KEYBOARD IMPROVISATION CHARACTERISTICS OF FRESHMAN AND SOPHOMORE INSTRUMENTAL AND VOCAL MUSIC MAJORS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for

the Degree Doctor of Philosophy in the Graduate

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By

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* * * * *

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ABSTRACT

The purpose of this study was to investigate the possibility that instrumental and vocal majors improvise on the keyboard in characteristic ways that may have a relationship to their major instrument. The National Association of Schools of Music urges that music programs on the college level include improvisation as part of the curriculum. It is possible that the results of this study can be used to inform the teaching of music theory, aural training, and group piano courses, as well as implementing improvisation as a separate entity into the music curricula.

Seventy-one students, including 25 sophomores and 46 freshmen with varied levels of keyboard experience from The Ohio State University, were used for the study. A questionnaire, two thirty-second improvisation samples from each student, and an interview were used to gather data. The questionnaire was used to gather demographic data. The interview that was conducted after the students played the improvisation samples was used to gather information from the students on their experience in the testing process, and their views on various aspects of improvisation. The improvisation samples were analyzed with respect to the presence of harmony, melody, counterpoint, and through-composition.

The results indicated that melodic material had the highest incidence for the entire testing population. When the freshman and sophomore populations were
considered separately, the improvisation samples that were performed by the freshmen had the largest incidence of melody, and the sophomore samples had the highest occurrence of harmony.

Within specific areas of study, winds, voice, and percussion students had the highest percentage of melodic material, and strings, woodwinds, and brass had the highest percentage of harmonic material. Contrapuntal material occurred the most frequently among the brass students, and through-composed material was of the highest percentage in the strings students.

The high incidence of melody in the testing population indicates that the use of melody and melodic material can serve as a point of departure for teaching various musical concepts. It is possible that the use of melody can be used to factor into learning devices that include sequence, antecedent and consequent phrase and voice leading practices that include similar, parallel, contrary, and oblique motion. Through the use of melody, fundamental concepts of music can be introduced and more complex elements of music can be clarified and reinforced.
Dedicated to the memory of my father Leo M. Chess
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# TABLE OF CONTENTS

Abstract .................................................................................................................. ii
Dedication .............................................................................................................. iv
Acknowledgments. ................................................................................................. v
Vita ......................................................................................................................... vii
List of Tables ......................................................................................................... xi
List of Figures ....................................................................................................... xiii

Chapters:

1. Introduction ....................................................................................................... 1
   Improvisation in the College Music Curricula ............................................... 3
   Need for the Study .............................................................................................. 7
   Purpose of the Study .......................................................................................... 9
   Definition of Terms ........................................................................................... 9
   Limitations of the Study .................................................................................... 14
   Organization of the Study ............................................................................... 17

2. Review of Related Literature .......................................................................... 18
   Improvisation and Composition .................................................................... 21
   Improvisation in Music Teaching and Learning ............................................. 24
   Teaching Strategies .......................................................................................... 43
   Summary ........................................................................................................... 51

3. Methodology .................................................................................................... 52
   Pilot Study. ....................................................................................................... 53
   Population ......................................................................................................... 55
   Procedure .......................................................................................................... 56
   Reliability .......................................................................................................... 73
   Summary. .......................................................................................................... 74
4. Results…………………………………………………………………….. 75  
General Analysis.................................................................................. 76  
Population of Participants.................................................................. 79  
Trends of Improvisation Samples...................................................... 82  
Silence Versus the Click Track.............................................................. 85  
Characteristics Between Instrumental Groups................................. 86  
Characteristics Within Instrumental Groups...................................... 92  
Reliability.............................................................................................. 97  
Post-Experience Interview................................................................. 100  
Summary............................................................................................... 106

5. Discussion....................................................................................... 108  
Analysis of the Improvisation Examples........................................... 110  
The Post-Experience Interview............................................................ 113  
Future Study......................................................................................... 117  
Implications for Teaching.................................................................. 123  
Conclusion........................................................................................... 126

List of References.................................................................................. 127

Appendices

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Solicitation Letter..................................</td>
<td>135</td>
</tr>
<tr>
<td>B. Questionnaire........................................</td>
<td>136</td>
</tr>
<tr>
<td>C. Signature Sheet for Compensation...............</td>
<td>137</td>
</tr>
<tr>
<td>D. Improvisation Analysis..............................</td>
<td>138</td>
</tr>
<tr>
<td>E. Format of the Study Process.......................</td>
<td>139</td>
</tr>
<tr>
<td>F. Interview Questions...................................</td>
<td>141</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Post-experience interview questions</td>
<td>61</td>
</tr>
<tr>
<td>3.2 Materials and equipment</td>
<td>63</td>
</tr>
<tr>
<td>3.3 Hard copy folder contents</td>
<td>70</td>
</tr>
<tr>
<td>3.4 Computer contents</td>
<td>71</td>
</tr>
<tr>
<td>4.1 Instrumental distributions of freshmen and sophomores</td>
<td>80</td>
</tr>
<tr>
<td>4.2 Distribution of keyboard experience</td>
<td>81</td>
</tr>
<tr>
<td>4.3 Most common to least common characteristics</td>
<td>84</td>
</tr>
<tr>
<td>4.4 Occurrence of melodic material</td>
<td>87</td>
</tr>
<tr>
<td>4.5 Occurrence of harmonic material</td>
<td>88</td>
</tr>
<tr>
<td>4.6 Occurrence of contrapuntal material</td>
<td>89</td>
</tr>
<tr>
<td>4.7 Occurrence of through-composed material</td>
<td>90</td>
</tr>
<tr>
<td>4.8 Characteristics between instrumental groups</td>
<td>91</td>
</tr>
<tr>
<td>4.9 Percentages of musical characteristics for strings</td>
<td>93</td>
</tr>
<tr>
<td>4.10 Percentage of characteristics for woodwinds</td>
<td>94</td>
</tr>
<tr>
<td>4.11 Percentage of characteristics for brass</td>
<td>95</td>
</tr>
<tr>
<td>4.12 Percentage of characteristics for vocalists</td>
<td>95</td>
</tr>
<tr>
<td>4.13 Percentage of characteristics for percussion</td>
<td>96</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>4.14</td>
<td>Percentage of harmonic and/or contrapuntal material</td>
</tr>
<tr>
<td>4.15</td>
<td>Agreement between researcher and Person 1</td>
</tr>
<tr>
<td>4.16</td>
<td>Agreement between researcher and Person 2</td>
</tr>
<tr>
<td>4.17</td>
<td>Agreement between Person 1 and Person 2</td>
</tr>
<tr>
<td>4.18</td>
<td>Perceived difficulty and enjoyment</td>
</tr>
<tr>
<td>4.19</td>
<td>Responses about improvisation in general</td>
</tr>
<tr>
<td>4.20</td>
<td>Responses about issues of learning improvisation</td>
</tr>
<tr>
<td>4.21</td>
<td>Responses about how improvisation informs the musician</td>
</tr>
<tr>
<td>5.1</td>
<td>Modified improvisation analysis</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Melody only</td>
<td>10</td>
</tr>
<tr>
<td>1.2</td>
<td>Melodic improvisations with limited harmony</td>
<td>11</td>
</tr>
<tr>
<td>1.3</td>
<td>Contrapuntal Improvisation</td>
<td>12</td>
</tr>
<tr>
<td>1.4</td>
<td>Harmonic improvisation</td>
<td>13</td>
</tr>
<tr>
<td>1.5</td>
<td>Tracks overview</td>
<td>14</td>
</tr>
<tr>
<td>3.1</td>
<td>Tracks window</td>
<td>69</td>
</tr>
<tr>
<td>3.2</td>
<td>MIDI edit track sample</td>
<td>71</td>
</tr>
<tr>
<td>3.3</td>
<td>Notation editor sample</td>
<td>72</td>
</tr>
<tr>
<td>4.1</td>
<td>Metric implications through first beat emphasis</td>
<td>78</td>
</tr>
<tr>
<td>4.2</td>
<td>Key velocity</td>
<td>78</td>
</tr>
<tr>
<td>4.3</td>
<td>Absence of dynamic change in relationship to melodic contour</td>
<td>79</td>
</tr>
<tr>
<td>4.4</td>
<td>Harmonic material containing triads</td>
<td>82</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

College music majors enter the undergraduate music program with a mixture of anticipation and apprehension. In addition to courses in a given major area, students must study other areas in the music curriculum to gain experience in various aspects of the profession. For example, a music education major who is a cellist will be required to take classes in music history, theory, ear-training, conducting, methods courses on other instruments, and courses in group piano.

The purpose of this study was to determine if there are relationships between the freshman or sophomore music students’ major instruments and the characteristics of their keyboard improvisations. Since undergraduate students who major in an instrument or voice are often required to take group piano courses, it is possible that the results of this study may provide information for group piano curriculum development.

Musical skills and concepts that are taught in the group piano situation are usually presented within the framework of sight-reading, transposition, harmonization, and improvisation. Improvisation, in particular, and its use in the college music curricula, brings to light issues that include the recognition of its value and the
development of the skill for the well-rounded musician. In the context of improvisation, there can be opportunities for exploring, reinforcing, and clarifying musical concepts, as well as the opportunity for assessment and creativity in the context of extemporaneous music making.

The term “musicianship” refers person’s technical skill on an instrument as well as analytical, aural, and sight-reading skills. The term “well rounded” may describe a person who possesses the aforementioned qualities, but can also include that a person can compose and improvise. Improvisation is the application of analytical, technical, and aural skills that become manifest in the theater of real time composition.

In 1965, the desire to develop better musicians resulted in a great deal of thought and discussion among music teachers and music organizations. It was the goal of increasing musicianship in students on a large scale that resulted in the inception of The Comprehensive Musicianship Project (CMP).

_Teaching Music in the Twentieth Century_ (1986) describes Comprehensive Musicianship (CM) as a philosophy for teaching music, working from the premise that all aspects of music as an artistic discipline should be integrated and related. This philosophy fosters growth in musical knowledge and skill at all levels of instruction and synthesizes musical materials by making connections through performance, analysis, and composition. Comprehensive Musicianship promotes music learning through the study of elements in the context of their functions through: (1) listening, analysis, and evaluation of music; (2) performance of music; and (3) compositional processes and writing skills.
Keyboard improvisation can be a means to experience music from the perspectives as proposed by the philosophies of Comprehensive Musicianship, as well as serving as a means to assess musical knowledge and skill. It is in the process of improvisation that one can experiment with the basic elements that exist in all musical styles such as pitch, duration, dynamic level, and timbre. Through the assessment of musical skill and knowledge, improvisation can offer insight as to the development of teaching strategies and materials.

*Improvisation in the College Music Curricula*

In many undergraduate music programs students are required to take a minimum number of group piano courses, or they must take a proficiency examination to be exempted from some of the courses. Although the curricula of keyboard courses for music education majors vary, these students are urged to develop and maintain keyboard skills in order to demonstrate, accompany, and, in some cases, compose and arrange pieces for their students when they are in the field.

In Item Five of the performance section of the *National Association of Schools of Music Handbook for 2003 and 2004* (2003), keyboard competency is listed as a required skill. For instrumental and vocal music majors in particular, keyboard skills, and improvisation would be useful for developing aural, analytical, and compositional competence. In order for a person to be an effective educator and a high quality performer, possession of aural and analytical skills is imperative. Improvisation is one way to foster this skill.

In the teacher education courses in various colleges, there are many materials offered in keyboard courses that are directed to student musicians. In a study of all the
public and private colleges and universities in California that offer a bachelor’s degree in music education, Marks (1994) determined which of the surveyed schools required a course in Jazz Methods/Improvisation. Despite the fact that teachers indicated the need for such instruction, only 25% of the schools offered Jazz Methods/Improvisation courses as a requirement.

Della Pietra and Campbell (1995) examined improvisation and its process in the context of a music education methods course. The purpose of the study was to explore how students reveal understanding of improvisation and its relationship to analytical listening. In the course of five 90-minute sessions, focus was given to the listening and the analysis of model pieces, as well as to small-group improvisations that were based on the style of the model pieces. The study developed profiles of the two students involved in order to trace emerging thoughts and behaviors regarding training in improvisation. Although these students differed in prior experience and personal perspectives on music making and teaching, both showed evidence of an evolving sensitivity to the process of improvisation as a result of the instruction.

According to Lusted (1984), music educators recognize the importance of keyboard harmony in the college music curriculum, but disagree about how many piano courses should be required. There has been some disagreement, according to Lusted as to whether functional keyboard, which is comprised of skills that include score reading, sight-reading, harmonization, transposition, and improvisation, should be taught in music theory, class piano, or as a separate course. In questionnaires that were sent to 124 NASM approved schools, Lusted found that class piano examinations most frequently included sight-reading, harmonization, scales, and memorized pieces. Broken
chords and arpeggios were low priority items at the bottom of the list. Lusted did not include improvisation in the listing of requirements.

Laughlin (2004) conducted a study to investigate how academic institutions accredited by the National Association of Schools of Music meet the improvisation requirements in the group piano curriculum. Laughlin used a survey to determine the texts, instructional approaches, and the frequency of exposure to improvisation. The survey results indicated that improvisation is often considered a great asset and is held in high regard, yet very few continue to nurture the skill in the group setting.

A descriptive study by Wollenzien (1999) examined music education curricula in colleges and universities of the North Central Division of the Music Educators National Conference (MENC). Data from the 47 participating institutions that were members of the National Association of Schools of Music were examined and the results indicated that the all curricula examined vary only slightly from the NASM guidelines. Most of the institutions offer and require courses in music history, conducting, and teaching methods, but give less attention to topics such as teaching techniques, improvisation and music as an integrated subject.

McDonald (1989) sent a survey questionnaire to 449 institutions to obtain descriptive data concerning the course content of functional keyboard skills classes designed for the undergraduate piano major with the pedagogy or performance emphasis. The institutions involved were four-year degree granting members of the National Association of Schools of Music. The results showed that only 45% of the participants indicated that their institution offered functional keyboard skills classes for the undergraduate piano major. McDonald points out that the functional keyboard skills
are defined as sight-reading, transposition, harmonization, improvisation, and accompanying, and that even the piano major must acquire these skills to function adequately at the keyboard. The survey that was sent out to the participants listed a total of twenty different functional skills that were taught in either the class setting or in the private lesson. Data also indicated, however, that there were different amounts of emphasis placed on items in the responding institutions.

Lindeman (1996) addresses the question about the necessity of K-12 teachers to develop skills in improvisation, including harmonization of melodies and real-time creations of material for classroom work. Emphasis is given to the idea that creativity should be planted firmly in the school music program at an early age and to the ideas put forth by The National Standards for Music Education (1994).

Kolar (1975) states that if learning within a given subject area is to transfer to other areas, that continuity and structure are essential. The fundamental conceptualizations that provide the vehicle for a continuous spiral of learning are paramount if the conceptual approach is to produce broad insight and foster subsequent growth. Improvisation, Kolar continues, relies upon conceptual knowledge and performance skills that become the prerequisites for completing a conceptual cycle.

Generally, freshman and sophomore instrumental and vocal students do not choose to improvise on their own. It is also unlikely that during their first years of college, they will have had any type of improvisation incorporated into their studies except in a group piano course. While a number of educators, including Baker (1980), Dobbins (1980), Gillespie, (2002), Geiersbach (2000), Goldstaub (1996), and Snyder (1975), have explored the teaching of improvisation in the context of the instrumental
rehearsal and the classroom, there remains much to be done in the implementation of improvisation as an element of education and assessment in music.

**Need for the Study**

There are several aspects of improvisation that require research in order to have an understanding of how to learn or teach it. As an art and as a skill, improvisation engages physical skill and inner hearing, as well as the application and transfer of all musical knowledge that a musician accumulates in the course of training and experience. Through combining the information from various areas of research, teachers and learners can gain insight to improving skill in improvisation as well as imparting those skills to our students.

As educators, we often hear the phrase that we should “meet the students where they are.” It is this idea that has served as a catalyst for considering possibilities to explore different strategies for teaching keyboard to instrumental and vocal majors who have had little or no experience with the keyboard. It is possible that “where the students are” can be related to their major instrument of study and the characteristics of the music they improvise on the keyboard. If there is a relationship between the students’ major instruments and how they improvise on the keyboard, then there might be ways to communicate musical concepts based on what is seen in the student improvisations.

Issues that came to light that indicated a need for this study were related to the following propositions: (1) “Where the students are” can be assessed prior to teaching them the keyboard. It is possible that based on a questionnaire, improvisation samples, and the opportunity to discuss their thoughts on improvisation, students may provide
information that would contribute to teaching them more effectively; (2) There may be an indication of how a student assimilates musical information, based on how they create music on the keyboard; and (3) Similarities in improvisational characteristics within the major areas of instrumental and vocal study may be related to students’ musical experiences and knowledge, or their perception and preconceived ideas about improvisation.

Research in music education has addressed a broad range of topics involving improvisation that include its function in the jazz ensemble, its implications for creative process and learning, its place in the assessment of musical skill, its use for improving technique, and its use for measuring musical aptitude. There is the possibility, however, that improvisation can be used as a tool to analyze what a musician brings from one type of musical experience to another. In the field of teaching the piano to non-keyboard music majors, it would be a benefit to: (1) determine if there are specific musical characteristics that exist in the keyboard improvisations of students who are vocalists, or who play a strings, woodwinds, brass, or percussion instruments; (2) categorize and define the musical characteristics; and (3) make proposals as to how the characteristics of student improvisations can inform teaching.

Through the examination of the characteristics of the students’ improvisations, it is possible to determine similarities and differences in how those students think about music. Based on the information generated from this study, one can explore possibilities for modifying teaching strategies for given situations, as well as discovering additional ways to present musical concepts in general.
Purpose of the Study

The purpose of this study was to determine if a relationship exists between a freshman or sophomore student’s major instrument and how the student improvises on the keyboard. Information that can be determined by the findings of this study are related to: (1) relationships between keyboard experience and the characteristics of the students’ keyboard improvisations; (2) the difference in the characteristics between the freshmen’s keyboard improvisations and those of the sophomores; and (3) what the freshmen and sophomores think about improvisation in terms of the process itself, learning it, and its contribution to overall musicianship.

Definition of Terms

Keyboard improvisation, which is the central focus of this study, can be thought of as spontaneous composition and performance of music in real time. Other terms that can be used to refer to improvisation are: adlib, invent, concoct, play by ear, impromptu, unrehearsed, and extemporize. Improvisation can be done using a structure or a set of given parameters, or it can be executed in the environment of complete freedom of form, content, or structure.

The participants were given no parameters except for the time allotment, which was monitored by the researcher. No directives of style, tempi, phrasing, or other musical parameters are offered to the participant for their improvisations. However, in the analysis of the improvisation samples, the following definitions offer clues to the characteristics that are present in different groupings of students.

Improvisation “characteristics” or “attributes” refer specifically to the musical elements and devices as well as their combinations based on the parameters of this
study. Melodic material, contrapuntal material, harmonic material, and through-composition are the characteristics being used for the scope of this study.

The definition of terms as they are used for this study are as follows:

1) Melodic improvisation is used to describe an improvisation that utilizes a distinctive melodic line for most of the improvisation or a melody that is unaccompanied. It refers to successive pitches that may or may not imply a tonal center, and it may be phrased or fragmented. Melodic improvisation may utilize imitation between upper and lower registers, antecedent and consequent phrase, varying phrase lengths, or changing metric groupings. Samples that are analyzed as possessing melodic attributes include very little or no harmonic occurrences. The melodic material in an improvisation may include any pitch range, repetition, motive, scalar, or arpeggiated material.

Figure 1.1 illustrates the presence of melody only. Because the other elements of harmony and contrapuntal material would involve another voice, the only other analytical possibility for this sample besides the element of melody would be that of being through-composed.

![Figure 1.1: Melody only](CLICK%20MB%20fr%20Score.pdf)
Figure 1.2 illustrates an improvisation example that has primarily melodic material and a limited amount of harmony. If one takes into consideration that the melodic material is the predominant feature, then, this sample would be labeled as “melodic,” even though a small amount of harmonic material is present.

![Image of Melodic Improvisations with Limited Harmony](image1)

Figure 1.2: Melodic improvisations with limited harmony

2) Contrapuntal improvisation as it applies to this study refers to two or more simultaneously occurring independent melodic lines in oblique, similar, or contrary motion occurring between the right and left hand for the majority of the sample. While the results of the independent lines may in some cases manifest harmonic occurrences, the primary factor under consideration is occurrence of two or more independent melodic lines in the example.

Figure 1.3 illustrates the presence of two or more independent lines. Most of the contrapuntal material can be seen occurring between the treble and bass clef, but it is possible that an additional line can be noted by viewing the difference of the stem direction of certain notes from the majority of note occurrences in a given clef.
3) Harmonic improvisation refers to the simultaneous execution of two or more tones. These tones may imply the structure of a chord; however, tone clusters and other combinations of intervals are included in this description. Harmonic improvisation in this study can include homophony, where there is a distinct melodic line with what appears to be an accompaniment. In this study, harmonic improvisation primarily comprises musical material that occurs simultaneously in a vertical structure, such as that of any combination of intervals excluding the octave, hymn form, or tone clusters.

Figure 1.4 shows harmonic improvisation to the fullest extent where every pitch in the composition is harmonized. In the analysis of the musical sample, however, harmony can be indicated as an element if there is a strong representation of it in the piece.
4) Through-composed improvisation is devoid of any apparent manifestation of structure in form, meter, phrase, or rhythm. The non-structured improvisation in this study can be considered ‘through-composed’ in all senses of the term in that there is no way to analyze the material with regard to any formal structure. A sample of through-composed improvisation can employ contrapuntal, melodic, or harmonic devices.

5) “Event” refers to the time at which pitches are initiated, referred to as a “note-on event”, to the time it is released, which is referred to as a” note- off event.” In the “tracks overview” window and the “MIDI edit window” a note-on event is indicated by the start of a horizontal line, and the note-off is shown by the discontinuation of the horizontal line. A harmonic event is that situation where there is the simultaneous occurrence of pitch initiation. Release of pitch is not a consideration in the scope of this study.

6) The “tracks overview” window, as can be seen in Figure 1.5, displays MIDI information that is contained in specific tracks. The tracks are represented horizontally, and a horizontal rectangle is as long as a given set of note on events. When there are no
notes being played, a horizontal box will not be present. The lines within each horizontal rectangle indicate the “note-on” events. A window of this type has been formatted for each participant and certain details of the improvised material are viewed in this window for clarification.

Figure 1.5: Tracks overview

Limitations of the Study

This study was directed at the freshman and sophomore music majors because it is usually during these particular years that those students would be enrolled in group piano courses. The fact that the study was done at the beginning of the school year has implications for the freshman participants that are included in the following list of limitations.

The limitations for this study are as follows:

1) The subjects of this study were limited to freshman and sophomore music students who were majoring in strings, woodwinds, brass, percussion, or voice. Because of sequential courses that are required during the freshmen and sophomore years, the identification of “freshman” and “sophomore” was determined by the courses taken in
the School of Music at the time of the study rather than credits earned and years
attended that would determine class rank at the university in general.

2) The study was conducted during the first quarter of the academic year.

3) Because the testing was done at the beginning of the academic year and the
freshmen were in their first weeks of college, had not yet attended a full quarter of class
piano. For this reason “class piano experience” is not considered as an element in the
demographic information for the freshman participants.

4) The study is limited to vocalists and instrumentalists who have little or no
keyboard experience. It is through this limitation that an “equal footing” is built into the
testing process, by requiring them to improvise on the keyboard.

5) This study does not address isolated techniques on specific instruments or
within instrumental families. Similarities of the improvisation samples within
instrumental families, however, may reflect perception of music and transfer of
knowledge, experiences, and performance techniques on a given instrument that have
transferred to the keyboard.

6) Improvisation is only used as a tool for identifying specific musical
characteristics. The improvisation samples are analyzed visually, and all of the
characteristics that are noted from a sample are viewed in a score format from music
files generated by the students.

7) This study does not take the tonal range of the instrumentalist or vocalist into
consideration in this study. A trumpet player or violinist may play the instrument that is
in the upper range of that particular instrumental family, but it is only the instrument
type itself that is being used in the scope of this study.
8) For the purpose of this study a small range of music elements is used in the analysis of the samples that include isolated elements of melody, harmony, counterpoint, and through-composed form.

9) The terms used in this study relate to certain elements of music, but only in the broad sense for the purpose of general analysis. For example, the terms “melody” and “melodic material” refer to a wide range of situations and include any set of sequentially occurring tones and “harmony” and “harmonic material” can refer to any simultaneously occurring tones.

10) The students in this study were not asked if they had experience improvising on their instrument, in an ensemble, or if improvisation was incorporated into their private lessons.

11) The improvisation samples were only performed on the keyboard. The improvisation of instrumentalists and vocalists on their own instrument is not in the scope of this study.

12) Students were not asked if they can improvise on their instrument, or have improvised during their lessons or in an ensemble.

13) The characteristics of both the first and the second examples are analyzed together. This means that if one of the samples has melodic material as a characteristic, the set of examples for the given participant is described as having melodic material as one of the attributes of the set of samples.
Organization of the Study

Chapter One describes the background of the study, discussions on the attributes and uses of improvisation, and discussion of material written about improvisation. Also included in the first chapter is the need for the study, the purpose of the study, the definition of terms, and the limitations of the study. Chapter Two comprises a review of the literature in relationship to different aspects of improvisation in the context of musicianship, teaching, learning, and performing. Chapter Three outlines the formal design of this study and contains a description of the participants, and the three instruments used to collect data into a compound entity of information. In Chapter Four, the findings of the study are presented as they relate to the research questions. Chapter Five draws conclusions from an analysis of the data as it relates to the instrumental/vocal groupings of participants and the occurrence of musical elements in their improvisation examples. This concluding chapter also presents recommendations with respect to educational implications, and suggestions for further studies and other types of studies.
CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this study was to determine if a relationship exists between the non-keyboard music major’s instrument of study and the individual’s approach to keyboard improvisation. The greater part of the literature reviewed in this chapter involves the pedagogy of improvisation, learning improvisation, using improvisation as a process for developing musicianship, and using improvisation to inform curriculum and strategies for non-keyboard major group piano instruction. The post-experience interview involves a degree of reflection, but it is not the primary source of data; therefore the process of reflection is not addressed in terms of this review of literature.

This chapter focuses on literature related to keyboard improvisation as a manifestation of music in real time, and its function in the development of overall musicianship. A number of studies that involve improvisation on instruments other than the keyboard are included in this review because the topics that are addressed in those studies can transfer to the keyboard.

While age and cognitive development factor into the learning process, it is still possible that through the years certain general human attributes, such as interest and attitude, can play a part in the learning process. The research that has been done in the area of improvisation in the context of education reviewed in this chapter, involves
various levels of schooling that include college and non-college students, but it can be applicable to all age levels.

If we explore the history of traditions in Western European music, we can observe that improvisation was a part of demonstrating technical skill, knowledge of the style, and manifesting individuality in the context of certain restrictions of the given period. As notation developed, improvisation left the forefront of performance practice.

Randall (1993) points out that during the second half of the nineteenth century, improvisation gradually disappeared from performance practices. Some of the factors responsible for this change could be the separation between composer and performer, changing musical styles, and the rise of new types of virtuosity. By the arrival of the twentieth century, musical training and performance consisted mainly of interpretation and re-creative aspects of music making. Today, according to Randall, formal study of the pianist usually begins with rote activities, music reading, and exercises to develop technical facility. Ear training, theory, and music history may be added as parts of music training in the course of study, but the main objectives of these additions would be to re-create a written composition as faithfully as possible.

In sacred music, improvisation is both beneficial and desired. Many organists who play in the religious setting still use improvisation for modulation, interludes, postludes, and other aspects of the church music environment. In contemporary worship, improvisation is highly desirable for a music director, as well as those who perform in a church group as a ministry. While sight-reading skills continue to be an advantage, the ability to improvise music based on chord symbols can be advantageous
as well. Training such as this, however, is not always readily available, even though many people can see its value.

Nolte (1999) conducted a study with the purpose of assessing the use and training of keyboard skills of a random sample of parish musicians of three church parishes. The background of the subjects was reviewed together with their music responsibilities in the parish. The study identified several keyboard skills that are essential for parish musicians with the purpose of determining a relationship between the skills parish musicians use and the musical training they received.

As results showed that the skills included in the survey were still being used in the professional field, Nolte suggests that college keyboard programs should continue instruction in those skills. The response of the subjects also indicated that they lacked skill in the following areas of study: improvisation, composition, hymn playing, the use of the synthesizer, and score reading.

It should be noted that items specifically requested of the subjects were demographic information, their individual views, and the assessment of their keyboard skills. While the subjects communicated via the survey that they lacked training in specific areas such as hymn playing and the use of the synthesizer, it is possible that their own judgment of their musical skills may have been severe, and therefore inaccurate. The outcome of a later follow-up study revealed no significant changes in the use of skills and training.
Improvisation and Composition

Improvisation and composition are process approaches in that they both require the application and transfer of musical knowledge, skills, and experience through the generative process itself. If we think of improvisation and composition both as process approaches to creativity, we can find a number of ways to instruct each of them individually, as well as in the context of each other.

Hamilton (1999) was interested in the learning process of sixth-grade students as they were completing their improvisation and composition assignments. Part of the process of completing the assignments was that of collaboration among the students in large groups, small groups, and partners, as well as the student working independently. Hamilton served as both teacher and researcher for the study, and peer interaction was considered part of the teaching and learning process. Data were collected through video and audio recordings, an evaluation that included the examination of student work, and journals. Projects included composition and improvisation based on a chord progression, an opera project, and an invented notation piece. The students used pitched and non-pitched instruments, including percussion instruments, electronic keyboards, and Orff instruments.

Changing the groupings of students helped facilitate learning so that individual work and peer interaction took place. The students successfully completed and performed the music assignments for their classmates, and results indicate that skills in composition and improvisation can be fostered through peer interaction. Hamilton’s study has implications for music learning for all levels, particularly with respect to the
learning that takes place in different groupings, and sizes of groups in addition to the individual work required to process information.

Changing the size of the groups as well as setting the stage for students to partner with different people can be helpful in the facilitation of learning in a number of ways: (1) the students learn to communicate musical ideas and concepts verbally in the context of working with one another and thereby are able to discover what they do and what they do not understand; (2) the students have the opportunity to hear each other’s work and exercise critical thinking through discussion of processes and elements of one another’s work; (3) through the group process, students become less self-conscious about their created work and performances, and thereby gain freedom to take risks without fear of criticism.

Torrance (1977) describes the process approach to learning as a way of sensing problems or gaps in information, forming ideas or hypotheses, testing and modifying these hypotheses, and then communicating the results. This approach can refer to a sequence of steps or stages through which one can clarify a problem, work on it and produce a solution that resolves the difficulty. In the process of musical improvisation, a musician operates from a given parameter such as a scale system, phrase structure, melodic contour or other musical elements, and creates material based on the understanding of those elements. During this creation process one formulates ideas, tests these ideas, and modifies these ideas in real time.

Nettl (1974) states that improvisation and composition are basically the same, but at different ends of the continuum. Improvisation, Nettl says, is the type of musical creation in which the decision-making time is compressed into split seconds as opposed
to the longer time it takes to write down a composition. According to Nettle, the musician must simultaneously think, hear, and imagine what will follow a segment and what its relevance will be to the preceding and subsequent moments of the music.

In regard to questions with respect to curricular approaches that would be effective in teaching composition and improvisation, Hilley (1996) emphasizes that improvisation and composition should not be viewed or approached separately, but that both of the experiences should be participatory. Hilley urges that teachers should hone their own skills in improvisation itself as well as in teaching improvisation.

Rosenboom (1995) proposes that the aspect of developing musical invention in parallel with musical discipline and that composition and improvisation are in continual interface with one another. Rosenboom makes the distinction between composition and improvisation, and delineates as to: (1) how synthesis of the two subjects can be advantageous to music study; and (2) that improvisation and composition taught in tandem can enhance the curriculum, reinforce learning, and improve musicianship on a broad scale.

Lubart (1998) developed a set of instructional materials in the form of a teaching manual that was to be used to prepare teachers to give instruction in percussion ensemble improvisation. The instruction consisted of learning to play percussion instruments, composing, performing, conducting, and improvising music for percussion ensemble. Since the striking of percussion instruments, according to Lubart, does not present some of the fine motor-coordination issues related to bowing, fingering, or embouchure, it was proposed that beginners may quickly experience levels of ensemble
music-making not readily accessible in other musical situations where melodic instruments are involved.

In the project, students used traditional Western music theory and notation to compose and play pieces designed to function as rhythm sections to accompany improvisation. Lubart employed the use of experts and field-testing in order to gather data. The resulting information was that the proposed materials may be used as a sequenced guide to playing, composing, conducting, and improvising music for percussion ensemble. The materials and the approaches introduced in Lubart's work can readily apply to other instruments. It can bode well for the keyboard instructor in particular, to implement some of the traditional notation, as well as some practices used on percussion instruments in the context of the group piano situation.

For some keyboard students, the tactile experience of playing rhythm in isolation away from pitch prepares them for finger independence on the keyboard. Hilley and Olson (2002) use what they refer to as “tabletop exercises” where the student practices various rhythms by tapping a horizontal surface, and then practices playing rhythms on the keyboard.

*Improvisation in Music Teaching and Learning*

There are mixed views on the characteristics and functions of improvisation. Some contend that improvisational skill is a by-product of knowledge of harmony, scales, and various compositional devices. Others contend that improvisation is born purely out of aural skills, inner hearing, sometimes referred to as ‘audiation’ and creativity. Still others believe that improvisation is a mixture of these elements, and that
unless one has the structural knowledge of music as well as the aural skills, it is impossible to improvise.

While strong knowledge of music theory is helpful, the combination of music theory with the skill of internal hearing is beneficial for the creation of music. It is unlikely that composers who have a “trademark sound” in their music did not know to at least some degree what their music would sound like prior to affixing the notation to paper.

Jessen (1991) performed a study to determine the effect of audiation on the ability of sixth-grade students to improvise rhythmically. Two instruments were used to collect the data from 63 participants who were from one public school. The individual performance component of the 1983 Manitoba Music Assessment was designed to analyze the students’ rhythmic improvisations based on completeness of beats, steadiness of pulse, sense of finality, and originality. Gordon’s “Intermediate Measures of Music Audiation” was used to measure each student’s musical aptitude. Jessen employed two teaching methods: Gordon’s audiation learning sequences techniques, and Orff-based rhythm improvisation activities. Findings indicated that: (1) a prerequisite to audiation of rhythm is the audiation of a steady beat; (2) improvisation and audiation techniques must be developed slowly; and (3) a correlation exists between rhythmic aptitude and performance of rhythmic improvisation, completeness of beats, steadiness of pulse, and a sense of finality.

Creativity and improvisation are often described in the same context. Musicians can have extensive musical knowledge, technique and experience, but in order to be a
strong musician, they must be able to improvise. One can, however, develop a higher level of musicianship through the process of learning to improvise.

The Dalcroze Eurhythmics approach can be helpful in using movement to help reinforce the understanding of musical concepts, and to clarify elements that have no direct visual representation. Other than words written in the score, there is no way to visually represent “rubato.” Movement improvisation working in tandem with musical improvisation can be used to help work with specific elements of music. Movement improvisation can also serve as a springboard for the implementation of improvisation on a musical instrument.

Joseph (1982) performed a study on kindergarten students involving the Dalcroze Eurhythmics approach that can be applied to students of all ages. The study involved teaching through the Dalcroze Eurhythmics approach with and without the use of improvisation in the process of teaching. The population consisted of three groups: (1) a group who received what Joseph describes as an “informal” music program; (2) one who received Eurhythmics with improvisation; and (3) a group who received Eurhythmics without improvisation. Over the course of a year, the groups involved in the Eurhythmics program participated in 44 lessons that followed a format incorporating ear-training, movement exploration, rhythmic movement, rhythmic games, relaxation, improvisation, and a “concert time.” A pre-post test designed to measure the children’s musical aptitude through music and movement improvisation was administered to ten randomly selected children from each group.

The test focused on rhythmic movement and improvisation to examine the hypothesis that those who receive Eurhythmics training will perform better than those
who do not receive the training. This was indicated by the subject’s recognition of and response to familiar rhythmic patterns in unfamiliar music. The test results show that Dalcroze Eurhythmics, which includes improvisation in its approach, should be included in early childhood music education. Joseph states that a longitudinal study of a given population such as this group would shed more light on the effectiveness of the Dalcroze Eurhythmics approach to teaching music, and that the approach warrants further consideration and study.

Freundlich (1978) conducted a study of musical thinking that involved viewing spontaneous solutions to musical problems in children. The problem was presented as a traditional musical frame, and the solution proposed by the researcher was to be an improvisation. Two fifth-graders were asked to improvise on a standard 12-bar blues, using a diatonic xylophone. The improvisations were notated and then analyzed in terms of their conformity to the musical frame, coherence within the improvised line, and the enrichment of the musical material. The results of the study demonstrated that a child can generate authentic musical ideas without reference to musical notation and that musical concepts that are inherent in the process of improvisation can be logically organized and amenable to developmental study. This study supports that improvisation can be a useful tool for developing musical understanding in young students, and that notation is not always necessary in clarifying or reinforcing musical concepts.

Chappell (1999) believes that the emphasis on technique in lessons inhibits the growth of musicianship. The focus of the study was that heavy emphasis on technique may be responsible for the development of unnecessary physical tensions. However, Chappell proposes that the use of improvisation in the context of the lesson can
contribute to the development of technique, as well as enhancing memorization. In terms of brain usage, Chappell states that technical skills and note-reading are based largely in the left hemisphere and skills of improvisation, memorization, and internalization are based in the right hemisphere. Pianists are urged to become more creative, imaginative, and musical, that even beginners should be given the opportunity to develop all the functions of the brain, that is, using both hemispheres, from the very beginning of musical study. Chappell suggests that through the whole-brain approach to piano pedagogy, it is proposed that students will develop greater musical understanding and acquire a greater sense of physical ease while playing, and that the approach will increase motivation, reduce anxiety, physical tension, and improve sight-reading skills.

Some believe that in order to be able to improvise, a musician must possess a high level of technique on an instrument. While it is the case that one may be able to express improvisational ideas with technical facility, research suggests that technical facility is not necessary in order to improvise in general.

Through a study that involved band students, Wig (1980) investigated the feasibility of teaching sixth and eighth-grade band students to manipulate the musical elements of pitch, intensity, and duration in creating improvisations on their respective instruments. A secondary purpose of this study was to examine the relationships between the students’ ability to improvise, their general academic ability, and their performance ability. The main hypothesis was that instruction in music composition strategies would enable middle school band students to improve their scores on an investigator-constructed measure of melodic improvisation skills. The null hypothesis that tested was that there would be no difference in the students’ pre-test and post-test
scores in the measurement of melodic improvisation skills. The investigator-constructed
“Measure of Melodic Improvisation Ability” (MMIA) served as a criterion measure,
and sought to evaluate the students’ ability to improvise a theme and create variations of
that theme. Types of variation for the themes included retrograde, inversion, retrograde-
inversion, or embellishment.

Each student performed a theme and two variations of approximately ten
seconds in length that were tape-recorded. After a seven-week instruction period, the
students were asked to perform a theme and two variations under the same parameters.
Three professional musicians including a Jazz musician, a teacher of gifted and talented
students, and an elementary instrumental music specialist evaluated the music based on
criteria that was assigned by the researcher.

The analysis of the pre-test, and post-test scores on the MMIA were analyzed
using the dependent t-test and indicated significant results at the .001 level of the gain
scores of the sixth and eighth-graders combined as well as separately. The study
concluded that the teaching strategies that used the basic musical elements were
effective in the middle school band student’s ability to improvise music. There was no
relationship between the performing ability and academic achievement as factors related
to the ability to improvise music.

A descriptive study of a sequential process used for the development of a short
course in basic Jazz piano skills, which was conducted by Larsen (1986), seems to
support the idea that improvisation can enhance musical knowledge and skill. The study
involved the observation of a set of students over a two-year period, where workshops
in Jazz piano were given to the participants of the class. The data collected indicated
that most of the students achieved success at improvisation in the Jazz idiom, and were able to acquire skills in using seventh chords. Larsen indicates that all of the students attained a reasonable score, which tested cognitive knowledge of the Jazz idiom. The data also reveal that it is possible in the course of the improvisation experience to learn the structural and analytical aspects of the musical material.

Predictors of certain types of musical skill can be related to knowledge in specific areas that interface to a particular skill that is assessed. For example, knowledge of pitch notation is essential for open score reading, so it makes sense that if one can read an open score fluently, then a strong skill in basic note reading is present.

Madura (1992) conducted a study to investigate the relationship among various aspects of vocal Jazz improvisation achievement and several predictor variables. The subjects included 101 college students enrolled in vocal Jazz courses. The aspects of vocal Jazz improvisation that were measured were tonal skills such as intonation, correct notes, appropriate language, variety, originality, motivic development, unity; rhythm, sense of pulse, appropriate feel, appropriate figures, variety, originality, expression of the music that would include appropriate scat syllables, tone quality, variety in tone quality, variety in range, and variety in dynamics. These items were measured by judges using five-point rating scales for two tasks, which involved a blues progression and a ii-V7-I progression. The independent variables were Jazz theory achievement, imitative ability, jazz experience, instrumental lessons, voice lessons, general creativity, and gender.

The major findings of the Madura study were that: (1) strong correlations were identified between vocal Jazz improvisation achievement and Jazz theory knowledge,
imitative ability, and Jazz experience; (2) a significant, but weak relationship existed between vocal Jazz improvisation achievement and previous lessons on an instrument, which indicated little practical significance; (3) non-significant relationships were found between vocal Jazz improvisational achievement and voice lessons, gender, and general creativity; (4) strong correlations were found between the blues; and (5) ii-V7-I tasks, although subjects performed the blues much better than the ii-V7-I task. The best predictors for the improvisation tasks were, Jazz theory knowledge, imitative ability and Jazz experience. The three underlying factors of vocal Jazz improvisation were identified as rhythm, tonal, and divergence. Jazz theory knowledge and jazz experience were the best predictors of rhythm. The sole significant predictor of tonal was imitative ability, and the sole significant predictor of divergence was Jazz theory knowledge.

The fact that there was a weak correlation between the vocal jazz improvisation and previous study on another instrument could indicate that the basic performance techniques do not transfer between the instrument and voice. While wind instruments involve breathing technique like the voice, it is possible that the transfer from the breath and embouchure on a wind instrument has no application with the syllabic execution in the context of varied rhythmic patterns that would be required in vocal Jazz.

McDaniel (1974) compared jazz improvisers and non-improvisers with respect to musical experience and background. McDaniel set out to see if there were significant differences that could have implications for the teaching of music and jazz improvisation. Using the Aliferis Music Achievement Test (AMAT), which was designed to measure a student’s discrimination of melodic, harmonic and rhythmic elements and idioms, students were evaluated on their ability based on the scores. In all
of the 14 schools that were used in this study, improvisers scored higher than the non-improvisers on melody, harmony and rhythm in all of the tests. The results of this study suggest that jazz improvisation as an experience can foster other musical skills.

Azarra (1993) conducted a study where a curriculum using improvisation was designed and examined for the purpose of improving the music achievement of elementary school instrumental music students. The problems under investigation were: (1) to investigate the effect of improvisation study on the music achievement of fifth-grade wind and percussion students; and (2) to investigate the effects of various levels of music aptitude on the music achievement of the fifth-grade wind and percussion students. The results show that improvisation did contribute to the improvement of the music performance achievement in the elementary students.

Improvisation can be used to supplement and assess music learning. Many of the skills inherent with aural training, music theory, and compositional techniques in music can be assessed through improvisation. Through the act of improvisation, one can focus on particular elements to generate music, and through improvisation, one can more fully understand the concepts being taught.

Whitman (2001) tested the effect of vocal improvisation on four areas of achievement that included attitudes about personal skills and participation in choral rehearsals, aural identification, sight-reading skills, and knowledge of music theory. The control and experimental groups consisted of one auditioned choral ensemble, and one non-auditioned curricular choral ensemble of students from the ninth to the twelfth grades. The control group, which consisted of 51 students, received no instruction or practice in vocal improvisation, and the experimental group, which consisted of
41 students received instruction in vocal improvisation. The tasks in the study were to identify the roots of chords, and consonance versus dissonance. The experimental group, which received fifteen minutes of instruction and practice in vocal improvisation during each rehearsal session, scored significantly higher than the control group on the aural skills test.

Montano (1983) investigated the effect of improvisation using specific given rhythms on rhythmic accuracy in sight-reading for group piano students in an elementary level college course. Thirty-two undergraduate students were divided into two groups and given a pre-test. Over the course of six weeks, the experimental group was given a program of improvisational exercises. A sight-reading post-test was then given to both groups at the end of the six weeks and Montano concluded that the experimental group indicated a higher level of rhythmic accuracy in sight-reading than the control group, where no experiences in improvisation were provided.

There are many studies that explore the development of language, motor skills, math skills, spatial skills, and myriad other skills in relationship to physical and cognitive growth. Musical skill, however, can involve a mixture of conceptual skills, and there are times when the information must be extrapolated from combinations of events. For example, in the case of improvisation, one may have numerous musical ideas, but may be limited in technical skills.

Brophy (1998) examined age-related differences in the melodic improvisations of children six to twelve years of age that might be influenced by their degree of maturation. Forty of the total participants (N=280) improvised three sample melodies of eight measures each using the C-pentatonic scale on an Orff alto xylophone, and the
three remaining groups improvised on a variety of Orff instruments. Performances were videotaped and a total of 840 improvisation samples were collected. The independent variables were age, weekly musical experience, and years of private study. The dependent variables related to improvisation were the melody score, rhythm score, and the structure score. Scores were assigned to selected musical characteristics based on age-related differences of the students. The characteristics were examined with respect to melodic range, melodic motion, closing tone, repeated and developed melodic motives, beat divisions, sense of pulse, repeated and developed rhythmic motives, the presence of phrases, and the presence of antecedent and consequent phrases.

Results show that there were developmental trends in all but the melodic characteristics, and that the combined characteristics of children’s alto xylophone improvisations change significantly with age and appear to be independent of mallet facility. The change is developmental in nature because of skill in using the mallets, and moving toward increased motivic repetition and development, greater attention to the pulse, increased generation of rhythmic patterns, and greater structural organization. Brophy infers that there may be a dynamic stage of development from ages six through nine with a significant change between the age of eight and nine, followed by a plateau from age nine through eleven, and a resuming of development at age twelve.

The Brophy study shows that development should be considered in the course of teaching improvisation. One can present information that is appropriate for a given age level, but consideration should be given to motor skill development as well as general understanding of concepts that can be related to skill, experience, and practice, as well as the developmental stages of an individual.
Ott (1995) points out that much of the literature on music improvisation has examined improvisation with formally trained adults, however proposes that available evidence indicates that formal musical training and repeated practice are not required for meaningful improvisations. The study examined the contributions of basic processes and environmental factors to the development of improvisational skill. It evaluated the hypothesis that improvisational skill is related to increased awareness of subtle, contextually relevant perceptual information. The researcher performed an assessment of intelligence, auditory discrimination, motor coordination, and prior musical experience in children four to ten years of age that improvised melodies on a synthesizer in response to varying degrees of context.

There were a number of what Ott referred to as “context conditions,” which include the following components: (1) Baseline, that had no musical context and no example available; (2) Cued Melody, that offered no context but a standard melodic example was provided; and (3) Harmonic Context and Root Position, in which a musical context with triads voiced in root position were voiced in second inversion.

Ott noted a number of inter-correlations between some of the predictor variables, such as motor coordination contributed significantly to the prediction of subjects’ improvisational skill under both harmonic context conditions, and that early improvisation is related primarily to motor skills. It was also found that formal musical training contributed to the prediction of improvisational skill in the harmonic context, suggesting that there is some benefit of musical training that is specific to particular situations. For example, knowledge and experience with harmony would contribute to the type of harmonic material present in the improvisation samples. The chords voiced
in root position provided a clearer perceptual bit of information than the chords voiced in second inversion. However, the subjects trained in music demonstrated no greater awareness of contextually relevant perceptual subtleties than the untrained subjects.

The act of improvisation on any instrument involves multiple sensory involvement. The use of visual cues in addition to other sensory input experiences can facilitate the development of skill in improvisation. There can be differences in skill acquisition that are related to the maturation of an individual, but manipulation, and modification of materials and procedures, can make the teaching and learning possible as well as effective.

Coy (1989) endeavored to determine if 60 middle school band students with two to three years of instrumental music training can develop fundamental skills in jazz improvisation over a six-week period. The study compared the effectiveness of researcher-designed materials and multi-sensory instruction on improvisational skills, rhythmic accuracy, and attitudes. An instructional manual focusing on limited melodic and rhythmic material that included 44 rhythm cards, blues scales in three keys, a cassette accompaniment tape, and historical listening examples was used for the study. The control group consisting of 30 students received the instructional manual for daily use with no teacher intervention, and the experimental group, also consisting of 30 students received the same materials with twenty minutes daily of teacher-directed multi-sensory instruction during band. The multi-sensory instruction involved aural perception, eurhythmics, verbal association, symbolic association, and synthesis. The results indicated that there were significant gain scores overall for both groups in performance and rhythm, but the experimental group had a significantly higher score on
the rhythmic accuracy and the performance aspects than the control group. These findings show that it is possible for improvisation skills to improve in a short period of time.

Improvisation, which can be an environment for the creative process in learning music, can offer a number of advantages for music teaching and learning. As material is presented, the student can reveal knowledge and understanding through the application of the material through improvisation. The challenge for the improvisation instructor is to plan strategies whereby the student can take in the information in the learning process and then generate music that reflects the assimilation of the information. Careful planning on the part of the educator can enhance a student’s knowledge and application of learned material. This information given in context can then be applied to other areas of the student’s musical experiences by improving aural and analytical skills.

Improvisation involves divergent thought processes prior to, during, and at the close of any improvisational activity. In an investigation conducted to see if divergent responses could be developed, Holliger (1987) provided structured sequential material that used improvisation as a means to develop and measure divergent thinking in a set of four girls and four boys age eight to ten enrolled in group piano instruction. Two pilot studies were conducted and three students who were the most consistent and homogeneous in their evaluations were selected for the study. Robert Pace Music for Piano, Level One textbooks were used to provide the structured material for the application of concepts to musical improvisation. Students were given two half-hour lessons a week, of which antecedent and consequent phrase activity comprised five-minutes per lesson. A pre-test and a post-test using a four-measure unresolved phrase
played by the teacher with a four-measure response by the students that resolved
musically, were individually performed and recorded. Judges used a seven-option
response scale based on the four hypothesized abilities of creativity proposed by J.
Guilford, which were fluency, flexibility, originality, and elaboration. The results of the
study show that children’s musical divergent thinking skills can be developed, and that
the cognitive approach may be an effective method to achieve this end.

Crum (1998) conducted a study that examined the attitudes and opinions of
teachers who were members of the Florida State Music Teachers Association. One
hundred sixty-two teachers were surveyed regarding attitudes and opinions about
instructional content and teaching approaches for beginning and intermediate piano
instruction. Most of the respondents were older females with the average age of fifty-
two, and half of those surveyed held an undergraduate degree in music. The respondents
taught a total of 3,748 private students. It was indicated that there were 444 students
involved in group piano, but it is not clear as to whether the group piano students were
part of the 3,748 who were involved in private study.

Eighty-four percent of the respondents indicated that piano skills such as
transposition, improvisation, sight-reading, harmonization, performing with other
musicians, progressions, analysis and ear-training were more appropriate for beginners
than instruction in performance. However, individual skill ratings indicated more
emphases of the study of notated music. Most of the teachers involved in this study
believed that accurate reading is vital for beginners.

Respondents seemed to support the idea of Comprehensive Musicianship, but
the indications show that they preferred traditional performance instruction. There was
not a strong evidence of the fusion of piano, education, and music instructional methods. A very specific group of participants was used in this study. However, it is possible that on a broader spectrum that includes other organizations and institutions, the responses may yield different results.

A number of conditions can affect how people approach improvisation or improvise melodic material. Partchey (1973) examined the effect of certain learning strategies on creative musical behavior. Students were recorded as the improvised melodies on an alto or tenor xylophone to a pre-recorded piano accompaniment. The study used 90 sixth-graders divided into three groups. The first group heard their performances before a re-trial, the second group heard a model improvisation and the third group made repeated, but unguided attempts, serving as the control group. Learning was evident in all the groups, with feedback showing the highest improvement in creativity, and repetition showing the least improvement. Performance scores themselves, however, were unaffected by the various learning strategies.

It appears that it was helpful for the students to hear their performances and make assessment prior to their retrials. This seems to support my thoughts that improvisation can serve as a vehicle for overall learning as well as assessment. It is evident that students, even those as young as sixth-grade can benefit from improvisation. What stands out the most in this particular study is that the group that showed the most improvement was the one who had the opportunity to hear their performances. This could indicate not only the manifestation of music in real time in the context of improvisation, but also modification of material as a result of critical and analytical thinking.
Kishimoto (2002) conducted a qualitative study in which improvisation was used as a tool for developing basic keyboard skills in the undergraduate class piano curriculum. The investigation operated on the notion that improvisation can be successfully incorporated into the class piano curriculum. In the course of the process, five original improvisation exercises were utilized as supplemental activities in teaching of two sections of first level class piano over the course of fifteen weeks. The data serving as a basis of the analysis included the instructor’s log, videotapes, and a survey to which the participants responded voluntarily. The results indicated that students found the improvisation activities beneficial and valuable as well as enjoyable.

In the final analysis of the Kishimoto study, the videotapes served well to confirm some of the ideas of the researcher. The instructor’s log reflects the perception of the set of events of the instructor. The survey indicates the student’s specific feelings about the experience. The videotapes serve as the best indicator as to the success in learning because one is able to observe the class and the improvisation performances. It is possible that by using the three above-mentioned methods of data collection, a triangulation of specific elements of the teaching and learning experience can be made.

In the development of teaching strategies, the instructor’s task involves the careful planning of activities that can include discussion, individual and cooperative work, and convergent and divergent thinking. In all of these elements, the principles of process and content are to be considered for effective teaching and learning.

Sarath (1996) designed a class in basic musicianship that focused on improvisation and a reflection on strategies for curricular reform that were centered on the principles of process and content. The assessment of the class revealed that the
combination of hands-on, active learning, and the personalized creative experiences of 
improvisation and composition, enhanced the students’ engagement in the learning 
process, as well as the self-motivation and mastery of the material.

Age and skill play a part in the acquisition of new knowledge, particularly if the 
educational process is dependent on certain previous knowledge and/or experience. 
However, organized sequencing and musical modeling are still important parts in 
teaching music. While these strategies are often used separately, fusing together 
modeling with the sequencing can have many benefits for larger mixes of students in 
one classroom population.

Bitz (1998) conducted a study of pre-college-aged students that may be applied 
to learning improvisation on the college level. One of the main purposes of the study 
was to provide classroom teachers a base for using certain strategies when teaching 
improvisation in the classroom. Eight established improvisation educators, whom Bitz 
identified by their publication records and presentations at state and national 
conferences, were used for the study, and described their teaching strategies in a series 
of interviews. The study then investigated the effects of musical modeling and direct 
instruction sequence on the improvisation performances of middle school and high 
school instrumentalists. Based on the interview responses, Bitz compared answers and 
created generalizations and noted exceptions. The interviews indicated that improvised 
music is taught differently than the non-improvised music, and that the participants used 
many of the same strategies for the different styles of improvisation.

The Bitz study also investigated the effectiveness of musical modeling and 
direct instruction sequencing as teaching strategies for improvisation. In the study,
twenty-four high school and middle school double bass students were divided into two random groupings, a treatment group and a control group, of 12 students each. The treatment group was to improvise after receiving instructions with modeling, and the control group received the same instructions without musical modeling. The procedure was then repeated with direct instruction sequencing. Bitz used a modified version of the Jazz Guitar Improvisation Rating scale and a panel of four judges to evaluate the recorded improvisations. The results of the study were that the participants who received musical modeling scored significantly higher than those who did not. The participants who received direct instruction sequencing, scored higher than the control group. This evidence shows that the independent variables of musical ability, years of study, and age did not have a significant effect on the participants’ scores.

Sun (1993) examined the use of the computer in teaching musical concepts to children from three to six years of age. While the examination of process of learning with the computer was done with very young children, there can be some applications to work with adults. For example, the activities in composition and improvisation that were used in the process can be manipulated to work with adults in reinforcing perception of sounds and icons. This work with sound and icons would serve as stepping-stones to understanding musical symbols, according to Sun. Another consideration is that the results of the study indicate that visual representation of the notation affected the subjects’ attitudes towards their products, and the combination of visual and aural feedback affected the compositional style. The data infer that there can be some difficulty in transferring the visual icons to aural stimuli as well as learning the rhythm.
Teaching Strategies

Herzig (1997) conducted a study, which was used to identify instructional components of Jazz piano technique that can be applied to improvisation outside of the Jazz genre. Herzig’s quantitative analysis consisted of counting the number of pages devoted to categories of theory, technique, melodic improvisation, creating harmonic accompaniment, rhythm, style characteristics, aural training and other keyboard skills. Herzig analyzed the percentages of pages devoted to each category in relationship to the total number of pages. The results showed that creating harmonic accompaniment ranked the highest at 28%, music theory ranked second at 23%, and melodic improvisation ranked third at 17%. The lowest ranking categories were rhythm and aural training. Recommendations for future research included the validation of the identified categorizations for content analysis, surveying larger numbers of people, employing observational techniques to clarify teaching approaches, and comparing teaching approaches in controlled environments.

Kolar (1975) states that improvisation is the experimentation with a musical concept to further establish the understanding of that concept. Kolar’s study is a collection of keyboard improvisation activities that implements selected Twentieth-Century techniques to provide elementary improvisational experiences for the teacher and student, and offers suggestions for appropriate materials and teaching strategies. In addition to identifying Twentieth-Century compositional techniques and their implications, the study also provides the background material for musical growth through sequenced improvisational activities. The organization of the material includes activities such as call and response, creative story, question and answer, and rhythmic,
melodic, and harmonic variation as preliminary work for studying Twentieth-Century improvisational techniques. The Twentieth-Century melodic and harmonic devices that are utilized for the study are pentatonic, whole-tone, modes, bi-tonal, bimodal, bi-chordal, quartal, and twelve-tone.

Kolar states that the belief that improvisation cannot be taught is not based on truth. A keyboard teacher can nurture a student’s development of improvisational skills through the use of clearly presented musical concepts, providing a variety of materials and experiences, creative activities, and the encouragement of self-evaluation. Kolar adds that each, student regardless of level, should acquire fundamental understanding and skill. Age and reason for piano study, according to Kolar, do not alter the structure of musical learning or improvisational experience, but only dictates a rate at which the materials are presented. Previous knowledge and experience are considerations for the development of materials and activities for teaching music. In the case of improvisation, the student is in a position where accumulated knowledge and experience are to be manifest in demonstration through improvisation.

Methods of teaching music can influence musical preferences, but it is also possible that learning situations can have an effect on how one acquires specific skills. Jazz and non-Jazz improvisation share characteristics in learning and performance in that both forms have aural, perceptive, technical, and historical attributes. Though some students come to the learning situation possessing strengths in the aural-perceptive attributes, others may enter the situation with higher levels of technical skill and historical knowledge. It can also be the case, however, that when one enters the learning
experience with strengths in certain areas, that it may be the teaching in the weak areas that provides for the most effective learning.

Hores (1987), Rosfeld (1989), and Sessions (1980) performed research that has instructional implications for improvisation as a platform for performance, and in the context of education. The research was conducted within the jazz idiom but can be directly applied to other genres of improvisation.

Sessions (1980) conducted a study with the purpose of the evaluation of the effectiveness of Jazz and Jazz improvisation in the teaching of music fundamentals concepts at the college level. In this study, Jazz examples and improvisation exercises were substituted for nursery rhymes and folk songs in an experimental group, while the control group used traditional music found in music fundamentals textbooks. The dependent variables that were examined to measure achievement were the cognitive skills of musical notation, scales, chords, and keys, as well as attitudes towards the experimental Jazz materials by the experimental group. The hypothesis was that the experimental group would perform at an average level on musical achievement measures, and that there would be no difference between the control group and the experimental group. A second hypothesis was that the experimental group would demonstrate positive attitudes toward the use of Jazz materials and Jazz improvisation in terms of a designated percentage level using Likert-type questionnaire items.

The population for Sessions’ study was a group of 26 college students who had enrolled in two different sections of a music fundamentals course and were pre-tested to determine achievement in cognitive skills on a teacher-made pre-test. The population was distributed arbitrarily as to which students would be in the experimental group and
which would be in the control group. For sixteen weeks, the students were instructed in their respective environments, and at the conclusion of the experimental period. Researchers administered post-tests and questionnaires. The results showed that there was no significant statistical difference between the relevant dependent variables reflecting achievement and the students in the experimental group who demonstrated positive attitudes toward the Jazz materials. While the first and second hypotheses were supported by the results of this study, it was recommended that Jazz musical examples should be tested in other student populations to see if similar results occur. Further research is suggested in order to carefully define the relationship between the effects of Jazz musical examples and other factors that contribute to the learning situation of individual students.

Bash (1983) examined the effectiveness of three instructional methods to determine if any of the methods generated full dimensional performance skills in improvisation. The purpose of the study was to examine the effectiveness of three instructional methods that focused on different aspects of improvisation. These methods were: (1) Performance involving technical treatment with and emphasis on scalar and chordal activities; (2) aural-perceptive, which involved vocal rote responses to blues patterns, vocalization of blues improvisation and instrumental echo response patterns; and (3) historical/analytical, which involves the treatment with the analysis of specified performance strategies. Bash indicates that no significant difference was found between the perceptive treatment and the historical and analytical treatments. Bash adds that the results suggest that the non-technical dimension can be a supplement to the traditional improvisation instructional strategy.
Snyder (1975) states that since students experience music from a very young age, that they should be introduced to improvisation at a young age as well. According to Snyder, it would serve one well to begin teaching solely by melodic means, even when the student plays an instrument such as the guitar or the piano, which can produce two or more notes simultaneously. Snyder concludes that as the student explores melodic material and receives immediate feedback, skills in melodic variation can be developed from the very beginning of the student’s training.

One strategy that is overlooked in college music courses, outside of those in the music education programs, is that of collaboration. Teaching improvisation in the class piano setting opens many opportunities for learning in the collaborative environment. Inherent in the collaborative process is that people learn from one another through modeling, as well as through interactions with each other. A by-product of the collaborative process is that as the frequency of collaboration increases, students become less inhibited around each other, and the classroom can serve as a community of musical sharing, and learning.

Della Pietra (1997) conducted a study in the context of urban public high school students, but it can also transfer to the college level. The purpose of the study was to determine the effectiveness of a three-phase instructional model for improvisation, assuming no pre-requisite musical knowledge. In the testing process, non-pitched percussion instruments were used to determine the reproduction of musical perception and rhythm in the students. The instructional model used strategies that were enacted within the three phases of each lesson. The model included presentation to the class, small ensemble work, and performance. To collect the data of the students’ reactions
and interactions in during class, principles, strategies, and techniques of participant observation were used while the class was being taught.

The experimental group of the Della Pietra study was a combination of 17 ninth through twelfth-grade students from two different urban sites. Participants in the control group were members of an ongoing piano class that consisted of 13 students that served for the purpose of comparison. In the course of three and a half weeks, between the pre-test and post-test, the experimental group received fifteen improvisation lessons based on the constructivist principles using various percussion instruments. The control group continued ongoing piano study. The dependent variables were the perception of tempo, perception of meter and the reproduction of musical rhythms. Two rhythm subtests from the Gordon’s Music Attitude Profile were used, and a Rhythm Performance Measure, created by the investigator, which employed a Macintosh computer, was used that used a percussion controller with a MIDI interface. The results showed no significant differences in the perception of tempo and the reproduction of rhythm, but significant results were found for the perception of meter.

It is possible that the perception of meter was at a higher level because of the use of the percussion instruments and that accent, which would help determine meter in a non-pitched instrument, is also one of the elements that contributes to the exploration of timbre and technique on that given type of instrument. By not including the additional element of varied pitch, as one would have on a keyboard or other instrument, a student playing a percussion instrument may be able to focus more on dynamic levels.

The group piano student can expect that harmonization, sight-reading, transposition, and improvisation will be part of the material covered in the class.
Although the National Association of Schools of Music continues to urge the implementation of improvisation into the mainstream of music education, there can be a variety of conditions that can impede progress in this area.

According to Chen (2000), who conducted a study centered on education in Taiwan, higher education increasingly focuses on preparing teachers for the field, yet the goal of training general music teachers is not reflected in the undergraduate degree piano requirements. As is found in the United States, harmonization, accompanying, and other keyboard skills used in teaching were ranked as very important. However, junior high school teachers detailed a need for university courses that address skills that included improvisation. The focus of this study was directed to the establishment of minimum standards for competency to ensure consistency in teacher training that gives emphasis to keyboard skills that benefit future teachers.

Questionnaires were sent to the chairpersons of music departments at nine universities involved in secondary school teacher education, and to 241 junior high schools randomly selected from 721 schools. One music teacher from each of these schools was surveyed, and the major findings were that higher education in Taiwan increasingly focuses on preparing teachers. However, the goal of training general music teachers at the time of the writing was only in applied music degree programs, and is not reflected in undergraduate degree piano requirements. The chairpersons’ attitudes toward group piano instruction in this study appeared to be negative, and the potential effectiveness of group piano teaching in preparing general music teachers is not recognized. The music teachers and the chairpersons ranked sight-reading, harmonization, and accompanying as the three most important skills for general music.
Junior high school teachers but added that there is a need for university courses that address general keyboard skills as well as harmonization and improvisation.

Chen suggests that implementing a certificate program, which addresses requirements and professional education as well as specialized areas in applied music degree programs for applied music as well as the educational college programs. Chen also states that teaching courses in small groups that stress functional keyboard skills for the benefit of the future teachers would be extremely helpful in releasing skilled teachers into the educational system. Chen adds that increased interaction between the leaders of higher education and teachers in the field should commence in order to reduce discrepancies between pre-service training and the demands in the field.

Many view improvisation as “playing by ear” and also see improvisation as a means to develop skill in different aspects of music including theory and analysis. The converse can also be true, in that learning to “play by ear” can facilitate the development of skill in improvisation. It is the “inner hearing” of music that can make it easier to bring it forth in the performance on one’s instrument.

Hines (1994) attempted to determine the extent of retained keyboard skills of former class piano students. Sight-reading, scale playing, harmonization, and transposition were the keyboard skills that were analyzed. The study provided descriptions of class piano students who successfully demonstrated keyboard proficiency twelve to eighteen months earlier and were, at that time, able to demonstrate proficiency in sight-reading, scale playing, harmonization, and improvisation. Subjects in the sample attempted to perform selected portions of the previous examination; results indicated an overall loss of piano skills. It is possible that because the testing
process used specific material from past proficiency exams, that the documented loss of skill may not relate as much to decay of keyboard knowledge, as it would to the fact that they were no longer familiar with the specific exam material from the previous eighteen months.

Summary

Chapter Two consists of a review of related literature pertaining to various aspects of improvisation, including how improvisation fosters musicianship with respect to understanding of harmony, melody, rhythm, and form, how to teach improvisation, what is involved in generating improvisational material, and how improvisation can enhance other areas of musical development. Chapter Three describes the methodology used in this study, defines the populations, identifies the subjects, and describes the process of the pilot study and the reliability test.
CHAPTER 3

METHODOLOGY

The purpose of this study was to determine if there are relationships between the freshman or sophomore music students’ major instruments and the characteristics of their keyboard improvisations. The characteristics considered for the analysis of the samples that were played by the students were melodic, contrapuntal material, harmonic material, and through-composition. Since undergraduate students who major in an instrument or voice are often required to take group piano courses, it is possible that the results of this study may provide information for group piano curriculum development.

A pilot study was conducted in order to address the issues of the set up of the environment, hardware and software operation, the process of information gathering, the coding of the participants, and the analysis of the improvisation samples. Modifications for the study that were based on the pilot study related to the environment in which the study was conducted, the process, and the data organization. The study process involved the use of a questionnaire to gather demographic information, two student improvisations of thirty seconds each, and a post-performance interview. This chapter discusses the process of gathering the data and the means of analysis.
Pilot Study

The purpose of the pilot study was to examine the process of the testing instrument with respect to procedure, dialogue, setting up templates for the improvisation samples, testing equipment, and other aspects of the data collection and organization. Data organization issues that were addressed in the pilot study involved the organization of the music files, questionnaire information, and the post-experience interview material.

Items that were assessed, reviewed, and modified based on the pilot study were: (1) the timing of the data gathering process for each participant, including signing consent forms, filling out the questionnaire, performing the improvisation samples, engaging in the recorded interview process, and signing the compensation forms; (2) the organization of the computer files, questionnaires, and transcribed interviews in hard copy material for each participant; (3) the overall physical testing environment; and (4) the technical aspects of the set-up for the testing process, such as MIDI connections, as well as software and hardware configuration.

An item that emerged during the pilot study was that if the participants were not informed that there was going to be a click track on the second example, that they were startled when the sound occurred. The immediate occurrence of the click sound produced nervousness and a delay in the beginning of performance. As a result of this, it was most effective to: (1) inform the participant about the “click” prior to the overall testing, as well as prior to the point where the participant would begin to play the set of samples; and (2) remind the participant about the click prior to the second sample where the click was used, and then proceed to do a sound test by engaging the “record”
command. As a means of testing the equipment directly prior to the second sample and to give an opportunity of hearing the sound of the click, the participant was asked if the click could be heard through the headphones.

Other situations that occurred during the pilot study revealed that time must be allotted for preparation and testing of the recording equipment, the computer/MIDI setup, and naming the templates for each participant. The time that was most convenient for this was during the time that the participant was filling out the questionnaire and the consent forms.

Delays in recording that occurred during the voice activation mode on the cassette recorder made it impossible to hear some of the responses, so it was found to be more effective to leave the tape recorder on during the entire interview. In order to prepare the cassettes for later organization, the date and name of the student was written on each tape that was used on a given day, and used a new tape for each new day. This way when material was transcribed, it was easier to file the transcribed interviews with the dated questionnaires, consent forms, and graphic files of the music samples for each student.

There were problems that arose when I attempted to give improvisation characteristics more or less weight based on the order in which they were written. The specific issues that prompted a modification of my analytic process was that: (1) A characteristic may appear to be of equal prominence and so therefore of equal value for the visual analysis, but to be written down, one of the elements was recorded first; and (2) The order of the written analysis could change or confound the data if what was
listed as the primary element was the only element to be taken into consideration in the description of the material, or if it was the determinant of the analysis.

For the analysis of the improvisation samples, seventeen categories of improvisation characteristics emerged that were based on the combined analyses for the first and second improvisation samples using the characteristics of melody, counterpoint, harmony, and through-composition. In the analysis of population distribution, both examples with their paired attributes were used to categorize participants. The pair of characteristics that were assigned to each sample in the analysis of the sample was given equal weight.

Population

On March 12, 2004, the protocol number 2004EO1 was assigned when approval for this study was given from the Institutional Review Board. The College of the Arts and the Department of Dance at The Ohio State University provided funding for the study for materials and compensation that was offered to the students who participated in the study.

The participants consisted of 71 music students consisting of 46 freshmen and 25 sophomores who were instrumental or vocal majors. The testing was done during the first quarter of the school year, therefore, the freshmen were at the very beginning of their college experience and the sophomores had already experienced a full year of college.

Volunteers were obtained from aural training, theory, and beginning music technology classes who were informed of the process of the study at the time of solicitation. Solicitation forms were posted (Appendix A) and forms were handed out
during class meetings to those class members who expressed an interest in participating in the study. On the forms the participants provided contact information, and indicated possible times that they were available and they returned forms to me so I could set up a schedule for the study. I set up the time-slots based on all of the students’ information and I called each potential subject to set up the time and place of the study. A couple days before they were to participate in the study, I confirmed the time, place, and the process via e-mail and phone.

Procedure

The primary study took place in one of the offices in The Ohio State University School of Music. The students were given the choice of many different times of the day to sign up for the testing process. The sign-up times were from early morning to mid-evening so that the participant could choose a time that was most comfortable to be in a performance situation. A fifteen-minute time slot was allotted for each participant, allowing for some flexibility in terms of entering and exiting the testing location.

The synthesizer was placed on a desk so that the participant faced one wall, and the computer was positioned so that I was facing the wall perpendicular to that of the participant. I was within two feet of the participant to allow for easy communication and monitoring. The student wore headphones that were connected to the synthesizer. I did not hear the improvisation sample while the student was playing it and the placement of the keyboard and computer were such that the student would not see the computer screen as music files were set up and the samples were being timed.

The students were permitted to ask questions at any time, except when they were playing the improvisation. In order to maintain purity of the data, there was no
repetition of a sample, nor were there to be any interruptions while the sample was being played.

The students had the choice of having the light in the office switched on or using the natural light that came in the office window. The participants were positioned so that they would not be facing the window in order to avoid outside distractions and after images due to lighting from the outdoors. They were given the choice of standing, or sitting on a chair or piano bench while playing the samples. They faced at a right angle away from me as they played the samples.

The order of the performance of the samples remained the same for both the pilot study and the main study in that the first sample was performed without the click track, and the second sample had the click track in operation during the recording process. The order of performance in silence followed by performance with a click was to avoid the participant being influenced by a pulse for both samples. By the second sample, where the pulse was used, the participant knew basically what to expect, with the added feature of the click.

Each participant filled out a questionnaire with demographic and academic information that would be used for groupings according to class rank, major instrument, and level of keyboard experience. During the testing process, a temporary code was assigned to the individual, which was later transformed into a detailed code based on the information from the questionnaire. The student’s name, class rank, last four digits of the student’s social security number, major instrument, and keyboard experience were translated into an alpha-numeric code.
The questionnaire information (See Appendix B) was used to group participants into the basic categories of class rank, keyboard experience, and major instrument of study. The range of the vocalists such as soprano, alto, tenor, and bass, or the instrumental ranges such as violin, viola, cello, and bass, was not taken into consideration in this study; only the basic instrumental families and voice were a consideration. The instrumental categories used were, strings, woodwinds, brass, vocal, and percussion.

When the questionnaires were completed, the participants were given time to become familiar with the synthesizer. They were to wear the headphones and adjust them as needed, and they were permitted to adjust the volume control on the synthesizer and/or the headphones. They were requested, however not to change the keyboard sound in any way, nor to operate any of the other keyboard controls.

The facing of the participants was at a right angle of my facing so that they could be assured that I was not seeing the performance of the improvisation samples. The perpendicular facing also prevented them from seeing and being distracted by the computer screen while I worked with the software. My proximity to the participants facilitated easy access to all of the equipment in case there were technical difficulties, and it enabled me to enter their line of vision more easily for cuing the start and finish of the improvisation samples.

The process of playing the improvisation samples and the cue to begin and end each example was explained to each participant at different times during the process. The participant was told that each sample would be thirty seconds in length, and that I would watch the time on the computer screen, and they were to play until I gave them
the cue to finish. It was also explained that of the two improvisations, the second one would have a click occurring while they were playing. For starting and ending the samples, I demonstrated how I would enter their line of vision from the right side, so as not to startle them, and I demonstrated the hand movements that I would use to indicate when they were to begin and end their improvisation.

Once the participants felt comfortable with playing the keyboard, and indicated such, we began the next part of the process. At this point, time could be used to ask questions related to the process, and clarification was given as to the sequence of events. The subject was given no indications as to genre, style, texture, or other musical characteristics, but was informed of the signal to begin and to finish the performance.

To signal the beginning and end of each improvisation, I entered the participant’s line of vision from the right side and pointed my index finger as a cue to start. At the end of the improvisation, I moved into the line of vision again and made a cut-off sign with the palm of one hand starting face upward and then arcing my hand in the manner of a choral conductor signaling a cut-off. To keep an accurate account of time, I watched the timer on the computer that was part of the music software. When I signaled the participant to start with one hand, I simultaneously clicked the cursor to the “record” button in the software with the other hand, and when I signaled the participant to stop playing, I clicked the cursor on the “stop” button in the software in the same manner.

After the improvisation sample was digitally recorded, the participant was asked a set of questions (See Appendix F) about the experience of playing the improvisation samples and questions about improvisation in general.
The participant was told that the questions in the interview were open-ended and that there was no right or wrong answer. There were a few occurrences where the participant needed clarification on a particular question, and in those cases suggestions as to the meaning of the question were given, but no directives were given for how to answer the question.

The set of questions that were used in the interview began with views expressed by the participants regarding the performance of the improvisation samples. In the first two questions, the subject had the opportunity to discuss what internal dialogue occurred while performing the first and second improvisations. The goal of the third and fourth question was to discuss which improvisation was difficult, and which one was more enjoyable. As part of the answer, the subject was to give a reason why he considered a sample more difficult or more enjoyable to perform.

The fifth and sixth questions were related directly to what the subject thought about improvisation in general, and then the subject was asked to discuss thoughts on learning improvisation. These two questions opened the opportunity for the participant to express and elaborate on their views of improvisation in relationship to their individual experiences, as well as the issues that arise when learning improvisation.

The seventh question gave the student an opportunity to discuss how improvisation informs musicianship. The wording of the question left the venue open for a wide range of responses that related to how the subject feels that improvisation reveals the level of musicianship and skill as well, as how improvisation can be a tool that one teaches himself. The final question of the interview had to do with the subject’s view of the time allotment for playing each improvisation.
For the interview, the following list of questions in Table 3.1 was used. Probing for detailed answers was not done, and explanations of the questions were only given if the student indicated a lack of understanding of the meaning of the question. Suggestions for possible areas of response were avoided during the entire interview process.

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1. What did you think about when you were doing the first improvisation? (No click track)

2. What did you think about when you were doing the second improvisation (with the click track)?

3. Which improvisation did you find more difficult? Why?

4. Which improvisation did you find the most enjoyable? Why?

5. When you think of improvisation in general, what do you think about?

6. What issues come to mind when you think about learning to improvise?

7. How do you feel that improvisation informs you as a musician?

8. How did you feel about the time allotment for each improvisation?

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Table 3.1: Post-experience interview questions

The questionnaire, the improvisation example, and the transcribed responses were combined into an individual file for each participant. Musical characteristics for each student’s improvisation were described and put into each student file with the other materials.
A Macintosh G4 laptop computer, MIDI cables, MIDI interface, headphones, and the SY22 keyboard synthesizer were used for the input of the improvisation samples. The cassette tape recorder was used to record the interviews, and a flash disk was used to store the Microsoft Word documents and the improvisation samples.

Cassette tapes were used only to record the post-experience interviews, and the researcher read a prepared set of interview questions in order to state each question the same way for each participant. The music samples were stored in digital and graphic formats on the computer and flash drive. Acrobat Reader 5.0 was used to view the musical examples in their various formats. A window shot was “taken” of the score, MIDI edit window, and other materials that were created by Digital Performer 4 and stored in a PDF format to be read in Acrobat Reader 5.0.

Table 3.2 shows a list of the materials used to conduct the study. The materials used for the study are the following: hardware, basic materials, and software. The hardware column includes all materials used to record and store the music data and the recorded material collected in the post-experience interview. The materials column includes batteries for the cassette recorder, as well as forms and materials for recording and storing non-digital information. The software column lists the software programs that were used to collect, view, and combine various aspects of all of the data that were collected.
Table 3.2: Materials and equipment

The sequencing software *Digital Performer 4™* by *Mark of the Unicorn* (MOTU) was the program choice for this study for a number of reasons. In addition to a generally “user-friendly” layout of commands and windows, it was easy to transfer my experience with previous programs to navigate through the commands and windows in this particular program.
Digital Performer 4™ is a music sequencing software that is installed onto the computer and is used as a means to record and store music digitally by use of what is known as a “controller,” which was a Yamaha SY22 electronic keyboard synthesizer. The keyboard is connected to a computer via a MIDI interface, enabling communication between the computer and the keyboard. In this way, the music is performed on the keyboard and via the MIDI interface, and the keyboard sends the music data to the computer, which records the music in a digital format. To play back the recorded music, the computer then communicates back to the keyboard via the MIDI interface and plays the recorded music. The music can be heard through a speaker system or through a set of headphones that are plugged into the synthesizer.

The “tracks” window was used as a means of checking the set-up for the input of the musical sample, as well as showing that material was being recorded into the computer. Track one was kept silent in the first example, and was reserved for the click track in the second example. The second track in each sequence was used for the musical material that was played by the students. Rectangles that are in the tracks window represent the occurrence of note one events. A break between horizontal rectangles represents that there were no note events at that time. The horizontal lines in the rectangles represent the actual notes, and the duration of a pitch is reflected in the length of each horizontal line. Figure 3.1 shows a tracks window that was used in the analysis of the improvisation samples.
Digital Performer 4™ provides a means of viewing key velocity, which is the intensity of key depression at the initiation of pitch production. The key velocity graphic, Figure 3.2, shows the dynamic level of a pitch at the time the key is pressed. The dynamic representation is indicated by vertical lines as well as numbers that are labeled 0 –127 at the bottom of the MIDI editing window. The number and the line represent the dynamic level of attack in both numerical and graphic form. The respective length of each vertical line and the number indicates the comparative intensity value of each note represented by that line. For example, a note that has the number of 60 would be louder than that with the value of 30. Respectively, the length of the vertical line valued at 60 would be longer than that of 30. The velocity of the ‘note on’ event, labeled as “on velocity” in Figure 3.2, can be used to view dynamic levels that imply meter or phrase for this study. Thus, a longer line in the context of shorter lines in the ‘on velocity’ event would indicate emphasis to that note-on event.

Figure 3.2 shows a display of the pitch input information. A graphic representation of the duration of each sound is depicted by the length of a horizontal
line corresponding to the length of the note that is played. In Figure 3.2, there are many repeated notes in the lower register, with mixtures of single note and double note textures in the upper register. At the end of the sample, it can be seen that there are repeated harmonic structures followed by a single note in the lower register that is played simultaneously with two notes in the upper register. The observation of repeated material is confirmed by the many lines in the key velocity graph at the bottom of the example.

The numeric notations at the top that appear to be a ruler are numberings for every two measures. When there were no clicks in the first student sample, and with the unaccented clicks in the second sample, the graphic is still formatted for metered counts of four. Thirty seconds of music in this case results in playing into the ninth measure on the graphic.

Figure 3.2: MIDI edit track sample
Figure 3.3 is a sample of a notation file in *Digital Performer 4™* that shows repeated harmonic “note-on” events in parallel sixths in the notation format. By viewing the material in the notation format, one can readily identify musical elements that include harmony, melody, counterpoint, and phrase construction.

![Notation editor sample](image)

Figure 3.3: Notation editor sample

A Macintosh G4 Laptop computer having a 1.33 GHz speed, and 1.25 GB of memory using the Mac OS X operating system was used for collecting and formatting the music data for the study. It was connected to a synthesizer via a MIDI-interface box to transmit digital information between the computer and the synthesizer.
The UM-2E USB MIDI Interface was used to connect the computer to the keyboard. Software was provided with the interface unit to facilitate configurations of connections for use with *Digital Performer 4™* and the SY22 keyboard.

In order for the computer and the SY22 to be able to communicate with each other, the “local” must be set to “off” using the following steps: (1) Push the “MULTI” button; (2) push the “edit/utility”” button; (3) push the “midi” button on the screen and it will be indicated that the MIDI local is ON; at this point; (4) using the cursor button, move the underline symbol to the word “on”; (5) push the “+” or “-”, until the word “on” becomes “off” resulting in the words ‘midi local off’ that appears in the synthesizer LED display; and (6) push the “multi” button on the synthesizer. Once this is done, the computer and the synthesizer will be able to communicate back and forth.

In order for sound to come through the headphones, *Digital Performer 4™* must be launched and: (1) A sequence window must be opened; (2) a track must be selected; (3) a patch/sound must be chosen for that particular track; and (4) the cursor should click in the track so it is engaged to set up to record. Even if recording has not commenced, the sound will transmit to the headphones.

Prior to setting up the templates for the improvisation samples, specific patches needed to be selected that would be as “generic” as possible. On the SY22 synthesizer that was used, patch 17, a piano sound, was selected and used on the second track in *Digital Performer 4™*. In both the first and the second improvisation, the second track of the *Digital Performer 4™* program was used as the “play” track on which the participant would be playing the improvisation. For the second improvisation the piano
sound was used, as well as “patch 64,” which was an unaccented percussive sound for the designated “click-track.”

In setting up the computer and the program for the improvisation samples, it was easier to have one template for the sample that did not have a click track, and one for the sample that had the click track. Prior to the playing of each improvisation sample, the template was renamed for the individual and the “save as” command was used. In naming each improvisation sample for each participant, the indication as to whether a click track was present or not was implemented into the file name.

The music samples were organized into separate computer folders and separate hard copies for each person. On the computer, a folder was created for each date that the testing took place, and within each dated folder was another folder for each participant. On the exterior of the hard-copy folders, the participant’s name, designated code that had been derived from the demographic information, and the date of testing was written in the upper portion of the folder. In the event that relationships of data and gender might be performed in a later study, red folders were used to designate females and blue folders were used to designate males.

Inside the folder for each person was the completed questionnaire, the signed consent form, the transcribed interview, and the formatted music files. The formatted music files were stored in the midi-graphic, editing, and notation format resulting in six music files representing three formats for each improvisation sample, as well as the original sequence file for each sample.

All of the data were referenced with the student’s name, instrument, class rank, and code used for the anonymous identification. The hard copy folders and a separate
copy of all the transcribed interviews were put in order of the date that the student participated in the study. This way, if I was reading material from the interview and saw information, which I wished to explore for further detail, I could reference all the material in the hard-copy folders to see if there was any relationship to other student information or to the musical scores.

Table 3.3 lists the music files in all formats and the individual response information for each student. The list of files indicates the materials collected and sorted for each student participant.

| 1. Sequence overview window – NO click and CLICK | = 2 files |
| 2. MIDI edit window picture – CLICK and NO CLICK | = 2 files |
| 3. NOTATION file – CLICK and NO click | = 2 files |
| | TOTAL=6 files |
| 4. Questionnaire |
| 5. Transcribed interview |
| 6. Signed consent form |

Table 3.3: Hard copy folder contents

Computer files were kept for each student. The material stored on the computer included three formats of the music files, plus the original Digital Performer 4™ files for each music sample, plus the transcribed interview for each student.

Table 3.4 shows a list of all of the files that were stored on the computer. Files that were stored on the computer include the letter of solicitation, transcriptions of the interviews, the music files in digital and notation formats, PDF files of the MIDI edit
window and the tracks window, the questionnaire, questions for the post-study interview, basic outline of the participant/researcher interaction, and a copy of the consent form.

1. Digital Performer files – click and no click = 2 files
2. Sequence overview window – click and no click = 2 files
3. MIDI edit window picture – Click and no click = 2 files
4. Notation file – CLICK and NO click = 2 files

TOTAL = 8 music files per student

5. Questionnaire
6. Transcribed interview
7. Consent forms and solicitation forms
8. Files in PDF format of charts and illustrations
9. Original *Digital Performer 4™* files for each improvisation sample

Table 3.4: Computer contents

Each of the two music samples for each participant was formatted into three types of graphic files and stored. For the file without the click track, there were three graphic files, and the file with the click had three graphic files, resulting in six music files for each person.

The improvisation samples were formatted in three viewable graphic formats: (1) the sequence overview window, which shows the track selected for the example, and a graphic representation of when there is musical activity; (2) a MIDI edit window, which showed pitch length, pitch indication and key velocity; and (3) a notation file of
all of the samples, which were contained in the Digital Performer™ 4 software and stored as an Acrobat Reader 5.0 file. These files were then rendered into the Acrobat Reader program by taking a picture of the window through the computer software, and, where needed, the contrast was enhanced through the Photoshop program.

Analysis of results from the data involved codifying the information obtained from the questionnaires, formatting the music samples into graphic and notation files, and transcribing the material from the interviews. For analysis and comparing numbers, the data were organized and charted in several ways that included the total number of students, the distribution of freshmen and sophomores, the number of freshmen and sophomores who study specific instruments, and keyboard experience.

Once the analysis was performed of the music samples, the data was organized by groupings of the music samples themselves, i.e. samples having certain musical characteristics were grouped by those particular characteristics. For example, for the preliminary analysis, all of the samples that were primarily of melodic material, but through-composed, were put into one grouping. The analysis of the musical samples was also considered in the context of samples within specific class ranks, instrumental groupings, and keyboard experience groupings. The analysis of the music samples was done using both the primary and secondary analysis as the consideration for the initial groupings.

The analysis of the data includes class rank and keyboard experience, class rank and characteristic of improvisation, instrument of study, and characteristic of improvisation. Comparisons and categories of student groups were made based on the analysis of the improvisation samples that used the characteristics of melodic material,
contrapuntal material, harmonic material, and through-composed material. Capitalized abbreviations were assigned to each characteristic, and the analysis of each improvisation sample resulted in two selected characteristics that seemed foremost in that sample. The abbreviations were: (1) MEL for melodic material; (2) CON for contrapuntal material; (3) HAR for harmonic material; and (4) TC for through-composed material. Therefore, if a sample showed attributes of primarily melodic material, but was also analyzed to be an example of through-composition, the resulting abbreviation of the paired attributes would be MEL/TC.

Reliability

The purpose of the reliability study was to see if there was agreement between the researcher’s analysis of the music samples and that of two other music educators. Inter-coder reliability was used to determine the reliability between the analysis of the researcher and two outside people. The reliability was determined in the following ways: (1) between the researcher and each person individually; (2) Each outside person in relationship to each other; and (3) the researcher and the two outside persons together.

The participant sample sets were randomly selected and sent to two music educators in the Columbus, Ohio area. Each of the sample packets contained a page of instructions for performing the reliability study, definitions, and their applications to the study, an identification page for each set of samples for each student participant, and the two samples in a score format that were to be viewed for analysis.

Each improvisation sample set was identified by a four-digit code and consisted of the first and second improvisation sample in the score format, as well as an analysis
sheet on which the characteristics of the improvisation were to be recorded. Those who assisted in the reliability study knew that the students were undergraduates, but were not informed as to how to identify demographics of the students from the codes on the improvisation scores.

The outside music educators were instructed to choose two possibilities that would characterize each improvisation example and indicate those in the space provided for that sample; the one characteristic that to them best described the sample was then to be indicated in a box provided on the form. The instructions for analysis were that: (1) the analysis was to be purely visual and playing the samples would not be necessary for the analysis; and (2) there would be grey areas where characteristics of a sample seemed to be of equal importance, but they were to indicate their immediate observation for the final analysis and place the information in the box provided. When those who assisted with the reliability study were finished with their analysis, they returned the materials.

Summary

This chapter has described the methodology, and the software and equipment used for this study. The population was defined, subjects were described and coded, and the purpose and process of the pilot study and the reliability study were described. Chapter Four presents the findings from the analysis of the data, and Chapter Five discusses the data and offers suggestions for further study.
CHAPTER 4

RESULTS

The purpose of this study was to determine if there are relationships between the freshman or sophomore music students’ major instruments and the characteristics of their keyboard improvisations. Since undergraduate students who major in an instrument or voice are often required to take group piano courses, it is possible that the results of this study may provide information for group piano curriculum development.

The characteristics that were used for the analysis of the keyboard improvisation samples were the following: (1) melodic material; (2) contrapuntal material; (3) harmonic material; and (4) through-composed material. In the analysis and charts, the abbreviations for the characteristics are: (1) MEL for melodic material; (2) CON for contrapuntal material; (3) HAR for harmonic material; and (4) TC for a sample that is analyzed as through-composed.

A combination of 71 freshman and sophomore instrumental and vocal majors from The Ohio State University School of Music who have little or no keyboard experience were used for this study. The study was done at the beginning of the academic year. Keyboard experience ranged from no experience to between four to six years of formal study.
This chapter presents the findings that were determined from the visual analysis of the musical examples. The directive was to establish what relationships, if any, exist between the visual analysis of the music data with respect to the four afore-mentioned characteristics and the student’s major area of concentration. In addition to the analysis of the improvisation samples, this chapter presents information from the post-experience interview where the students have the opportunity to discuss their thoughts about improvisation.

The instrumental groupings and keyboard experience of the students were determined through a Researcher Designed Questionnaire. At the end of each participant’s testing experience, the information gathered from the Researcher Designed Interview was used to determine if there was a relationship between how a student improvised and the responses to the interview questions.

General Analysis

There was a wide distribution of keyboard experience among all of the students, ranging from no experience to varied combinations of private study and group instruction. Forty-one students (58%) out of N=71 did not have formal keyboard study before college. The remaining population of students had some formal piano study prior to college. There was no relationship between the perceived difficulty and enjoyment of playing the first and second example to the level of keyboard study or class rank. A notable difference existed, however, between the freshmen and sophomores in that the freshmen played improvisations with a higher melodic content and the sophomores played examples that had a higher harmonic content.
Both the first and the second examples played by the students showed visible evidence that all were thinking in terms of duple meter in the performance of their improvisations. The key-velocity window did not reflect metric accents, but the general shape of much of the melodic material and the placement of harmonic material, and in some cases the change in rhythmic activity that would imply phrase groupings and cadence were present.

Figure 4.1 is an example of an improvisation that implies metrical organization. In this particular case, harmonic material is articulated on the first beat of each measure in the treble clef in half note values for the first two measures, and for the remaining three measures of this excerpt, and octave or a seventh initiates the measure in the bass clef in whole note values.

The student who played the example in Figure 4.1 was a freshman vocalist who had more than four but less than six years of private study. Some of this person’s keyboard skill is evident because of the use of octaves in the left hand. Independence of finger motion is evident in measure three and measure four, where the two notes that initiate the measure are held down while the remaining notes of the measure are performed.
The absence of dynamic change was evident in the lack of variation in the length of the vertical lines in the key-velocity window. Regular dynamic accents, which would have implied meter, or the start of a phrase, that would be seen in the velocity-window were not present. Figure 4.2 is an example where there is little change in the height of the vertical lines that would reflect intensity. Most of the lines are at a MIDI indication of 40, in the scheme of 127 MIDI dynamic units of intensity.

Figure 4.2: Key velocity

Figure 4.3 shows a typical example of an improvisation where the dynamics remain the same while the melody shows a contour. There is a slight crescendo at the onset when the melody ascends at the beginning of the piece, but after that point, there is no further variation in dynamic level.
Figure 4.3: Absence of dynamic change in relationship to melodic contour

Population of Participants

Seventy-one students (N=71) with a breakdown of 65% (n= 46) who were freshmen, and 35% (n=25) who were sophomores participated in this study. Out of N=71, the distribution of the population over the areas of instrumental or vocal concentration of study was nine string majors (13%), 19 woodwind majors (27%), 23 brass majors (32%), 16 vocal majors (23%), and four percussion majors (6%).

Table 4.1 contains the breakdown of instrumentalists and vocalists with respect to class rank. Of the 46 freshmen students, five were string majors, 12 were woodwind majors, 19 were brass majors, eight were vocal majors, and two were percussion
majors. The sophomore population consisted of four who were string majors, seven woodwind majors, four brass majors, eight vocal majors, and two percussion majors.

<table>
<thead>
<tr>
<th>Freshmen n=46</th>
<th>Sophomores n=25</th>
</tr>
</thead>
<tbody>
<tr>
<td>(65% of N=71)</td>
<td>(35% of N)</td>
</tr>
<tr>
<td>Strings = 5</td>
<td>Strings = 4</td>
</tr>
<tr>
<td>Woodwinds = 12</td>
<td>Woodwinds = 7</td>
</tr>
<tr>
<td>Brass = 19</td>
<td>Brass = 4</td>
</tr>
<tr>
<td>Vocal = 8</td>
<td>Vocal = 8</td>
</tr>
<tr>
<td>Percussion = 2</td>
<td>Percussion = 2</td>
</tr>
</tbody>
</table>

Table 4.1: Instrumental distributions of freshmen and sophomores

Almost 30% more freshmen than sophomores participated in the study, and the distribution of the participants in each class rank indicates a broad range of keyboard experience. When keyboard experience of all the students taken into account, the result is that the freshmen who have had no formal study prior to college comprises 28 students (60% of n=46), and 13 sophomores who did not have formal study prior to college comprise 52% of n=25.

Table 4.2 provides a detailed break down of the distribution of the levels of experience. It should be noted in this calculation that because the freshmen were in the first couple of weeks in their college career, and as per the limitations of this study, “class piano in college” was not applicable to the freshmen on the questionnaire.
Table 4.2: Distribution of keyboard experience

<table>
<thead>
<tr>
<th>Level of Keyboard Experience Prior to and during college.</th>
<th>% of N=71</th>
<th>Fr. % of n</th>
<th>So. % of n.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No experience</td>
<td>24%</td>
<td>14 (30%)</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>No experience prior and class piano in college</td>
<td>4%</td>
<td>0</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>Piano Keyboard at home</td>
<td>8%</td>
<td>5 (11%)</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Self taught</td>
<td>1%</td>
<td>9 (20%)</td>
<td>1(4%)</td>
</tr>
<tr>
<td>Self taught+ class piano in college</td>
<td>8%</td>
<td>0</td>
<td>2 (8%)</td>
</tr>
<tr>
<td>Private lessons before college</td>
<td>17%</td>
<td>11(24%)</td>
<td>1(4%)</td>
</tr>
<tr>
<td>Private lessons before college as well as class piano in college</td>
<td>10%</td>
<td>0</td>
<td>7 (16%)</td>
</tr>
<tr>
<td>Private piano before college and private and class piano in college</td>
<td>4%</td>
<td>0</td>
<td>1(4%)</td>
</tr>
<tr>
<td>Class piano in college</td>
<td>4%</td>
<td>0</td>
<td>3 (12%)</td>
</tr>
<tr>
<td>&gt;4&lt;6 years before college and private study in college</td>
<td>1%</td>
<td>0</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>&gt;4&lt;6 before college—no other experience</td>
<td>13%</td>
<td>7(15%)</td>
<td>2 (8%)</td>
</tr>
</tbody>
</table>

Table 4.2: Distribution of keyboard experience

No relationship emerged between a student’s class rank and the complexity, rhythmic variety, or melodic contour of either of their improvisation samples. However, there was a higher incidence of melodic material in the freshman improvisations and of harmonic characteristics in the sophomore improvisations.

Figure 4.4 is an example of an improvisation performed by a sophomore student. The majority of harmonic material in this sample is root position triads or thirds. Melodic material does not occur until the third measure, which begins with three single notes followed by harmonic material.
The analysis in the context of the different instrumental families yields a different layout of results, which is the focus of this study. Since there is little difference between the characteristics of freshmen and sophomores outside of the higher frequency of harmonic material in the sophomore population, the freshmen and sophomore data is grouped together for the remainder of the analysis.

*Trends of Improvisation Samples*

Melodic material was present in over half of each category of students, and the occurrence of harmonic material was evident among the brass and woodwind students. Contrapuntal material was the most frequent in the brass students proportional to their total followed by the vocalists and woodwind musicians, which were much less in this area.

Out of the total number of participants, 68% played the same characteristic improvisations for both examples, and in the remaining 32% there was a change in characteristics between the first and the second example. The change between the first and the second example did not have a notable relationship to the level of keyboard experience, instrument of study, or class rank.
The paired characteristics in the analysis for each improvisation sample is indicated an abbreviation of the two characteristics separated by a forward slash. The abbreviations of the characteristics are: (1) MEL for melodic; (2) CON for contrapuntal; (3) HAR for harmonic; and (4) TC for through-composed. Therefore the analysis of an improvisation example can be MEL/TC, indicating that the sample was predominantly melodic material that was through-composed. The two characteristics for each improvisation sample are weighted equally.

There are 17 main characteristic groupings based on paired combinations of melody, harmony and contrapuntal material, when the first and the second improvisation sample are used together for analysis of group trends. The first sample can be analyzed as MEL/TC and the second as HAR/TC for one person. However for another person, the first example may be analyzed as HAR/TC and the second as MEL/TC resulting in two separate groupings.

Table 4.3 shows the characteristic pairs of improvisation in order of the most to the least frequent occurrence in the freshmen and sophomores. The first column shows the combination of characteristics, the second column shows the sum of both the freshmen and sophomores with those characteristics, and the third column shows the percentage of the total population. The double lines between some of the rows of the characteristics indicate notable changes in the percentage of occurrence for a particular pair of characteristics.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of Students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEL/TC MEL/TC</td>
<td>23 +1 0=33</td>
<td>47%</td>
</tr>
<tr>
<td>MEL/TC HAR/TC</td>
<td>4 + 4 = 8</td>
<td>11%</td>
</tr>
<tr>
<td>MEL/CON MEL/TC</td>
<td>3 + 3= 6</td>
<td>8.5%</td>
</tr>
<tr>
<td>MEL/HAR MEL/HAR</td>
<td>3 + 2=5</td>
<td>7%</td>
</tr>
<tr>
<td>MEL/CON MEL/CON</td>
<td>2 + 1= 3</td>
<td>4%</td>
</tr>
<tr>
<td>MEL/TC MEL/HAR</td>
<td>2 + 1= 3</td>
<td>4%</td>
</tr>
<tr>
<td>MEL/HAR MEL/CON</td>
<td>2 + 1= 3</td>
<td>4%</td>
</tr>
<tr>
<td>MEL/CON MEL/HAR</td>
<td>1 + 1=2</td>
<td>2%</td>
</tr>
<tr>
<td>MEL/TC MEL/CON</td>
<td>1 + 1=2</td>
<td>2%</td>
</tr>
<tr>
<td>MEL/HAR MEL/TC</td>
<td>1 + 1=2</td>
<td>2%</td>
</tr>
<tr>
<td>HAR/TC MEL/TC</td>
<td>1 + 0=1</td>
<td>2%</td>
</tr>
<tr>
<td>HAR/TC HAR/TC</td>
<td>1 + 0= 1</td>
<td>2%</td>
</tr>
<tr>
<td>MEL/HAR CON/HAR</td>
<td>1 + 0=1</td>
<td>2%</td>
</tr>
<tr>
<td>HAR/CON HAR/CON</td>
<td>1 + 0=1</td>
<td>2%</td>
</tr>
<tr>
<td>HAR/CON HAR/TC</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>HAR/TC MEL/HAR</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>HAR/TC HAR/MEL</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 4.3: Most common to least common characteristics

The gray areas in Table 4.3 show the improvisation characteristics that remained the same for the first and the second example. The double lines between rows one and two, four and five, seven and eight, and row 14 and 15 indicates where the breakdowns of more to lesser occurrences of musical characteristics. The largest break is between
the first set (MEL/TC and MEL/TC) at 47% going down to 11% for the next set, where the characteristics are MEL/TC and HAR/TC. The next major change in attributes decreases to 4 %, where contrapuntal material is used and variations of melody, counterpoint, and harmony are occurring in the improvisation samples. The remaining ten groups occur between zero and two percent of the student participants.

In viewing all of the samples with respect to separate class ranks as well as together, there was no predictor in the class rank as to how a student improvised with respect to the four elements of analysis. Both the freshman and the sophomores had a wide range of keyboard experience, and there were mixtures of improvisation characteristics, across the range of experience in both ranks of students. Keyboard experience may have an effect on the complexity of the improvisation with respect to more complex rhythmic patterns, and compound chords. However, the basic elements of analysis for this study are melody, harmony, counterpoint, and through-composition.

Silence Versus the Click Track

Between the first and the second example, 46 students (65%) played improvisations that did not change between the first and second example, and 25 students (35%) played improvisations that changed between the first and second example. The ways in which the examples changed, such as MEL/TC to HAR/TC or MEL/TC to MEL/CON had no relationship to the click track. There was no relationship between class rank and keyboard skill, and whether or not the student played the first and second example the same or differently.
Characteristics Between Instrumental Groups

Melody and through-composed were the main elements that occurred in all of the instrumental groups. The highest occurrence of harmony was in the strings, woodwinds, and brass, the highest occurrence of contrapuntal material was in the brass students, and the highest percentage of through composition was among the strings students.

In the overall population of N=71, the distribution of musical elements was that 66 (92%) participants had melodic material as an attribute in one or both of their improvisation examples. Harmonic elements were present in 26 (37%) students, contrapuntal elements were present in 15 (21%) students, and the characteristic of through-composition was present in 55 (77%) of the students.

In the compound analysis of the first and second examples, the brass students exhibit a higher frequency of change between their first and second improvisation examples. These are the cases that between the first and second improvisation that one or specific elements departs from the forefront of visual analysis, and another manifests as more obvious in the analysis. In one student sample, melody and harmony were the two characteristics in the first sample, whereas the analysis of the second sample resulted in a varied set of attributes.

Table 4.4 shows that melodic material occurs the most frequently in each instrumental group in the first, second, or both improvisation examples played by each participant. The distribution of the occurrence of melodic material in the analysis of the first and second improvisation sample of the various instrumental groupings is: 89% of the strings students; 100% of the woodwind students; 87% of the brass students; 100%
for vocal students; and 100% of the percussion students. The range of occurrence of melodic material for all of the instruments is 13 percentage points. The strings and the brass are within two points of each other, 89% and 87% respectively, and the other instruments are at the sample percentage point.

Table 4.4: Occurrence of melodic material

Table 4.5 shows the occurrence of harmonic material in each instrumental grouping. The distribution of harmonic material in one or both of the samples is 44% for strings, 42% for woodwinds, 43% for brass students, 31% for vocalists, and 25% for percussionists. The string, woodwind, brass and vocal students fall within three points of each other with respect to the percentage of occurrence of harmonic material. Percussion and voice are similar to each other, within a six-point range.
Table 4.5: Occurrence of harmonic material

Table 4.6 shows the use of contrapuntal material that occurred in 11% of the strings students, 11% in woodwinds, 39% of the brass students, 13% of the vocalists, and 25% of the percussionists.

Of all of the instrumentalists, the brass and percussion students show the highest frequency of contrapuntal material in their improvisations, with the brass having the highest percentage. It is to be noted also, that the brass and percussion percentage points are within 14 points between the two populations. The string and the woodwinds majors have the sample percentage of counterpoint. The vocal majors, at 13% of their population, are within three percentage points of the woodwinds and strings majors.
Table 4.6: Occurrence of contrapuntal material

The distribution of the analysis of through-composed music occurred in the following manner: 100% of the strings; 84% of the woodwinds; 65% of the brass; 81% of the vocalists; and 50% of the percussion majors.

There was no relationship between the pieces that had through-composed as part of their analysis and the other attributes. Because there were often two other elemental attributes present, such as melody and harmony, or melody in the context of counterpoint that demanded attention, the formal element of through-composed was omitted from consideration for the analysis of certain improvisation examples.
Table 4.7 shows the distribution of through-composed material over all of the instrumental families. The range of the occurrence of through-composed material is 50% among the instrumental families.

Table 4.7: Occurrence of through-composed material

In table 4.8, the total number of instrumentalists for each area is listed at the top and the distribution of the improvisation characteristics is presented in the underlying column for each instrumental group. The instrumental groups are abbreviated as: STR = Strings; WD = Woodwinds; BR = Brass; VO = Vocal; and PER = Percussion. The abbreviations for the four parameters of analysis are: MEL for melody or melodic material, TC for through-composed, HAR for harmony or harmonic material, and CON for contrapuntal material.
<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
<th>STR=9</th>
<th>WD=19</th>
<th>BR=23</th>
<th>VO=16</th>
<th>PER=4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEL/TC</td>
<td>MEL/TC</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44%</td>
<td>47%</td>
<td>43%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>MEL/TC</td>
<td>MEL/HAR</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
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<td>5%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
</tr>
<tr>
<td>MEL/TC</td>
<td>HAR/TC</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11%</td>
<td>11%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
</tr>
<tr>
<td>MEL/TC</td>
<td>MEL/CON</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
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<td>5%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
</tr>
<tr>
<td>MEL/CON</td>
<td>MEL/TC</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>MEL/CON</td>
<td>MEL/HAR</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEL/HAR</td>
<td>MEL/TC</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
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<td>5%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>MEL/HAR</td>
<td>MEL/HAR</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>4%</td>
<td>6%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>MEL/HAR</td>
<td>MEL/CON</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9%</td>
<td>9%</td>
<td>13%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>MEL/CON</td>
<td>MEL/CON</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>5%</td>
<td>9%</td>
<td>13%</td>
<td>25%</td>
</tr>
<tr>
<td>MEL/HAR</td>
<td>CON/HAR</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/TC</td>
<td>HAR/TC</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/TC</td>
<td>MEL/TC</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/MEL</td>
<td>MEL/TC</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/CON</td>
<td>HAR/CON</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/CON</td>
<td>HAR/TC</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HAR/TC</td>
<td>MEL/HAR</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6%</td>
<td>6%</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.8: Characteristics between instrumental groups
The percentage of the occurrence of each set of characteristics is indicated in the column for each instrumental family, which corresponds to the row that describes a particular combination of attributes for the improvisation samples.

The overall trends for the instruments, according to the analysis is that that between 50% to 100% of the participants improvised using through-composed and 92% of the participants improvised using melodic material in one or both of their improvisation samples. The occurrence of harmonic material is highest in the strings students at 44%, and the occurrence of contrapuntal material is highest among the brass students. Overall, other than brass, the occurrence of contrapuntal material was very low for the other instrumental families resulting in 11% for strings, 11% for woodwinds, 13% for voice, and 25% for percussion.

Characteristics Within Instrumental Groups

The following graphs show the percentages of the occurrences of musical elements that are present within each instrumental grouping. The first five graphs show the occurrence of a characteristic in isolation. Specifically, the percentages of each group that has attributes of melody, harmony, contrapuntal material, and through-composition are shown, as they exist in a particular instrumental area. These percentages are inclusive of the occurrence in one or both of the improvisation examples.
Table 4.9 through and including table 4.13 show the characteristic distributions in percentages for each instrumental family. The distribution of characteristics in the strings area from the most frequent attribute to the least is: 100% through composed; 88% melodic; 44% harmonic; and 11% contrapuntal.

Table 4.9: Percentages of musical characteristics for strings

Table 4.10 shows the frequency of attributes in the woodwinds area from the most to the least frequent is: 100% through-composed; 84% melodic; 42% harmonic, and 11% contrapuntal material.
Table 4.10: Percentage of characteristics for woodwinds

Table 4.11 illustrates the distribution of attributes for the brass students. The brass students have the highest percentage of occurrence of contrapuntal material in their improvisations 39\% of the time. The attributes in order from most to least frequent occurrence are: 91\% melodic; 65\% through-composed; 48\% harmonic; and 39\% contrapuntal.
Table 4.11: Percentage of characteristics for brass

Table 4.12 shows that the frequency distribution of characteristics for the vocalists from most to least occurring is: 100% melodic material; 81% through-composed; 31% harmonic material; and 19% contrapuntal material.

Table 4.12: Percentage of characteristics for vocalists
Table 4.13 shows the percentages of attributes for the percussion majors. From the most frequent to the least frequent attributes, the improvisation characteristics for the percussion students are 100% melodic material; 25% harmonic material; 25% contrapuntal material; and 50% through-composed material.

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melodic</td>
<td>100%</td>
</tr>
<tr>
<td>Harmonic</td>
<td>25%</td>
</tr>
<tr>
<td>Contrapuntal</td>
<td>25%</td>
</tr>
<tr>
<td>Through-composed</td>
<td>50%</td>
</tr>
</tbody>
</table>

Table 4.13: Percentage of characteristics for percussion

Table 4.14 shows the percentages of the occurrence of harmonic and/or contrapuntal material in the instrumental or vocal areas. The occurrence of the harmonic or contrapuntal material occurred in either one or both of the improvisation samples. Melodic material may be present in one or the other sample, but Table 4.14 reflects specifically the occurrence of harmony and counterpoint.
Table 4.14: Percentage of harmonic and/or contrapuntal material

<table>
<thead>
<tr>
<th>Strings</th>
<th>Winds</th>
<th>Brass</th>
<th>Voice</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>56%</td>
<td>53%</td>
<td>57%</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Reliability

Inter-coder percentage reliability testing was used for the analysis of reliability testing for this study. The percentages of the analysis for reliability agreement are in the following illustrations, and the percentages are in relationship to eighteen randomly selected examples of the student improvisations. The conditions for reliability were based on exact agreement, paired agreement, one agreement, and no agreement in relating the results of the analysis.

In Table 4.15, the reliability agreement between the researcher and “Person 1” indicates that there is a lower percentage in the exact agreement (17%) and the paired agreements for the first example (22%). The second example shows a higher percentage of agreement for the exact agreement showing 28%, and 39% for the paired agreement for the analysis second improvisation example.
In one agreement it can be seen that there was 50% agreement for the researcher and “Person 1” for the first example and 33% for the second example.

<table>
<thead>
<tr>
<th></th>
<th>Example 1 (%)</th>
<th>Example 2 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact agreement</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Paired agreement</td>
<td>22</td>
<td>39</td>
</tr>
<tr>
<td>One agreement</td>
<td>50</td>
<td>33</td>
</tr>
<tr>
<td>No agreement</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.15: Agreement between researcher and Person 1

The following illustration reveals that exact agreement occurs for 28% of the time for example one between the researcher and “Person 2” and for the first improvisation example, but that there is 56% exact agreement in the second example. In the analysis between the researcher and ‘Person 1’ and the researcher and ‘Person 2’ it can be seen in these first two illustrations that there is a wide variation in the agreement.

<table>
<thead>
<tr>
<th></th>
<th>Sample 1 (%)</th>
<th>Sample 2 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact agreement</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td>Paired agreement</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>One agreement</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>No agreement</td>
<td>16.6</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.16: Agreement between researcher and Person 2

The 56% exact agreement shown in Table 4.16 in the second improvisation sample may be due to the fact that the second was played with the presence of a click track. Because of the click track, the students may have been able to address other
aspects of music when playing the second example. One reason for the 56% and the 44% one agreement that is depicted in Figure 4.16 is due to the fact that the pairs of characteristics that are attributed to any one sample are considered of equal value regardless of order. The second reason is that for any set of two samples, there may be up to four characteristics noted for that pair of samples that would include melodic, contrapuntal, harmonic, and through-composed material as any one of the characteristics. This means that between any two researchers if there is even only one common characteristic marked between the two researchers that the reliability analysis would be noted as one agreement.

Figure 4.17 reflects the reliability agreement between “Person 1” and “Person 2” and shows that in the area of ‘one agreement’ there is the highest percentage. For the analysis of the first improvisation example, there is 61% agreement between the two people, and for the second improvisation example there is a 50% one agreement between the two outside persons.

| Exact agreement: | Example 1 = 11%  | Example 2 = 6%  |
| Paired agreement: | Example 1 = 22%  | Example 2 = 33% |
| One agreement:   | Example 1 = 61%  | Example 2 = 50% |
| No agreement:    | Example 1 = 6%   | Example 2 = 6%  |

Table 4.17: Agreement between Person 1 and Person 2
After those assisting with the reliability study returned the analyzed samples, they expressed that there were many grey areas in the analysis and that in some cases, it seemed that the two elements they recorded for a given sample could or should be given equal weight. Because of these grey areas, those performing the outside analysis for reliability felt compelled to make specific decisions that may not have accurately reflected their actual perceptions of the improvisations they were given for the reliability testing.

The highest percentage for reliability for both of the researchers was that of one agreement. As mentioned previously, this is partially due to the fact that any combination of the four characteristics for analysis was considered for this study, and that the characteristics were considered of equal value.

*Post-Experience Interview*

There was no relationship between the students’ perception of difficulty or enjoyment of the process of playing a sample and the characteristics that were manifest in a given sample. The main reason some participants considered the first sample difficult was that they did not feel comfortable with the absence of parameters. The reason that participants found the second sample difficult was because they felt restricted by the pulse provided by the click track. The participants who found the second sample enjoyable expressed that they enjoyed the structure of the pulse. A number of participants indicated that they used the click track as if it were another instrument with which to carry on a musical dialogue.
The reasons for enjoyment of the first and second example were similar. Those who enjoyed the first example the most found the lack of structure appealing. Those who found the second example the most enjoyable expressed the found the presence of structure an enjoyable factor because they had a framework in which to create music, that was provided by the pulse in the click track.

The experience of difficulty and enjoyment of the first versus the second sample was very similar for the freshmen and sophomores. Out of the population of N=71 participants, 54% considered the first example to be the most difficult, and 48% considered the first example to be the most enjoyable. One sophomore student expressed that neither seemed more difficult.

The distribution by the instrument for perceived difficulty and enjoyment is in the following illustration. Under the “most difficult” and the “most enjoyable” columns, the sample number is written first, followed by the number of occurrences for that sample in the instrumental category.

One hundred percent of the percussionists said they found the second example most enjoyable to play, and more than 50% of the strings and the vocalists found the second example most enjoyable to play. Fifty-six percent of the strings majors and 62% of the vocal majors found the second example to be the most enjoyable to play. It should be noted that five of the strings majors found the second example the most difficult to play, but five also found the second example most enjoyable to play. Based on the total numbers for the strings population and the distributions illustrated in the following table, this indicates that only one person found the second example enjoyable as well as difficult.
Table 4.18 shows the distribution of the perception of difficulty versus enjoyment grouped by instrumental family. Note that in the vocal population, one person did not perceive either sample more difficult than the other.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Most Difficult</th>
<th>Most Enjoyable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strings = 9</td>
<td>No.1 = 4 (44%)</td>
<td>No.1 = 4 (44%)</td>
</tr>
<tr>
<td></td>
<td>No.2 = 5 (56%)</td>
<td>No.2 = 5 (56%)</td>
</tr>
<tr>
<td>Woodwinds = 19</td>
<td>No.1 = 10 (53%)</td>
<td>No.1 = 12 (63%)</td>
</tr>
<tr>
<td></td>
<td>No.2 = 9 (47%)</td>
<td>No.2 = 7 (37%)</td>
</tr>
<tr>
<td>Voice = 16</td>
<td>No.1 = 7 (44%)</td>
<td>No.1 = 6 (38%)</td>
</tr>
<tr>
<td></td>
<td>No.2 = 8 (50%)</td>
<td>No.2 = 10 (63%)</td>
</tr>
<tr>
<td></td>
<td>NEITHER = 1 (6%)</td>
<td></td>
</tr>
<tr>
<td>Brass = 23</td>
<td>No.1 = 11 (48%)</td>
<td>No.1 = 12 (52%)</td>
</tr>
<tr>
<td></td>
<td>No.2 = 12 (52%)</td>
<td>No.2 = 11 (48%)</td>
</tr>
<tr>
<td>Percussion = 4</td>
<td>No.1 = 4 (100%)</td>
<td>No.1 = 0 (0%)</td>
</tr>
<tr>
<td></td>
<td>No.2 = 0 (0%)</td>
<td>No. 2 = 4 (100%)</td>
</tr>
</tbody>
</table>

Table 4.18: Perceived difficulty and enjoyment

The highest percentages that had to do with the perception of time for each of the improvisation samples were those who thought the time allotment was too short, or satisfactory. Those who thought the time allotment for playing each improvisation sample was satisfactory comprised 56% of the participants, and those who thought the time allotment was too short comprised of 30% of the students. The remaining 14% of the students felt that too much time was given to perform the samples. Two students mentioned that they felt that the first improvisation seemed to be longer than the second one.
The three questions that related to the students’ thoughts about improvisation in general, issues of learning to improvise, and how improvisation informs one as a musician, generated five primary areas of responses. The categories of responses were generated from the responses of the 71 participants, and key words were divided into related groups. The highest percentages of responses relate that the students think of improvisation involving freedom and self-expression in music making, or that when they think of improvisation, they think of Jazz.

| Fear, anxiety, insecurity, nervousness and feelings of inadequacy. Talent, musical ability and confidence are factors in being able to improvise. | 10% |
| Knowledge and skill in theory, aural-training, rhythm, scales, technique, formal construction, and other musical elements are essential to being able to improvise. | 17% |
| Playing anything within a framework or parameter. | 7% |
| Complete freedom from structure and creativity. Creating music and self-expression. Feelings and emotions are expressed in improvisation. | 34% |
| Jazz and being able to play with others. | 32% |

Table 4.19: Responses about improvisation in general

The second question regarding improvisation had to do with the students’ thoughts about the issues of learning improvisation. The same categories as the previous question were used, but the distribution of answers was the highest in the area of theory, aural-training and other areas related to being able to play, hear, and analyze music.
Fifty-five percent of the students considered theory and aural training the foremost issue of learning to improvise. The overall distribution of student responses about issues of learning to improvise is in Table 4.20.

In Table 4.20 it can be seen that the distribution of student responses changes focus from Table 4.19. In Table 4.20, the emphasis of student responses leans towards the knowledge of music theory, skills in aural training, and other areas related to musical elements and devices. The second strongest set of issues as indicated in Table 4.20 is related to feelings of fear, anxiety, insecurity and other negative emotional issues at 21% of the population. Playing within a framework, complete freedom and thinking in terms of the platform of jazz improvisation do not appear to be a high priority among the students.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear, anxiety, insecurity, nervousness and feelings of inadequacy. Talent, musical ability and confidence.</td>
<td>21%</td>
</tr>
<tr>
<td>Knowledge, skill in theory, aural-training, all compositional elements.</td>
<td>55%</td>
</tr>
<tr>
<td>Playing anything within a framework or parameter.</td>
<td>3%</td>
</tr>
<tr>
<td>Complete freedom from structure. Creating music and self-expression.</td>
<td>14%</td>
</tr>
<tr>
<td>Jazz and being able to play with others.</td>
<td>7%</td>
</tr>
</tbody>
</table>

Table 4.20: Responses about issues of learning improvisation

The remaining question in the post-experience interview was related to the students’ thoughts about how improvisation informs them as a musician. The responses of the students changed, but there were still five basic categories of responses.
Knowledge and skill related to music theory comprised 38% of the responses, and creativity and self-expression comprised 39% of the student responses. The third response comprising 14% of the students was that improvisation displays and improves technique. The sets of responses and the percentages of each response is illustrated in Table 4.21.

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t know. I am not sure. I don’t improvise much.</td>
<td>7%</td>
</tr>
<tr>
<td>Music theory, aural skills, rhythm. Learning music in general.</td>
<td>38%</td>
</tr>
<tr>
<td>Improvisation helps display and develop/improve technique and skills. It expands one’s mind and knowledge. Makes one a well-rounded musician.</td>
<td>14%</td>
</tr>
<tr>
<td>Creativity, self-expression. Being able to figure out and develop one’s own style.</td>
<td>39%</td>
</tr>
<tr>
<td>Improvisation helps one play better with others.</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 4.21: Responses about how improvisation informs the musician

The percentage distribution of the responses in Table 4.21 shows that music theory and aural skills as well as creativity and self-expression, were the foremost ideas of how students thought that improvisation informed them as a musician. Fourteen percent of the students considered development and display of technique as ways that improvisation informed them as a musician. Some of them expressed that to be a well-rounded musician that one should be able to improvise. The highest percentage points were between the aspects of improvisation for developing music theory, aural skills, and rhythm at 38%. This also included creativity and self-expression, as well as being able to develop a musician’s individual style.
Summary

There was a broad range of keyboard experience across the population of 71 participants. The range was from very little to more than four but less than six years. Experience, however did not serve as a predictor for the improvisations.

There was no difference in the improvisations between class ranks except for that the sophomores had a higher frequency of harmonic material, and the freshmen showed a higher frequency of melodic material. The improvisational elements of melody, harmony, counterpoint, and through-composition spanned across the instrumental populations, but there were attributes that were higher in some instrumental families than in others. There was no relationship between the characteristics of a student improvisation and the combination of class rank, keyboard experience, and which improvisation a student considered more difficult or enjoyable.

Those who found the first example enjoyable expressed the enjoyment of the absence of structure and the freedom to change tempo, and those found the second example most enjoyable appreciated the parameter of pulse, and some of the participants used the click as a component of musical dialogue, as well as a parameter.

Basic views on improvisation across all of the populations were similar with respect to views of improvisation in general, and what the considerations are in learning to improvise. When students were asked what they thought about when they thought about improvisation in general, a number of them expressed that they thought of Jazz when they thought about improvisation. Others expressed that improvisation was about creating music in the moment, knowing scales and chords, or variations of manipulation, rearrangement, and manipulation of musical material.
Chapter Four discussed the results of the study with respect to the characteristics of the improvisation samples and the relationship of those characteristics to the students’ area of study. Chapter Five is a discussion of the major findings from this study, conclusions derived from the results of the study, and recommendations for further study.
CHAPTER 5

DISCUSSION

This chapter discusses the outcomes of the data and the reasons that certain trends in the results may have occurred. The process, the participants, and the resulting product are discussed with respect to observable results, apparent relationships, and possible hypotheses as to their occurrence. General conclusions are presented along with recommendations that pertain to the execution of the study and the analysis of the data. The issues that are examined that are relevant to the study itself are the process, population, time frame, and elements that relate to further research or the replication of this study.

The results show that there was no significant relationship between a freshman or sophomore student’s class rank and the attributes of his improvisation samples. A student’s keyboard facility was not taken into consideration in the scope of this study, because only the designated attributes of melodic material, harmonic material, contrapuntal material, and material that was through-composed were examined. The only difference between the improvisations of those who had less versus more keyboard experience was the complexity, not the content. The general content for the analysis would remain the same, but the difference in the level of
keyboard experience would determine the treatment of the material.

With the exception of a higher incidence of harmonic material, there was no difference in the improvisation samples between the freshmen and the sophomores. The fact that the sophomores have had more aural training and music theory classes could have contributed to the higher incidence of harmonic material in their samples. The presence of triads in some of the sophomore improvisations supports also that some of the course work they may have had in class piano, coupled with classes in aural training and music theory, enabled them to use some of the material in their improvisations.

The results show that melody was the musical characteristic present in most of the improvisation samples of the total population of participants. Melodic material occurred the most in the freshman population, perhaps as a result of: (1) the freshmen have not had courses in harmony in their course work yet; and (2) the freshmen, being new to the college experience may have been more self conscious than the sophomores.

The implication of the higher incidence of melody in the freshmen for teaching is that melody can serve as the point of departure for teaching music in general, as well as for introducing the student to improvisation. Working with melodic material in the initial stages of college music study can be a non-threatening way to introduce form and contrast, manipulation of rhythm in the context of melody, theme and variation, and implied harmony, in preparation for more complex textures.

The brass, woodwind and vocal students have the highest degree of harmony as well as counterpoint in one or both of their examples. The highest percentage of change between the first improvisation sample and the second improvisation sample is also a frequent occurrence in this population.
The reason for the higher degree of change between examples in the brass students is not clear. There is no relationship to the aspect of change between the first and the second example in this population, and the class rank or keyboard experience.

Analysis of the Improvisation Samples

The lack of dynamic accents in all of the examples may indicate that the participants were primarily concerned with creating music purely through the use of pitch and rhythm. It is also possible that the overall experience of producing an improvisation sample in the testing situation may have generated a level of anxiety or self-consciousness in the participant, resulting in a lack of attention to dynamic accent, or dynamic contour in a phrase.

The fact that the keyboard was not the major instrument of study for the participants could also be a contributing factor to the lack of dynamic variation in the improvisation samples. The execution of metric accents, ebb and flow of melodic material, staccato, legato, and other issues related to the speed and weight of key depression are technique-related issues for the keyboard instrument that require practice.

For the most part, there was no unifying material that would give evidence to recurring patterns in melody or the harmonic material. Only in very few cases did the rhythmic material offer evidence of phrase or cadence. Other than the implication of duple meter, which is discussed later, there are no musical characteristics in the samples that indicate formal structure in any of the improvisations.

There were gray areas in the choice of musical terms and definitions that sometimes made the analysis difficult. Because “through-composed” was the only
offering of choices pertaining to form of the piece, an analysis involving form of the piece could only involve “through-composed” elements. In order to avoid assigning the term “through-composed” to the example, one had to make a choice from the remaining terms where the possibilities may not always provide accurate assessment of the improvised material. While it is possible that music can have metric attributes as well as being through-composed, outside of the implication of duple meter, there were no other unifying elements in the improvisation samples that would inform other musical structures.

One reason for the occurrence of primarily through-composed material is that the freshman and sophomore students would not have yet had courses in form and analysis. In a later study, binary, ternary, as well as through-composed form can be used in the analysis of improvisation samples.

In the group piano courses, the implementation of form could greatly enhance the student’s understanding for other course work. I have found in my own work, that a student is more readily able to identify phrases and structures on an elementary level once he has done some work with antecedent and consequent phrase, and playing music in binary and ternary form.

If the analysis of the improvised material were to be done as I had originally intended with the distinction of primary versus secondary characteristic of any one example, I believe that it would prevent identifying the trends that are in the different instrumental families. I feel that by including both attributes of a given sample, and giving each equal weight, that I was able to better assess change in material from one
sample to the other, and to better ascertain what knowledge and experience the students might be bringing to the study.

One reason for considering both attributes of the samples equally was that there were times when no distinction could be made between the value of one element over the other in the paired analyses of the improvisation samples. In the contrapuntal sample, for example, melody, as well as the simultaneity of would be equally weighted. To judge one element over the other in a case such as this would be an inaccurate description of the sample. If one of the improvisational elements were to be omitted in the analysis because it was considered secondary to the sample, the results would be such that there would appear to be no differences between certain pairs of student improvisation samples.

Experience in an ensemble may be a factor in how a musician experiences improvisation, understands music, produces, and creates music. Many of the brass and woodwind students have played in large and small ensembles. If a population has more experience in the smaller ensembles, then it is possible that in their respective instrumental part they may have had more melodic material. Because of the size of a smaller ensemble, the instrumentalist may also have more melodic responsibility as well as playing a part that changes roles in the course of the music, such as melody, counterpoint, countermelody, descant, basso continuo, imitation, and motivic accompaniment. Experiences in all of these functions can influence the perception of music at a given time.
The Post-Experience Interview

In the post-experience interview, none of the students mentioned formal structure or dynamics in terms of what they thought about when they thought about improvisation or learning how to improvise. They discussed chord progressions, scales and harmony as elements of improvisation, but never brought up formal structure as an important factor.

One student discussed improvisation on a number of levels relating to musical elements, devices, and the real-time creation of musical material. The student did not directly refer to formal structure but stated that “working within a framework and at the same time working from a spontaneity that you don’t have the opportunity to do when you’re reading music but that the material that is generated is not random.” The student described improvisation as a “universe of different avenues” and added that thinking in a key was not a consideration when improvising for this study, but would consider keys and scales if given another opportunity.

What I perceive this student was attempting to express was that improvisation is by no means random, but that you have the opportunity to operate from a spontaneity that results from knowledge and experience. The reference to improvisation as a “universe of different avenues” and the fact that the student would liked to utilize different keys and chords, communicates to me that there is a realization that musical material can be created within given parameters and still be unique and expressive.

Comments relating to learning improvisation, as well as thoughts about improvisation in general were similar. In addition to learning scales, rhythms, and chords, and manipulating them, several students intimated that in order to improvise
“there should be an innate ability and that improvisation is not just something that should be learned.”

A brass student discussed improvisation in terms of emotions expressed and that the focus to playing the improvisation samples was “to think more of expressing my inner feelings and emotions through the music instead of trying to pick out which notes might sound better.” The student related a weakness in music theory, so found it difficult to figure out where to play on the keyboard. My impression here is that because of lack of keyboard skills and musical knowledge, the student accessed emotion to generate improvisational material.

One of the questions in the interview involved how improvisation informs one as a musician. There was a range of responses from the view that improvising helps develop skill in knowledge of scales, and contributes to overall technique as a result of the process of improvising. Many of the participants believe that in order to improvise, a person must possess a high level of technique as well as a thorough knowledge of theory, scales and chords. Most of the references in this area had to do with “paper and pencil” knowledge of the material.

Several students stated that they believed improvisation was important, but when they think about improvising they have a sense of fear. The obstacle that was the most prevalent for students wanting to improvise, or thinking that they can improvise, was the lack of skill in the use of scales and chords.

Participants who discussed improvisation out of the “paper and pencil” context of theoretical knowledge discussed how important it was to be aware of what is “going on around you” in the ensemble in which you perform. One comment was that
improvisation adds a second layer, and also that improvisation is based on a parameter, but improvisation offers the opportunity to explore new ideas and that these ideas will lead to other venues of musical development.

There were varied reactions to the use of the click track in the second sample. When asked what sample they found most enjoyable or most difficult, the responses ranged from the click track being helpful in generating material, or increasing the enjoyment and ease of playing, to being restrictive, distracting, irritating, or cumbersome.

A variation of the post-experience interview that could be considered for future studies is a post-experience questionnaire. The format of the post-experience questionnaire would be that for each of the questions, the students would circle a choice that most described their perception of the experience and their thoughts on the experience. This way the student would be able to focus and direct the answer to one element or a combination of elements as presented in the questionnaire, and the researcher would be able to tabulate the answers in a more objective manner.

The manner in which the post-experience interview was set up for this study was that the students were asked questions and their answers were recorded. The immense freedom given for the structure of the answers made it difficult to clearly codify a subject’s answers to calculate percentages of responses. In the case of the current study, keywords in the responses were used to make decisions as to the category to which each response would be assigned. A format where the participant would be required to choose a response that “best describes your thoughts and perceptions” would perhaps be more appropriate for a study such as this one.
The reasons for difficulty and enjoyment were often the same among the participants. Some participants commented that the click track provided a more enjoyable experience because a structure was given in the form of a pulse and the participant could “play off” the pulse. For other participants, the sample with the pulse was restricting and they found that they had to “rush to keep up with the click.”

While the pulse was unaccented, some of the participants related that they felt restricted within a duple meter. In the graphic format of many of the samples where the click was provided, there was space in the graphic that was evidence that the participant waited a given number of clicks before beginning the improvisation. This waiting period was usually two or four counts. I believe that the participants used the waiting period to feel the pulse internally but were also counting a preparation for duple meter.

Only a couple of the participants expressed that they consciously used the click as part of an ensemble interaction, and that the implementation of silence in the improvisation was in dialogue with the click. It is interesting to note that the parameter that provided enjoyment for some of the students provided limitations to the other students. Some of the students found improvising in silence a freeing experience, while others found the lack of the structure given by the pulse difficulty. By the same token, some of the students enjoyed working within the framework of the pulse in the second example, while others found it limiting.

Almost all of the participants considered the thirty-second time frame for playing the improvisation samples to be satisfactory. Most of the students stated that they saw the time frame as an inherent aspect of the process, and expressed that they prepared mentally for the fact that there was a thirty-second limit. Those who thought
that the time frame was too short expressed that they were “just getting into it” and that they would have liked to continue because they were enjoying the experience.

*Future Study*

In order to have an accurate picture of whether there are indeed relationships that need to be addressed with specific method and focus, a study that involves a much larger population in each instrumental area would be necessary. Acquiring information from students at other colleges across the country could help in gathering information that would give evidence as to whether or not trends are present across varied populations.

The timing of the study during the academic year may contribute to obtaining participants as well as their comfort level, and how and what they perform. A recommendation regarding the timing of the study would be to acquire participants during all times throughout the academic year. Student attitudes tend to be different at the beginning of the year than at the end. By the end of the academic year, the student is involved in concerts and preparing for the summer. Whether this would affect the outcome of the study is unknown.

There is some debate on the part of the researcher as to revision of descriptive terms and phrases in the questionnaire in the collection of the demographic data. It seems that additional consideration should be given as to specific timelines of study and experiences, as well as to conditions that would determine a particular level of keyboard experience.

When the participants gave information about their piano experience being “self-taught” or having a “piano keyboard at home” it became clear that there was not
an indication of actual knowledge of the keyboard that could be attributed to these factors. For some people, self-taught might mean that they know where the letter names on the keyboard are, and that they know the upper register from the lower register. To others, it may mean that they taught themselves the aforementioned material and that through their independent work, they acquired skill in music reading and rhythm. By the same token, a “piano keyboard at home” does not necessarily mean that one actually played the keyboard.

When a student was given the option to indicate “private lessons before college,” a distinction was not made as to the years of study, nor was there space to indicate at what age the student was involved in the private study. In the case of “more than four but less than six” (>4<6) years of study, however, there is a distinction made as to the specific number of years of study, but the age at which this took place was not requested or indicated. It is possible that the private lessons may have begun at a very young age, and there might be a span of several years between when the student had private lessons and when they began to attend college.

Perhaps only formal training should be considered a factor for a study such as this, but then the accountability for those people who have a degree of physical facility on the keyboard warrants consideration as to what they create and play at the keyboard. These are possibilities that should be considered for future endeavors. However this situation is resolved, there would need to be distinctions made with regard to time-line and skill, as well as the experience itself.

In the examination of the improvisation samples and the analysis of the samples from the reliability study of the other two educators, it appears that modifications in the
improvisation analysis form are necessary for clarification and differentiation of the samples. A possible revision of the analysis process for the improvisation samples would be to either: (1) increase the categories for analysis of the samples; (2) keep the analysis of the samples to the same four categories, but that the definition within a given category would be narrow in scope; or (3) offer major categories with sub-categories for a higher level of distinction in the samples.

One way that the major categories with subcategories can be utilized in the analysis of the improvisation samples is illustrated in Table 5.1. In the first column the sample code would be indicated with the musical characteristics under the sample code. The sample code would reflect one student participant, and each sheet would contain the analysis of both improvisation samples for the one student. For each of the improvisation samples the characteristic of melodic material and harmonic material, as well as the formal structure, would be marked where applicable. The melodic material, harmonic material, and formal structure each have three sub-categories. Offering the three sub-categories offers the opportunity for a more detailed analysis for sorting the improvisation samples by the presence of certain characteristics and the types of those characteristics.
<table>
<thead>
<tr>
<th>Compositional Properties</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melodic Material</td>
<td>No Click</td>
<td>Click</td>
</tr>
<tr>
<td>Monophonic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivic</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Contrapuntal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonic Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choral/Four or more simultaneous voices</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Homophonic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clusters, dissonance, non-ternary harmonic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>shapes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binary</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ternary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through-composed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.1: Modified improvisation analysis

The reliability study revealed that certain elements in a given improvisation sample might be perceived first, and therefore written down as the primary function of that sample. However, between the two reliability groups, as well as the reliability groups and the researcher, there was often disagreement between what factors should be included in an analysis because of function, such as melody in the context of counterpoint, or melody in the context of harmonic accompaniment. One person might consider the element of form to be important, even though through-composition was the only choice, and another person may choose to ignore the form of the piece but see that melody and harmony in the piece are the most important features to acknowledge.

It appears that two characteristics for a given improvisation sample should weigh equally in the analysis phase because by the nature of space and time continuum.
one of the items must be written first, even if both have equal weight. However, it is also possible that it could be the case that there would be two categories for each improvisation that are not one given characteristic, but could be two or more different families of characteristics. These characteristics could enable the sample to be analyzed with regard to element and function, or element and form.

The term “characteristic” or “element” can be used to describe musical attributes on a number of levels. In the case of harmony, four voice/hymn style, homophonic style, and tone clusters, are possible categories under the general description of harmonic content. While the note events in the Alberti bass are not simultaneous occurrences, it is possible that Alberti bass and other chord-based melodic structures could fit under the umbrella of harmony.

There are generalities that can be applied to specific groupings, but I believe that a more detailed analysis of the improvised material would yield a breakdown of improvisational styles that could give more information as to the implications within the specific instrumental and vocal groupings, as well as how the improvisational styles relate to past and current keyboard experiences.

A study of freshmen and sophomores as individual groups could prove helpful for planning curriculum and determining relationships between course experience and characteristics that are present in improvisation samples. Using the same format of the testing process with minor revisions between the freshman and sophomore populations, investigations can be performed that pertain to what a freshmen student brings to the college experience, as well as what the sophomore brought to the experience initially and retained from the previous academic year.
A study that could be done separately, or in combination with this study would be to analyze how students improvise on their own instruments. Improvisation on their own instrument as well as improvisation on an unfamiliar instrument, which in this case was the keyboard, could triangulate a few crucial elements that could be integral in a student’s musical growth.

An important item that should be considered for study would be to determine if the subjects have had any experience in improvisation on their major instrument. Because of the goal of providing a “level playing field” by requiring the instrumentalists and vocalists to improvise on the keyboard, it was not taken into consideration that they may have had improvisation during their private lessons or in the context of an ensemble. In the future, as part of the demographic information, including questions that involve improvisation on one’s major instrument as well as on another instrument that they play should be a consideration.

The differences between the characteristics for the instrumentalists and the vocalists do not necessarily warrant curricular change. However, it is possible that the difference in course experience can influence the presence of certain musical characteristics in the students’ improvisations. As a population, the sophomore improvisation samples had a higher incidence of harmonic material, and the freshmen had a higher incidence of melodic material. However, the group of participants as a whole showed melodic material as the highest occurring attribute, and it is this factor that can be a consideration for finding starting points and generating materials that involve melody that can enhance learning other musical concepts.
This study was performed using freshmen and sophomore instrumental and vocal majors. This study can serve as a template for a future study that would involve keyboard majors who do not improvise. In the case of the keyboard majors, it would be important to establish that they do not improvise and to divide the population of keyboard majors into a number of subgroups. A possible preliminary study involving keyboard majors would use undergraduate and graduate keyboard majors divided into performance and non-performance groupings. Relationships of the results that can be determined through a study such as this would involve similar elements to this study as well as the differences between performance and non-performance majors.

Implications for Teaching

This study brings to light a number of ideas that can have implications for teaching group keyboard to music majors, as well as teaching other courses in the college music program. The fact that the student improvisations had a high incidence of melodic material implies that melody can be a starting point for teaching a some of the more complex musical concepts. Since melody is the starting point for teaching music from the beginning, it can also be a base for generating understanding of other concepts that use melody as a component of a larger entity.

Meter, phrase, formal structure, and harmony can all be taught in the context of melodic material through intervals, melodic contour, pitch range, and melodic accompaniment figures, such as the Alberti bass and the walking bass. Once students begin part writing, they often begin to view music vertically and forget that it is horizontal movement of the individual voices that determines the vertical spacing between different combinations of voices.
Teaching music from the angle of melodic material can be used to explore musical concepts that are not readily perceived as melodic, but that can be broken down into melodic components and devices. Harmony can be approached from the angle of melody, since, through time, it is melodic movement of a given voice that is creating harmonic changes. Some of the first rules that we encounter when studying voice-leading in music theory is to keep the common tone, move to the nearest chord tone, and to use contrary motion as much as possible. This short list of rules for part-writing is based on melodic movement to produce harmonic “correctness” in certain styles, but also has implications for learning other compositional devices.

The approach of concepts through the use of melody may prove beneficial in harmonic dictation for aural training. In my experience, aural dictation progressed from single voice directly to four-part dictation and chord qualities. Individual movement of a voice in relationship to only one other voice was not presented. If harmonic dictation could be presented through layering two, three, and then more voices, it might be possible for students to hear the subtle changes in harmony where there is less intervallic movement in any one voice. Possibilities for exploration in this manner can include basic voice movement such as parallel, similar, contrary, and oblique motion. These concepts can be used to proceed to experimentation with various compositional devices that include suspension, passing tones, neighbor tones, appoggiatura, and escape tones.

Another implication for teaching is generated from the post-experience interview. When they were asked about what they thought about in terms of learning to improvise, a number of students expressed that improvisation was either something they
could not do, or that they experienced fear or anxiety when they thought about it.

Information from this study can be used to inform ways of presenting musical concepts and experiences in the context of improvisation that would alleviate anxiety. Melodic material, which occurred the most frequently in the student improvisations, may be a sure point of departure for starting “where they are” when teaching new concepts and directing challenging musical experiences.

Except for the vocalists, all of the other instrumentalists produce sound on their instrument by an action of their fingers, or in the case of the percussionist, the mallet, the finger, and the hand. For the vocalist, melody is generated through breath and control of different vocal muscles, as well as through syllables. The idea of how the instrumentalist and vocalist produce melody can be the first consideration of starting “where they are.”

In a sense melody is rhythmically based, and it is possible that the creation of melodic material can be accomplished through the practice of rhythm starting with the production of sound from the fingertips. In a number of instrumental and keyboard methods, there are exercises in which the students practice instrumental finger patterns or tap their fingers to the rhythm of a given melody. A number of piano methods present improvisation through finger tapping exercises where the student can tap out rhythms, and then transfer those rhythms to the keyboard to explore melody.
Conclusion

This study consisted of multiple layers of information. The questionnaire provided information about instrumental study, prior keyboard experience, and participation in ensembles prior to and during college. The improvisation samples served the purpose of revealing given musical characteristics that were prevalent in certain groupings of the participants. The post-experience interview was valuable in that it offered insight into how the students perceived different parts of the experience, as well as what they thought about different aspects of improvisation.

Improvisation can be a humbling experience. It can, however, serve a number of functions in addition to the pure creation of music itself. Improvisation is a way to manifest music in such a way that assessment can be made on skills and knowledge, as well as technique. It can also serve as a venue for acquiring skills, knowledge, and technique.
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APPENDIX A

SOLICITATION LETTER

July 2004

Dear Freshman and Sophomore Music Students,

I am conducting a study as partial fulfillment for my PhD in music education from The Ohio State University School of Music. This letter is written to invite you to be a participant in a study through which I will be exploring improvisational processes of instrumentalists and vocalists on the keyboard.

I am specifically interested in working with freshman and sophomore participants who 1) are music majors, 2) have had very little or no keyboard, and 3) who major in voice, strings, brass, woodwinds, or percussion.

You will remain completely anonymous in the publication itself, but part of the research process requires me to obtain specific information from you so that I can observe relationships of data in the course of my research.

The study will consist of three parts: 1) You will fill out a form to provide information that includes your class rank, instrumental study and piano experience, 2) You will perform two short improvisations of 30 seconds each, 3) You will participate in a short interview which will be recorded on audio tape and transcribed.

You are part of the study in a voluntary position and may withdraw at any time without penalty and if at any time you have questions about the study, feel free to contact me at: chess.1@osu.edu or 614-688-4972. Dr. R.J. David Frego is the Principal Investigator and I, Susan Chess am the Co-investigator.

You are a valuable part of the process and I hope that you will see this as an interesting opportunity. If you can participate in this study, please provide the following information and I will contact you.

Name

E-mail address

Sincerely,

Susan L. Chess
The Ohio State University
614-688-4972
chess.1@osu.edu
APPENDIX B

QUESTIONNAIRE

I. Personal Information
Are you employed by The Ohio State University? Yes ________ No ________
*Name ___________________________ * Rank (Fr, So) ______
*Last 4 digits of S.S.#. ___________ E-mail address ____________________________
Gender: Male ________ Female ________ Age: __________________________

II. Instrumental study
*Major Instrument __________________________ Total years of study ________
Other Instruments (Include self-taught) __________________________

III. Music Coursework and Experiences
Prior to College- Check all that apply.
Theory ______ Aural Training ______ Music History ______ Composition ______
Band ______ Chorus ______ Orchestra ________ Small ensemble* ________
Other __________________________

During College - Check all that apply
Theory ______ Aural Training ______ Music History ______ Composition ______
Band ______ Chorus ______ Orchestra ________ Small ensemble* ________
Other, write in __________________________
Include extra-curricular experience where applicable. For example if you play in a rock band outside of college, but during your college attendance.

*IV. Keyboard Experience
1. No keyboard experience prior to college
   a. No experience prior to college (ne)
2. Some keyboard experience prior to college
   a. private study – no more than 4 years (p)
   b. self-taught (st)
   c. played piano or keyboard at home – no lessons (pkbh)
   d. more than 4 years, less than 6 years (>4<6)
3. Some keyboard experience in college
   a. class piano in college (cpc)
   b. private study in college (psc)
   c. class piano and private study in college (cppsc)
APPENDIX C

SIGNATURE SHEET FOR COMPENSATION

Summer and Autumn 2004
Research Study for Dissertation

We the undersigned have received compensation for participation in the research study in which Dr. David Frego (principal investigator) and Susan Lorrainne Chess (Co-Investigator) are collecting data. We understand that in the published dissertation our identities will remain anonymous, but that the personal information being collected below is for book keeping purposes.

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137
APPENDIX D

IMPROVISATION ANALYSIS

A 4-digit code is indicated for each set of two samples. Use each single page provided for the analysis of both samples. The two samples, marked ‘Example 1’ and ‘Example 2’ follow each coded page. Be aware that some of the samples may have more than one page of music.

Check two types of each improvisation out of the list below that could describe the improvisations, choose the one that best describes the given sample, then write the number or the word that best describes the sample in the box provided.

Example:

Sample Code  ______  ______  ______  ______

Example 1
After selecting two characteristics that can describe the given example, indicate the best description in the box below.

[ ] 1. Melodic Improvisation
[ ] 2. Contrapuntal Improvisation
[ ] 3. Harmonic improvisation
[ ] 4. Through-Composed Improvisation

Example 2
After selecting two characteristics that can describe the given example, indicate the best description in the box below.

[ ] 1. Melodic Improvisation
[ ] 2. Contrapuntal Improvisation
[ ] 3. Harmonic improvisation
[ ] 4. Through Composed Improvisation
APPENDIX E

FORMAT OF THE STUDY PROCESS

I. QUESTIONNAIRE
   1. Consent form - get signature of participant
   2. Participant will fill out the questionnaire- In the interest of time, place a TEMPORARY code at the upper right hand corner of the questionnaire for later coding.

II. Improvisation Samples
   1. Describe process of playing the improvisation samples-
      “You will play two 30 second improvisation samples. I will signal you to start, (I point to the student to cue to start) and when you are to bring the improvisation to a close, I will signal you to stop like this. “ (I come into their line of vision with my palm up and bring my hand out to my right as I turn it over and close it to ‘cut off’ the sample). “There will be no need for you to try to time your work, I will be watching a timer on my computer, and I will not hear what you are playing. You will hear what your are playing through your headphones.”
      “Take some time and play the keyboard to get accustomed to it. I only ask that you do not change any of the settings or sounds, or operate the pitch-bend control when doing the improvisation”.
      “Let me know when you are ready to play the first sample and I will signal you to begin.”

As soon as the participant is signaled to begin playing, the recording must be initiated in the Digital Performer 4 software.
Sequence must be renamed for each participant.
   1) No click track
      a. Signal to start (point to participant)
      b. Signal to stop (open to close hand/conducting cut-off)

In order to test the equipment and software set up each time as well as to give the students a chance to hear the click track so they are not startled by it, I conduct a test where I play the click track for them and I ask them if they hear the click.
“Let me know if you hear a click through your head-phones”
If ‘no,’ I explore and fix the situation. If ‘yes’ I stop the click and say “Ok, I will signal you to start and after 30 seconds I will signal you to stop”

2) Click track - Signal to start (point to participant) at 30 seconds, signal to stop (open to close hand/conducting cut-off)
III. Post Experience Interview—Set up and test recorder. Each tape will have a date and all the participants for that date will be put on the tape. Write the student’s name on the tape at the beginning of the individuals interview and state the date and student’s name at the beginning of the interview and at the end of the interview stating ‘end of interview’ at the end of the interview on the tape along with the student’s name again.

“Now we are in the post-experience interview part of the study. What will happen is that I will ask you a question and you answer it however you wish. I will begin the interview with your name, the date, and the words ‘post-experience interview’ several times, and I will end the interview with your name, the date, ‘post-experience interview’ and ‘the end’ several times. This is so that when I am transcribing the tapes, I have verbal markings of my beginnings and endings. You will remain anonymous, as this material, should it be used in the publication of the study will be coded with your other materials.”

Post-interview Questions
1. What did you think about when you were doing the first improvisation?
   (No click track provided)
2. What did you think about when you were doing the second improvisation?
   (Click track provided)
3. Which improvisation did you find more difficult? Why?
4. Which improvisation did you find most enjoyable? Why?
5. What do you think of when you think about improvisation in general?
6. What issues do you consider when you think about learning to improvise?
7. How do you feel that improvisation informs you as a musician?
8. How did you feel about the time allotment for each of the improvisation examples?

The post-experience interview is conducted, and at the close, the student signs a sheet confirming compensation for the participation and is escorted out of the testing room.
APPENDIX F

INTERVIEW QUESTIONS

1. What did you think about when you were doing the first improvisation? (No click track provided)

2. What did you think about when you were doing the second improvisation? (Click track provided)

3. Which improvisation did you find more difficult? Why?

4. Which improvisation did you find most enjoyable? Why?

5. What do you think of when you think about improvisation in general?

6. What issues do you consider when you think about learning to improvise?

7. How do you feel that improvisation informs you as a musician?

8. How did you feel about the time allotment for each of the improvisation examples?