social problems, practical action research design was selected over PAR. To situate the study in a live classroom, I collaborated with a music teacher who was willing to be the agentive partner in trying transmediation in his classroom. Unlike in PAR, students in this study were not enlisted as co-researchers.
Part II: Design

Overview of the Design
This study was conducted in a Grade 8 beginner strings’ class of thirteen students. The study was divided into two phases: observation and intervention (Figure 1). In the first phase, the teacher taught six classes while I observed. In the second phase, students were divided up into groups of four or five to compose musical pieces through transmediating the given source. Six classes were spent translating verbal, visual, and video sources, with each mode containing one direct and one abstract source. Students were tested three times throughout the study (before and after phase 1, and after phase 2) with two tests on musical and general creativity. Prior to the study, test instruments were designed and pilot tested with the Grade 8 band class of the same school. On the last day of the study, reflections were gathered through a class discussion and a teacher interview.

Figure 1: The Design of the Current Research

Rationale for using numerical data. There were three tests throughout the study, which produced numerical data. Traditionally, the use of numbers had been the indicator of distinguishing quantitative and qualitative research (Creswell & Plano-Clark, 2007; Hammersley, 1992; King, Keohane, & Verba, 1994; Miles & Huberman, 2014). However, such dichotomy is not relevant because numbers are just a way of symbolizing quantities, not a method itself. Therefore, the inclusion of numerical data does not turn a qualitative research into a mixed-method study (Maxwell, 2010). Numerical data can provide systematic evidence that
can strengthen researchers’ analysis (Maxwell, 1992), and precisely describe desired amount, rate of change, or frequency more effectively than adjectives (Becker, 1970). Thus, the use of numbers from simple count of items to statistical data of the sample is a “legitimate and valuable strategy for qualitative researchers when it is used as a complement to an overall process orientation to the research” (Maxwell, 2010, p. 480).

In this study, the analysis of students’ test scores provided internal generalizability, which means “generalization within the setting or collection of individuals studied, establishing that the themes or findings identified are in fact characteristic of this setting or set of individuals as a whole” (Maxwell, 2010, p. 478). The statistical data helped to track the level of students’ creativity throughout the study and showed its trends. Incorporating this data provided another type of evidence to the qualitative analysis.

**Participant Selection**

Four criteria were considered to select participants. The first criterion was the willingness to commit for the minimum duration of 21 classes. The design of the study demanded the minimum of two classes for the pilot study, six classes for the three tests which takes two classes each, 12 classes for the two phases of six classes, and one class for reflection, which add up to nine weeks if the class meets every other day. The second criterion was the availability of required space and equipment. Testing of the Measure of Creative Thinking in Music (MCTM) required a soundproof room with temple blocks and a piano (or a keyboard). In addition, enough number of separate rooms were needed so that each student group could work independently without interference from the other groups. The third criterion was the class size. Each group should have no more than five students, so that there are enough amount of interaction and exchange of ideas without breaking into subgroups. The ideal class size I had in mind was under 20 students, considering the practical number of available rooms and desired amount of supervision by the teacher and the researcher. The fourth criterion was students’ age. Students should be mature enough to work in groups with minimal instruction, produce complex output, and articulate self-reflection.

Finding the site that met these criteria was challenging. There were multiple attempts to recruit music classrooms in public schools which were all turned down, due to rigorous schedule of competitions, trips, or concerts throughout the year. There was one private school that met the
criteria and was willing to participate, but the school closed soon after. The current study site was found through a personal acquaintance who worked as a supplied teacher at the school.

This study was undertaken in a non-denominational Christian private school located in the Greater Toronto Area, Ontario. All students came from similar socio-economic background which could afford the private school tuition, and from parents that value or do not mind the integration of Biblical worldview into the curriculum. The school consists of Preschool, Junior school (K–5), Middle School (Grade 6–8), and Senior School (Grade 9–12). Both music teachers of the school were contacted, and only Mr. Patrick (pseudonyms were used for all names to protect anonymity) accepted to participate in the study. The study was conducted in his Grade 8 string ensemble class. Higher grades would have been more ideal, but the Senior School had low number of students enrolled in music, which was not feasible for the study.

There were 13 students in the class, eight males and five females. 10 of them were Asian, two were Black, and one was White. The classroom had two separate soundproof practice rooms attached, so students were divided into three groups of four or five. One of the practice rooms had a piano and temple blocks available, which was ideal for the testing of MCTM. There were various percussion and keyboard instruments available in addition to students’ own string instruments that students could use for their compositions.

**Procedures for Recruiting and Obtaining Permissions**

The recruiting process began one year prior to the study. The Director of school was contacted by email with the plan of study to discuss the possibility of conducting the study at the school. He directed me to the two music teachers of the school. Both teachers were contacted, and only Mr. Patrick accepted to participate in the study.

The first visit included greeting the teacher, checking the equipment and spaces, and participating in one of his string classes to get to know the students. The second visit was arranged a month prior to the study. Detailed schedule and design of the study were confirmed with Mr. Patrick, the Middle School Principal, and the Director of school. I also met with Ms. Claire, the other music teacher, for the possibility of pilot study in her Grade 8 band class, which she agreed to participate.
Since all participating students were under the age of 16, parental consent had to be obtained for each of the students participating in the study. Permissions were obtained through consent letter (see Appendix D) from the parents of the students in both classes (Mr. Patrick’s and Ms. Claire’s), the Director of school, and the teacher. The letter explained the purpose and design of the study, detailed schedule, data collecting methods (video recording, interviews, and field notes), participants’ responsibilities, contact information, assurance of confidentiality, and the right to withdraw. The site being a private school eliminated the need for the School Board approval. Approval from the research institution was obtained from the Research Ethics Boards (REB) at the University of Toronto (see Appendix D). The study commenced after the approval of the REB and all study participants.

Confidentiality and Access to Data Retention

Anonymity for the school and the participants was provided with pseudonyms. Gathered data such as individual test scores, CAT scores, video recordings and field notes were accessed only by the teacher, researcher, and the advisory committee. Any data collected were guarded in a secure private location in the researcher’s place and would be destroyed three years after data collection. There were low or no potential physical, psychological/emotional, social, or legal risks.

Role of the Researcher

Mr. Patrick and I collaborated throughout the two phases of the study, and our role ranged from observers to facilitators. During the first phase, Mr. Patrick taught the classes as he planned before this study. I was only informed about the tentative lesson plans for the six classes, and did not alter the lesson plans or took parts in teaching the classes. During the class time, I was a complete observer sitting at the teacher’s desk, taking field notes. I did not interact with the students except greeting at the beginning and the end of the classes.

During the second phase, we implemented series of transmediation activities that I designed, and both of us were facilitators in this phase. At the beginning of each class, I gave directions and introduced the source before breaking them up in groups. While they were working, Mr. Patrick and I went back and forth between groups to supervise how they were doing, reminded them of time, and checked if the recording devices were working properly. We helped when they asked for clarification or permission to move/use classroom equipment, but did not interfere with their
processes. Near the end of each class, we put the groups back and facilitated the performance of their compositions, and asked them to explain their composition. During the three tests, I administered the test, gave instructions, and answered any questions while Mr. Patrick supervised the students.

**Clarification of Research Biases**

I acknowledge the presence of my personal biases during the process of recruiting, creating test instruments and activities, and collecting and analyzing the data. Firstly, most of my teaching experience came from Christian private schools, so I had more connections in those and was prone to select such setting which felt comfortable to me. However, I had clear selection criteria to not to choose the sample solely on convenience. Also once the site was selected, I checked to make sure that the objective of the study could be met.

Second, when designing the tests and transmediation activities, assumptions were made in terms of difficulty and student appeal according to my experience with middle school students. To minimize the personal bias, pilot study of the created test instrument was conducted against TTCT which has large normative data. Also, any modifications to MCTM-II were approved by Peter Webster, who created the test. Moreover, each transmediation task was checked with Mr. Patrick to have another perspective on its appropriateness.

Finally, I was aware that the data collection process and data analysis could have been influenced by my desired outcomes, which was to see smaller improvement on creativity on the first phase and greater on the second. Therefore, I collaborated with other practitioners to increase objectivity. First, I collaborated with a statistician to validate and analyze numerical data gathered from the study. Second, instead of scoring them myself, I recruited four expert judges to help me score the visual section of TVVC and students’ musical compositions with Consensual Assessment Technique. Third, when taking field notes or analyzing the video data of students’ process, I tried to transcribe as much as I could to prevent focusing too much on my positive or negative impressions.

**Preliminary Phase**

**Designing the Test Instruments.** Two test instruments were used for the testing—MCTM-II (Measure of Creativity Thinking in Music) by Dr. Peter Webster (1994) and TVVC
(Test of Verbal and Visual Creativity) which I created. The purpose of using two different tests was to measure students’ musical creativity separately from their general creativity, and to reveal the effects of the stimuli on both general and domain specific creativity.

**TVVC (Test of Verbal and Visual Creativity).** TVVC was created based on the need of a testing tool that could accommodate the specific design of this research. The test had to: (a) have three alternate versions; (b) measure skills that were believed to be related to general creativity; and (c) be no longer than 15 minutes so that taking it three times does not burden students. To create such test, I extracted three tasks from the three instruments that test general creativity: Torrance Test of Creative Thinking (Torrance, 1981), Remote Associates Test (Mednick, 1962), and the Test of Creative Thinking Drawing Production (Urban & Jellen, 1996). The first two tasks were designed to measure verbal creativity:

1. Guessing the Consequences: List as much outcomes as possible for a given improbable situation
2. Making Association: List everything common about the given two remote words

Scoring method for these two tasks was taken from the verbal TTCT (Torrance, 1981), which the responses are scored in terms of the fluency, flexibility, and originality. Fluency was measured through the number of answers for each question (1 point each); flexibility was measured by the number of categories of similar answers (1 point each); and originality was measured by awarding extra points (1 point each) to the relevant yet unique answers that no other students put. 5 minutes were given for each task.

The third task asked students to complete the given unfinished drawing and write a title for it. This part of the test was scored separately using the Consensual Assessment Technique (CAT). Two university instructors (a Fine artist and a professional photographer) had been recruited as judges. I met each of them individually, and asked to rate the creativity of the drawing in a scale of 1 to 10. All drawings from the three tests were mixed together and names were hidden before the scoring.

**Pilot Test.** A pilot test was conducted to check the validity of TVVC, and the reliability among its three alternative versions. The two tests that had normative data, similar tasks and scoring methods were the Abbreviated Torrance Test for Adults (ATTA) and the verbal TTCT (Torrance Test of Creative Thinking). ATTA seemed to fit better since it had the same number of
tasks and same duration as TVVC, but the publisher did not allow me to use it to test Grade 8 students, since it was designed to test adults only. Therefore, TTCT-Verbal Form A, which was designed for Kindergarten to adults, was selected. There were seven tasks in the test and it took 45 minutes to complete.

The pilot test took place in Ms. Claire’s Grade 8 band class one week prior to the commencement of the study. On the first day, students took TTCT-Verbal A, and on the second day same students took TVVC that combined all three alternative versions. Because each TVVC version takes 15 minutes to complete, combined TVVC took 45 minutes which was the same duration as TTCT-Verbal A.

The two tests were scored by me according to the scoring manual. Students were ranked for each test according to the score, and the ranking of the two tests were compared using Spearman’s rank correlation to see whether someone who scored high on the TTCT also high in TVVC and vice-versa. The result revealed that the two tests correlate significantly high at $\rho = .87$. The below scatter plot shows the positive correlation between the two rankings (Figure 2).

![Figure 2: Spearman's Rank Correlation of TVVC and TTCT](image)

**Modified MCTM.** Two modifications were made to the MCTM with consultation of its author, Dr. Peter Webster. Firstly, the number of tasks were reduced to decrease the test time. The original MCTM takes about 20 to 25 minutes per child, and to test 13 students it would take 5 classes per test, which was not feasible for the study. The test time had to be reduced to about 5
minutes, so that each test could fit into one period plus their break time. Also, since MCTM was designed for children of age 6 to 10 which was significantly younger than the participants, tasks were adjusted to the age-appropriate level.

Similar tasks were grouped to reduce the number of tasks. The original test had total of 10 musical tasks in three categories (exploration, application, and synthesis), so the goal was to reduce them to three, one in each category. First, those tasks that are too introductory (e.g., exploring the sound of the piano) were removed. Second, if two tasks were similar, tasks that used instruments were chosen over the ones that use the voice. With my experience teaching young adults, I thought they could be more resistant to make growly or squeaky sounds, or imitating a robot with their voice than to create a song on the piano. Third, the figures from the original test which were black and white, hand-drawn, with some of the features unclear, were replaced into color pictures of selected objects and sceneries. Three alternate versions of the test were created by the researcher, which all were confirmed with Dr. Peter Webster, who also consented the use of the modified MCTM in this study.

**Selection of the Transmediation Sources.** Total of six sources were chosen from three non-musical modes (verbal, visual, and video). One of the purposes of this study was to explore the relationship of the level of abstraction in the source and the quality of the transmediated products. Therefore, each mode contained one direct and one abstract source based on the amount of abstract representations in the source (Table 2).

**Table 2: Sources**

<table>
<thead>
<tr>
<th>Verbal (Direct)</th>
<th>Verbal (Abstract)</th>
<th>Visual (Direct)</th>
<th>Visual (Abstract)</th>
<th>Video (Direct)</th>
<th>Video (Abstract)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1</td>
<td>Lesson 2</td>
<td>Lesson 3</td>
<td>Lesson 4</td>
<td>Lesson 5</td>
<td>Lesson 6</td>
</tr>
<tr>
<td><em>The Cat in the Hat</em></td>
<td>“Fire and Ice”</td>
<td><em>The Angelus</em></td>
<td><em>Broadway Boogie-Woogie</em></td>
<td>Tom &amp; Jerry clip</td>
<td>iPad Advertisement</td>
</tr>
<tr>
<td>(Dr. Seuss, 1957)</td>
<td>(Frost, 1920)</td>
<td>(Millet, 1859)</td>
<td>(Mondrian, 1943)</td>
<td>(Quimby, 1947/2015)</td>
<td>(Apple Canada, 2016)</td>
</tr>
</tbody>
</table>

The selected pages in *The Cat in the Hat* had straightforward descriptions of actions and events, aided by illustrations and onomatopoeia (e.g., “thump”) or motion words (e.g., “jumps” and
“hops”). In contrast, the poem “Fire and Ice” had more abstract concepts such as desire or hate. Similarly, The Angelus had recognizable figures and landscape, whereas the Broadway Boogie-Woogie had only straight lines and squares. The Tom & Jerry clip had exaggerated physical motions such as walking and smashing that are transferable to musical sounds, but the iPad advertisement had more abstract moving images of the galaxy.

**Data Collection and Analysis Method**

**Tests.** There were three tests throughout the study. Each test took two classes to complete. Each test started with the modified MCTM. Mr. Patrick taught the class as normal while I invited each student to the soundproof practice room for the MCTM. Students were videotaped throughout the MCTM to be scored later with scoring guide (see Appendix B). When the last student finished the test, all students were gathered in the classroom and took TVVC (Version A in Test 1, Version B in Test 2, and Version C on Test 3). No video data were collected for the TVVC, because student interaction was not allowed during the testing. The verbal section of TVVC was scored by me and the inventories of students’ answers were made electronically after the scoring was completed. The visual section was scored by two expert judges through Consensual Assessment Technique. The judges were briefly interviewed in person after the scoring, on their thoughts on the design of the tasks and students’ drawings. The dialogues were written electronically immediately after. Test scores were analyzed through two paired t tests (between Test 1 & 2 and Test 2 & 3) to examine the effects of each stimuli (general music classes in the first phase and transmediation in the second). Any individual outliers (e.g., dramatic differences between the tests) were studied qualitatively in relation to the video data from the MCTM and the transmediation processes.

**Phase 1.** For the first six classes, Mr. Patrick taught the class as he planned, including short theory and history lessons, performance of string repertoire, and playing tests. The goal of the first phase for me was to get to know the participants and the setting. I observed the class and took field notes, focusing on class dynamics, student characters, class events, and level of student engagement. The data was used to assign students into groups by mixing different personalities, genders, and levels of musical proficiency. Two students (James and Ethan) did not want to be videotaped, so I put them into the same group which I only recorded the audio (Table 3).

**Phase 2.** For six classes after test 2, students worked in groups to work on transmediation tasks. They worked with verbal sources (a picture book and a poem) in the first two classes, then
with paintings in the next two classes. For the lesson on moving images (videos without sounds), students were put into two groups by redistributing group 3 members into the other two groups, for better data collection. Lesson 5 and 6 required at least three devices per group: one computer/laptop and two video recorders. Each group needed their own computer/laptop so that they could pause, run, or move to different places as they worked. Two video recorders had to be set in different angles (one facing the screen and the other facing the students) to capture their interactions and how those interactions were related to the parts of the video clip (Group 1’s cameras were set in the way that James and Ethan were out of the angle). Considering the number of available devices and space to set those equipment, we decided that two groups would work better.

Table 3: Group Assignments

| Group Assignments | Lesson 1–4 | | Group 2 | | Group 3 |
|-------------------|------------|---------------------------|---------------|--------------------------|
|                    | Emma | Ethan | James | Olivia | William | Aiden | Daniel | Emily | John | Eric | Joshua | Karen | Sarah |
| Group 1            |      |      |       |        |         |       |        |       |      |      |        |       |       |
| Group 2            |      |      |       |        |         |       |        |       |      |      |        |       |       |
| Group 3            |      |      |       |        |         |       |        |       |      |      |        |       |       |

Each day began with the introduction to the source that would be transmediated into a musical composition. Each composition had to be at least one minute long, and they could use any objects and instruments that were available in the room. They were also informed that they could use their voice or body parts to create sound (see Appendix C for lesson plans, general procedures, and composition requirements). Each day, the groups chose where they would like to work among the three rooms (except for lesson 5 and 6 which the locations were set). Each room had a video/audio recording device. Students sat in a semi-circle facing the camera/audio recorder. While students were working, Mr. Patrick and I were rotating between the groups to observe and supervise. We only facilitated the process and did not intervene. I took field notes.
while Mr. Patrick was making sure that students were following the instructions, not touching the recording devices, and not disrupting each other or the other groups. All field notes were taken using key words and short phrases which were filled electronically at the end of the day.

Students were gathered near the end of each class and presented their composition to each other. They were also asked to explain why they composed it that way. All compositions were later transcribed with musical notations and descriptive words. Each musical event was paired with students’ explanation where applicable, to analyze the intended meaning of each musical passage. The compositions were evaluated according to two of Fueyo’s criteria (problem-posing/risk-taking and repleteness) and the Consensual Assessment Technique. Two music teachers were recruited as judges. They were briefly interviewed in person after the scoring on their thoughts on the scoring process and the compositions. The dialogues were electronically written immediately after.

**Coding of the video data.** All video/audio data of the student process were viewed/heard multiple times. I chose one group from each day that seemed to have the most interesting data, which I transcribed. The transcript included descriptions of the situation, body gestures, verbal communications, musical ideas, and pauses. Field notes were used to support and confirm the video data, and helped describing any ambiguous student dialogues or events. Completed transcripts were printed on paper and put in a binder for a hand colour coding. Initially, there were two predetermined themes derived from the research question: students’ use of multimodal communication and Wallas’ stages of creative process.

In the first round, the entries were highlighted in assigned colours by the communication mode (gestural: green; verbal: purple; musical: yellow) to track students’ multimodal strategies. However, students’ gestures were often used in combination, so in the second round, small dots in the appropriate colour were added on the upper right corner of the highlighted passages to denote multimodal communication. At the end, number of interactions were counted by day and mode.

In the third round, I looked for evidences of Wallas’ stages of creative process. Noticeable length of pauses or random playing were marked in brown as incubation, and ground breaking ideas were marked in pink as illumination. Verification was divided into acceptance (blue) and
rejection (red) of the idea. I then discovered that the number of incubation moments were significantly greater in some of the days, which led me to further investigation.

**Reflection.** On the last class, there was a class discussion about the students’ experience. I led the discussion with the predesigned questions. The discussion was video recorded to be transcribed. After the last class, I interviewed Mr. Patrick about his experience and thoughts, which was also transcribed (see Appendix E for the discussion and interview questions).
Chapter 4
Results and Analysis

Results from the study are reported in this chapter, which are organized by the research subquestions:

1. What strategies do students use for transmediation?
2. How does level of abstraction in the task affect students’ creative process and product?
3. How does transmediation affect general and domain-specific creativity compared to the general music classes?

The first section explores students’ strategies used for transmediation, by going through the common stages of creative process found in the groups. The next section focuses on the relationship between the level of abstraction in the task and the quality of both the process and the product. First, students’ use of multimodal interaction is compared between the abstract and direct source. Second, students’ compositions are analyzed through the CAT scores and the amount of literal and imaginative transmediation. The third section examines the effects of trasmediation on students’ general and domain-specific creativity by comparing the test scores from both phases of general music classes and the transmediation unit.

The Stages of Collaborative Creative Process

The analysis of video data of each group’s collaborative transmediation process revealed a common pattern which was categorized into five stages: exploration, awakening, verification, incubation, and elaboration. These stages closely revealed Wallas’ (1962) stages of creative process: preparation, incubation, illumination, verification, and elaboration, but was slightly varied due to the nature of the group setting. Wallas’ first stage, preparation, is the initial stage of a creative process which “the problem is investigated in all directions” (Wallas, 1926, p. 80). In this study, the preparation stage was divided into two distinct parts: exploration and verification. The first part, exploration, was similar to Wallas’ preparation stage in the sense that students were exploring the medium to gather information that will be useful for the task, but it was different in the way that almost no attention was paid to the given task. Students spent most of the time exploring different instruments at this stage. The second part was verification, which students were openly sharing, accepting, and declining ideas from the initial investigation of the
task. In contrast to the Wallas’ model, the verification stage came before the incubation and the illumination, because group members needed to access what ideas they had in mind before pondering and elaborating those (Table 4).

Table 4: Comparison of Wallas’ Stages of Creative Process and the Result of the Current Study

<table>
<thead>
<tr>
<th>Order</th>
<th>Current study</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exploration</td>
<td>Verification</td>
<td>Incubation</td>
<td>Illumination</td>
<td>Elaboration</td>
<td></td>
</tr>
<tr>
<td>Wallas</td>
<td>Preparation</td>
<td>Incubation</td>
<td>Illumination</td>
<td>Verification</td>
<td>Elaboration</td>
<td></td>
</tr>
</tbody>
</table>

**Stage 1: Exploration.** The first stage was characterized by students’ exploration on different instruments. My prediction of sequence was that students would examine the given source first, discuss the sound they want to create from it, then acquire the instruments that would best represent such sound. However, rather than speculating the given task, students first grabbed the instruments they wanted (except for lesson 5 and 6 which students were curious to see the video first). Students sometimes made frequent trips to change the instrument just to try out different ones or to find what they liked. There were some who knew what they wanted to play right away (e.g., Daniel: drum set, Aiden: piano), and they spent this stage setting the instrument up and began to play them. For those who changed instrument frequently (e.g., Olivia and Ethan), spent time choosing what they wanted to play by trying different instruments for a while.

Students’ personal preference was different on choosing pitched or non-pitched instruments (Table 5). Restriction of having at least two string instruments were given on lesson 1 and 3 to see if it affected students’ instrument choice. Although the restriction did not seem to have significant effect, it revealed that some students (e.g., William) would play pitched instrument only when he/she had to.

Once everyone in the group chose the instrument, they sat together and spent time playing music, existing or random pieces. Some students explored different ways to play the instrument. For example, Emily was playing violin vertically like a cello (lesson 1) or like a guitar (lesson 4). Similarly, Daniel was exploring with different kind of mallets (lesson 1) or with fingers (lesson 3). Students did not ask the other person to change the instrument or fought over one instrument. Each had fun playing their own instrument, or observing others playing their instrument.
### Table 5: Student's Instrument Choice

<table>
<thead>
<tr>
<th>Group</th>
<th>Name</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
<th>Lesson 5</th>
<th>Lesson 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emma</td>
<td>Tambourine</td>
<td>Maracas</td>
<td>Piano</td>
<td>Tambourine</td>
<td>Cymbal</td>
<td>Djembe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olivia</td>
<td>Spoons</td>
<td>Hi-hats</td>
<td>Temple</td>
<td>Mouthpiece</td>
<td>Maracas</td>
<td>Cymbal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stomps</td>
<td></td>
<td>blocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>James</td>
<td>Violin</td>
<td>Piano</td>
<td>Violin</td>
<td>Piano</td>
<td>Marimba</td>
<td>Hand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>drums</td>
</tr>
<tr>
<td></td>
<td>William</td>
<td>Violin</td>
<td>Drumstick</td>
<td>Violin</td>
<td>Tambourine</td>
<td>Djembe</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shaker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethan</td>
<td>Ratchet</td>
<td>Spoons</td>
<td>Cowbell</td>
<td>Sleigh bells</td>
<td>Cabasa</td>
<td>Sleigh</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice</td>
<td></td>
<td></td>
<td></td>
<td>bells</td>
</tr>
<tr>
<td>2</td>
<td>Aiden</td>
<td>Cello</td>
<td>Piano</td>
<td>Piano</td>
<td>Keyboard</td>
<td>Piano</td>
<td>Tom-toms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sleigh bells</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emily</td>
<td>Violin</td>
<td>Maracas</td>
<td>Violin</td>
<td>Violin</td>
<td>Cello</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>John</td>
<td>Piano</td>
<td>Sleigh</td>
<td>Cello</td>
<td>Cello</td>
<td>Piano</td>
<td>Cello</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>bells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Daniel</td>
<td>Snare</td>
<td>Tom-tom</td>
<td>Snare</td>
<td>Tom-tom</td>
<td>Tom-tom</td>
<td>Snare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hi-hats</td>
<td></td>
<td>Hi-hats</td>
<td></td>
<td>Cymbals</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Joshua*</td>
<td>Cello</td>
<td>Cabasa</td>
<td>Cello</td>
<td>Djembe</td>
<td>Piano</td>
<td>Piano</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maracas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eric*</td>
<td>Maracas</td>
<td>Maracas</td>
<td>Tambourine</td>
<td>Temple blocks</td>
<td>Hand drums</td>
<td>Djembe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice</td>
<td>Djembe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Karen**</td>
<td>Maracas</td>
<td>Voice</td>
<td>Voice</td>
<td>Maracas</td>
<td>Maracas</td>
<td>Marimba</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Snare</td>
<td>Cabasa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sarah**</td>
<td>Violin</td>
<td>Violin</td>
<td>N/A</td>
<td>Piano</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of pitched instrument</th>
<th>7</th>
<th>3</th>
<th>8</th>
<th>7</th>
<th>4</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td># of non-pitched instrument</td>
<td>8</td>
<td>12</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td># of voice or body part used</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Restriction</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Note. *Group 1 for lesson 5 and 6 **Group 2 for lesson 5 and 6

They sometimes exchanged the instrument to see what the other was like. Most of the communication at this stage was musical, and seldom verbal. The length of the exploration phase varied from under a minute to five minutes. Near the end of the seemingly endless exploration
phase, usually one group member called for the attention of the group with a question such as “So how are we going to do this?” or grabbed the source to start speculating. Then the group members started to pay attention to the source.

**Stage 2: Verification.** In this stage, group members carefully examined the given source, and exchanged their opinions on how to transmeditate it into a musical output. Group members refined the musical ideas to represent what they wanted through collaboration. They mixed the verbal, musical, and gestural mode to effectively convey the intended meaning. The color-coding analysis of students’ interaction revealed that verbal interaction was used the most, followed by musical, then gestural (Table 6).

<table>
<thead>
<tr>
<th></th>
<th>Verbal</th>
<th>Musical</th>
<th>Gestural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>The Cat in the Hat</em></td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>“Fire and Ice”</td>
<td>14</td>
<td>11</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td><em>The Angelus</em></td>
<td>20</td>
<td>7</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td><em>Broadway Boogie-Woogie</em></td>
<td>63</td>
<td>31</td>
<td>13</td>
<td>107</td>
</tr>
<tr>
<td>Tom &amp; Jerry clip</td>
<td>15</td>
<td>10</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>iPad ad video</td>
<td>34</td>
<td>8</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>149</strong></td>
<td><strong>74</strong></td>
<td><strong>40</strong></td>
<td><strong>263</strong></td>
</tr>
</tbody>
</table>

Students used verbal expressions to describe, use musical terms, or give precise directions (Ex. 1–3).

**Ex. 1. Verbal Communication: Description**

**Lesson 4: Broadway Boogie-Woogie, Group 2**

Aiden: This is what is happening inside a brain, like those impulses [makes a ring with his thumb and index finger] that are travelling [gently moves the finger ring].
Ex. 2. Verbal Communication: Musical Terms
Lesson 2: “Fire and Ice,” Group 3
Karen: So we should be like really light, [starts to play the snare drum with her mallets softly, then takes the mallets off the drum, but gradually makes her motion bigger and more intense. Then she suddenly stops.] Hey, what’s that… [pauses] Sarah & Karen: Crescendo!

Ex. 3. Verbal Communication: Giving Directions
Lesson 4: Broadway Boogie-Woogie, Group 2
The group is deciding how to do portray the coffee shop scene from their story.
Daniel: As she is playing, we should do the conversation.
Aiden: I will be the barista, you be the guy. I will talk first.

Musical sounds were used to demonstrate musical ideas (Ex. 4).

Ex. 4. Lesson 2: “Fire and Ice,” Group 3
The group is reading Frost’s poem “Fire and Ice.”
Joshua: “Some say the world will end in fire.”
Karen: So how could we describe fire?
Joshua: [Starts to shake the maracas]
John: [Joins to shake his maracas]
Sarah: [Joins by playing low double stops on her violin]

Gestures were used to point, demonstrate, and express rejection/acceptance of the idea, often combined with verbal explanation or sound (Ex. 5–8).

Ex. 5. Lesson #4: Broadway Boogie-Woogie, Group 3
Karen: And then we stop, and he [points at John] does the falling sound, and we start over.
John tries to play the blocks in the descending order. However, because he is playing the blocks counter-clockwise, the pitches go down and then up. He tries couple of times, switching the order in different ways, but it is not improving.
Joshua: Isn’t it the other way [points at the blocks with his index finger in a right direction]?
John: [Hands over the mallet to Joshua]
Joshua: [Plays each block for John] This is [points at a bigger block] lower than that
[points at a smaller block].
John: Oh yeah? [Takes the mallet from Joshua. He tries twice and plays a perfect
descending run.]

Ex. 6. Lesson 2: “Fire and Ice,” Group 3
Karen: Okay, so ‘some say’ Sarah can play really long [violin whole bow motion].
Joshua: Can we just make fire? Like, [rubs maracas and cabasa together like starting fire
from two rocks]
Karen: Yeah, after the “end” I will give like a little break, and then in “fire” we all go like
crazy [motions fierce movement].

Ex. 7. Lesson 4: Broadway Boogie-Woogie, Group 2
Emily: [Looks at Daniel, and taps on the tom-tom with her violin bow] Okay, you can do
your foot steps, like the man walking.
Daniel: [Plays slow eighth notes on the tom-tom]
Emily: That’s too slow. Let’s do it like [shakes her head side ways in a faster pace]
Aiden: [Looks at Emily’s gesture] Not an army, like a normal civilian.
Daniel: Okay, so, [plays little bit faster on the centre of the tom-tom]
Aiden: I think the normal civilian will be more like outside [points near the rim of the tom-
tom] of that.
Daniel: [Moves his drumsticks near to the rim of the tom-tom and plays softer and faster
than the first time]

Ex. 8. Lesson 5: “Tom and Jerry,” Group 3
Karen stops the video after the scene where Tom hits Jerry and a bump grows on top of
Jerry’s head.
Karen: When he gets a bump, we should wheee! (Pretends a bump is growing on her
crown with her hand).

The multimodal exchange of questions, answers, and debates led to either acceptance or rejection
of the ideas. When accepting the idea, other members would say affirmative words, show
positive reaction, or imitate the idea after someone presents his/hers (Ex. 9).
Ex. 9. Lesson 2: Fire and Ice, Group 3
Joshua: For “what I’ve tasted of desire,” we can just say [in desperate tone] “give me, give me.”
Karen: Oh yeah!
Sarah: Yeah!
Eric: [Laughs]
Sarah: And you have to have the hand too [reaches out the right arm].
Joshua & Karen: [Imitates Sarah and reach out the right arm]

Rejection of an idea would happen in various ways. The most prevalent case was saying no to the person who put out the idea. While there is a valid reason for rejection for the most of the time, some ideas would get rejected for no apparent reason (Ex. 10 & 11).

Ex. 10. Lesson 4: Broadway Boogie-Woogie, Group 2.
The group is trying to imitate the sound of door chime when a guy walks into a Starbucks.
Aiden: Then the Starbucks [shakes the sleigh bells continuously].
Emily: Why are you shaking it for so long? It’s just a bam.
Daniel: It’s just [taps the hi-hat once]
Emily: You know how when you walk in? [Makes a gesture of a door opening with her hand]

Ex. 11. Lesson 2: “Fire and Ice,” Group 3.
The group is trying to represent the “ice.” Eric rubs the snare drum with his maracas.
Karen: No! [Takes Eric’s hand away]
Few minutes later, the group is trying to represent the “ice” in another verse. Eric hits the side of the snare with the maracas.
Karen: No! [Holds the snare back from him]

Sometimes the idea was presented, but did not get elaborated further in the group and perished. Other times it was seemed to be accepted and even made to the rehearsal process, but seamlessly disappeared in the final product: It could be the person simply forgetting to play the part, or rejecting the idea without other members’ consent. Another case was that the person who was supposed to play the part was unsatisfied, so he/she either discarded or refined it in the
performance. Depending on the amount and quality of validated ideas, students either moved on to the incubation or jumped to the elaboration stage.

**Stage 3: Incubation.** After some constructive exchange of ideas in the verification phase, the groups often got mired. Sometimes they ran out of ideas to fill up the required duration of one minute, or they had no idea how to transmediate certain concept, or the group could not agree on the same idea to pursue. This stage was sometimes absent in an easier transmediation task, or was significantly long which ended up in seeking for help or incomplete composition. Students detached from the task in this stage. They often went back to the random playing similar to the exploration phase. They would play their instruments without any verbal communication, sometimes in unconventional ways (e.g., bowing strings over the bridge or playing the violin vertically like a cello). Another case was to remain in silence. Some made small noises with the instrument if the silence was too awkward. Sometimes they verged off to unrelated conversation, or expressed the frustration. For example, in lesson 2 with the poem “Fire and Ice”, Eric’s group ran out of the ideas and could not make the piece longer than a minute. Eric leaned back in the chair, dropped his maracas on his laps and said, “The poem is so short! How can you make it over a minute?”

The incubation stage is defined as “the delay between preparation and the moment of insight” which “the prepared material is internally elaborated and organized” (Sawyer, 2006, p. 58). While it seems like a “counterintuitive phenomenon because it is not time spent working on a problem that helps, but rather time away from the problem” (Smiths, 2003, p. 28), it rather is an important strategy to overcome a difficult creative task. Wallas (1926) suggested that one should take an “interval free from conscious thought on the particular problem concerned” when faced with more difficult form of creative thought, to allow the mind to freely work on the unconscious or partially conscious processes (Wallas, 1962, p. 87). Smiths (2003) offered a cognitive explanation behind the incubation, that taking a break from the task allows one to approach the problem from a fresh context, which is “less likely to lead to previously encountered dead-end lines of thinking” (p. 28). Most of the time the incubation ended with one person who got an idea which is described as illumination.

**Stage 4: Illumination.** Illumination is the experience of having the “aha” moment. It is “the appearance of the ‘happy idea’ together with the psychological events which immediately
preceded and accompanied that appearance” (Wallas, 1926, p. 80). Wallas (1926) claimed that this moment “cannot be influenced by a direct effort of will” (p. 93), which agreed with data from this study. Usually, one person suddenly sprung up from the incubation with an idea. For example, during lesson 4: Broadway Boogie-Woogie, group 2 initially worked on the idea of portraying what is happening inside a brain, but could not execute it to musical ideas. The boys were making unrelated conversation, while Emily was staring at the painting. When the conversations died and the group got back onto the task, Emily said, “Isn’t it like a city?” Then the other members started to throw ideas about the city idea, which developed into a story which became the basis for the composition. Sometimes the idea came from the least expected person. For example, Sarah, who barely spoke in class or led the group, frequently came up with ideas for the difficult tasks. In lesson 2: “Fire and Ice,” her group was struggling to expand the piece into one minute. The group drifted off to unrelated conversation while Sarah remained silent. Then she suddenly suggested, “How about the world is okay and then we slowly like make it worse?” referring to the poem’s first verse “Some say the world will end in fire.” After the breakthrough, groups moved to the elaboration stage.

**Stage 5: Elaboration.** The elaboration stage was equivalent to Wallas’ where the group elaborated the verified idea into the complete form. Once the group finalized the composition, they practiced the piece and modified the details (Ex. 12).

**Ex. 12. Lesson 3: The Angelus, Group 2**

The group is practicing to play ‘the two gunshots’ together.
Emily: You know when we stop,
John: We should do it together.
Daniel: Guys, count to two.
Emily: Just look at everyone.

Depending on the difficulty level or how focused the group was, some groups did not reach this phase and had to head straight to the performance. For example, two groups did not reach this stage in lesson 4, while in lesson 5, every group had an ample amount of time to rehearse. The groups were highly focused at this point, and the exchange of idea, if there were any, were more rapid and more brief than the verification stage. The rehearsing process could be collaborative or slightly dictated depending on the amount of ideas or the energy level. For example, in lesson 1:
The Cat in the Hat, John directed the whole process like a conductor. He stood in front of the members, instructing and coaching when and what to play.

At the beginning of the study, I was worried that the composition would change too much each time if they did not have a written notation. On the other hand, I did not want to give them too much restrictions, so I suggested the written notation (which did not have to be musical) as an option. One out of three groups used the notation on the lesson 1 (Plate 1).

Plate 1: Written Notation from Group 1

![Written Notation from Group 1](image)

*Note. Names were hidden for anonymity.*

However, it was before the end of the first lesson that students realized that they did not need a notation to play consistently. First, the piece was only a minute-long; second, they had the source with them which itself was kind of a notation; and third, everyone participated in the composition so they knew the piece from the heart. The absence of music score enabled a lot more eye contacts and gestures during both the rehearsal and the performance. They played the composition from the beginning to the end and then repeated until the sequence is smooth. There was much less verbal communication, but more gestural and musical ones. The gestures were not exactly what professional musicians use, like subtle breathing and a small nod, but they communicated with direct eye contacts, big head turns, mouthing, and silent laughter. While these five phases happened in the listed order for the most of the time, some were repeated partially or switched in the order depending on the difficulty of the task.
The Effects of the Level of Abstraction on Transmediation

One of the research questions of this study was to explore the relationship between the level of abstraction in the source and its transmediated product, assuming that more remote connections have to be made to translate an abstract source (Kandel, 2016). For the six lessons, three modes (verbal, visual, and video) were used, each mode containing one direct and one abstract source (Table 7).

Table 7: Sources

<table>
<thead>
<tr>
<th></th>
<th>Verbal (Direct)</th>
<th>Verbal (Abstract)</th>
<th>Visual (Direct)</th>
<th>Visual (Abstract)</th>
<th>Video (Direct)</th>
<th>Video (Abstract)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1</td>
<td>The Cat in the Hat</td>
<td>“Fire and Ice”</td>
<td>“The Angelus”</td>
<td>Broadway Boogie-Woogie</td>
<td>Tom &amp; Jerry clip</td>
<td>iPad Advertisement</td>
</tr>
<tr>
<td>Lesson 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students’ perception of difficulty. To see how the level of abstraction or the mode affected students’ perception of difficulty, students were asked to rate the difficulty of the six lessons during the discussion on the last day. One being the hardest, students’ ranking of difficulty was:

1. Mondrian: Broadway Boogie-Woogie
2. Millet: The Angelus
3. Robert Frost: “Fire and Ice”
4. Dr. Seuss: The Cat in the Hat
5. iPad advertisement
6. Tom & Jerry clip

Students identified Broadway Boogie-Woogie as the hardest, which was expected. However, The Angelus came as the second which was a surprise. I was expecting one of the abstract sources in the other mode (poem or the iPad advertisement) to come as a second. When I asked why, Emma responded, “Because you don’t really know. They are still pictures, and all you have is colours and what noises do the color make?” In contrast, they identified the videos to be the easiest to translate, because they gave the idea of when to play what. The concept of time seemed to be an important factor in their perception of difficulty. The verbal sources and the videos share the
property of time with music, and the chronological events from the sources helped students to structure their musical compositions. In contrast, in the paintings, all elements were presented at once, which students had to invent the sequence of materials in order to transmediate them into music. Thus, the transmediation happened in a two-step process with the paintings: translating the painting into a sequenced material (e.g., a story), then to a musical composition. This additional step resulted in more number of interactions (Figure 3). There were more number of interactions when transmediating abstract sources (lesson 2, 4, and 6) in comparison to the direct ones (lesson 1, 3, and 5). The number was highest in the lesson 4: *Broadway Boogie-Woogie*, which students identified as the most difficult task. Similarly, the frequency of the incubation moments, which reflected the amount of struggle, also corresponded with the level of abstraction (Figure 4). There were more incubation moments when transmediating the abstract sources (lesson 2, 4, and 6) in comparison to the direct ones (lesson 1, 3, and 5).

Figure 3: *Number of Interactions*
Figure 4: Number of Incubation Moments

**Amount of literal and imaginative transmediation.** The level of abstractness in the source was found to be closely related to the level of transmediation. Mavers (2015) described two types of transmediation: literal and imaginative. Literal transmediation represents a literal translation of each element in media to another, while imaginative transmediation is when a “given communicated entity is deliberately remade with the resources of a different mode,” for example creating a free writing in response to a piece of music (p. 285). Direct source often led to literal transmediation, while more abstract source led to imaginative translation.

There was a tendency to gravitate toward the direct link first, and then create the remaining links later. This tendency was first seen in the Test for Verbal and Visual Creativity (TVVC) results. Among the three tasks of the TVVC, students identified the remote association task to be the hardest because they could not see the apparent links. In the visual section, students gravitated toward direct links of typical associations. As the result, the visual section in the Version C had the lowest average score even though it was the third test that students took. The two visual art expert judges agreed that Version C contained more shapes that closely resembles another object, for example, an arrow or a speech bubble (Figure 5).
In this task, most of the students chose to write in the speech bubble figure and used the arrow figure as an arrow or a rocket, which both judges perceived as ‘not creative’. In contrast, Version B received the highest average score, because it had less direct links and contained more organic shapes, according to the judges (Figure 6). The oval shape allowed students to shift from the top-down perspective, thus resulting in more rotated images which the judges found to be more ‘creative’. Similarly, during the transmediation unit, students gravitated toward the direct links and created literal translation (Table 8). In contrast, they created more imaginative translation when the links were absent (Table 9).
Table 8: *Examples of Literal Transmediation*

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Musical output</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Twice”</td>
<td>Play the instrument twice</td>
</tr>
<tr>
<td>“Fire”</td>
<td>Fierce playing (loud and fast)</td>
</tr>
<tr>
<td>“Up and down”</td>
<td>Glissando up and down</td>
</tr>
<tr>
<td>“Desire”</td>
<td>Shouting “Give me, give me”</td>
</tr>
<tr>
<td>Dark colours</td>
<td>Minor scales</td>
</tr>
<tr>
<td>Falling (motion in the video)</td>
<td>Descending glissando</td>
</tr>
</tbody>
</table>

Table 9: *Examples of Imaginative Transmediation*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Musical output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mourning</td>
<td></td>
</tr>
<tr>
<td>Injury</td>
<td></td>
</tr>
<tr>
<td>War</td>
<td></td>
</tr>
<tr>
<td>Jerry (the mouse) walking around</td>
<td></td>
</tr>
<tr>
<td>The galaxy</td>
<td></td>
</tr>
<tr>
<td>Yellow (color)</td>
<td></td>
</tr>
</tbody>
</table>

Considering that music involves time and sound, the videos had the most number of direct links. It provided the timing, and often suggested the direct playing motion. In Tom & Jerry clip, there were scenes with hitting, playing piano, or running. Therefore, compositions contained more
sound effects than melodic or rhythmic materials. In contrast, there were more harmonic, melodic, and rhythmic materials in the iPad advertisement which contained more abstract concepts such as the space and planets. However, this does not mean they translated every element. Because the video has a set beginning and the end, sometimes they just filled in the time with simple shaker rattles or taps on the drums.

When transmediating the verbal source, students took the full advantage of the freedom they had for the composition to fill the time with the narration. There was no “no spoken words” rule so two out of three groups read sentences out loud as part of their composition. One group played sound effects for the narration on the background while the other played a short musical segment only after the narration of each line (Table 10). Such approach allowed them to find one direct link in the sentence and repeat the idea until the sentence ends, thus again filling the empty space.

Table 10: Composition #2, Group 3

<table>
<thead>
<tr>
<th>Order</th>
<th>Narration</th>
<th>Musical event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Some say the world will end</td>
<td>Violin: ascending glissando&lt;br&gt;Snare: roll&lt;br&gt;Cabasas and maracas: shake</td>
</tr>
<tr>
<td>2</td>
<td>in fire,</td>
<td>Everyone playing fierce&lt;br&gt;Violin: low trills</td>
</tr>
<tr>
<td>3</td>
<td>Some say in ice.</td>
<td>Cabasas and maracas: slow shake&lt;br&gt;Violin: a few high notes and soft squeaks</td>
</tr>
<tr>
<td>4</td>
<td>From what I’ve tasted of desire</td>
<td>After the narration, everyone shouts “Give me, Give me!”</td>
</tr>
<tr>
<td>5</td>
<td>I hold with those who favor fire.</td>
<td>Everyone playing fierce</td>
</tr>
<tr>
<td>6</td>
<td>But if I have to perish twice,</td>
<td>Everyone bangs the instrument together twice</td>
</tr>
<tr>
<td>7</td>
<td>I think I know enough of hate</td>
<td>Everyone plays randomly, less fierce than the “fire”</td>
</tr>
<tr>
<td>8</td>
<td>To say that for destruction ice</td>
<td>Cabasas and maracas: slow shake&lt;br&gt;Violin: a few high notes and soft squeaks</td>
</tr>
<tr>
<td>9</td>
<td>is also great and would suffice.</td>
<td>Everyone plays randomly, less fierce than the fire</td>
</tr>
</tbody>
</table>
This was where the prediction went wrong—rather than striving to translate each and every concept, they skipped the abstract ones and filled the space with repeating the literally transmediated idea. For example, in the clause “But if I have to perish twice,” they would rather focus on the word “twice” then “perish,” and omit the rest by using the narration. Only one group used narration for *The Cat in the Hat*, because the given text was long enough to provide enough number of direct links for a minute-long composition.

The big challenge came when students faced the visual sources. There was no time frame given, no words to read out loud, and not much direct links. Students felt that it was harder to imagine how to represent a certain colour or shape into the musical sound. Students were forced to create connection between two remote concepts, and they did it by making a two-step process: creating a story (verbal) from the picture and then translate the story into the music. For *The Angelus*, all three groups created a story based on what they saw on the picture. Based on the dark colours and two peasants praying, they all ended up with a similar story such as hearing a news of a family died on a war (group 2 & 3), and two poor farmers praying for a good year (group 1). The resulting compositions were similar, containing of minor chords, dissonance, and harmonic minor scales (Table 11).

Table 11: *Similar Motives from Lesson 3*

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Motive" /></td>
<td><img src="image2.png" alt="Motive" /></td>
<td></td>
</tr>
</tbody>
</table>

The *Broadway Boogie-Woogie* presented the biggest challenge. There were only squares and lines of three primary colours without any strong resemblance of an object. Coming up with the story was not easy, so each group focused on creating one external link that can lead them to a story. One group linked the picture with the mobile game “Crossy Road” and used the digital game theme (Table 12).
Table 12: Composition #4, Group 3

<table>
<thead>
<tr>
<th>Order</th>
<th>Musical event</th>
<th>Instruments</th>
<th>Intended meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Super Mario Theme</td>
<td>Piano, temple blocks</td>
<td>Start of the game</td>
</tr>
<tr>
<td></td>
<td><img src="image1.png" alt="Super Mario Theme" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Random jumping notes</td>
<td>Piano, temple blocks, Djembe, rattle</td>
<td>Going over obstacles</td>
</tr>
<tr>
<td>3</td>
<td>Temple blocks getting faster Piano clusters descending</td>
<td>Piano, temple blocks</td>
<td>Die</td>
</tr>
<tr>
<td>4</td>
<td>Sudden stop</td>
<td>Piano, temple blocks</td>
<td>Start the game over</td>
</tr>
<tr>
<td>5</td>
<td>Super Mario Theme</td>
<td>Temple blocks</td>
<td>Start the game over</td>
</tr>
<tr>
<td></td>
<td><img src="image2.png" alt="Super Mario Theme" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Temple blocks Djembe</td>
<td>Going over obstacles</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Everyone except piano</td>
<td>Game getting slightly harder with more obstacles</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rhythms getting faster, more intense, louder Piano clusters descending</td>
<td>Everyone</td>
<td>Reach the climax and die</td>
</tr>
<tr>
<td>9</td>
<td>Sudden stop</td>
<td>Piano</td>
<td>End of the game</td>
</tr>
<tr>
<td>10</td>
<td>Descending glissando</td>
<td>Piano</td>
<td>End of the game</td>
</tr>
</tbody>
</table>

Another group thought of a bird’s-eye view of a city and created a story of a man walking to different places in a city (Table 13). The other group took an entirely different approach: to read the picture like a musical notation (Table 14). They went from the top to bottom, from left to the right, and assigned instruments to each colour so that they would play when they see their colour. Piano gave the constant pulse so that everyone could read the picture at the same pace. While this was the hardest task, it put out the most variety of interpretations. In summary, the absence of direct link fostered students to form remote associations, which resulted in diverse and imaginative transmediation.
### Table 13: Composition #4, Group 2

<table>
<thead>
<tr>
<th>Order</th>
<th>Musical event</th>
<th>Instruments</th>
<th>Intended meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Bass and snare drum</td>
<td>A business man walking</td>
</tr>
<tr>
<td>2</td>
<td>A short rattle</td>
<td>Sleigh bells</td>
<td>Opening the door of the Starbucks</td>
</tr>
</tbody>
</table>
| 3     | Violin: double stops  
Cello: random quarter notes  
Bass drum: quarter notes | Keyboard (Choir Ahs), bass drum | Noise in the Starbucks |
| 4     | Call and response | Keyboard (Choir Ahs), bass drum | The man having conversation with the barista |
| 5     | A short rattle | Sleigh bells | Giving the change for the coffee |
| 6     |               | Keyboard | “Thank you” |
| 7     |               | Bass drum | “Thank you” |
| 8     |               | Snare drum | The man walking to his office building |
| 9     | Glissando up | Cello | Office door opening |
| 10    | Random small sounds, slowly decreasing | Everyone | People working, fading out |

### Table 14: Composition #4, Group 1

<table>
<thead>
<tr>
<th>Order</th>
<th>Musical event</th>
<th>Instruments</th>
<th>Intended meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Trumpet mouth piece</td>
<td>Opening intro</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Piano</td>
<td>Colour yellow</td>
</tr>
</tbody>
</table>
| 3     | Rattles on top of the piano ostinato  
Tambourine, sleigh bells, piano | Tambourine, sleigh bells, piano | Tambourine (Red)  
Sleigh bells (Blue) |
Creativity Scores of the Compositions. Two scoring methods were used to access the creativity of the compositions: CAT (Consensual Assessment Technique) and Fueyo’s (2002) criteria, which both were scored out of 20. For CAT scores, ratings from the two judges were averaged (Table 15).

Table 15: CAT Scores

<table>
<thead>
<tr>
<th></th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
<th>Lesson 5</th>
<th>Lesson 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Group 2</td>
<td>11</td>
<td>9</td>
<td>15</td>
<td>13</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Group 3</td>
<td>10</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>28</td>
<td>38</td>
<td>34</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Mean</td>
<td>8.67</td>
<td>9.33</td>
<td>12.67</td>
<td>11.33</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>

CAT scores only provided numbers, since the judges did not have to provide justification or comments for their scores. While CAT was helpful to see the correlation between the level of creativity and other factors such as level of abstraction or time, it alone could not explain the results. Therefore, I used part of Fueyo’s (2002) criteria for assessing transmediation. Among Fueyo’s seven criteria (problem-posing/risk-taking, expressiveness, repleteness, collaboration, care, time/effort, self-evaluation), problem-posing/risk-takiing and repleteness were chosen because it seemed to be the most related to the transmediated product, while the others were more related to the process.

To score the problem-posing/risk-taking, the amount of literal and imaginative transmediation was calculated. Each piece was transcribed, and each transmediated entry was classified to be either literal or imaginative. The percentage of each type of transmediation was calculated according to the duration, and the imaginative entries were given twice the point than the literal ones. Each composition was given a score out of ten. To score the repleteness of a musical composition, the extent of the way students manipulate musical parameters (rhythm, pitches, harmony, and articulation), and their use of the instrument as a medium in its full potential were measured. To measure the manipulation of musical parameters, Musical Flexibility (MF), Musical Originality (MO), and Musical Syntax (MS) were taken from Webster’s MCTM scoring methods. One of Webster’s criteria, Musical Extensiveness (ME), which scores the amount of clock time involved in the creative task, was eliminated because the duration of the piece was restricted. Each category (MF, MO, MS) was scored out of five. MF was scored on the number
of musical parameters manipulated (pitch, harmony, speed, dynamics, and articulation). MO was marked on the uniqueness of the composition in comparison to the other group’s work. MS was scored on “the extent to which the response makes musical sense” (Webster, 1994, p. 4). To measure the extent of the exploitation of the potentials of the medium, one point was given for each way they used the instrument. For example, three points were given if someone played violin using glissando (sliding on the fingerboard), pizzicato (plucking the string), and tremolo (fast bowing) on the same piece. Playing an instrument in an unconventional way also counted as a point, for example, hitting tambourine between two closed placed chairs instead of shaking with hand. Each composition was given a score out of 20 for the repleteness, which was divided by two and added to the problem-posing/risk-taking score (Table 16).

Table 16: Fueyo Scores

<table>
<thead>
<tr>
<th></th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
<th>Lesson 5</th>
<th>Lesson 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>12.5</td>
<td>13.5</td>
<td>14</td>
</tr>
<tr>
<td>Group 2</td>
<td>17</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>Group 3</td>
<td>10.5</td>
<td>15</td>
<td>14.5</td>
<td>15.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>37.5</td>
<td>39</td>
<td>39.5</td>
<td>42.5</td>
<td>29.5</td>
<td>27</td>
</tr>
<tr>
<td>Mean</td>
<td>12.5</td>
<td>13</td>
<td>13.17</td>
<td>14.17</td>
<td>14.75</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Spearman’s rank correlation showed significantly high correlation between the CAT and Fueyo scores ($r_s = .829$). The two sets of scores were combined (Table 17) to see the correlation between creativity scores and the level of abstraction.

Table 17: CAT and Fueyo Scores Combined

<table>
<thead>
<tr>
<th></th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
<th>Lesson 5</th>
<th>Lesson 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>15</td>
<td>20</td>
<td>22</td>
<td>23.5</td>
<td>26.5</td>
<td>26</td>
</tr>
<tr>
<td>Group 2</td>
<td>28</td>
<td>22</td>
<td>28</td>
<td>28</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>Group 3</td>
<td>20.5</td>
<td>25</td>
<td>27.5</td>
<td>25.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>63.5</td>
<td>67</td>
<td>77.5</td>
<td>77</td>
<td>57.5</td>
<td>49</td>
</tr>
<tr>
<td>Mean</td>
<td>21.17</td>
<td>22.33</td>
<td>25.83</td>
<td>25.67</td>
<td>28.75</td>
<td>24.5</td>
</tr>
</tbody>
</table>

The graph of the combined mean product creativity scores (Figure 7) is different from previous graphs on number of interactions or incubation which seemed to increase on the days with more
abstract sources (Figure 3 & 4). In fact, Spearman’s rank correlation showed negative correlation between the product creativity scores and the level of abstraction ($r_s = -0.085$). Rather, the scores seemed to correlate with the time ($r_s = 0.6$), which slightly increased over time.

Figure 7: Creativity Scores of the Compositions over Time

The Affect of Transmediation on Students’ General and Domain-specific Creativity

Students were tested three times throughout the study with TVVC and MCTM: before phase 1 of general music classes taught by Mr. Patrick, after phase 1, and after phase 2 of transmediation. In order to compare the effectiveness of the two phases, it was essential to have all three scores. Therefore, scores from students who took test three times were selected for analysis. While all students took Test 1 ($N = 13$), some students were absent for the other two tests which decreased the number of valid data. Eight students took all three TVVCs and seven students took all MCTMs. Although Eric took MCTM three times, his scores were removed because he took the test partially (which will be explained in the next section). The three mean scores from TVVC ($n = 8$) and MCTM ($n = 6$) were analyzed by paired $t$ test to examine the effectiveness of the stimuli in each phase. The goal of the numerical analysis was to quantify and track students’ creative thinking abilities, and study the data qualitatively in conjunction to students’ creative process. These values were not intended to provide quantitative data or suggest any generalizable statistical meanings.
The paired-\(t\) test showed similar results on TVVC and MCTM scores. The mean score significantly increased in both phases, greater after the transmediation unit. TVVC scores (Table 18 & Figure 8), representing students’ domain-general creativity, increased after the first phase, \(t\) (7) = 3.376, \(p = .012\), MD = 5.886. The increase was greater after the second phase, \(t\) (7) = 3.4, \(p = .011\), MD = 16.552. MCTM scores (Table 19 & Figure 9), representing students’ musical creativity, showed only subtle changes. The mean score increased slightly after the first phase (MD = 3.267) and greater after the transmediation unit (MD = 6.761).

Table 18: TVVC Scores

<table>
<thead>
<tr>
<th>Name</th>
<th>TVVC #1</th>
<th>TVVC #2</th>
<th>TVVC #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joshua</td>
<td>37</td>
<td>44</td>
<td>58.5</td>
</tr>
<tr>
<td>Karen</td>
<td>30</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Olivia</td>
<td>33.5</td>
<td>37</td>
<td>65</td>
</tr>
<tr>
<td>Aiden</td>
<td>32</td>
<td>36.5</td>
<td>40</td>
</tr>
<tr>
<td>Daniel</td>
<td>23.5</td>
<td>27.5</td>
<td>46</td>
</tr>
<tr>
<td>James</td>
<td>36</td>
<td>34</td>
<td>78</td>
</tr>
<tr>
<td>John</td>
<td>36</td>
<td>39.5</td>
<td>50</td>
</tr>
<tr>
<td>Eric</td>
<td>27.5</td>
<td>39.5</td>
<td>52.5</td>
</tr>
<tr>
<td>Total</td>
<td>255.5</td>
<td>301</td>
<td>435</td>
</tr>
<tr>
<td>Mean</td>
<td>31.94</td>
<td>37.63</td>
<td>54.38</td>
</tr>
<tr>
<td>SD</td>
<td>4.72</td>
<td>5.26</td>
<td>12.39</td>
</tr>
<tr>
<td>Range</td>
<td>13.5</td>
<td>16.5</td>
<td>38</td>
</tr>
</tbody>
</table>
Figure 8: **TVVC Scores**

![TVVC Scores graph](image)

<table>
<thead>
<tr>
<th>Name</th>
<th>MCTM #1</th>
<th>MCTM #2</th>
<th>MCTM #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olivia</td>
<td>47</td>
<td>50</td>
<td>62</td>
</tr>
<tr>
<td>Aiden</td>
<td>54</td>
<td>59</td>
<td>63</td>
</tr>
<tr>
<td>Joshua</td>
<td>67</td>
<td>71</td>
<td>67</td>
</tr>
<tr>
<td>Daniel</td>
<td>52</td>
<td>64</td>
<td>61</td>
</tr>
<tr>
<td>John</td>
<td>56</td>
<td>63</td>
<td>71</td>
</tr>
<tr>
<td>James</td>
<td>69</td>
<td>58</td>
<td>81</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>345</strong></td>
<td><strong>365</strong></td>
<td><strong>405</strong></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>57.5</td>
<td>60.83</td>
<td>67.5</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>8.69</td>
<td>7.03</td>
<td>7.58</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>22</td>
<td>21</td>
<td>20</td>
</tr>
</tbody>
</table>
There were some individuals that are worth of mention: James and Eric. While most of the scores increased slightly in both phases, James’s TVVC and MCTM scores both decreased after the first phase and dramatically increased after the second phase, implying that his level of creativity responded positively to the transmediation unit while negatively to the general music classes. His third MCTM result showed noticeable improvement on his repleteness. When he was asked to compose a piece with the piano about the given pictures, he tapped the body of the piano with his right hand while playing the keyboard with the left hand, using piano as a percussion as well as a keyboard instrument. Eric, on the other hand, refused to do the composition part for all three MCTMs, which made his scores invalid to be included in the data. When I asked Eric why he did not want to do the composition part, he said he did not want to play anything bad, showing resistance in presenting something imperfect.

Students’ Level of Engagement

Observations and the discussion at the end of the study suggested that students were better engaged during the transmediation unit. Phase 1 consisted of six classes on history, theory, and performance of Classical music:
Day 1: History of Classical Symphony

Day 2: Performing “Green Field” (pseudonym), Mr. Patrick’s own composition for the class

Day 3–4: Individual playing test on “Green Field”; other students were working independently on handouts on the Sonata form

Day 5: Theory lesson on the Sonata form, with the listening example of Hayden String Quartet Op. 64, No. 5 in D Major, “The Lark”.

Day 6: Analysis of “The Lark”

In general, there were no serious behaviour issues other than talking too much from time to time. However, Day 1 seemed challenging for students focus, especially toward the end of the period. Mr. Patrick tried to make the lesson engaging by using visual drawings on the board, clapping exercises, and making interdisciplinary connections to physics and visual arts. However, it was a full period of one-way lecture, and the amount of information given was dense. I saw two girls down on their music stand (they used music stands as desks for the theory lessons) and two boys sleeping. The engagement level was better during Day 6, because they were given music score to work on while the listening example was playing. They were engaged and seemed to enjoy when they were performing, but when Mr. Patrick was working with one section the other sections were easily distracted.

Students were actively engaged during the transmediation lessons. The transcription showed that everyone in the group contributed to the composition process. From the observation and video data they seemed to enjoy the process, and cared about their own and other group’s compositions. During the performances, they were highly focused when performing their own piece, and attentively listened when others were playing. They seemed genuinely interested how others interpreted the same source. The groups laughed, clapped and cheered each other.

During the reflection, Aiden said that the transmediation unit was “fun.” Everyone agreed that they enjoyed the composing process. Karen added that she liked how she could try “out of the box” ideas, because “there was no right or wrong answer.” When they were asked about the level of instruction, Daniel said he liked how they had the “complete freedom to do any ideas”. Doing one composition a day seemed to suit them well. I asked how would they have felt if they were given more than one day to do a composition, Daniel said “We would forget”. Emma added, “(I
would like to do) different things because nowadays, people’s attention span is small, so you’ll get bored of it. I enjoyed it more because I wondered what we will do in the next class.” When I asked about doing more than one composition a day, Olivia shook her head in disapproval and said that it would be too much. In the following interview, Mr. Patrick said he really enjoyed the project, and he would like to try incorporating instructions (e.g., how to play instruments in different ways) if he was to do it again.
Chapter 5
Discussion

The objective of the study was to investigate the process and the effect of the collaborative transmediation on students’ creativity.

Main Research Question:
How does collaborative transmediation affect students’ creativity?

Subquestions:
1. What strategies do students use for transmediation?
2. How does the level of abstraction in the task affect students’ creative process and product?
3. How does transmediation affect general and domain-specific creativity compared to the general music classes?

This study was conducted in a Grade 8 beginner strings’ classroom of thirteen students. The study was divided into two phases: the first phase where the teacher taught them as usual for six classes, and the second phase of six classes where the students were divided up into groups of four or five to compose a musical piece by transmediation. Two classes were spent on each selected mode of verbal, visual, and moving images. Students’ transmediation process and products were analyzed to examine students’ strategies used in the process, and the relationship between the level of abstraction of the sources and their transmediation process and product. Also, students were tested three times: before and after phase 1, and after phase 2, using two creativity tests on musical and general creativity (TVVC and MCTM). The scores were compared to see the effects of the general music classes and the transmediation on students’ domain-specific and general creativity. Altogether, the results revealed important themes about transmediation as a strategy to teach creativity in classrooms.

Themes

Students’ transmediation process. There was a common pattern in students’ collaborative creative process which are categorized into five stages: exploration, verification, incubation, illumination, and elaboration. These stages confirmed Wallas’ (1962) and Webster’s (2002) model of creative process, which proposed the sequence of preparation, time away from
the task, the inspiration, and the verification and polishing of the generated ideas. However, the order of the stages was slightly different in the results. Students had the verification stage before the incubation, because in a collaborative setting they had to share the generated ideas first in order to consider possible options. Students used multiple modes of communication during the process. They chose the most effective mode to convey the ideas: verbal to describe and give precise directions; musical to demonstrate musical ideas; and gestural to point, demonstrate, and express rejection/acceptance of the ideas.

**Level of abstraction.** The analysis of students’ process and the compositions showed that if students were working with more abstract sources, their process and products were a lot richer in terms of fluency, and the level of transmediation was more complex. The number of incubation moments indicated that students had more time struggling with the abstract sources, but the amount of interaction was significantly more, because they had to share personal meanings that each generated from their own experience and knowledge. The perception process was also different when they were analyzing the abstract and direct sources. Students were using the top-down process (Gregory 1970) of guessing the context of the abstract source, therefore generating more diverse ideas. In contrast, when the source was more representational, the interpretation was simple, literal, and similar among the groups. Therefore, the direct sources produced similar products among the groups while the abstract sources engendered very different ones. Also, students tended to gravitate toward the direct link first, and then create the remaining links later.

Students’ perceived level of difficulty of the transmediation tasks was different from what was intended. The prediction was that the level of abstraction would matter more than the mode of the source, but students’ feedback revealed that it was the opposite, that the mode mattered more than the level of abstraction. Students thought that the visual sources were the hardest to translate into music, followed by the verbal sources and the moving images, regardless of the level of abstraction. For example, students said that they had more difficulty transmediating the painting with identifiable figures and landscapes (*The Angelus*) than the abstract poem (“Fire and Ice”).

**Effects of transmediation on students’ creativity.** The study results were congruent with other research which suggested the positive effect of transmediation on students’ creativity (Bespflug & O’Neil, 2013; Leland et al., 2015; Mavers, 2015; Murgia, 2015). The numerical
data showed increase in students’ test scores after both the general music classes and the transmediation unit. The increase was significantly greater after the transmediation unit, showing that transmediation was more effective in fostering students’ creativity.

The score comparison of the two tests revealed that the increase was greater on the general creativity test than the musical creativity test. This result suggests the possibility that domain-specific creativity takes longer time to develop than general one, which needs further investigation. In addition, while most of the students’ scores increased in similar amounts, one student showed dramatic increase after the transmediation unit, suggesting that some students would respond to the transmediation better than the others. The qualitative data revealed the positive effect of transmediation on students’ engagement and motivation. The observation data showed that students were more actively involved in the transmediation process. Students’ feedback indicated that they had fun doing the transmediation, and felt safe about trying something original since there were no right or wrong answers.

Limitations of the Study

The biggest constraint of the study was time. Since I was not teaching in school, this study had to accommodate the schedule of the site. The administrator wanted the study to be done only within the context of the teacher’s curriculum, and the teacher could only spare time between the spring concert and the final exams. Therefore, the length of the study was confined to two months which was shorter than what was desired. Also, it was not possible to conduct a pilot study to validate the abbreviated versions of the MCTM to the original since the original MCTM-II requires 25 minutes per person to complete. Although I obtained the permission to use the abbreviated versions from the author Peter Webster, it would have been a stronger instrument with more validating process.

The site being a school classroom produced some uncontrollable situations, such as student absences or unforeseen changes of schedule due to the school events (e.g. some students leaving 5 minutes earlier to set up for the event). Since the analysis of the test scores required all three test scores, if a student missed a test due to the absence, his/her other two scores could not be used. As the result, the amount of valid data was smaller than expected (n = 7 instead of 13). Moreover, students had the right to refuse certain activities if they did not want to, and I could not anticipate how many would not consent to which. Two students did not want to be
videotaped, so I had to assign them to the same group which I only recorded the audio. Analysing the audio data was much harder than the video, because it was hard to hear who was speaking to whom, and the whole gestural communication was missing. In such case, it would have been helpful to have had an individual microphone attached to each student in the group, which was not possible due to the lack of funding.

**Recommendations for Practice**

In music education, the concept of transmediation is not new. Translating between music and visual representations (Hodkinson, 1972; Paynter & Aston, 1970; Schafer, 1970, 1992, 2005), story/poem to music (Bartel & Cameron, 1998; Katz & Thomas, 1992; Orff, 1978), music to body movements (Dalcroze, 1921, 1972), are only some of many examples. The activities themselves are not much different, but what I propose as transmediation differs in its educational objective and assessment criteria. Creativity in curriculum often has been misunderstood, as Paynter (1992) stated:

> They see creativity either as an impossible and pretentious goal (because they regard it as the province of a few very special minds) or as an open invitation to lawlessness, unproductive freedom and lowering of standards (p. 22).

The creative potential of transmediation has been overlooked as “one shot activity” than sequential learning/performing curriculum (Cameron & Bartel, 1998). However, findings of this study suggest that implementing sequence of transmediations rather than a single-time event, moving from simple transmediation to more complex ones, allows greater growth of students’ creativity that is worth the effort. In such well-organized curriculum, self-expression or embodiment of music are part of the processes that lead to the enhancement of creativity through making cross-modal associations. While free expressions are encouraged, the evaluation criteria are more rigorous than “everyone gets an A for participation.” Students’ creative process and products are carefully evaluated in terms of the amount of risks taken, use of the potentials of the medium, fluency, flexibility, originality, and more. Below are practical recommendations drawn from the findings of this study, for educators who wish to implement transmediation in their classrooms.
First, when assessing students’ transmediation, teachers must consider the context of their process with the products. A lot of creative assessments rely on the numerical rating of the products or test scores, while the creative process is often omitted or merely described. However, students’ transmediation processes contain rich information of educational significance, such as their strategies of coping with abstract transmediation tasks, the extent of their creative abilities such as top-down processing and remote cross-modal association, and the context of how the ideas were executed into the product. Therefore, along with the assessment of the products, teachers should also evaluate and track students’ creative processes by using appropriate criteria.

In line with the importance of assessment method, researchers should be careful when using the Consensual Assessment Technique. While it is suggested that CAT ratings of experts generally correlate highly (Amabile, 1982; Kaufman et al., 2009), results from this study were incongruent with the claim due to several reasons. First, many domains exist within the same field, and it is ambiguous whether it is possible to recruit experts from any of them. For example, when I was recruiting experts to rate students’ drawings, I chose two people from very different areas of visual arts (fine arts and photography), and their ratings showed low correlation. Also, the judges were not given the context of the transmediation, which affected their scores. The judges wanted to change the scores after I explained the context of the task and students’ process. In conclusion, when using CAT, I recommend recruiting expert judges from the same area, and to inform them with the context of the task when they are evaluating transmediated products.

The comparative analysis of students’ transmediation process and products of abstract and direct sources suggested that the teachers have to carefully select the material considering its educational values. Direct sources resulted in simple literal translations while abstract sources generated diverse and imaginative products. When given direct sources, students tended to gravitated toward the direct link and settling on the instant and less original ideas, avoiding the incubation. In contrast, when the source was too abstract, students were struggling for too long that some groups did not have enough time to elaborate the ideas. Therefore, teachers need to choose materials that are just above students’ current level of transmediation so that it generates more diverse top-down thinking, and not too challenging that they cannot properly go through each stage of creative process.
Recommendations for Future Research

This study was an ambitious attempt to explore many aspects of transmediation in a short amount of time. Although the results showed positive effects of transmediation on students’ creativity, the duration of two months was too short to reflect students’ growth. It would be beneficial to conduct similar studies with prolonged time, to capture the improvement of creativity and domain related skills which takes time to develop. For classroom teachers, it would be advisable to integrate the research throughout the whole term or the year. A longer time would allow incorporation of more modes, multiple levels of abstraction, or even a comparison study of two groups on the effects of doing only literal or imaginative transmediation which will provide more detailed analysis of the matter.

Another area of interest is the effects of input and output mode of transmediation on domain-specific creativity. In this study, the output mode was aligned to music while the input mode changed from verbal, visual, and moving images, and students showed improvement on their musical creativity. However, the effect on the creativity of the input mode is unknown, which will be helpful to investigate. Researchers suggested that musical listening is also a creative mental process which requires an effort to extract meaning (Brattico & Tervavniemi, 2006; Elliott, 1995; Webster, 2002), so it would be interesting to study the effects of musical listening on musical creativity by using it as one of the input modes in the transmediation. More research on transmediation of various input and output modes would be helpful for teachers of different disciplines, making the practice applicable to more classrooms.

The effect of instruction is another important area for further inquiries. Teachers only supervised in this study, but what if the students were given explicit instructions on making cross-modal connections? The role of the teacher in a creative process have been discussed by many, and most agree that teachers should not intervene too much (Wiggins, 2002; Elliott & Silverman, 2015). However, other studies suggest that explicit instructions were helpful in generating more creative products (Murgia, 2015), or students learned something valuable from working with the expert of the field to create (Bespflug & O’Neil, 2013). Investigating the ideal extent of teacher involvement for students’ creativity would be a significant contribution to the field.

Finally, while this study focused on how students transmediate, it would provide more depth of data to study why students make certain choices when transmediating. Egan (1992) suggested
that imagination is “subject to age- and experience-related changes” (p. 67), and proposed characteristics of students’ imaginative lives at the ages 8 to 15: (a) the affective connection; (b) extremes and limits; (c) romance, wonder, and awe; (d) associating with the heroic; (e) revolt and idealism; (f) matters of detail; and (g) and humanizing knowledge. For instance, in Lesson 3, the fact that two groups associated the sack in The Angelus with dead body (rather than a bag of wheats) might be related to their tendency to the extremes of human experience. Investigating the relationship between the age-specific characteristics of students’ imagination and their transmediating process would provide helpful information to understand their creative process.

This dissertation was a starting step in exploring the sparsely researched area of transmediation. I learned a lot through the study as a teacher and a researcher, and saw immense possibilities and potential of transmediation in fostering students’ multiliteracies and creativity. It is hoped that findings of this study encourage educators from various fields to implement transmediation in their classrooms.
References


105


108


Appendices

Appendix A: Test for Verbal and Visual Creativity (TVVC)

-Duration: 15 minutes
-There will be a cover page, and students will be asked to write their names on every page including the cover page.
-Students will have one question per page, allowing them enough writing/drawing space and prevent foreseeing. The space has been condensed in the appendix for the ease of viewing.
-The test administrator will keep track of time and give one-minute notice for each question.

TVVC – Version A

Question 1 (5 minutes):
What will happen if everyone in the world speaks one language? List as much consequences as you can.

Question 2 (5 minutes):
List everything common about the following two.

Broccoli Pen

Question 3 (5 minutes):
Complete the unfinished drawing below and write a title for it.
TVVC – Version B

Question 1 (5 minutes):
What will happen if computers have emotions? List as much consequences as you can. (5 minutes)

Question 2 (5 minutes):
List everything common about the following two.
Money       Cake

Question 3 (5 minutes):
Complete the unfinished drawing below and write a title for it.

![Unfinished Drawing]
TVVC – Version C

Question 1 (5 minutes):
What will happen if all refrigerators disappear? List as much consequences as you can. (5 minutes)

Question 2 (5 minutes):
List everything common about the following two.

**Car**  **Water**

Question 3 (5 minutes):
Complete the unfinished drawing below and write a title for it.
### TVVC Scoring Guide

For Question 1 & 2:

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency: Count the number of responses</td>
<td>+1 per response</td>
</tr>
<tr>
<td>Flexibility: Group similar responses into categories</td>
<td>+1 per category</td>
</tr>
<tr>
<td>Originality: Check each response and count how many similar responses are found in other students’ tests</td>
<td>+0 if more than twice</td>
</tr>
<tr>
<td></td>
<td>+1 if once</td>
</tr>
<tr>
<td></td>
<td>+2 if not found</td>
</tr>
<tr>
<td><em>Count multiple responses as one if they are grouped into the same category</em></td>
<td></td>
</tr>
</tbody>
</table>

Question 3:

The page containing Question 3 is scored by one or more expert judges with the following scoring guide.

-----------------------------------------------------------------------------------------------------------------------------
## TVVC Question #3 Scoring Guide: For the Judges

Eight Grade 8 students were asked to complete the unfinished drawing below and write a title for it (Include the unfinished drawing of the appropriate version). Students were given 5 minutes to complete the task.

Please rate the creativity of each drawing on a scale of 1 to 10, with 10 being exceptionally creative. Feel free to use fractions (ex. 7.5) if you need to. You do not need to provide any justifications for your ratings. Please use the following table to record your scores.

<table>
<thead>
<tr>
<th>Title of the drawing</th>
<th>Your score (out of 10)</th>
</tr>
</thead>
</table>

Your Name: _____________________________
Appendix B: Modified MCTM

Part I: Exploration

Use each task version accordingly.

Task 1A: “Now let's pretend that you are sitting next to a metal bucket for the whole storm. The raindrops begin to fall and little by little the storm begins to get stronger until the rain is coming down quickly and heavily. What would that sound like on the temple blocks?”

Task 1B: “Now let's pretend that you are in kitchen. A pot of water is boiling with a lot of bubbles. You get scared so you turn the stove off, and the water starts to cool down. What would that sound like on the temple blocks?”

Task 1C: “Now let's pretend that you are sitting next to a pond. A frog appears on the other side of the pond. The frog starts to jump its way across the pond to you, then passes you by. What would that sound like on the temple blocks?”

Part II: Application

Task 2: “Let's play a game now with the temple blocks. In this game, we are going to talk to each other on the blocks. You are to listen as I play first. When I stop, it will be your turn to play to me. You do not have to play the same thing that I play. You may play something different if you want to. You can make sounds that are high or low, loud or soft, or fast or slow. Are you ready? OK. Listen to me, then you play.”

There are six stimulus patterns in all (refer to the next page for the patterns). Each pattern is 3 pulses in duration, with a fourth beat of silence during which time the administrator should point to the child to cue him/her to.
Task 3: “Now let's make a sound story out of these pictures (show Figure Set A, B or C accordingly). Now, I'm going to close my eyes so that I cannot see the pictures. I want you to tell me this story using sounds. You can use any of the instruments that we have been using. You can make high sounds and low sounds, fast and slow, high and low. It can be as long as you want. Now I want you to think about your sound story and when you think you are ready, I would like to hear it”.

Part III: Synthesis

Measure of Creative Thinking in Music, Administrative Guidelines, Page 10
© Peter R. Webster, May 5, 1994
Figure Set A

Note. All images that are used in the Figure Sets are from Pixabay (http://www.pixabay.com), which are released under Creative Common CC0 (https://creativecommons.org/publicdomain/zero/1.0/deed.en). The images are free of copyright, and one can adapt and use them for personal and commercial uses.
Figure Set B
Figure Set C
**MCTM Scoring Guide**

*Musical Extensiveness* - the amount of clock time involved in the creative tasks

*Musical Flexibility* - the extent to which the musical parameters of "high"/"low" (pitch); "fast"/"slow" (tempo) and "loud"/"soft" (dynamics) are manipulated

*Musical Originality* - the extent to which the response is unusual or unique in musical terms and in the manner of performance

*Musical Syntax* - the extent to which the response is inherently logical and makes "musical sense"

---

**SUMMARY SCORING SHEET**

<table>
<thead>
<tr>
<th>TASK</th>
<th>Musical Extensiveness (ME)</th>
<th>Musical Flexibility (MF)</th>
<th>Musical Originality (MO)</th>
<th>Musical Syntax (MS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>_________________________</td>
<td>________________________</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>_________________________</td>
<td>________________________</td>
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**Raw Totals**

<table>
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<tr>
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<th>____________________</th>
<th>____________________</th>
<th>____________________</th>
<th>____________________</th>
</tr>
</thead>
</table>

**Standard Score**

<table>
<thead>
<tr>
<th></th>
<th>____________________</th>
<th>____________________</th>
<th>____________________</th>
<th>____________________</th>
</tr>
</thead>
</table>

**Standard Score Average**

*Note.* Adapted from *Measure of Creative Thinking in Music Administrative Guidelines*, Page 14-15 © Peter R. Webster, May 5, 1994
Appendix C: Lesson Plans

General Procedures

I. The units
- Each unit will have two lessons
  Unit 1: Transmediation from the verbal to musical mode
  Unit 2: Transmediation from the visual to musical mode
  Unit 3: Transmediation from the Moving Images (combination of verbal, visual, and gestural mode) to Musical Mode

II. The routine
1. Meet in the Strings room
2. In groups, work on the composition with the resource given by the teacher
3. Gather at the Strings room 10 minutes prior to the end of the period
4. Perform the composition to the class & explain it
5. Wrap up

III. Composition requirements

- The composition should be at least one-minute long.
- You can use any musical instruments or objects available in the room. You can also use your voice and body parts.
- You can ask teacher for help if your group is stuck, but try your best to work independently. Solving problems is part of the challenge.
| Lesson 1-1 |
|------------------|------------------|
| **Title:** Composing from a picture book | **Unit 1:** Verbal to musical |
| **Background Information:** | - Make sure students form three groups prior to this lesson  
- This will be the first lesson of the second phase, and the first collaborative transmediation |
| **Learning Expectations:** | - Students will collaborate to create a short composition from the selected pages of the picture book  
- Students will translate the verbal and visual sources into audible sounds, especially the onomatopoeia and motion words (ex. Thump, bump, run, hop, down, up) |
| **Materials/Resources:** | **Duration:** 50 minutes |
| - 3 hard copies of *The Cat in the Hat*  
- 3 video cameras | |
| **Lesson:** | |
| I. Orientation (5 min.) | |
| - With both groups present in the string room, students will be given the class routine and the composition requirements | |
| II. Split & Set up (2 min.) | |
| - Students should sit in a semi-circle format and facing the video camera | |
| III. Transmediation (30 min.) | |
| - **Source:** Page 40-46 from *The Cat in the Hat* by Dr. Seuss | |
| - Students do not have to translate every word into sound. They can look at the pages as a whole, working on the mood and feelings that the story conveys. | |
| IV. Gather (2 min.) | |
| V. Perform (10 min.) | |
| VI. Wrap up (1 min.) | |
| **Input Mode:** Verbal, visual | **Output Mode:** Musical |
| **Possible modifications:** | - Depending on the student pace and time, students can work more or less from the given number of pages |
| **Personal Notes/Reminders/Homework/Other Considerations:** | N/A |
# LESSON 1-2

**Title:** Composing from a poem  
**Unit 1:** Verbal to musical

**Learning Expectations:**
- Students will collaborate to create a short composition from the selected poem  
- Students will translate more abstract concepts and symbolic meanings (ex. perish, destruction, ice, fire) into sound

**Materials/Resources:**
- 3 printed copies of the poem  
- 3 video cameras

**Duration:** 50 minutes

**Lesson:**
I. Get settled & set up (2 min.)  
II. Transmediation (35 min.)

**Source:**

“Fire and Ice” by Robert Frost

Some say the world will end in fire,  
Some say in ice.  
From what I’ve tasted of desire  
I hold with those who favor fire.  
But if it had to perish twice,  
I think I know enough of hate  
To say that for destruction ice  
Is also great  
And would suffice.

- The teacher can give definition of the words upon request, but let students interpret the symbolic meanings

III. Gather (2 min.)  
IV. Perform (10 min.)  
V. Wrap up (1 min.)

**Input Mode:** Verbal  
**Output Mode:** Musical

**Possible modifications:**
- Depending on the student pace and time, students can work more or less from the given number of pages

**Personal Notes/Reminders/Homework/Other Considerations:**
- If time allows, let the students know that they will move on to the Unit 2 (visual) next class
### LESSON 2-1

<table>
<thead>
<tr>
<th><strong>Title:</strong> Composing from a painting (Realism)</th>
<th><strong>Unit 2:</strong> Visual to musical</th>
</tr>
</thead>
</table>

**Learning Expectations:**
- Students will collaborate to create a short composition from a painting from the Realism movement
- Students will analyze the visual elements (ex. sunset, prayer, church bell, field) and translate into the sound

<table>
<thead>
<tr>
<th><strong>Materials/Resources:</strong></th>
<th><strong>Duration:</strong> 50 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 3 color printed copies of the painting</td>
<td></td>
</tr>
<tr>
<td>- 3 video cameras</td>
<td></td>
</tr>
</tbody>
</table>

#### I. Get settled & set up (2 min.)

#### II. Introduction to the new unit (2 min.)
- “For the next three lessons, your group will compose from different paintings. While it could be different from working with words, it would be another exciting experience”.

#### III. Transmediation (33 min.)
- **Source:**
  “The Angelus” (1857-1859) by Jean-François Millet

![Image of the Angelus](image)

- The teacher can explain the title, but try to stay away from giving any more information that can lead to direct connections (ex. Millet depicted two peasants praying at the ringing of the church bell)

#### III. Gather (2 min.)

#### IV. Perform (10 min.)
- If time allows, the teacher can explain the background of the painting (about the Realism movement, the painter, and the source of inspiration)

#### V. Wrap up (1 min.)

**Input Mode:** Visual  | **Output Mode:** Musical

**Personal Notes/Reminders/Homework/Other Considerations:**
For this unit, the importance of field note is greater since students could often refer to parts of the with their fingers (which the camera might not be able to catch). Depending how this lesson goes, consider having another video recording device (ex. cellphone) from the other angle.
**LESSON 2-2**

<table>
<thead>
<tr>
<th><strong>Title:</strong> Composing from an abstract painting</th>
<th><strong>Unit 2:</strong> Visual to musical</th>
</tr>
</thead>
</table>

**Learning Expectations:**
- Students will collaborate to create a short composition from an abstract painting
- Students will analyze the abstract visual elements (ex. colours, forms, alignments) and translate into the sound

<table>
<thead>
<tr>
<th><strong>Materials/Resources:</strong></th>
<th><strong>Duration:</strong> 50 minutes</th>
</tr>
</thead>
</table>
- 3 color printed copies of the painting
- 3 video cameras

I. Get settled (2 min.)
II. Transmediation (35 min.)
   - **Source:**
     “Broadway Boogie-Woogie” (1942-1943) by Piet Mondrian.

III. Gather (2 min.)
IV. Perform (10 min.)
   - If time allows, the teacher can explain the background of the painting (about the Dutch abstract style, the painter, and the source of inspiration)

V. Wrap up (1 min.)

<table>
<thead>
<tr>
<th><strong>Input Mode:</strong> Visual</th>
<th><strong>Output Mode:</strong> Musical</th>
</tr>
</thead>
</table>

**Possible modifications:**
N/A

**Personal Notes/Reminders/Homework/Other Considerations:**
- If time allows, let the students know that they will move on to the Unit 3 (moving images) next class
**LESSON 3-1**

<table>
<thead>
<tr>
<th>Title: Composing from a cartoon clip</th>
<th>Unit 3: Moving images to musical sound</th>
</tr>
</thead>
</table>

**Learning Expectations:**
- Students will collaborate to compose a short background music for the selected silent (sound muted for the purpose of the lesson) cartoon clip
- Students will translate the gestures and events in the clip (ex. fire, bomb, chasing) into the sound
- Students will learn to synchronize their playing to the moving images

<table>
<thead>
<tr>
<th>Materials/Resources:</th>
<th>Duration: 50 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 2 labtops with the cartoon clip downloaded</td>
<td></td>
</tr>
<tr>
<td>- 4 video recording devices (two for each group: one facing the screen, the other one facing the students)</td>
<td></td>
</tr>
<tr>
<td>- Projector and speakers</td>
<td></td>
</tr>
</tbody>
</table>

I. Get settled & set up (2 min.)
II. Introduction to the new unit (2 min.)
   “For the next three lessons, your group will compose background music for different video clips. You will perform the piece with the video. While it is not necessary, matching the event with the sound could be an interesting challenge”.
III. Transmediation (30 min.)

**Source:**
Tom and Jerry, Episode 33 “The Invisible Mouse” (1947)
[https://www.youtube.com/watch?v=xb8jTvSwJbw](https://www.youtube.com/watch?v=xb8jTvSwJbw)

- While students can replay/pause the video as much they want, make sure the sound is muted all the time.
- The clip is 3 minutes long, so students can choose to work on parts
IV. Gather & Set up the projector and screen (5 min.)
V. Perform with the clip (10 min.)
- If time allows, play the original background music
VI. Wrap up (1 min.)

**Input Mode:** Visual, gestural

**Output Mode:** Musical

**Possible modifications:**
N/A

**Personal Notes/Reminders/Homework/Other Considerations:**
N/A
<table>
<thead>
<tr>
<th>LESSON 3-3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title:</strong> Composing from an Advertisement</td>
</tr>
<tr>
<td><strong>Learning Expectations:</strong></td>
</tr>
<tr>
<td>- Students will collaborate to compose a short background music for the selected silent (sound muted for the purpose of the lesson) advertisement</td>
</tr>
<tr>
<td>- Students will develop how to use musical elements to not only represent the visual elements (ex. galaxy), but to evoke intended mood (ex. modern, technological) and convey meanings</td>
</tr>
<tr>
<td>- Students will learn to synchronize their playing to the moving images</td>
</tr>
<tr>
<td><strong>Materials/Resources:</strong></td>
</tr>
<tr>
<td>- 2 labtops with the trailer downloaded</td>
</tr>
<tr>
<td>- 4 video recording devices (two for each group: one facing the screen, the other one facing the students)</td>
</tr>
<tr>
<td>- Projector and speakers</td>
</tr>
<tr>
<td><strong>I.</strong> Get settled &amp; set up (2 min.)</td>
</tr>
<tr>
<td><strong>II.</strong> Transmediation (32 min.)</td>
</tr>
<tr>
<td><strong>Source:</strong></td>
</tr>
<tr>
<td>Apple advertisement “iPad Pro - A Great Universe” (2016)</td>
</tr>
<tr>
<td><a href="https://www.youtube.com/watch?v=4V5PpVKnHHA">https://www.youtube.com/watch?v=4V5PpVKnHHA</a></td>
</tr>
<tr>
<td>- While students can replay/pause the video as much they want, make sure the sound is muted all the time.</td>
</tr>
<tr>
<td>- The clip is 30 seconds long, so students should compose for the whole advertisement</td>
</tr>
<tr>
<td><strong>III.</strong> Gather &amp; Set up the projector and screen (5 min.)</td>
</tr>
<tr>
<td><strong>IV.</strong> Perform with the advertisement (10 min.)</td>
</tr>
<tr>
<td>- If time allows, play the original background music</td>
</tr>
<tr>
<td><strong>V.</strong> Wrap up (1 min.)</td>
</tr>
<tr>
<td><strong>Input Mode:</strong> Visual, gestural, verbal (few subtitles)</td>
</tr>
<tr>
<td><strong>Possible modifications:</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Personal Notes/Reminders/Homework/Other Considerations:</strong></td>
</tr>
<tr>
<td>- If time allows, congratulate on the completion of the transmediation project. Ask students to prepare for the class reflection and discussion for the next class.</td>
</tr>
<tr>
<td>- All students will meet at the string room for the next class.</td>
</tr>
</tbody>
</table>
Appendix D: Consent Letters & Ethics Approval Letter

Consent Letter: Director of the School

Date: April 10, 2016

Dear the Director of the school,

My name is Grace Eunhae Ha and I am conducting a research study as part of the requirement for a PhD dissertation at the Faculty of Music, University of Toronto. I hereby invite your school to voluntarily participate in my study titled:

The Effects of the Collaborative Transmediation Practice on Students’ Creativity

The purpose of this study is to examine the process and the effect of the collaborate transmediation (recreating something that is known in one symbol system (ex. print) through another symbol system (ex. music)) practice on students’ creativity. All students in Mr. Patrick’s Grade 8 String Ensemble will be invited to participate. The study will start on May 5th and will finish on June 23rd, 2016. The study will be conducted during the regular class time. For the first month of the study, the class will be taught as usual. On the second month, students will work in groups and work on transmediation projects, creating short musical compositions from the non-musical source. The source will vary from books, pictures, and moving images. Mr. Patrick and I will support the process as facilitators. Students will take verbal, figural, and musical creativity tests at the start and at the end of each phase of the study. All students’ process will be recorded in audio and video format, which the parents have the right to not to consent. If the parents choose not to consent to the recording of their child, he/she will still participate in the study but I will not use any observation data from him/her and he/she will not appear in any video clips I might use in presentations.

The design and conduct of this study is being supervised by Prof. Lee Bartel. If you have any concerns or questions, please contact me at grace.ha@mail.utoronto.ca or my supervisor at lbartel@chass.utoronto.ca. You also may contact the University of Toronto, Office of Research Ethics (ethics.review@utoronto.ca, 416-946-3273). Because this study will become a part of the course curriculum, students will not be able to withdraw once the study begins. Therefore, the study will not begin until all participants have agreed. Your school’s participation is entirely voluntary and you can choose not to consent the study by withholding your survey document. The school’s and students’ identity related to any information they provide will be rigorously guarded. Students’ anonymity will be assured in any paper submitted or related publications. Confidentiality will be maintained throughout the research process. Any data collected will be guarded in a secure private location in my home and will be destroyed one year after collecting.

Please read the following and sign to give me your permission.

I understand that the information I provide here may be quoted by Grace Eunhae Ha in academic presentation or publication that my school and students’ identity will remain anonymous and confidential. I understand I am free to withdraw the school from this study at any time. I hereby agree my school participate and to allow information the students provides to be used in this research study.

_________________________        __________________________        ________________
Name                      Signature                      Date
Consent Letter: Teacher

Date: April 10, 2016

Dear the teacher,

My name is Grace Eunhae Ha and I am conducting a research study as part of the requirement for a PhD dissertation at the Faculty of Music, University of Toronto. I hereby invite you and your students to voluntarily participate in my study titled:

The Effects of the Collaborative Transmediation on Students’ Creativity

The purpose of this study is to examine the process and the effect of the collaborate transmediation (recreating something that is known in one symbol system (ex. print) through another symbol system (ex. music)) practice on students’ creativity. All students in your Grade 8 String Ensemble will be invited to participate. The study will start on May 5th and will finish on June 23rd, 2016. The study will be conducted during the regular class time. For the first month of the study, the class will be taught by you as usual. On the second month, students will work in groups and work on transmediation projects, creating short musical compositions from the non-musical source. The source will vary from books, pictures, and moving images. You and I will support the process as facilitators. Students will take verbal, figural, and musical creativity tests at the start and at the end of each phase of the study. All process will be recorded in audio and video format, which you and the students’ parents have the right to not to consent. If anyone choose not to consent to the recording, he/she will still participate in the study but I will not use any observation data from him/her and he/she will not appear in any video clips I might use in presentations.

The design and conduct of this study is being supervised by Prof. Lee Bartel. If you have any concerns or questions, please contact me at grace.ha@mail.utoronto.ca or my supervisor at lbartel@chass.utoronto.ca. You also may contact the University of Toronto, Office of Research Ethics (ethics.review@utoronto.ca, 416-946-3273). Because this study will become a part of the course curriculum, the participants will not be able to withdraw once the study begins. Therefore, the study will not begin until all participants have agreed. Your participation is entirely voluntary and you can choose not to consent the study by withholding your survey document. Your and your students’ identity related to any information they provide will be rigorously guarded. Anonymity will be assured in any paper submitted or related publications. Confidentiality will be maintained throughout the research process. Any data collected will be guarded in a secure private location in my home and will be destroyed one year after collecting.

Please read the following and sign to give me your permission.

I understand that the information I provide here may be quoted by Grace Eunhae Ha in academic presentation or publication that my identity will remain anonymous and confidential. I understand I and my students are free to withdraw from this study at any time. I hereby agree to participate and to allow information I provide to be used in this research study.

_________________________  ______________________  _______________
Name                      Signature                      Date

I hereby agree the researcher to record and videotape me during this research study and allow the data to be used for the purpose of the research.

_________________________  ______________________  _______________
Name                      Signature                      Date
Consent Letter: Parents/Guardian

Date: April 10, 2016

Dear participant’s parents/guardian,

My name is Grace Eunhae Ha and I am conducting a research study as part of the requirement for a PhD dissertation at the Faculty of Music, University of Toronto. I hereby invite your child to be a volunteer participant in my study titled:

The Effects of the Collaborative Transmediation on Students’ Creativity

The purpose of this study is to examine the process and the effect of the collaborate transmediation (recreating something that is known in one symbol system (ex. print) through another symbol system (ex. music)) practice on students’ creativity. All students in Mr. Patrick’s Grade 8 String Ensemble will be invited to participate. The study will start on May 5th and will finish on June 23rd, 2016. The study will be conducted during the regular class time. For the first month of the study, the class will be taught as usual. On the second month, students will work in groups and work on transmediation projects, creating short musical compositions from the non-musical source. The source will vary from books, pictures, and moving images. Mr. Patrick and I will support the process as facilitators. Students will take verbal, figural, and musical creativity tests at the start and at the end of each phase of the study. All students’ process will be recorded in audio and video format, which you have the right to not to consent. If you choose not to consent to the recording of your child, he/she will still participate in the study but I will not use any observation data from him/her and he/she will not appear in any video clips I might use in presentations.

The design and conduct of this study is being supervised by Prof. Lee Bartel. If you have any concerns or questions, please contact me at grace.ha@mail.utoronto.ca or my supervisor at lbartel@chass.utoronto.ca. You also may contact the University of Toronto, Office of Research Ethics (ethics.review@utoronto.ca, 416-946-3273). Because this study will become a part of the course curriculum, your child will not be able to withdraw once the study begins. Therefore, the study will not begin until all participants have agreed. Your child’s participation is entirely voluntary and you can choose not to consent the study by withholding your survey document. Your child’s identity related to any information he/she provides will be rigorously guarded. Your child’s anonymity will be assured in any paper submitted or related publications. Confidentiality will be maintained throughout the research process. Any data collected will be guarded in a secure private location in my home and will be destroyed three years after collecting.

Please read the following and sign to give me your permission.

I understand that the information I provide here may be quoted by Grace Eunhae Ha in academic presentation or publication but that my child’s identity will remain anonymous and confidential. I understand I am free to withdraw my child from this study at any time. I hereby agree my child to participate and to allow information my child provides to be used in this research study.

_________________________        _______________________        ___________________       _________
Child’s Name                  Parent’s/Guardian’s Name       Signature                 Date

I hereby agree the researcher to record and videotape my child during this research study and allow the data to be used for the purpose of the research.

_________________________        _______________________        ___________________       _________
Child’s Name                  Parent’s/Guardian’s Name       Signature                 Date
Ethics Approval Letter

PROTOCOL REFERENCE # 32969

May 4, 2016

Dr. Lee Bartel
FACULTY OF MUSIC

Miss Grace Ha
FACULTY OF MUSIC

Dear Dr. Bartel and Miss Grace Ha,

Re: Your research protocol entitled, “The effects of the transmediation group practice on students’ creativity”

ETHICS APPROVAL

Original Approval Date: May 4, 2016
Expiry Date: May 3, 2017
Continuing Review Level: 1

We are writing to advise you that the Social Sciences, Humanities, and Education Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB’s delegated review process. Your protocol has been approved for a period of one year and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Matthew Brower, Ph.D.
REB Chair

Research Oversight and Compliance Office - Human Research Ethics Program
McMurrich Building, 13 Queen's Park Crescent West, 2nd Floor, Toronto, ON M5S 1X8 Canada
Tel: +1 416 946-3273 Fax: +1 416 946-5763 ethics.review@utoronto.ca http://www.research.utoronto.ca/orc-researchers-administrators/ethics/
Appendix E: Questions for the Class Discussion

Guideline for the Class Discussion

Opening: “Thank you everyone for participating in this long journey of the transmediation project. Today we will talk about how you felt about the project. As I ask couple of questions, feel free to share your opinion”.

Questions A: About the Transmediation Experience

1. How did you like the project? Did you like/not like it? Why?
2. How did you like working in groups? Would you change anything?
3. Recall all the projects that we have done (show them the resources they have used). Which one was the easiest? Which one was the most challenging?
4. If you can add more units to this project, what would you add?
5. Do you feel like you became more creative after this project?

Questions B: About the Testing Experience

1. Recall the two tests that you took three times. How did you like the tests? Did you like/not like it? Why?
2. Which test did you like better? TVVC or MCTM? Why?
3. How did you feel about taking the test three times? Were they okay? Were they too long/short? Were they too easy/difficult?
4. Did you feel like you were getting better at the tests each time you took them?

Questions C: Other Thoughts

1. Are there any comments or thoughts about the whole experience?

Teacher Interview Questions

1. How did you like the study? Did you like/not like it? Why?
2. How would you compare your role as a teacher in this study your regular ensemble classes?
3. How would you rate students’ engagement level during this study?
4. Did any of the student process or products surprise you? If so, how?
5. Did you feel like the transmediation experience improved students’ creativity?
6. Were there any challenges conducting this study?
7. Would you change anything if you were to do this study again?
8. Would you try more transmediation with your students in the future? Why/why not?