

Rochester Institute of Technology

RIT Digital Institutional Repository

Theses

2004

Visual Design Systems for Music Education

Andrew D. Baker

Follow this and additional works at: <https://repository.rit.edu/theses>


Recommended Citation

Baker, Andrew D., "Visual Design Systems for Music Education" (2004). Thesis. Rochester Institute of Technology. Accessed from

This Thesis is brought to you for free and open access by the RIT Libraries. For more information, please contact repository@rit.edu.



Visual Design System for Music Education



A Thesis submitted to the Faculty of the College of Imaging Arts
and Sciences in candidacy for the degree of Master of Fine Arts
Graduate Graphic Design
School of Design Program
College of Imaging Arts and Sciences
Rochester Institute of Technology
Rochester, New York

Andrew Dennis Baker
May 2004

Committee Members

Andrew Dennis Baker

2021 Scottsville Road
Rochester, New York 14623

Bruce Ian Meader

Chief Advisor
Associate Professor
Rochester Institute of Technology
College of Imaging Arts and Sciences
Graphic Design Department
Rochester, New York 14623-5603

Peter Byrne

Associate Advisor
Assistant Professor
Rochester Institute of Technology
College of Imaging Arts and Sciences
Graphic Design Department
Rochester, New York 14623-5603

Lee Wilkins

Associate Advisor
Assistant Professor
Eastman School of Music
Community Education Division
26 Gibbs Street
Rochester, New York 14604-2599

Graduate Graphic Design
School of Design Program
College of Imaging Arts and Sciences
Rochester Institute of Technology
Rochester, New York

Title **Visual Design System for Music Education**

Thesis Committee

Professor Bruce Ian Meader
Chief Advisor

12 May 2004

Date

Professor Peter Byrne
Associate Advisor

5-12-04

Date

Professor Lee Wilkins
Associate Advisor

5-12-04

Date

Professor Patti Lachance
Department Chairperson

5.13.04

Date

I, Andrew Dennis Baker, hereby grant permission to the
Wallace Memorial Library, of the Rochester Institute of Technology,
to reproduce my thesis in whole or in part. Any reproduction will
not be for commercial use or for profit.

MAY 12, 2004

Submitted by

Andrew Dennis Baker
Designer

Date

Visual Design System for Music Education

Committee Members	2
Approvals	3
List of Illustrations	6–8
Thesis Project Definition	9,10
Mission/Goals/Objectives/Plans	11
Precedents	12–15
Thesis Document Structure	16–19
Research and Analysis	20–26
Synthesis	27–29
Ideation	30–67
Intermediate Evaluation	68–79
Implementation	80
Dissemination	81
Retrospective Evaluation	82
Conclusion	83–85
Glossary	86,87
Bibliography	88–91
Eight Music Elements Definitions	92–96
Appendices	97–129

Precedents 1

Figure 1.1
p 12

Labanotation
Ann Hutchinson
Model of recording movement
p 499

Figure 1.2
p 13

Labanotation
Ann Hutchinson
Model of recording movement
p 499

Figure 1.3
p 14

History of Commuication
Maurice Fabre
Love Song Siberian Language
Yukagira Tribe
p 30

Figure 1.4
p 14

Design Fundamentals
Gillam Scott
Figure/Ground Relationship
p 21

Figure 1.5
p 15

Baseline
International Type Magazine
No 42-2003
Hearing Type
Frank Armstrong
Properties of Sound
pp 18, 19

Research 2

Figure 2.1
p 16

Mechanical Engineering Design
Joseph Shigley
and Charles Mischke
The Phases of Design
p 6

Figure 2.2
p 21

Design Fundamentals
Linda Holtzschue
and Noriega Edward
Gestalt Psychology
p 52, 53

Figure 2.3
p 22

Theory of Design
Peter Gasson
Unity of Composition Rhythm
p 39

Figure 2.4
p 22

Elements of Dynamic Symmetry
Jay Hambidge
Synthesis and Analysis
pp 3-14,17

Figure 2.5
p 22

A Primer of Visual Literacy
Donis Dondis
Visual Expression
p 112, 113

Figure 2.6 p 23	Auditory Perception Warren Richard Pitch and Infrapitch p 72
Figure 2.7 p 23	Auditory Perception Joseph Fourier Waveform / Amplitude Spectra p 2
Figure 2.8 p 24	Signals, Sound and Senation Roger Shepard Chroma and Pitch Height p 146
Figure 2.9 p 24	Signals, Sound and Senation William Hartmann Cycles of Waveforms p 326
Figure 2.10 p 25	Physics of Music <i>Scientific American</i> Frederick Saunders Frequency Range pp 12,13
Figure 2.11 p 26	The Mathematical Theory of Communication Claude Shannon Shannon and Weaver process of Electrical Transmission p 35
Figure 2.12 p 26	Type and Typography Phil Baines and Andrew Haslam Gerberr's Adaptation for Human Communication p 34
Synthesis 3	
Figure 3.1 p 28	Art Fundamentals Theory and Practice Robert Bone David Cayton Otto Ocvirk Robert Sinson Philip Wigg p 53
Figure 3.2 p 29	A Primer of Visual Literacy Donis Dondis Visual Expression pp 112, 113

Ideation 4

Figure 4.1
p 35

The Thinking Eye
Paul Klee
Genesis of form
p 19

Figure 4.2
p 37

The Power of Limits
Gyorgy Doczi
Dinergic Atlantic Sundial
p 100

Figure 4.3
p 37

Paul Klee the thinking eye
Paul Klee
Linear-passive
p 112

Intermediate Evaluation 5

Figure 5.1
p 72

Musicage : Cage muses on words, art, music / Joan Retallack, editor.
John Cage
The Creative Process
p 7

Figure 5.2
p 73

John Cage Herausgegeben Von Heinz-Klaus Metzger und Rainer Riehn
John Cage
Concert for Piano and Orchestra
p 86

Figure 5.3
p 73

John Cage Herausgegeben Von Heinz-Klaus Metzger und Rainer Riehn
John Cage
veränderte Aufl: Music Walk
p 84

Figure 5.4
p 77

The Design Concept
Hurlburt Allen
Anatomy of the mind
Sigmund Freud
p 13

Appendices 6

Figure 6.1
p 97

The Power of Limits
Gyorgy Doczi
Musical Root Harmonies
p 8

Introduction

Music was the inspiration for this thesis, from the inception of its topic. Today music lives more in life than at any previous time in history, providing images and thoughts to the inner life of individuals. Music is the expression of the past, and the present, and helps define the course of time. To begin to understand the terminology of music and define the abstract and mystery of this communication device, activities to explore music appreciation began.

Music is a moral law. It gives a soul to the universe, wings to the mind, flight to the imagination, a charm to sadness and life to everything. Fine music is the essence of order and leads to all that is just and good, of which it is the invisible, but nevertheless dazzling, passionate and eternal form. Plato 427–347 B.C.

Psychology of Music

Carl E. Seashore
The Musical Mind
p 5

The musician lives in a world of images, realistic sometimes even to the point of a normal illusion...He creates music by "hearing it out," not by picking it out on the piano or by mere seeing of the score or by abstract theories, but by hearing it out in his creative imagination through his "mind's ear." That is, his memory and imagination are rich and strong in power of concrete, faithful, and vivid tonal imagery: this imagery is so fully at his command that he can build the most complex musical structures and hear and feel all the effects of every detailed element before he has written down a note or sounded it out by voice or instrument.

It is important to visualize the musical elements. The images are significant because music is in the minds of the composer and the listener, not actual sounds, but imagery, ideas, ideals, thoughts, and emotions. This thesis content develops a visual system to explain a complex and abstract set of definitions. The ambiguity in the eight musical elements: pitch, dynamics, tempo, rhythm, texture, form, timbre, and harmony are redefined through a visual language that leads to music appreciation and develops a cross-disciplinary communication channel between music and graphic design. The developed system provides music educators with a useful visual presentation tool to improve current teaching methods. It can also serve as a model for other kinds of visual communication problems.

Problem Statement	<p>People new to the study of music lack an understanding of the elements used to develop and describe music. These musical elements are: dynamics, form, harmony, pitch, rhythm, tempo, texture, and timbre. Currently, there is no visually-based system for teaching the principles of these elements. This thesis develops a visual system to be used as a teaching aid in helping students learn the principles of the eight elements of music.</p>
Documentation of Need	<p>This thesis is important because it focuses on effectively translating musical elements into a visual language that will enable the user to understand the foundational principles that, in turn, leads to greater music appreciation. Finally, this thesis benefits society because it develops cross-disciplinary communication between graphic design and music.</p>
Situation Analysis	<p>This thesis project explores visual communication as a means to improve current teaching methods and to increase the understanding of musical elements. This application will be introduced during the beginning stages of musical curriculums. Communication of this material to audience members with a range of different types of intelligences or learning styles (Howard Gardner's Theory of Multiple Intelligences) could pose a challenge to this thesis application.</p>
Goals	<p>The primary goal of this thesis is to translate the elements of music into a sign theory application and to develop a cross-disciplinary communication channel between music and graphic design. Another goal of this thesis is to serve as an expandable foundation in advanced areas of music vocabulary. This thesis could also serve as a model for other kinds of visual communication problems.</p>
Processes and Strategies	<p>The basis of this thesis is derived from a graphic designer's point of view, using these formal elements:</p> <ul style="list-style-type: none">• Line• Shape• Color• Texture <p>These formal elements are taken from Paul Klee, who used visual literacy and developed the theory of Genesis of form relating to pictorial dimensions.</p> <p>The strategies are from the psychological studies and resulting theories of perception known as Gestalt psychology. These theories are:</p> <ul style="list-style-type: none">• Proximity• Similarity• Continuity• Figure/Ground• Closure• Area• Isomorphic conclusions <p>The processes and strategies that linguist Ferdinand de Saussure used to understand general linguistics help translate complex ideas into a visual language. Education specialist Alfred Whitehead's process of educational learning is used to understand how to communicate the developed visual system to the educational discipline. The use of these methodologies contributed to a clear schematic language reference for the musical elements.</p>

Mission Statement	To improve the teaching of the principles of basic music elements through the development of a visual sign system.	
Goals	Objectives	Processes and Strategies
Phase 1 Music, Design Research and analysis of music and design	Music to explain the eight basic elements of music	Establish definitions of the elements of music to define and develop an understanding of the terminology
	Design to organize and define the communicative potential of basic visual principles	Gather information about visual language and fundamental design principles
Phase 2 Synthesis Ideation of conceptual solutions	Develop a cross-disciplinary communication channel between music and design	Identify the visual equivalents of the eight basic elements of music
	The user recognizes how visual language supports and communicates with more immediacy and clarity the eight basic elements of music	Develop a cross-disciplinary bridge between these two communication fields A extensive flow chart will show the major components of visual language and begin to display the principle elements of music into a sign theory application
Phase 3 Application Produce an informative educational application that is able to communicate the eight musical elements	The sign theory application will facilitate and unify learning in the discipline of music, providing an easier way to understand the eight musical elements.	The theories of Multiple Intelligences will produce an understanding to different learning intelligences in the academic setting
		Develop a written documentation explaining the procedure that informed the final application
Phase 4 Evaluation Evaluate the effectiveness of the application to determine the success of the design and its process	Analyze the application in an academic environment to assess the overall pragmatics	Create a questionnaire to solicit the input
	List ways to further research and assess the semiotic evaluation form	Test the model in an academic setting (Eastman School of Music) Semiotic evaluation is conducted to understand problems in the interpretation of application
Phase 5 Dissemination Communicate through publication the findings of this research	Write articles for appropriate journals	Write articles focusing on how music can be interpreted visually and the interrelationship that this application creates between music and graphic design

Figure 1.1
Labanotation
 Ann Hutchinson
Model of Recording Movement
 pp 499, 509

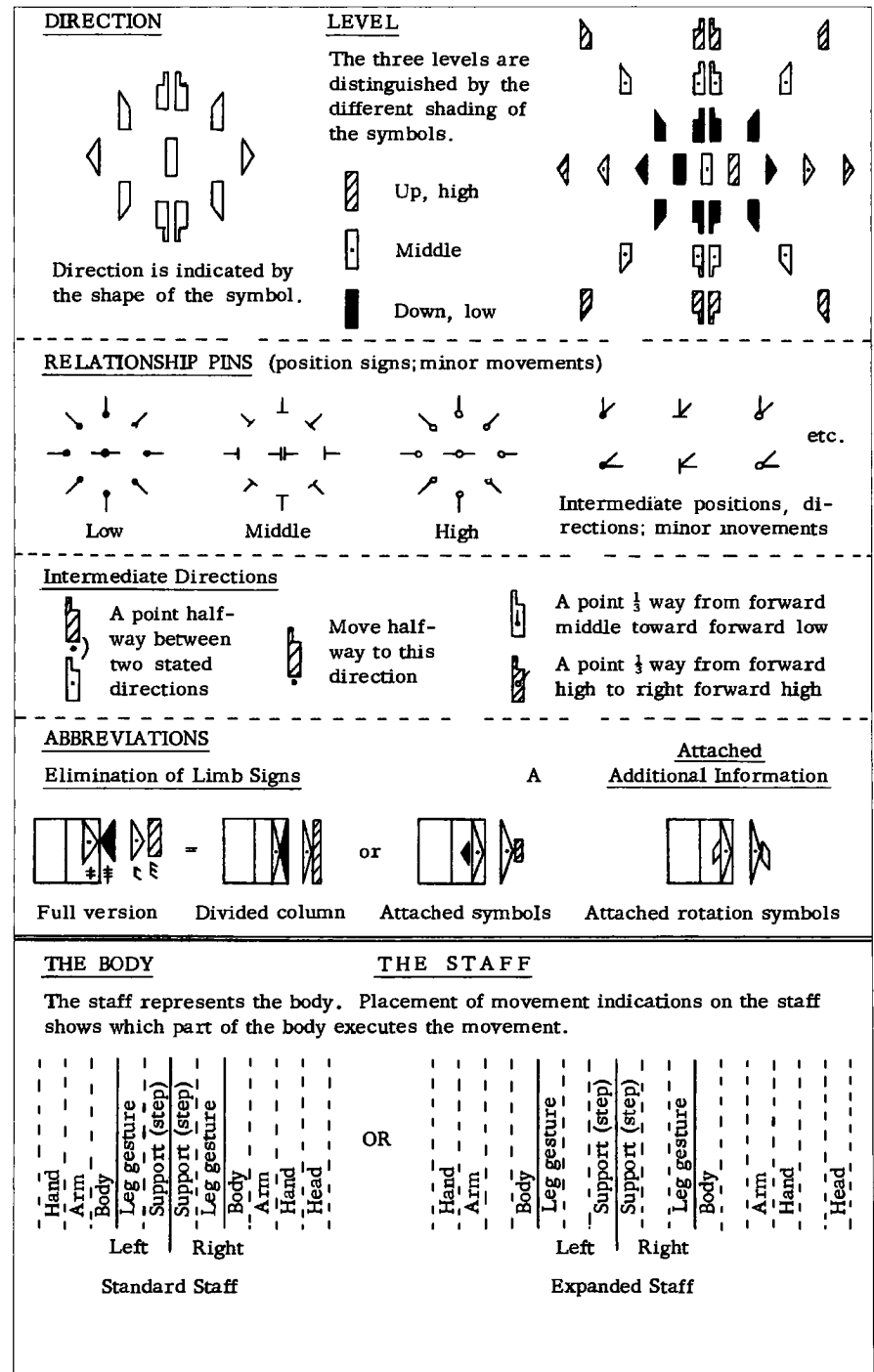
The reflection of space and the coding of complex dance movements displayed in symbolic forms was the foundation to understand sound visually. Hutchinson elaborates on Hungarian Rudolf Laban's notation techniques for describing precise movement and rhythm in dance. Hutchinson's system aims to record notations to present the principles of dance in definitive terms through visual examples. These visual applications give a firm foundation on which dance principles can be built. The system of specialized symbols describing movement is similar to this thesis in that it documents basic principles in visual form.

DYNAMIC SIGNS		Resultant, passive	Shaking, vibrato, tremolo
Slight accent	Strong accent		
EFFORT SIGNS (those in parentheses are Laban's abbreviated version)			
The Eight Basic Efforts			
	()	Strong, direct, slow (press)	
	()	Strong, direct, fast (punch)	
	()	Strong, flexible, slow (wring)	
	()	Strong, flexible, fast (slash)	
Element of Control		The Complete Effort Graph	
	Bound flow, guided, controlled, restrained	a - weight (force) b - space c - time d - flow	
	Free flow, unrestrained		
Because the extensive research work undertaken in recent years on the full use of dynamics, particularly in theatrical dance, is not yet completed, the new "working" signs are given here so that they can be identified when met in current working scores.			
Previous Signs		New Working Signs	
	Strong		Strong
	Weak		Gentle
	Emphasized		Relaxed
	Unemphasized		Uplift, buoyant
	Resilient (elastic)		Resilient (elastic)
	Resilient (elastic)		Weighty, heavy (reaction to pull of gravity)
OLD SIGNS (the new equivalent is indicated in parentheses)			
Wide, stretched		Front Signs, Stage Pins	
Keys for Systems of Reference		Analogy Signs	
(see Chapter 25)		Deviations	
Finger Signs		Deviations	
		Pins are now used instead of the very small direction symbols.	

These symbols provided reference for how to visually display dynamics along with movement.

Figure 1.2
Labanotation
 Ann Hutchinson
Model of recording movement
 pp 509, 435

This example shows direction, position, and three main levels of movement: turning, rotating, and twisting. These symbols, known as pins, are used to describe the positions and the feet or the relationship to the body's centerline. These symbols illustrate direction and visual rotation.



History of Communication

Maurice Fabre

Communication Theory

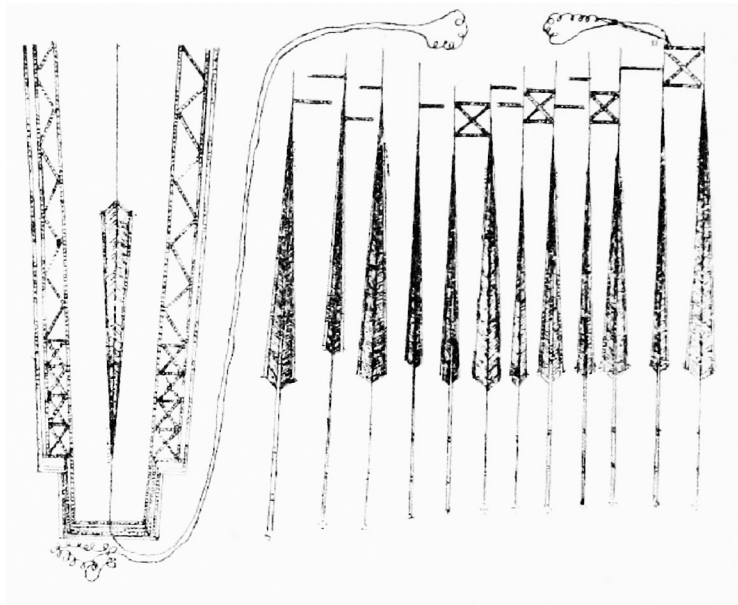
pp 9, 10

Maurice Fabre in *A History of Communication* documents the major occurrences that shaped communication and shows how our environment is shaped around human's potential to communicate.

Fabre writes that *to communicate is to be alive, to be active, in relation with others... For communication is essentially an interchange, a question and a reply, an action and a reaction between an individual and the environment in which he lives. As everyone knows, communication in this sense is not confined to man but is shared to a certain extent with insects and animals. It may involve sight, touch, and hearing, gestures, expressions, and noises.*

One form of communication is writing, within which are signs, symbols, ideograms, pictograms, and letters. For example, the display of a love song from the Siberian tribe, Yukagira, can be seen on a piece of birch bark. This early display of music is important to this thesis because it uses a form of visual language at a time when no written alphabet existed for a virtually unknown tribe.

Figure 1.3
Love Song Siberian Language
Yukagira Tribe



Understanding Form and Function

John Bowers

p 44

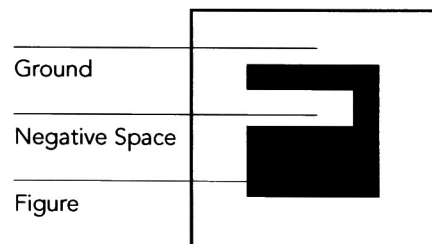
The visual component, figure/ground is discussed to recognize the importance of space in a composition and the interaction with form. Form is the arrangement of parts that differentiate one thing from another. Psychologists discovered that humans understand figure/ground relationship when people can perceive the difference and separate positive form from negative background. This figure became a guide to ensure that spatial interaction has been properly addressed.

Figure 1.4
Design Fundamentals

Scott Gillam

Figure/Ground Relationship

pp 10-30



Baseline

International Type Magazine

No 42–2003

pp 13–20

Frank Armstrong proposed to develop a new methodology for understanding typographic design, based on theoretical analogies between music and typographic composition. His theory, discussing visual equivalents to basic principles of music, such as harmony, melody and rhythm, is presented in *Baseline*, an International Typographic magazine. *Baseline* is the leading international magazine for typography. The philosophy of this magazine is to reflect all aspects of type, including its design, history, use, and links to the graphic, art and craft scenes. The passion for typographic composition based on theoretical analogies of music has been developing for twenty years. This case study introduces how music notation is directly related to understanding kinetic and static typography, supplying a visual notational system which made comparable meaning between music and visual symbols.



Figure 1.5
Hearing Type
Frank Armstrong
Properties of Sound
pp 18, 19



Mechanical Engineering Design

Joseph Shigley
and Charles Mischke

The Phases of Design

pp 753, 230

Shigley's model was used to develop a methodology that makes it possible to teach the eight musical elements.

Ward describes Shigley's model as ...prescrib[ing] a process that repeatedly iterates through a sequence of steps, in which a problem is first understood and a solution synthesized. The solution is then analyzed and evaluated; based on the analysis, a new solution may be tried (and the problem definition may even be modified). The key point is that a single solution is synthesized first, then analyzed and changed accordingly.

Figure 2.1

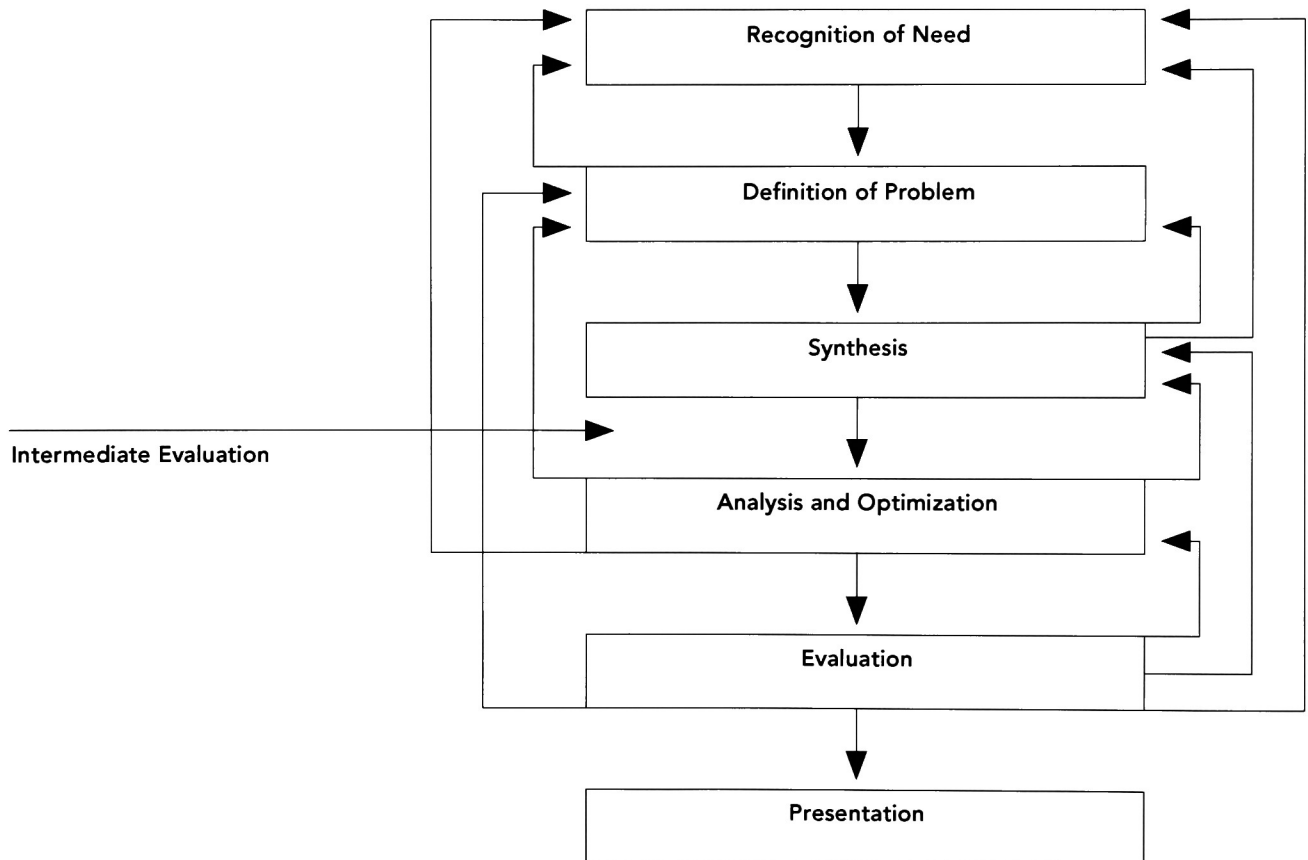
Design Theory and Methodology

Allen Ward

The Conventional Model

pp 81, 82

This model was adapted to this thesis and modified slightly to enable more evaluation stages. The placement of an intermediate evaluation stage can be seen below.



Visual Design System for Music Education

Processes

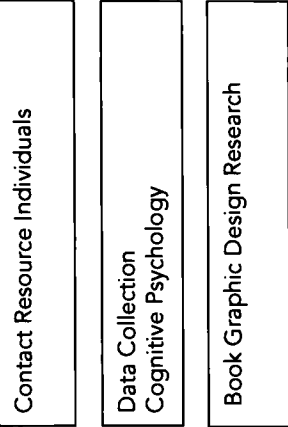
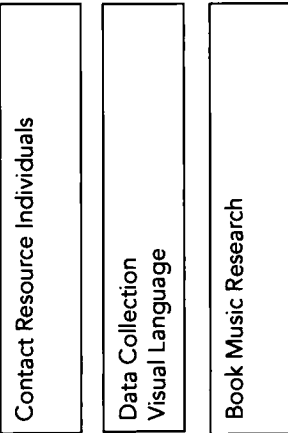
Music Research

Graphic Design Research

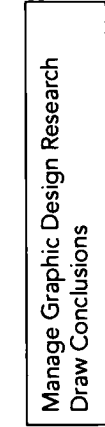
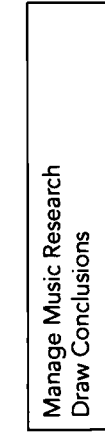
Process Stages

Problem Identification
People new to the study of music lack an understanding of the elements used to develop and describe music. This thesis will develop a visual system to be used as a teaching aid in helping students learn the principles of the eight music elements.

Thesis Research

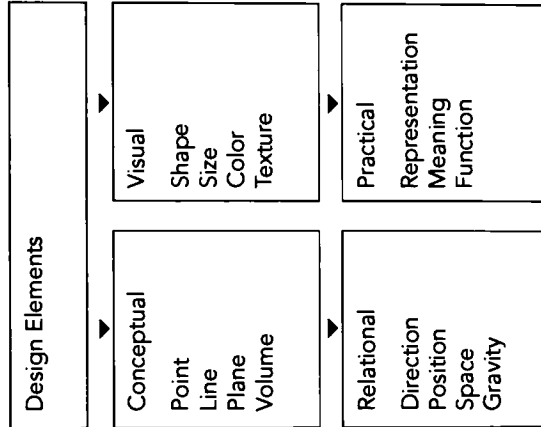
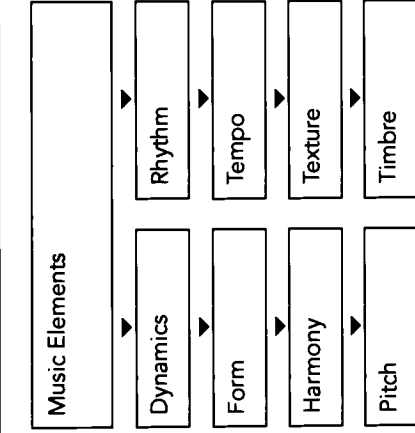


Research and Analysis
Collect a range of materials that are important to defining the problem statement



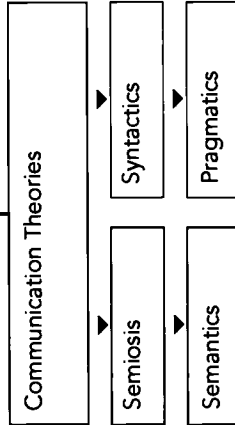
Synthesis

Analyze material collected and begin to organize data into understandable relationships between disciplines



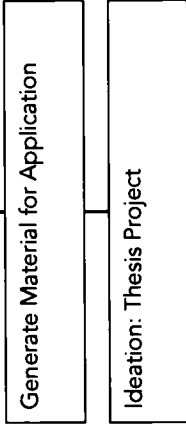
Intermediate Evaluation
Make references to learned experiences and focus on material defining the problem statement

Intermediate Evaluation



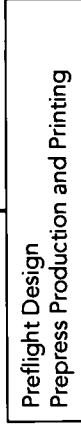
Ideation
Allow concepts to merge and form several solutions that could possible solve and define problem statement

Sign Theory Application

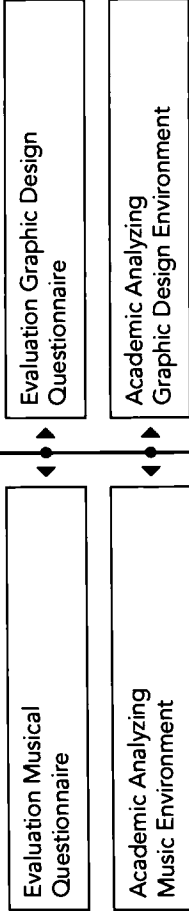


Implementation
Information and ideas should be refining the semantic and pragmatics of problem statement

Execution Manufacturing

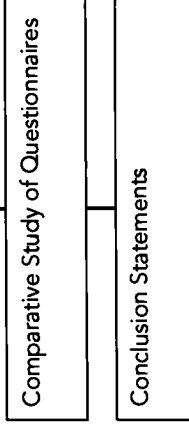


Dissemination



Retrospective Evaluation
Determine if application has effectively addressed the problem statement and identify what modifications need to be addressed from performance testing

Retrospective Evaluation



Thesis Project Definition	Introduce, identify, and understand the nature of the problem—including history, situation and goals.
Precedents	Describe other existing projects, case studies, and models that have meaningful relationships to the study.
Research	Describe facts, principles, theories, or relationships that have been discovered to help to solve the problem.
Synthesis	Describe interrelationships and patterns—sorting, sequencing, ordering information or parts of the problem.
Ideation	Describe the generation of conceptual solutions and preparation of a range of preliminary design approaches.
Intermediate Evaluation	Describe testing strategies that were used to judge ideation and the resulting selection of possible design solutions.
Implementation	Describe how the project was refined, developed, and produced to its final form or application.
Dissemination	Describe plans for future audience interaction—how could this product or information be distributed/used in the future?
Retrospective Evaluation	Assess the final product to determine strengths and weaknesses—how could future versions be improved?
Conclusion	Summarize overall experience and outcome—what was gained?
Glossary of Terms	Define particular terms that were used within the written documentation to aid in reader understanding.
Bibliography	List all sources used for the study by category—books, journals, magazines, web sites, etc.
Appendices	Label each tool, involvement or activity separately, enabling a reader to refer to additional supporting details at the end of the thesis documentation.

The primary subjects of this thesis were developed from thorough research in **design**: visual elements and rhetoric, perceptual and communication theories, and **music**: musical elements and music fundamentals. Additional information was sought from education and cognitive psychology. Subjects were researched on a macro and a micro level, to build a cohesive body of information that explain the systematic nature and intuitive principles of the foundational musical elements.

The investigation to construct this thesis began with the analytical understanding of the eight musical elements (Appendix A). The materials collected at the Sibley Music Library at Eastman School of Music provided clear definitions for these elements. The analysis of these definitions directed this thesis into researching the physics of music. During this search, *Psychology of Music* by Carl E. Seashore was consulted frequently to understand physical sound in the music medium. Seashore writes, *the psychological attributes of sound, namely, pitch, loudness, time, and timbre, depend upon the physical characteristics of the sound wave: frequency, amplitude, duration, and form*. Since all four terms are interchangeable, they provide the vocabulary for communicating frequency and the physical vibration of sounds.

The context of frequency was the link to visualizing pitch. In determining frequency, the number of successive sound waves determines intensity and divides pitch into two categories, indefinite and definite. Indefinite pitch has irregular vibrations and may include sounds like squeaking brakes or clashing cymbals. Definite pitch, or tone, has regular vibrations and reaches the ear at equal intervals. The investigation of the two categories of pitch led to a deeper understanding of the patterns of music and speech. These patterns of perceptual characteristics began to inform this thesis on how the frequency of pitch is analyzed using auditory nerve fibers and measured through the increment, Hertz (Hz). Hartmann presented a variety of examples to explain frequencies and pitch. He revealed that the most important of all musical intervals is the octave. The octave in western music has been fixed using twelve keys from the keyboard. The development of the piano gave instruments fixed frequencies (Appendix B). Pitch is determined by the frequency of regular vibrations and is given a specific value and corresponding name (note), expressed as a Hertz value (Hz). For example, if A is 440, G will be 392 Hz. The investigation of measuring nerve fibers yielded a major component of this thesis: the sound wave.

The research of the sound wave began at the Rochester Institute of Technology's Wallace Library. The fundamental principles of the nature of the sound wave gave an understanding of how to visually interpret the patterns of music and speech. Beyond visually displayed speech patterns, research moved into patterns, signs, symbols, and ornaments of design. These visual threads of design became references to visualizing information and also produced an exploration into dynamic symmetry. The rhythmical units of dynamic symmetry in visual composition are analogous to the geometric structures in musical composition. The research of the sound wave and dynamic symmetry created a parallel that instigated a theoretical analysis of the relationship between music and design.

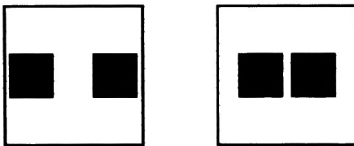
To reference and process information, the documentation was organized in notebooks (Appendix C). A timeline helped to prioritize research activity and maintain good time management (Appendix D).

Figure 2.2
Design Fundamentals
 Linda Holtzschue
 and Noriega Edward
Gestalt Psychology
 pp 52, 53



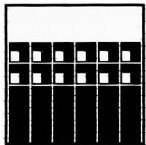
Continuance

Continuance occurs when nonessential material is removed from the visual statement so only those components that are absolute remain.



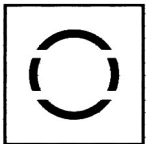
Proximity

Proximity refers to how elements tend to be grouped together, depending on their closeness. Elements closer together appear to be related.



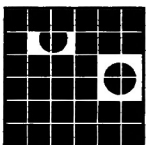
Overall Pattern

A texture is a visually reduced pattern, and a pattern is a visually magnified texture. Patterns and textures can be developed two or three dimensionally and from anything that can be repeated. They are made by repetition of similar or dissimilar individual components placed in relatively close proximity.



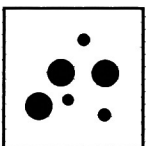
Closure

The human's perceptual ability to complete partial images is referred to as closure. A form displays closure when the separated elements are identifiable for mental completion.



Alignment and Grid Systems

Alignment can be divided into physical and optical components. Physical alignment is achieved when two or more elements are placed on a perceivable common line. An optical alignment occurs when the common line is not physically included in the composition. These physical lines used to organize, unify, and structure elements within the composition are referred to as a grid.



Similarity

Elements that share qualities such as color, size, and direction relate to one another.

Figure 2.3
Theory of Design
 Peter Gasson
Unity of Composition Rhythm
 pp 39, 70

The essence of rhythm is ordered variety, and ordered variety (in design) means the ordered arrangement of distinguishable things. In much the same way, the rhythm in music is attributed to the ordered sequence of notes played, and not to the actual notes themselves, so it is in design. The example shows two waves of different frequencies producing a beat. The creation of rhythm demands that at least three lengths, three shapes or three different spacings are supplied. This principle of a regular interval contributed to the development of this thesis because it began to visually represent one of the eight musical elements. *Theory of Design* also focuses on the aesthetic sensibility of the line, shape, proportion, and the overall form.

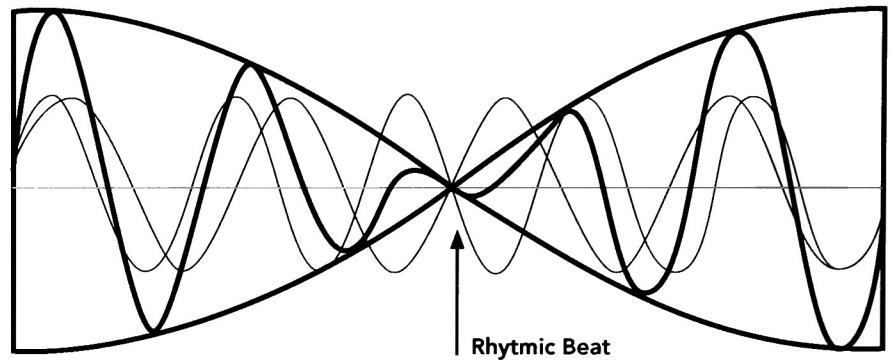
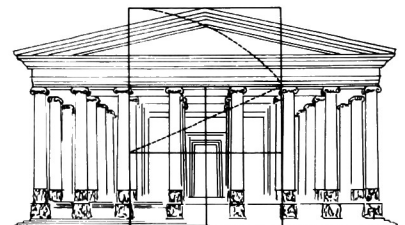
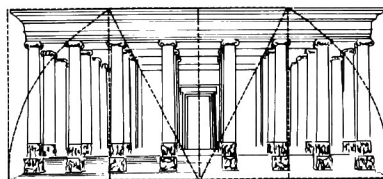
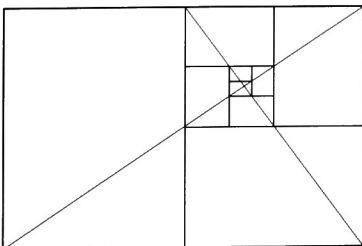


Figure 2.4
Elements of Dynamic Symmetry
 Jay Hambidge
Synthesis and Analysis
 pp 3-14, 17

The rhythmic units of dynamic symmetry in visual composition are analogous to the geometric and proportion structure of musical composition. Dynamic symmetry is founded on the architecture of human and plants and had its origin in ancient Greece. Simple visual shapes were developed to represent the geometric structure and proportion in musical composition. Hambidge reports that *It seems that the Greeks were perhaps the first to make real and lasting use of the golden rule and it is to them that we attribute many truly great designs—the Parthenon being just one such design among many.*

Figure 2.5
A Primer of Visual Literacy
 Donis Dondis
Golden Mean
 p 59

Dondis explains the importance of the scale system used by the Greeks, and this proportional formula known as the Golden Mean is illustrated here.



Auditory Perception
 Warren Richard
Analysis and Synthesis
 pp 1-4

Dr. Warren Richard, a chemist, introduces the fundamental principles of the nature of sound and focused on how sound is analyzed by the auditory system. These principles and guidelines that interpret auditory input informed this thesis on how to recognize and interpret the patterns of music and speech. *Sound travels through the air at sea level and normal temperatures at a velocity of about 335 meters per second, or 1,100 feet per second, for all but very great amplitudes (extent of pressure changes) and for all waveforms (patterns of pressure changes over time).*

In the first half of the nineteenth century, mathematician Joseph Fourier developed a visual presentation to depict both amplitude and time in the representation of waveforms shown in Figure 2.7. The analysis of the auditory nerve fibers, along with the periodic and nonperiodic sounds, serves as a model for displaying visual form. The display of 15 octaves ranging from 0.5 Hz to 16000 Hz is shown in Figure 2.6 (Hertz measures frequency; 1,000 Hz corresponds to 1,000 repetitions of a particular waveform per second). This diagram displays the perceptual characteristics of the frequencies of pitch and the 1/3-octave filters used. This resource, displaying the different frequencies of instruments and sounds, underlies the thesis application.

Figure 2.6
 Warren Richard
Pitch and Infrapitch
 p 79

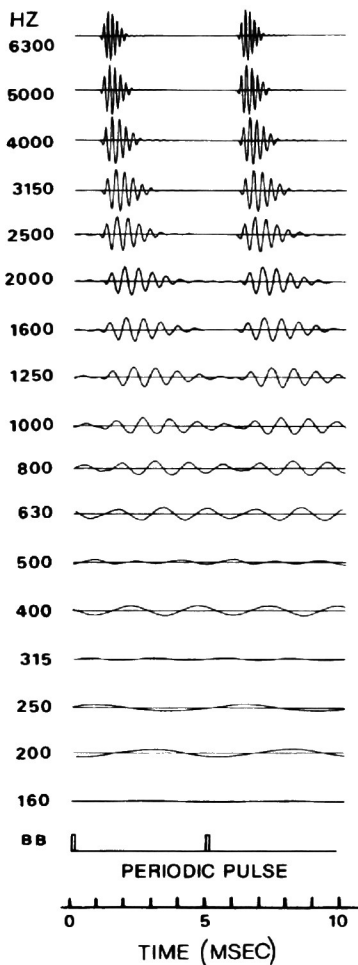
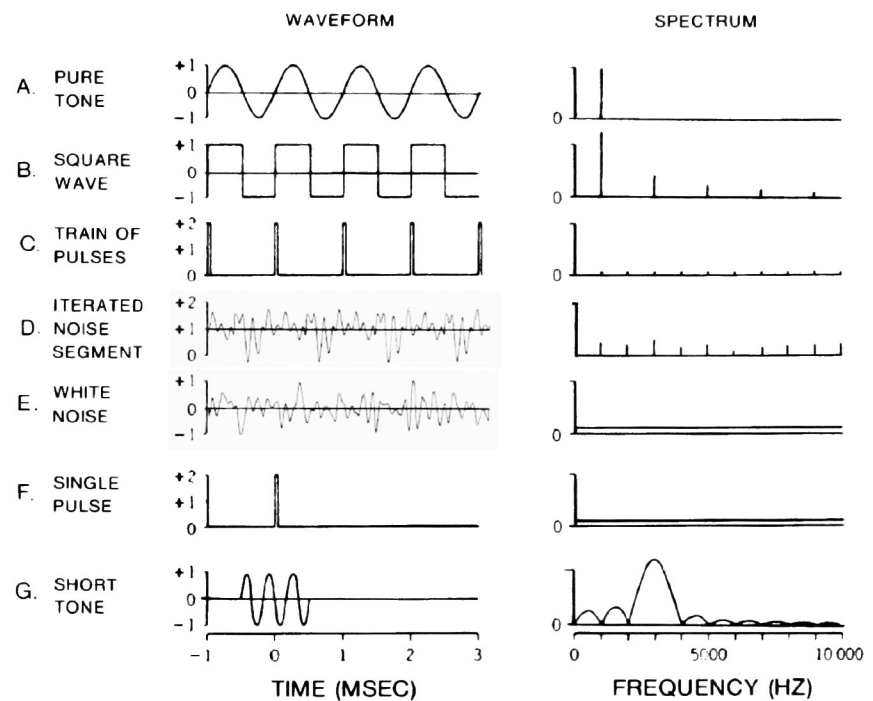


Figure 2.7
 Joseph Fourier
Waveform /Amplitude Spectra
 p 2



Signals, Sound and Senation

William Hartmann

Pitch, Chroma, Octive

pp 145–149, 264–281, 324–328

Hartmann used a variety of examples to understand the quantitative skills involving signals, aperiodic signals, and noise. Hartmann revealed that the most important of all musical intervals is the octave. He determined that the octave divides into smaller intervals and states that there are a multitude of dividing intervals across cultures. The variety of temperaments and tunings within the western musical tradition has been a major concern. The development of the piano changed the tradition and gave instruments fixed frequencies. The keyboard is constructed with 88 keys that interlock and stack. The keyboard intervals were approximately equal between keys, and this construction changed tradition to make the octave consist of twelve keys. Figure 2.8 shows an octave consisting of the twelve keys. *Tones separated by a tritone (half an octave) are on opposite sides of the chroma circle. One octave, from c to c' , is shown here with a heavy line.*

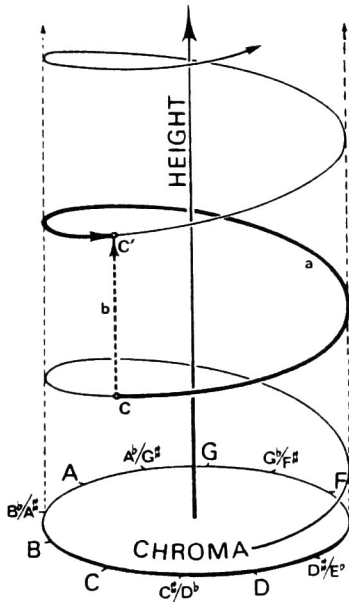
Harmonics are divided to form intervals in Figur 2.9. These intervals, in turn, create cycle waveforms known as beats. *For in each cycle of the waveform there are six beats between frequencies of $39.5f$ and $45.5f$ (790Hz and 910Hz).* This research is useful in understanding how the beat begins to measure time and display pitch.

Figure 2.8

Roger Shepard

Chroma and Pitch Height

p 146

**Figure 2.9**

Kohlrausch and Houtsma

Cycles of Waveforms

p 326

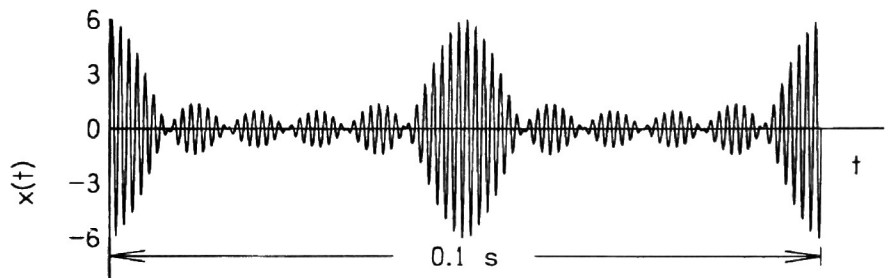


Figure 2.10
Physics of Music
Scientific American
 Frederick Saunders
Frequency Range
 pp 7–15

This harmonic analysis shows a comparison of frequencies across several musical instruments, and the diagram gives a harmonic analysis of different musical subject matter.

This is relevant to this thesis because it is through the understanding of music that sound can begin to be represented visually. Music is complex, and an understanding of how music transfers through different frequencies became the basis for developing the eight musical elements into a visual sign theory.

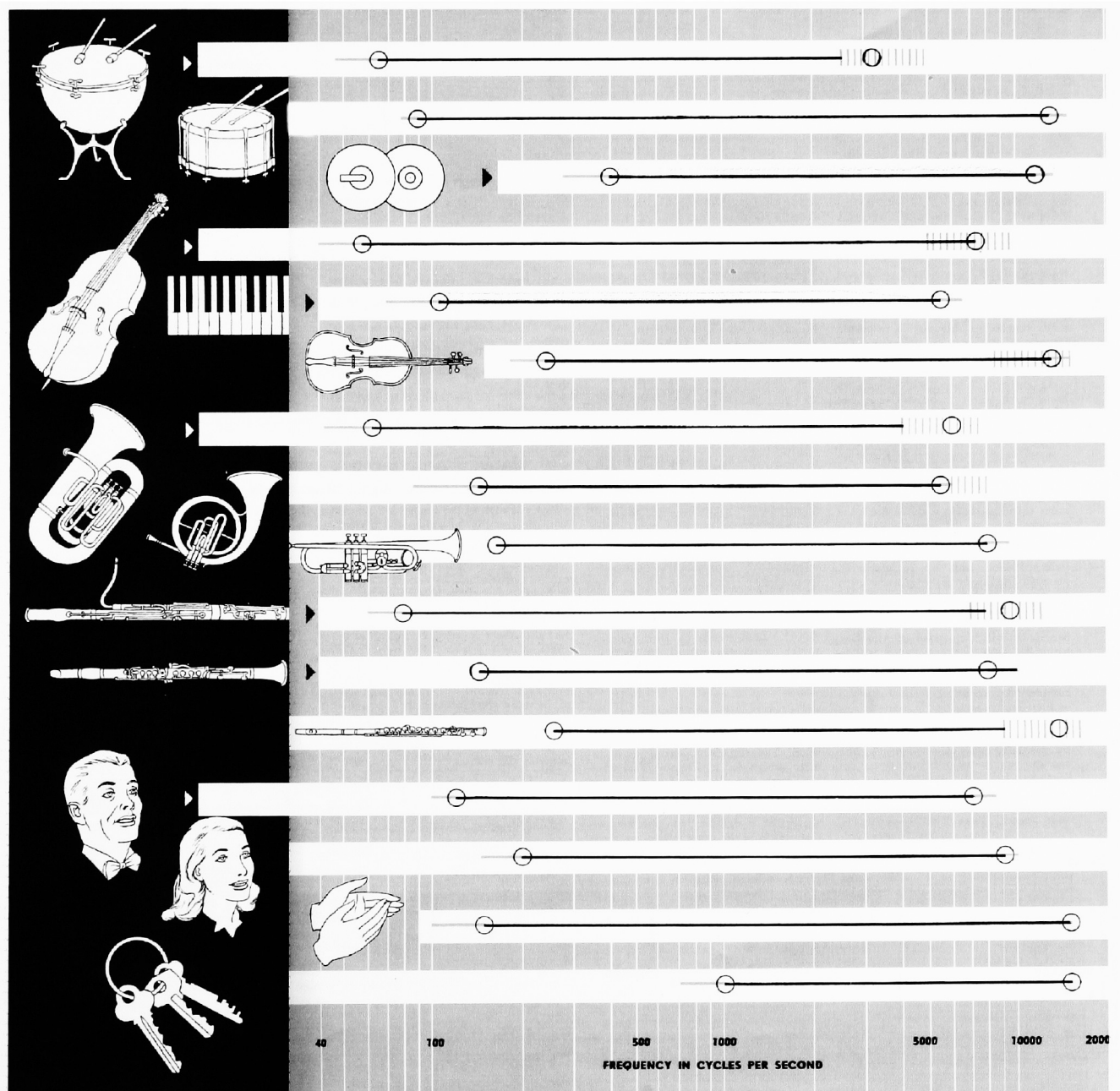


Figure 1.4
The Mathematical Theory of Communication
 Claude Shannon
 Shannon and Weaver process of Electrical Transmission
 p 35

In 1964, American mathematician and computer scientist Claude Shannon and American scientist and computer engineer Warren Weaver produced the first visual model to represent the communication process.

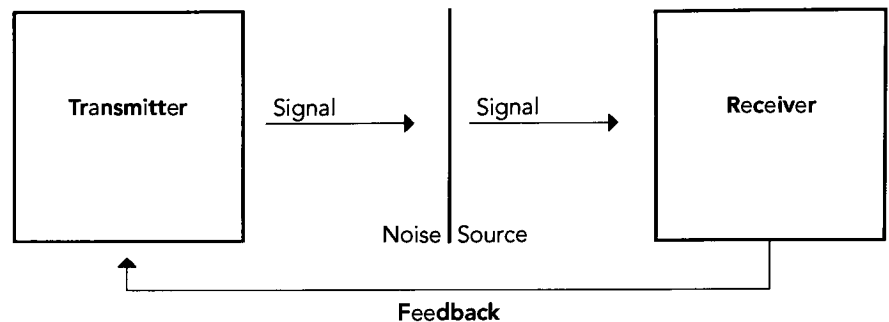
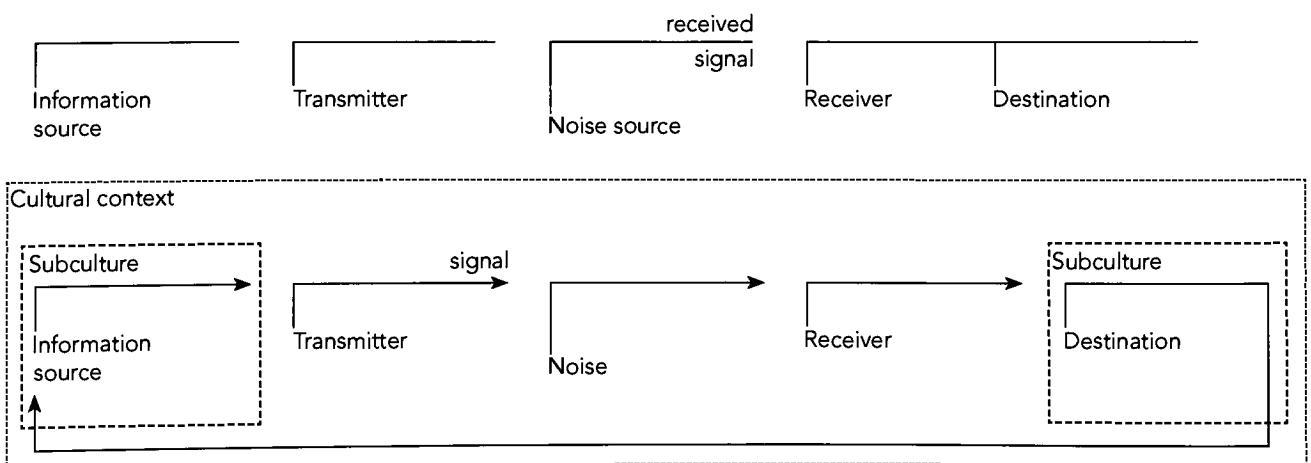


Figure 1.5
Type and Typography
 Phil Baines and Andrew Haslam
 Gerberr's Adaptation for Human Communication
 pp 34, 35

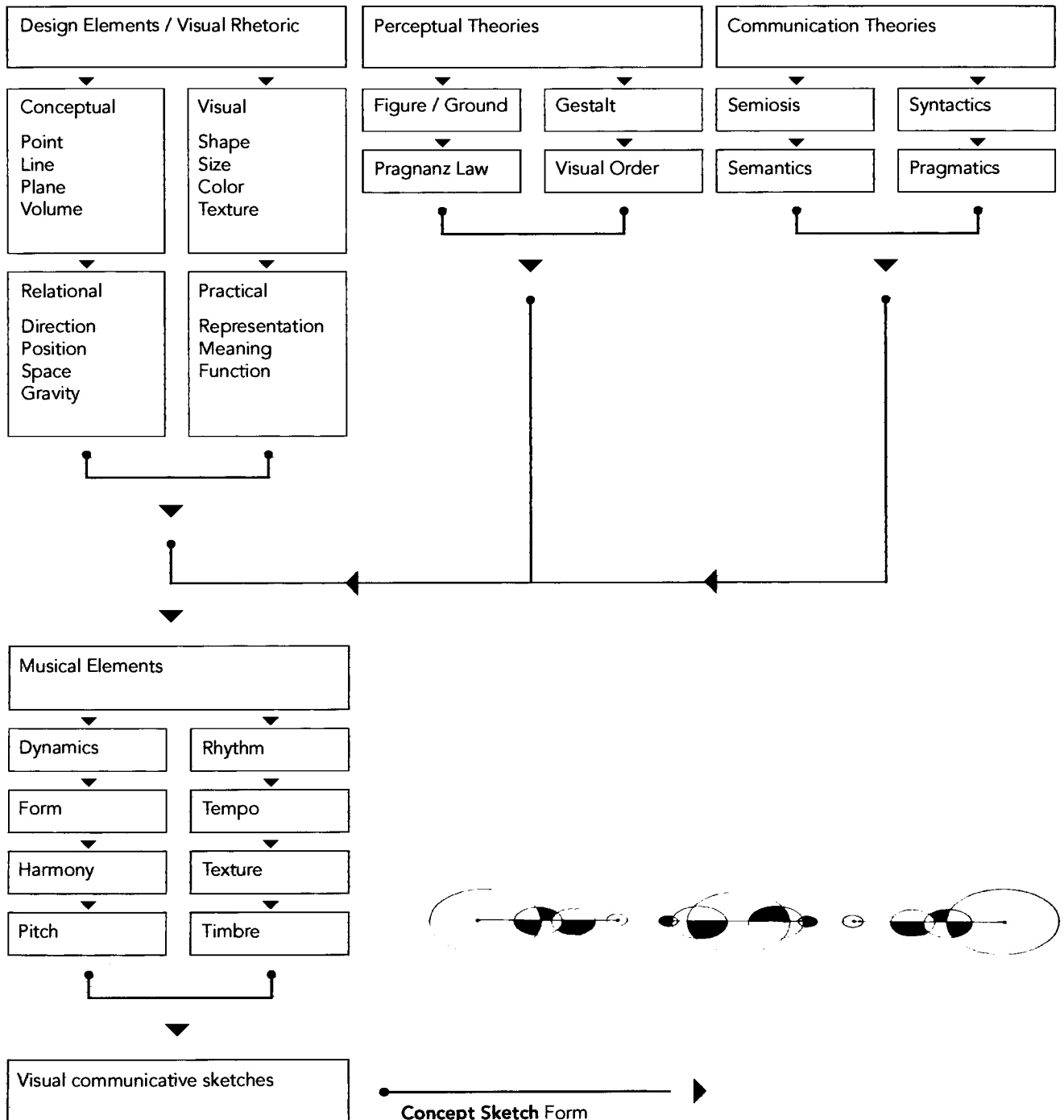
Baines and Haslam described the value of Shannon and Weaver's model of communication for the telephone, radio, and radar. They determined that the theory of communication depended on primary sound waves created by speech. The issue that Baines and Haslam discuss in *Type and Typography* is that the Shannon/Weaver model takes an interpretation of our cognition to decode the meaning of the message. George Gerberr's model, based on human analysis, not adapted from machines, is more applicable to the process of human communication.

These models indicate or suggest how this thesis delivers the intended message to the target audience. The goals and objectives follow these communication models to ensure that the final application is a clear interpretation of the intended proposal.



Explanatory Table

An explanatory table was constructed to determine the most effective organizational structure for communicating the collected research. This table allowed the information to formulate and organize research into structured concepts, principles, and theories. This structure also aided in focusing the information to effectively communicate visually the different layers of the musical elements. The conceptual sketches which developed from this table are displayed in Appendix E.



**Art Fundamentals
Theory and Practice**
pp 50–55

To further understand how to effectively communicate the eight musical elements, the resource *Art Fundamentals and Theory Practice* was used. This textbook, intended for teaching design elements, explicitly explains each element. The major components that make a completed work of art are:

Subject

- In a descriptive approach to art, subject refers to the persons or things represented, as well as the artist's experiences, that serve as inspiration.
- In abstract or nonobjective forms of art, subject refers merely to the visual signs employed by the artist. In this case, the subject has little to do with anything experienced in the natural environment.

Content

Content is the expression, essential meaning, significance, or aesthetic value of a work of art. Content refers to the sensory, subjective, psychological, or emotional properties that are felt in a work of art, as opposed to the perception of its descriptive aspects alone.

Form

- The arbitrary organization or inventive arrangement of all the visual elements according to the principles that will develop unity in the artwork.
- The total appearance or organization.

This example shows structural principles of visual order that organized visual differences within the application.

Figure 3.1
Art Fundamentals
Form and Visual Ordering
Robert Bone
David Cayton
Otto Ocvirk
Robert Sinson
Philip Wigg
p 53

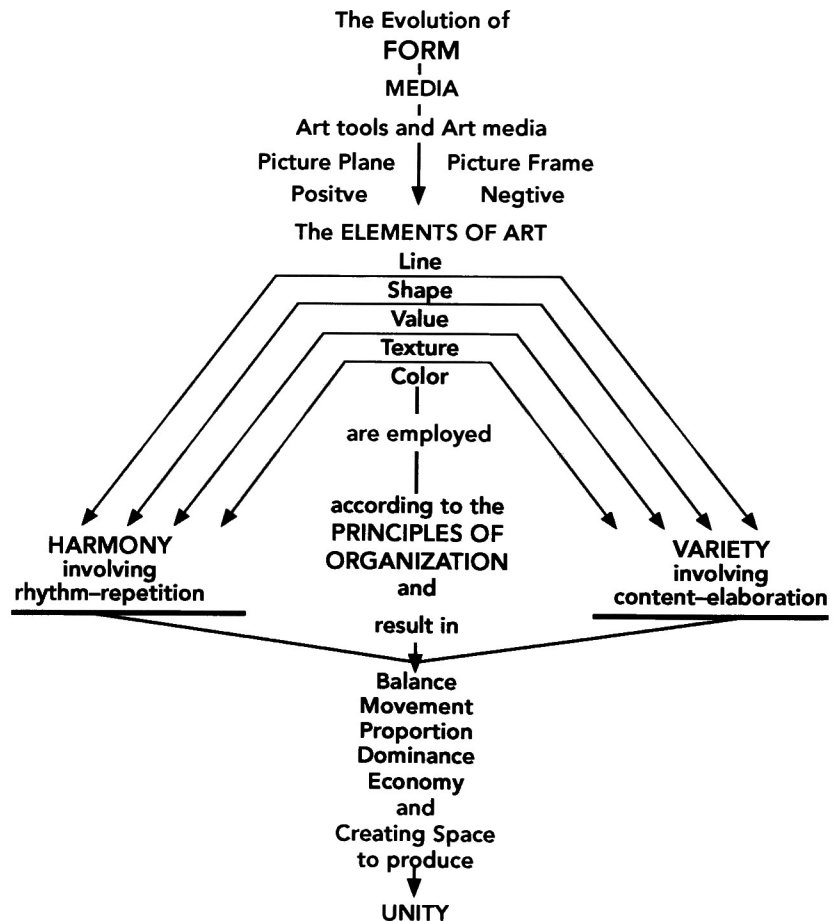
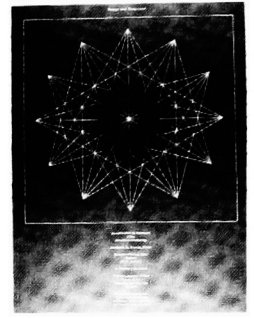
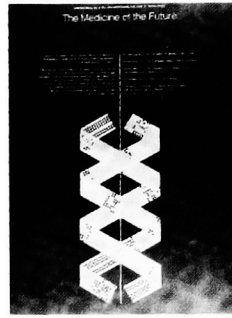
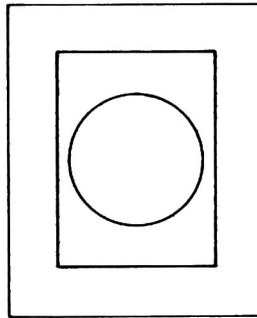


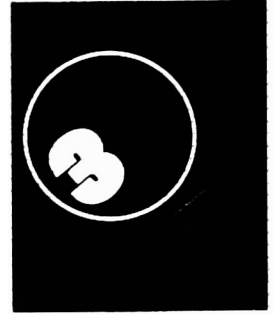
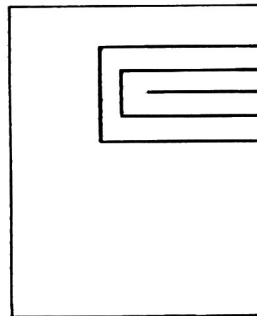
Figure 3.2
A Primer of Visual Literacy
 Donis Dondis
Visual Expression
 pp 50–55

This book gives a clear understanding of the basic elements and techniques of visual messages. The numerous illustrative examples clarify basic elements of design. Written analogies provide methods that help compose visual messages. Since *A Primer of Visual Literacy* is designed to teach students the principles of visual communication, it is a useful resource for effectively communicating the eight musical elements. These examples show a range of different ways to visually express content.

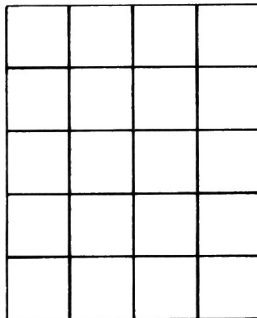
Symmetry



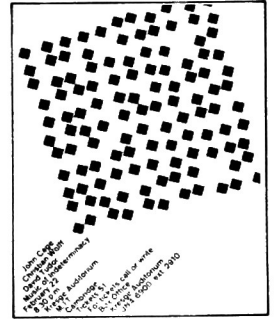
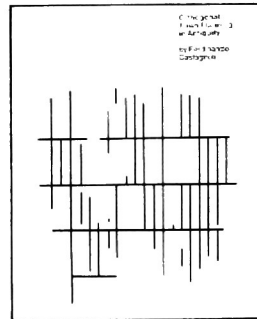
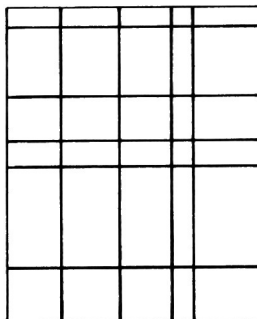
Asymmetry



Regularity

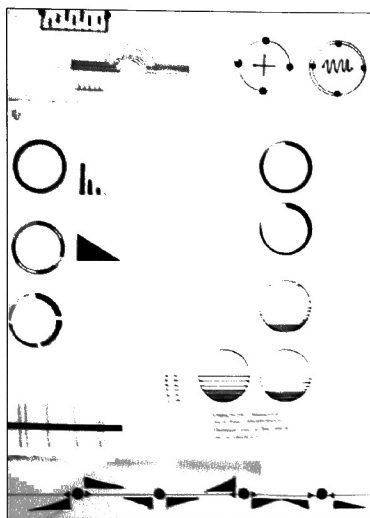


Irregularity

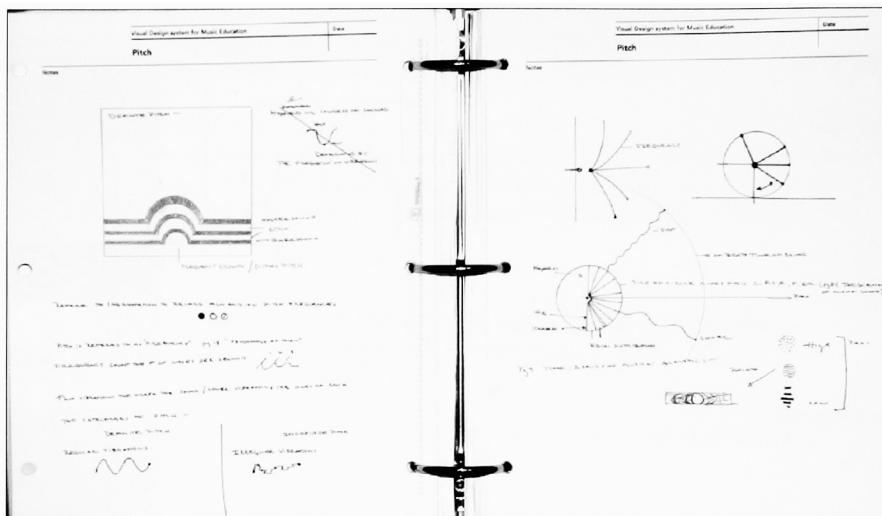


Concept Sketches

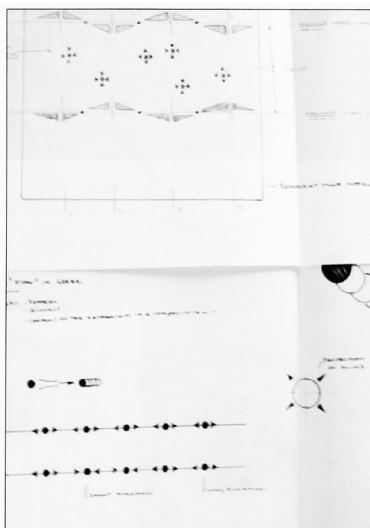
Depicted below are the original concept sketches from the development notebooks. These theoretical claymores from the research and analysis stage are accompanied by drawings, which began to illustrate optical foundations for the development of the problem statement. It was through these theoretical foundational blueprints that insights for the language of the elements of music were formulated into the preliminary design approaches.



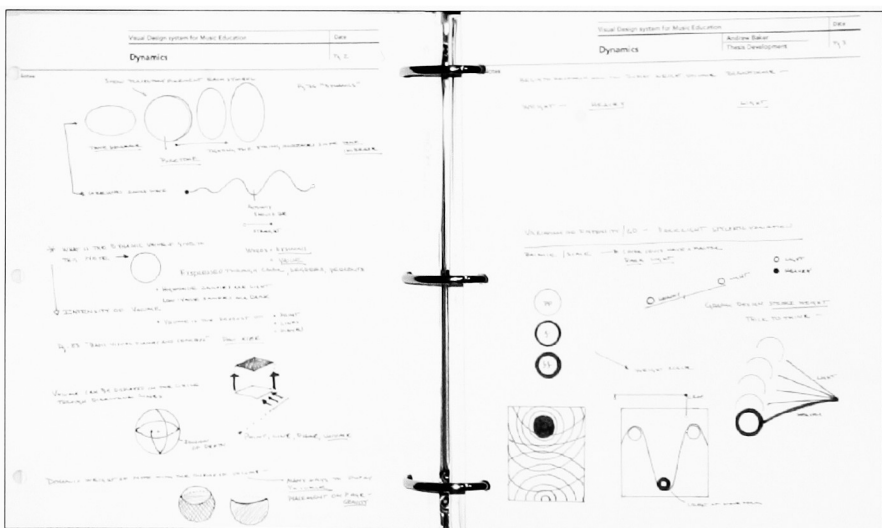
Synthesis of musical figures



Pitch is referred to as frequency; this qualitative attribute conditions the measurement of pitch and determines through the seconds of waveforms a definite tone distinction. The faster the vibrations or the higher number of crests to the waveforms, the higher the tones, and the lower the vibrations or number of waveforms, the deeper the tones. This ratio determined a visual movement to sound. Discussion sketches form chief advisor can be seen in Appendix F.



Synthesis of musical figures II



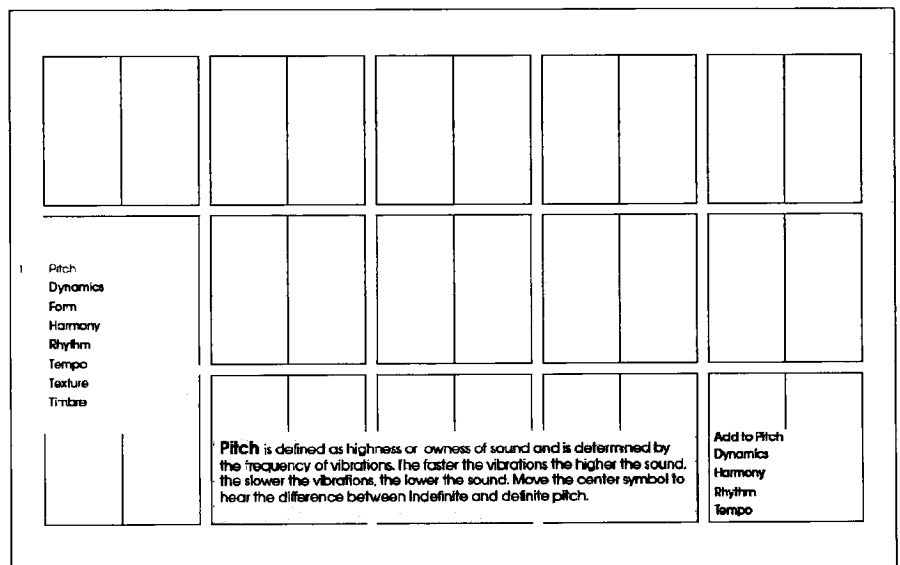
This information is associated with kinetics and the rate of change within dynamics. It is through the change of numbers that the power of tones and amplitude of sound was understood. This distinct understanding of the quality of a note that magnified through light or shades of changing numbers began to articulate the element dynamics.

Explanatory Table

The ideation phase explored several application formats to achieve the stated objectives. The content gathered directed the problem situation into an exploration of an interactive CD-Rom. This application was necessary to activate the participant and display the musical elements. The original concept flowchart, displaying the architectural framework of the interactive application, can be seen in Appendix G.

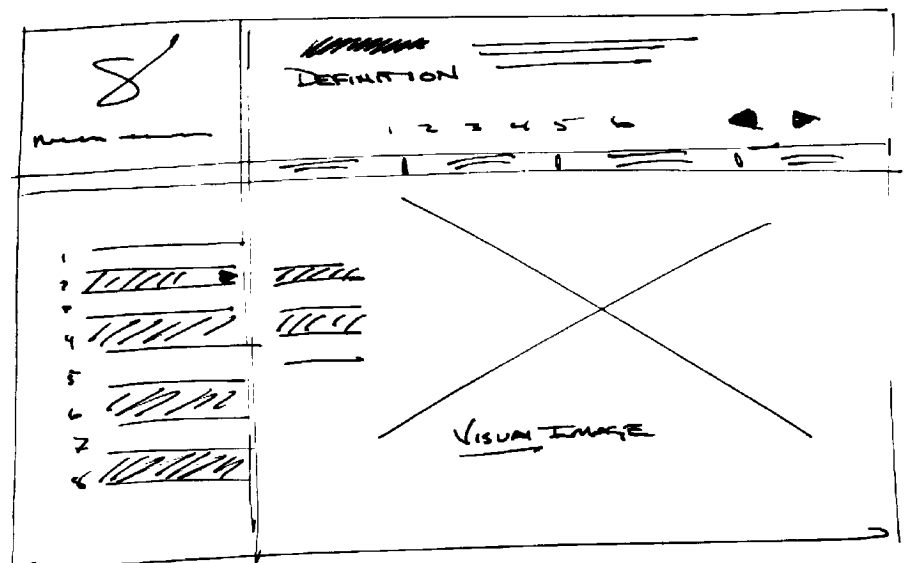
The interface design had to remain simple and intact without overwhelming or confusing the user. To ensure order in the application structure and navigation chart, a grid was implemented. The modular grid displayed below developed major horizontal divisions and provided a subtle visual language to unite navigational treatments.

The initial application decision experimented with elements such as color, size, weight, imagery, fonts, etc.. These spatial zones or sequences brought the complex ideas into a unification.



Proportional Modular Grid

Navigational treatment sketch

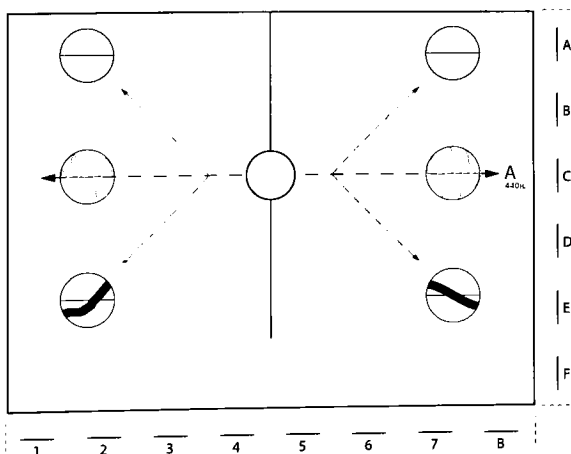
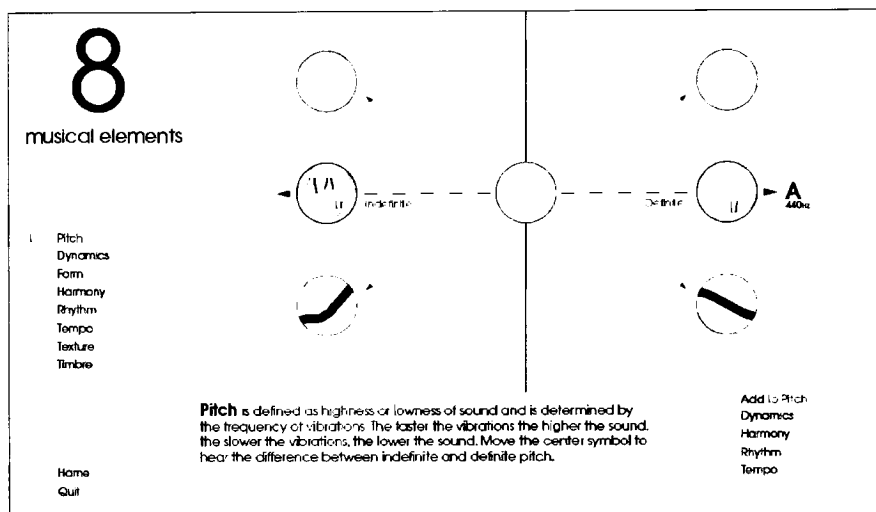


Explanatory Table

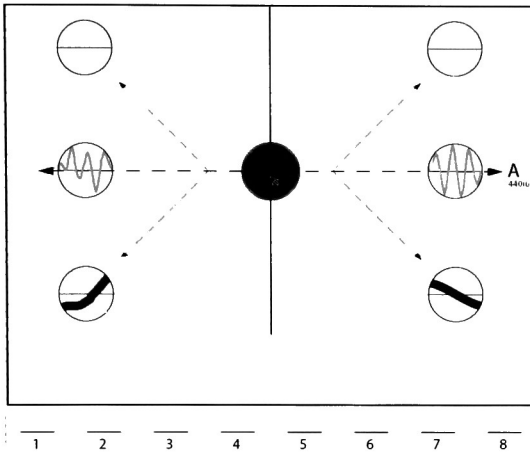
A computer generated storyboard of three elements, dynamics, pitch, and form was presented during the second committee meeting on January 14, 2004.

The initial response to the visual presentation was positive. Digression remained in the interpretation of the complexity of each of the three. The element pitch was analyzed and became the focal discussion point for the meeting. The comments pertaining to this element were directed towards reduction and simplification. The centralized tone with six surrounding pitch frequencies could reduce to two geometric shapes, one representing definite pitch, and the other, indefinite. Sine waveforms could constitute definite pitch and the indefinite pitch could be represented by cosine waveforms. The discussion moved into compiling the elements into a story. The point would be that the centralized figure would transform or help compose a narrative for each of the eight elements. To visualize how the point becomes a line and then transforms into a circle was suggested as a potential storyline. The deductive consensus was to further analyze the potential narrative for the eight elements.

Navigational Implimentations

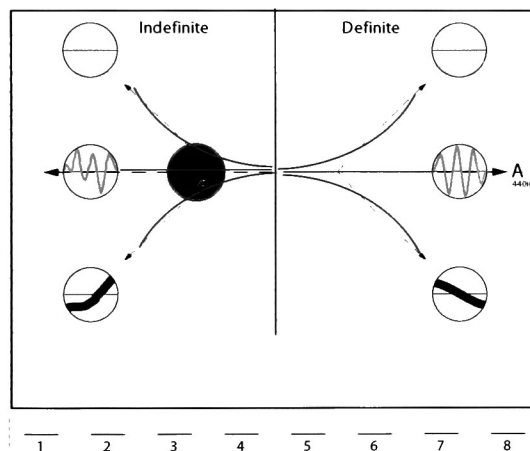


The page containing pitch introduces and defines the element through a definition, a visual representation, and audible sounds. The multiple sounds are activated by holding down the center of the pitch or tone symbol centrally located while moving along the displayed dotted lines. The left side of the tone shows indefinite pitch, which has irregular vibrations and may include sounds like squeaking brakes or clashing cymbals. Definite pitch, located at right of the symbol, has regular vibrations and reaches the ear at equal intervals.



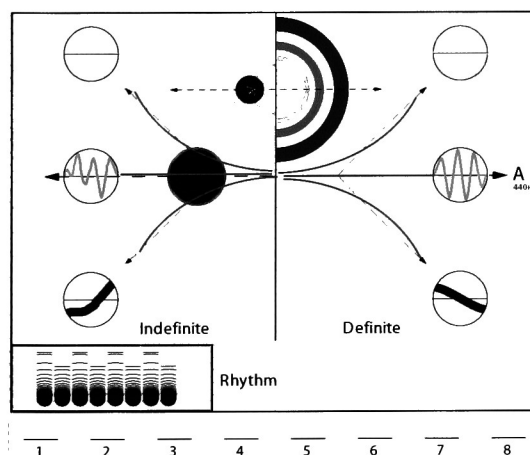
The activation of the pitch or tone is created by a double click of the mouse, and the sound sustains until the mouse button has been released. The sound is able to slide along the horizontal bar that changes the register of the pitch or tone, definite and indefinite. The pitch or tone is also able to change frequencies as it slides in a vertical direction in the grid section 2 and 7 from A-E.

Sound will begin with a double click on the center of the note.



The accompanied sound is activated on the grid in red. The indefinite pitch of squeaking brakes becomes the lower tone while the higher pitch consists of clashing cymbals. Definite pitch is created from a low bass G string, to a high E vibration of a violin that reaches the viewer at equal intervals.

Sound will produce indefinite tones and definite pitches.



The activated pitch can be manipulated by other musical elements, such as the dynamics located in the grid region 3-7 and A-B. Rhythm is displayed in 1-3 in letter F, while tempo could be displayed in section 4-5 and D-E. All these elements are controlled by the user to further understand the musical elements.

Sound will change by moving the musical elements on the page.

The transcript of all supporting text can be found in Appendix H.

Explanatory Table

In response to the complexity of the interactive application, an evaluation stage occurred to form configurations and to process the instructional objectives. This strategy to reframe the collected research generated a perception to further process and analyze the basic visual theories and concepts of design. The investigation began with Paul Klee, a master teacher at the Bauhaus in the 1920s, who developed the *Genesis of Form*. These theories in pictorial form provided a key to understanding how motion can be visually displayed. The realization that music is not static in the 2-dimensional plane, however very much alive, began research into the attributes and conceptual terms of motion in this dimension. The investigation began with researching the *Genesis of Form*, which provides the root to the development of motion in the visually dimension.

The process is delineated into 10 steps:

- 1 The point is not dimensionless, but is an infinitely tiny elemental plane, an agent that carries out no motion; in other words, it is at rest.
 - 2 Apply the pencil, and shortly a line is born.
 - 3 The point as a primordial element is cosmic. Every seed is cosmic. The point as an intersection of ways is cosmic.
 - 4 As a point of impact, the point is static.
 - 5 Tension between one point and another yields a line.
 - 6 Not yet discharged (abstract).
 - 7 Discharged
- The universal cause is, therefore, reciprocal tension, a striving for two dimensions.
- 8 Two points are ideally related in tension to a line. The result is an arc.
 - 9 Given equal velocities, the propagation of points along a line results in a meeting in the middle.
 - 10 The point sets itself in motion, and an essential structure grows.

Psychology of Music

Carl E. Seashore

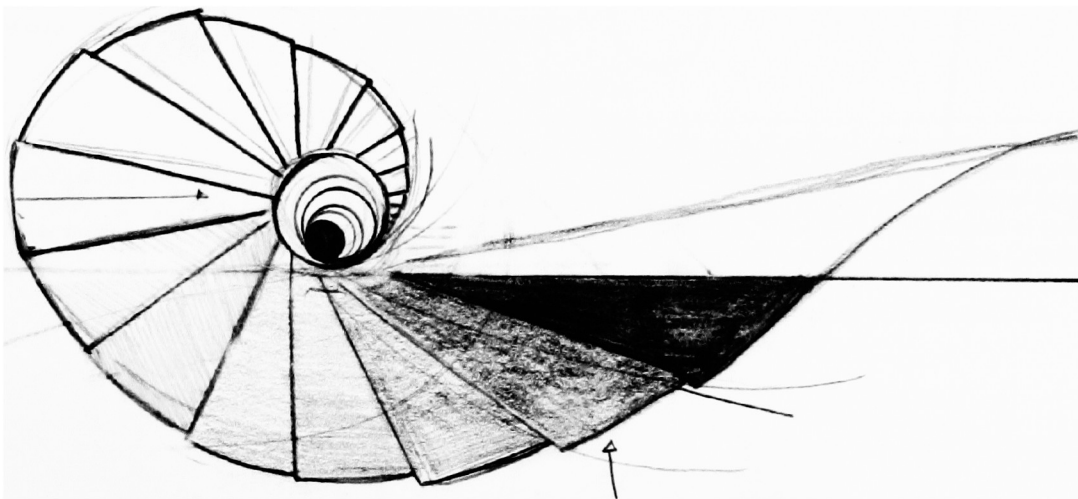
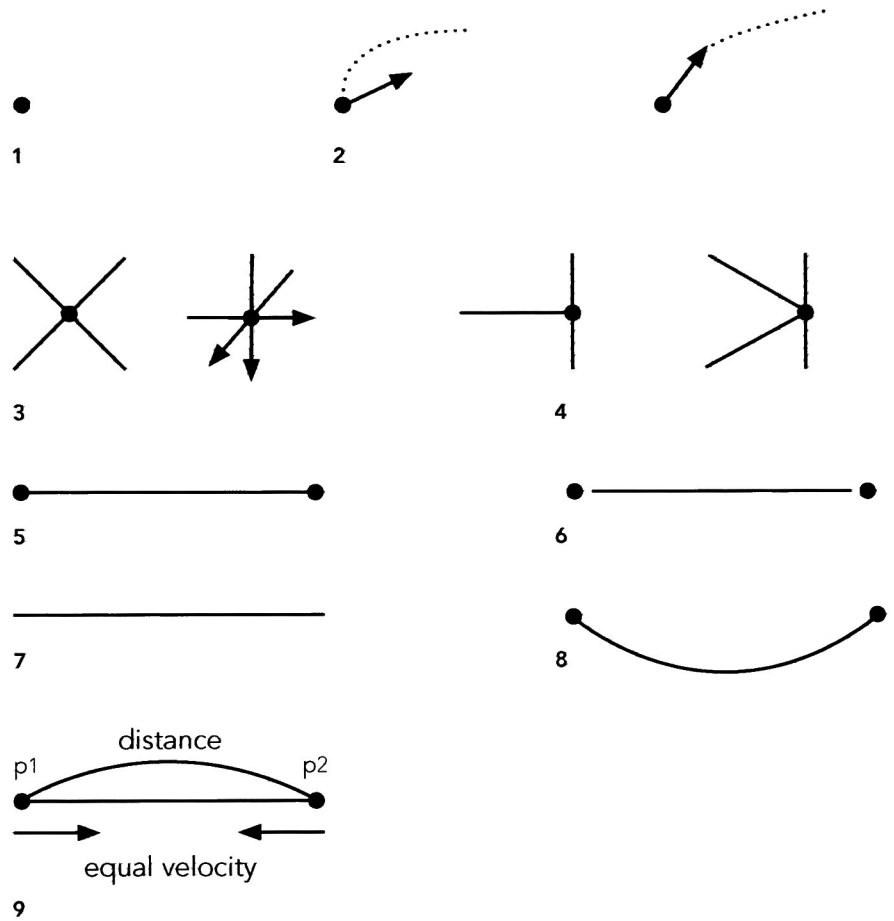
The Musical Mind

p 5

This progressive sequence develops a circle that yields sustained motion. The formation of the circle involves a radius growing from the inside out in pure progression, constituting a visual representation of the equal validity of intervals. The regular geometric division produces a linear arrangement of sound waves. "Synthesis of figuration," explained by Klee, is a growth of primary motion along a single dimension. The motion is represented by the sound wave, which, according to Seashore, "is the only medium through which music as such is conveyed from the performer to the listener." The sound wave is determined by the intensity of the physical tone, which is measured by the amplitude, or height, of the wave from crest to trough. The rhythmical units of dynamic symmetry in visual compositions are analogous to geometric structure and proportion in musical composition. These analogies enabled conceptual sketches to formulate and direct into theoretical ideations.

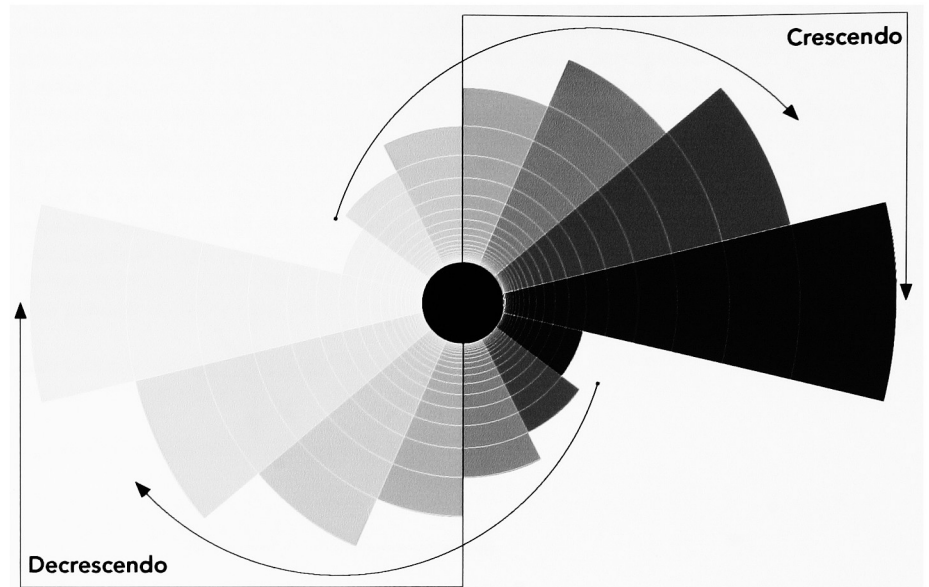
Pitch Analysis

Figure 4.1
The Thinking Eye
Paul Klee
Genesis of form
pp 18–21



THESE ARE STROKES AND WEIGHTS NOT COLOUR

Formation of Radius Dynamics



Visualization of a spherical object using a centralized pitch or tone to create the illusion of dimension for the representation of the element dynamics.

Conceptual Thoughts *The Thinking Eye* Paul Klee

Depicted below are the generated concepts and thoughts from Klee's theories. These theoretical concepts created a menu of pathways for the visual language of the elements of music.

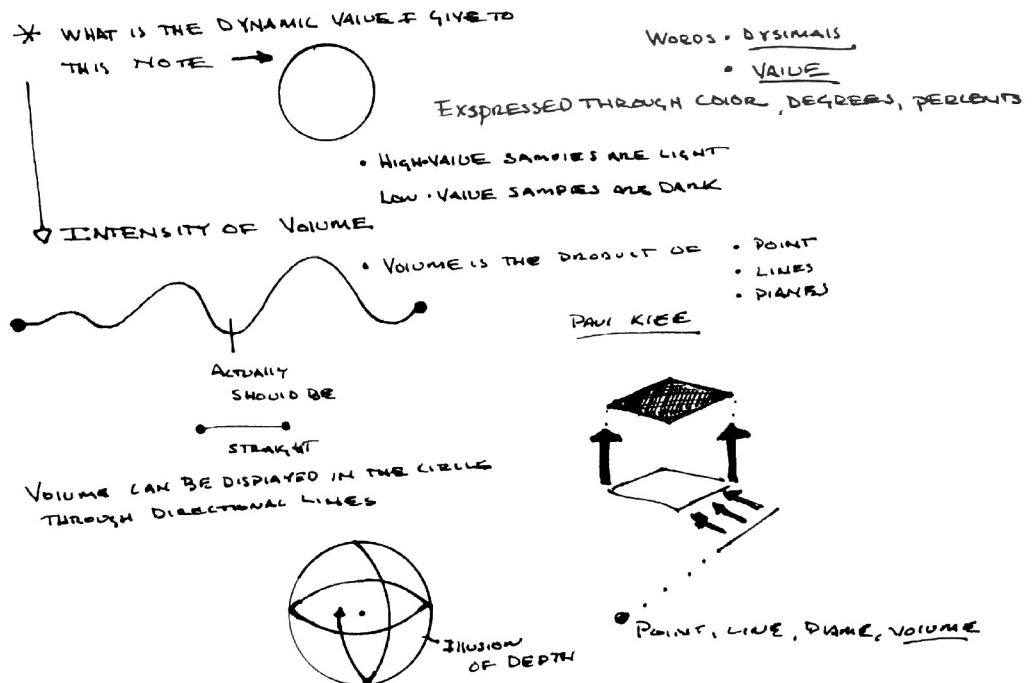
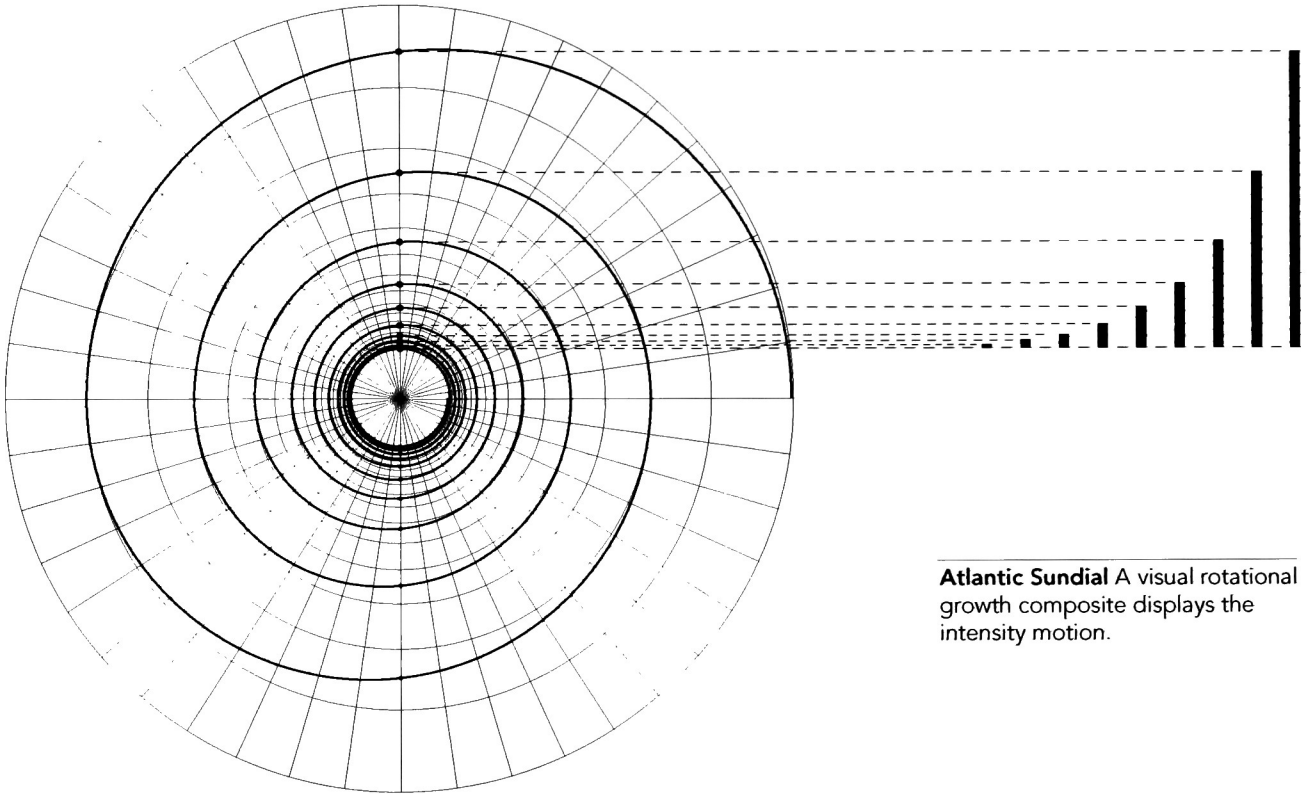


Figure 4.2
The Power of Limits
 Gyorgy Doczi
Dinergic Atlantic Sundial
 pp 52, 53

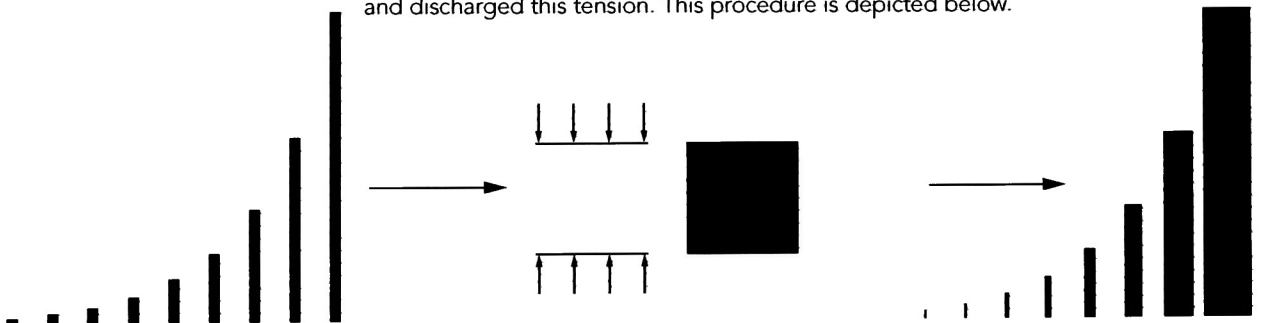
The Atlantic sundial is able to measure successive increments of growth because of its nearly circular shape. Since all vibration and rhythm are shared because of the underlying sound frequencies of wave patterns, a composite to visualize music can be generated from the diversity of the harmonious rhythm of light and sound. The central radius captures rhythmic acceleration as the tempo increases, changing the visual configuration. This ability to communicate the passage of time was done through sequence, a property that enables order for succession. The employed multiple stationary of frames is referenced with thick horizontal rules capturing the change of motion in a two-dimensional visual expression.



Atlantic Sundial A visual rotational growth composite displays the intensity motion.

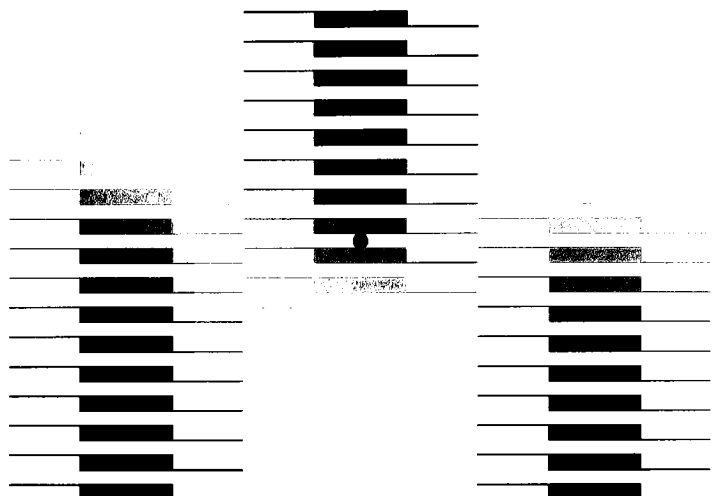
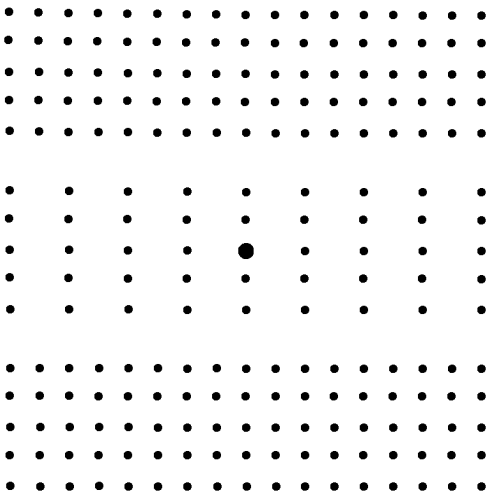
Figure 4.3
Paul Klee the thinking eye
 Paul klee
Linear-passive
 p 112

To represent the varying degrees of volume, the visual rotational growth composite allowed tension to become the reciprocal force to quicken spatial motion. This motion traces the growth composite and allows the physical forces to reconstruct the varying degrees of dynamics. The linear displacement of weight was developed from Klee's linear-passive theory. This theory enables the growth composite to incorporate volume when a line entered into a relation of tension with a parallel line and discharged this tension. This procedure is depicted below.



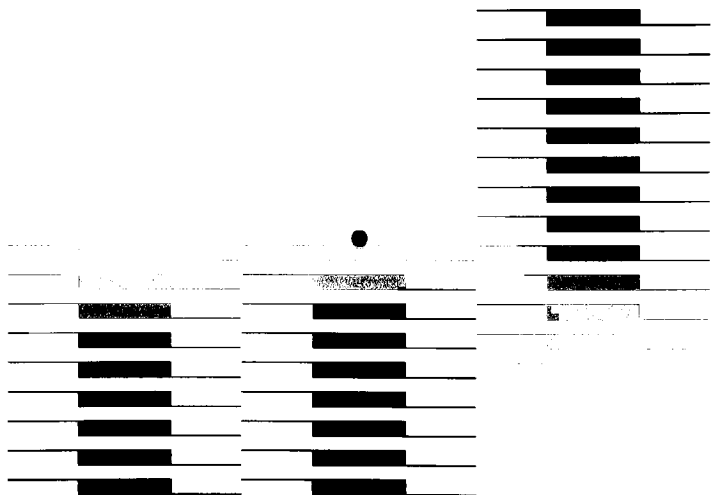
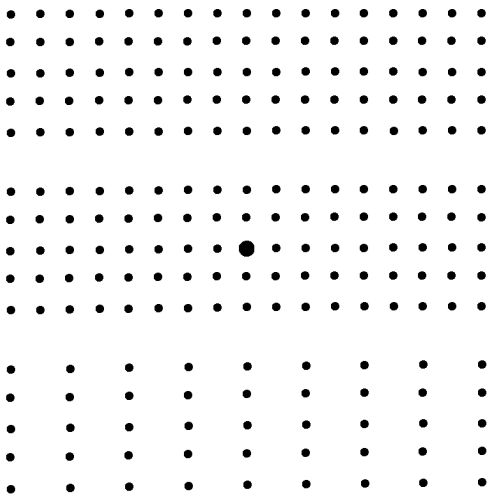
Form Reassessment

The social context and structural language of the visual element form needed to be assessed. The formal patterns which constituted the element of form were structure in a horizontal placement not expressing the linear formation of music. Also the formation did not interrelate all parts to construct a composition. The horizontal rules of white space separate the element into three distinct patterns of form and not a cohesive element. After extensive research into the organizational element in music, visual composites were developed and the concept sketches can be seen on the following page.



Form Ternary Ideation 1

Form Ternary Ideation 2

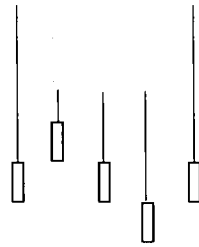


Timbre Binary Ideation 1

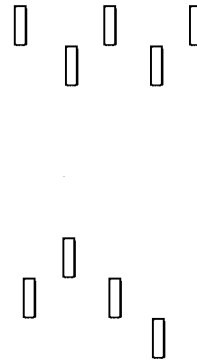
Timbre Binary Ideation 2

Concept Sketchs

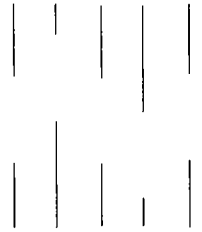
Form



Phase 1



Phase 2

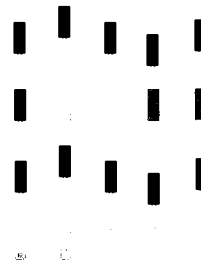


Phase 3

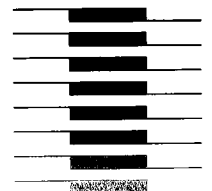
This sequence of sketches displays the developmental processes in arranging and readdressing the element form. The first three phases are organizing the other musical elements (pitch, dynamics, rhythm, tempo, texture, timbre, harmony) to produce a sense of structure in music formation. The melodic line is seen through staggered placement of the geometric shape. The last three phases establish contrast and variation using visual gradation. The developed element form articulated its organizational and structural association (Appendix I).



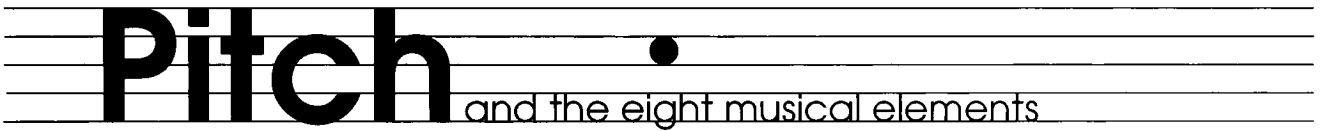
Phase 4



Phase 5



Phase 6



Pitchnarration

The centralized dot represented in each of the elements is part of a narration. The dot is a character referred to by Pitch. The underlying theme of this narration is how the character Pitch begins to understand individual identity when encountering other elements. The narration will be accompanied by sound to enable the user to understand the foundational elements that, in turn, will lead to greater music appreciation.



Definitepitch

Pitch is defined as highness or lowness of sound and is determined by the frequency of vibrations. The faster the vibrations the higher the sound, the slower the vibrations, the lower the sound. Definite pitch, or tone, has regular vibrations and reaches the ear at equal intervals.

Pitch

Dynamics

Rhythm

Tempo

Texture

Timbre

Harmony

Form



Indefinitepitch

Pitch is determined by the frequency of regular vibrations and then is given a particular value and corresponding note name, expressed as Hertz value (Hz). Indefinite pitch has irregular vibrations and may include sounds like squeaking brakes or clashing cymbals.

Pitch

Dynamics

Rhythm

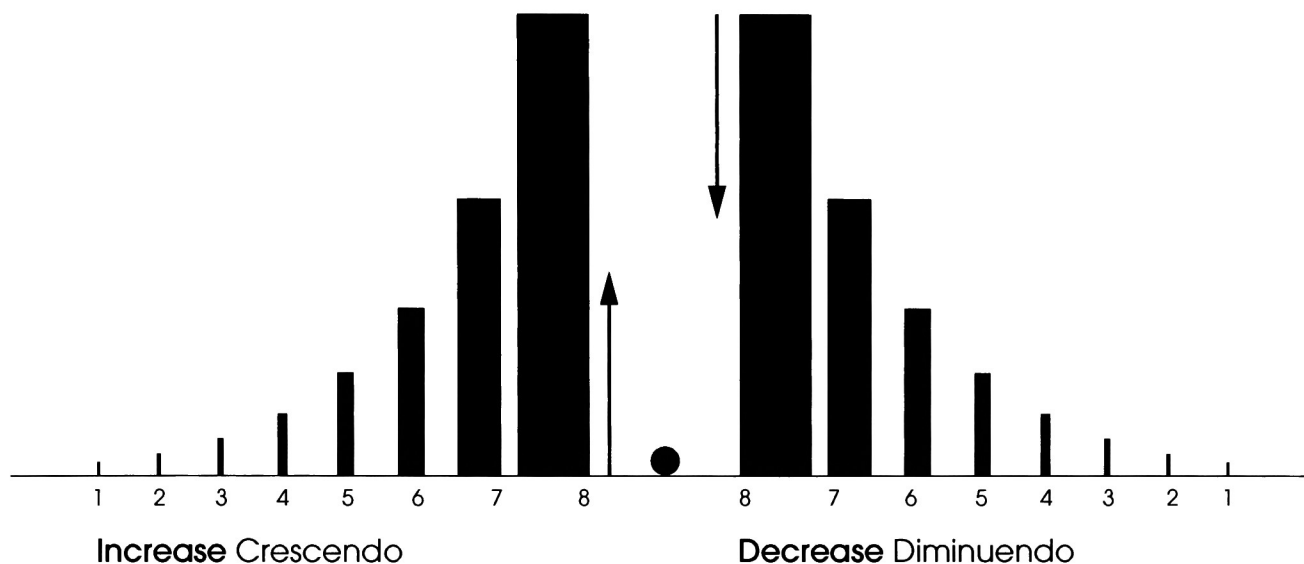
Tempo

Texture

Timbre

Harmony

Form



Dynamics

Dynamics are defined as the intensity of volume with which notes and sounds are expressed. Dynamics are indicated in the music by the composer to indicate a certain degree of loudness or softness.

- 1 pianississimo
- 2 pianissimo
- 3 piano
- 4 mezzo piano
- 5 mezzo forte
- 6 forte
- 7 fortissimo
- 8 fortississimo

Pitch

Dynamics

Rhythm

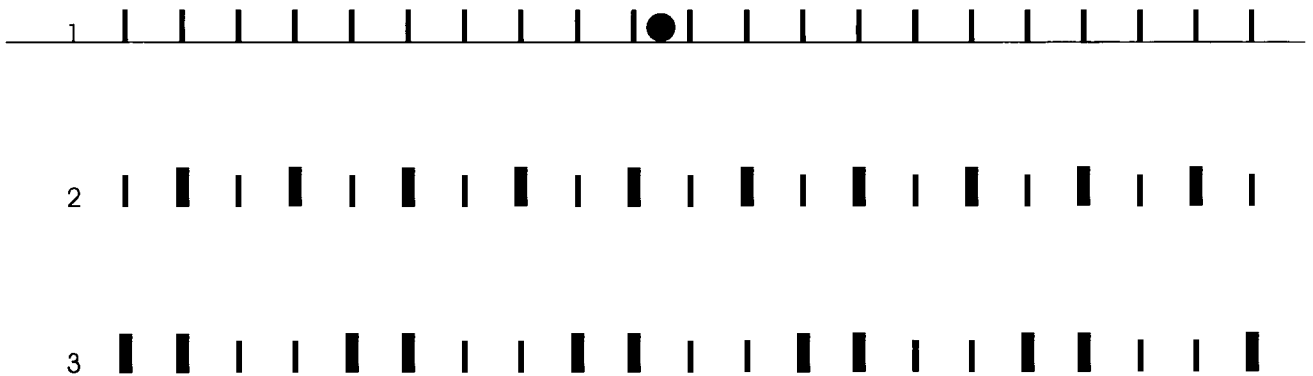
Tempo

Texture

Timbre

Harmony

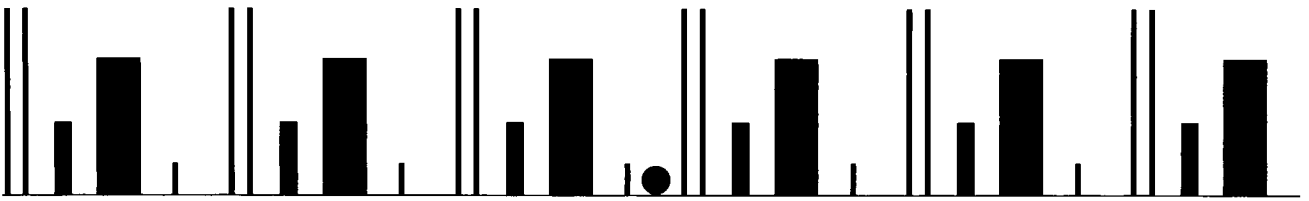
Form



Rhythmbeat

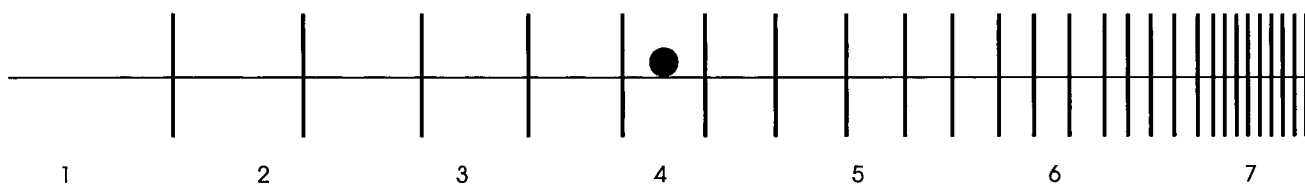
The beat found within music is the regular recurring pattern which can be divided into equal units of time. Beats are basic units of time by which all notes are measured.

- 1 Regular
- 2 Accented
- 3 Variation



Rhythmstructure

Rhythm is a combination of different note lengths in a piece of music or a regulated succession of strong and weak elements. Rhythm is an important parameter of musical structure; the other is pitch.



Tempo

Tempo is the musical speed or pacing of a musical composition. It may be indicated by a metronome designation that links a particular durational unit with a particular duration in clock time or by a description of speed and gestural character.

- 1 Largo
- 2 Adagio
- 3 Andante
- 4 Moderato
- 5 Allegro
- 6 Vivace
- 7 Presto



Texturemonophonic

Monophonic texture utilizes a single melodic line without accompaniment (this may include one or more people singing or playing an instrument in unison).

Pitch

Dynamics

Rhythm

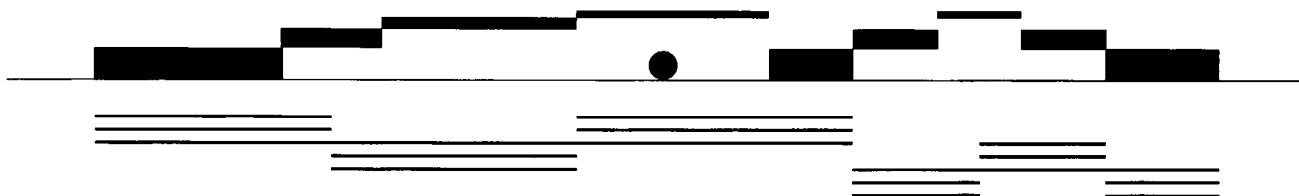
Tempo

Texture

Timbre

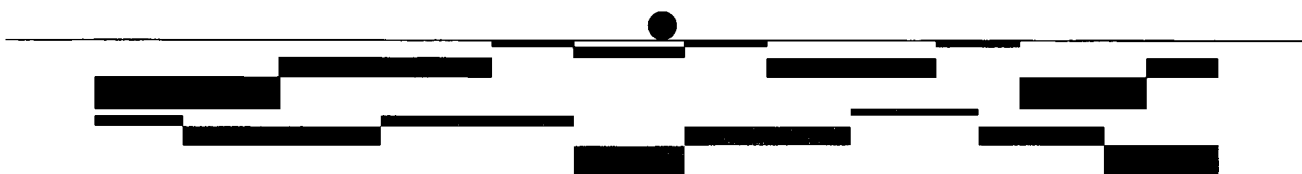
Harmony

Form



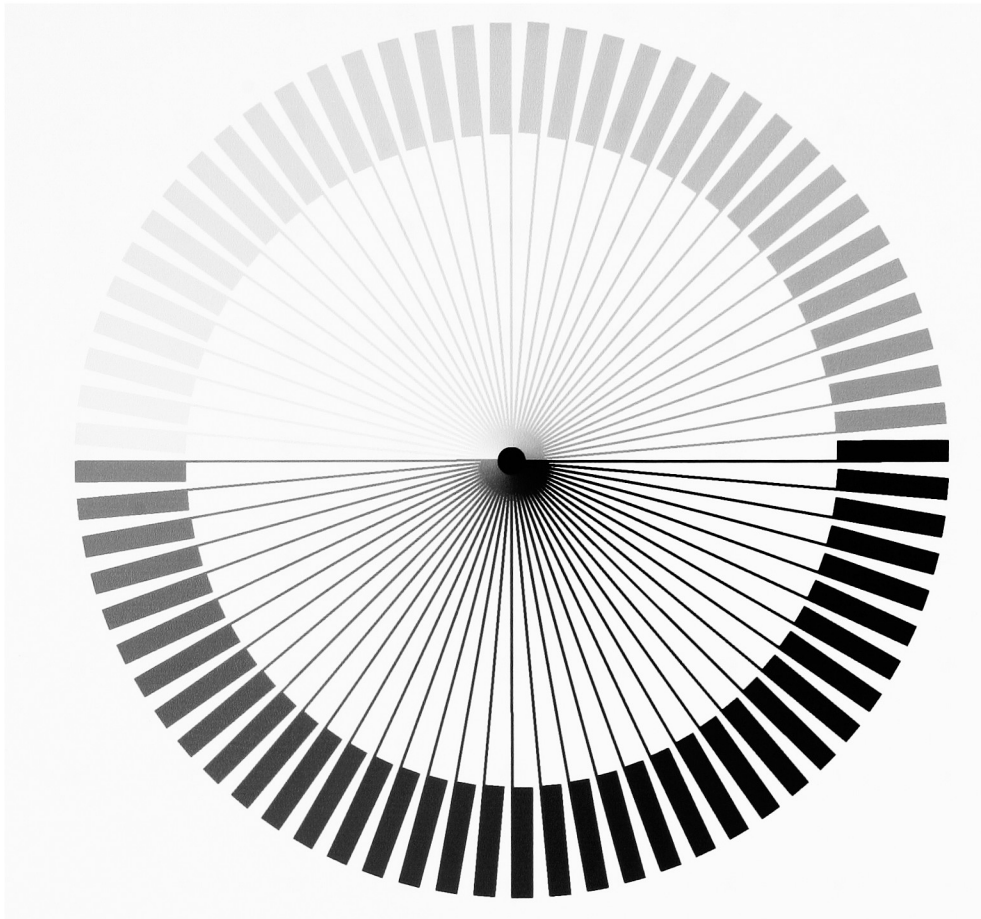
Texturehomophonic

Homophonic texture is a single melodic line accompanied by chords. Attention is primarily focused on the melody. All parts are rhythmically dependent upon one another or there is a clear distinction between the melodic part and the accompaniment parts.



Texturepolyphonic

Polyphonic texture consists of a simultaneous performance of two or more melodic lines with equal importance. Polyphonic writing often includes imitations when a melodic idea is presented by an instrument or voice and then restated immediately after by another voice or instrument.



Timbre

Timbre is identified as the characteristic color or sound of an instrument or voice. Changes in tone color create variety and contrast. When the same melody is presented in successive order by two different instruments the music takes on an expressive effect, or by contrasting a new melody and presenting it in a new instrument, a new idea may be highlighted.

Pitch

Dynamics

Rhythm

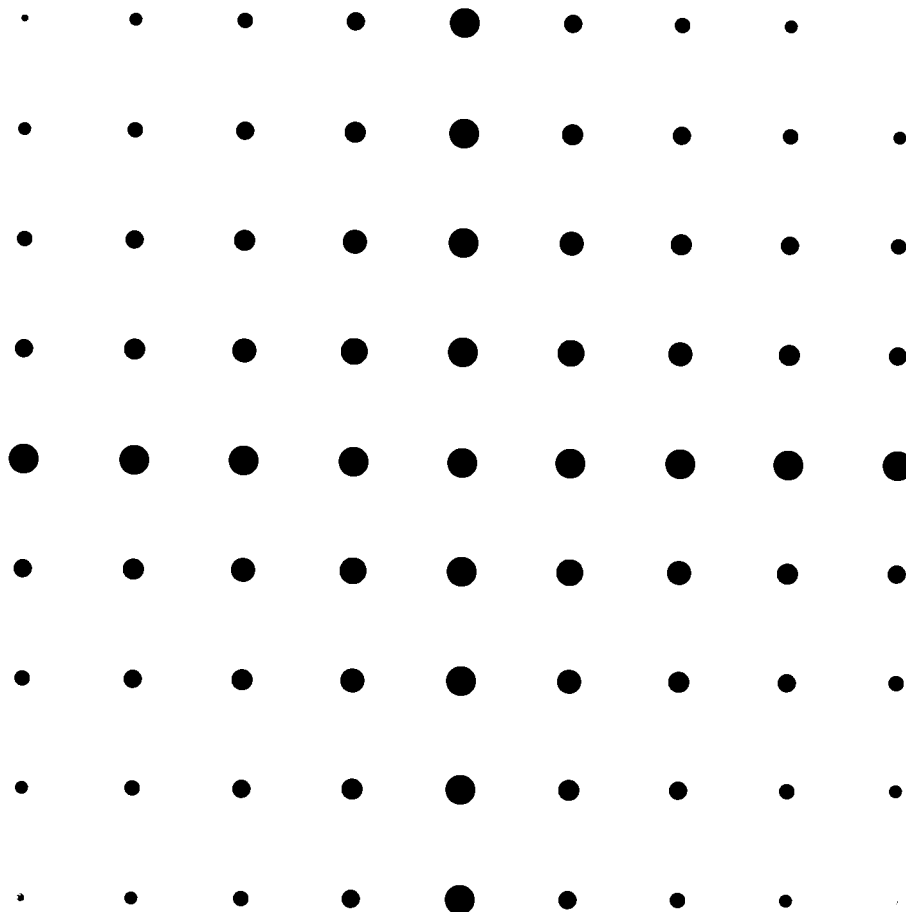
Tempo

Texture

Timbre

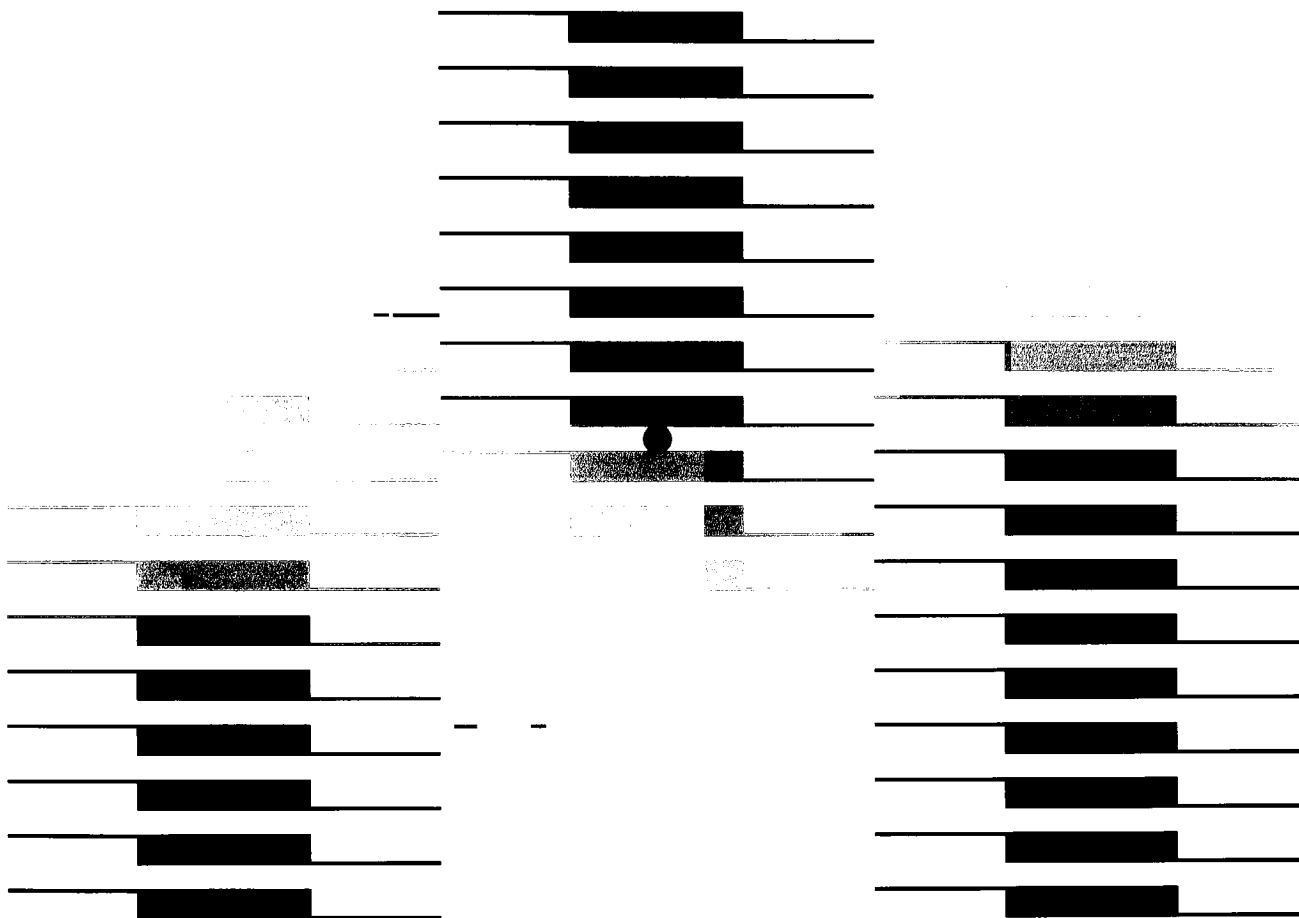
Harmony

Form



Harmony

Harmony is defined as an aspect of music that pertains to simultaneous combinations of sound. The word 'harmony' has been used to describe the position of higher and lower notes in relation to one another, in the placement of both its vertical and horizontal design.



Formternary

Ternary form is represented as a statement of the original idea (A), contrast or departure (B), and return of original idea (A). Contrast between A and B sections can be of any kind, sections can be of equal or unequal length, and the return of the material with the A section the second time can be a smooth transition or an abrupt change.

Pitch

Dynamics

Rhythm

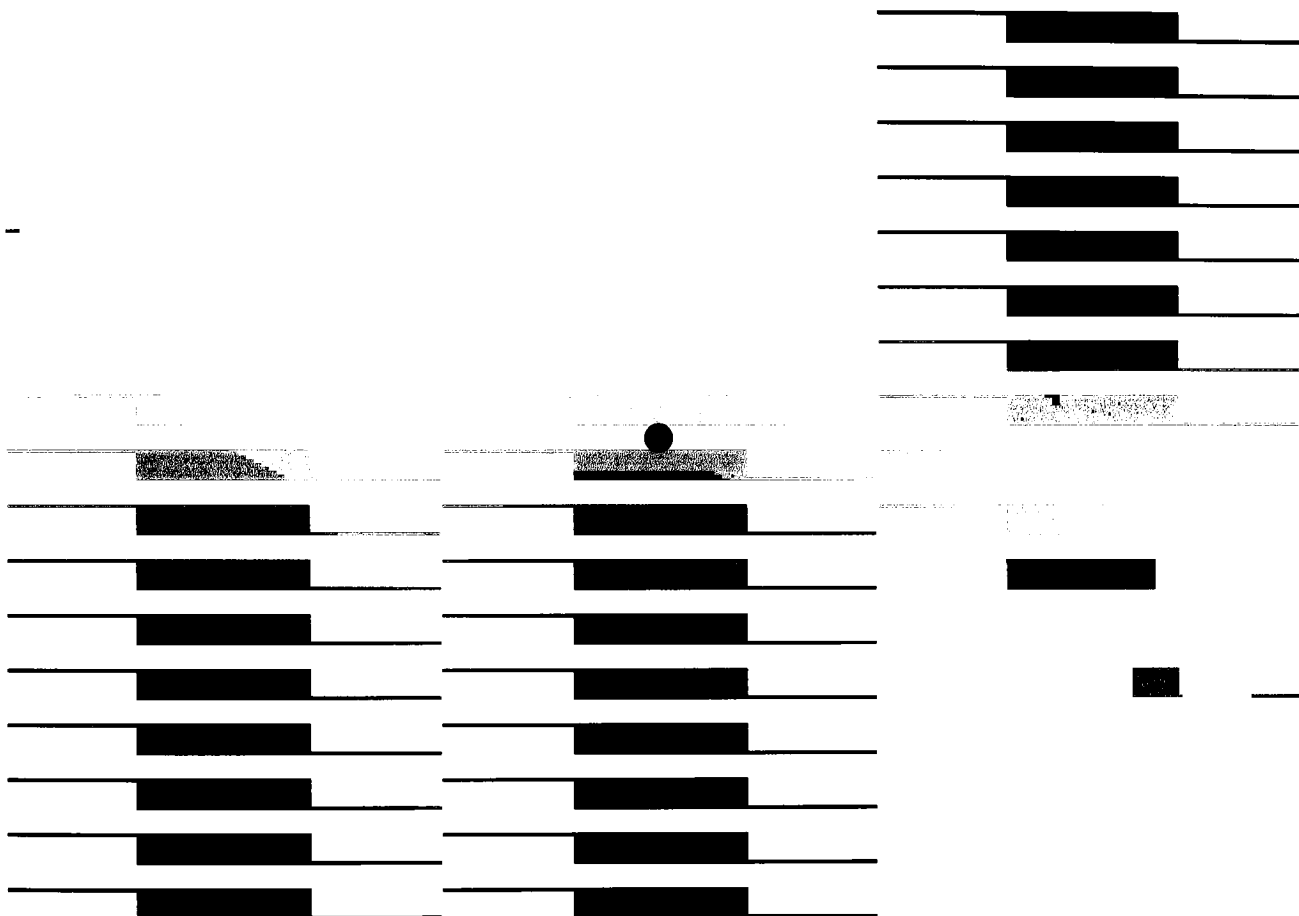
Tempo

Texture

Timbre

Harmony

Form



Formbinary

Binary form gives a feeling of statement (A) and counterstatement (B). A composition in AB form may be represented AABB, AAB, or ABB if either or both of its large sections are repeated. Differences between A and B sections can be of any kind, and the two sections can be equal or unequal in length.

Pitch

Dynamics

Rhythm

Tempo

Texture

Timbre

Harmony

Form

Intermediate Evaluation Stages

The intermediate evaluation had several stages consisting of general feedback from educators and students at Eastman School of Music. Committee meetings and individual conversations with committee members clarified and reinforced the objectives and strategies of this thesis. The qualitative analysis from each stage measured the value of stated objectives and directed contingencies into a plan for improvement.

Stage 1

Committee meetings

The first committee meeting was on December 16, 2003. The focus of the meeting was directed towards understanding the mission statement and the plans for execution. The research and documentation structures were reviewed and evaluated for directional focus. The concerns were directed towards understanding the target audience and how the thesis would impact that audience. The suggestion was made to consult Jacques Bertin's *Semiology of Graphics*.

The second committee meeting took place on January 14, 2004. A computer generated storyboard of three elements, dynamics, pitch and form, was presented. The initial response was positive pertaining to the visual presentation. Dissension remained in the interpretation of complexity of each of the three. An indepth summary of this meeting is found on page 31.

The third committee meeting took place on March 24, 2004. The primary focus of this meeting was to examine the information panels displayed in the Bevier Gallery. The discussions were structured to analyze the function and aesthetics of the displayed material. This interactive process of evaluation inadvertently led to refinement of the intended narration. The remaining portion of the meeting analyzed the formulated storyline of the narration.

The fourth committee meeting was held on April 26, 2004. The discussion of the meeting was directed towards the sequence of the narration. This issue was assessed with understanding the hierarchy, a form of organization, which looks at items by magnitude from small to large. The organizational principle provided inherent considerations, which led to a visual conclusion to the narration.

Thesis Committee Meeting

On Tuesday, December 16, 2003
Rochester Institute of Technology
Graduate Graphic Design
School of Design
College of Imaging Arts and Sciences

Andrew Dennis Baker
adb2403@rit.edu

At noon
Room 3510

Professor Bruce Ian Meader

Stage 2

Presentation to educators and doctoral students at Eastman School of Music

To analyze the assessment and delivery of the mission statement, a meeting was arranged on January 29, 2004, at the Eastman School of Music. The analysis began with an informal presentation to committee member Lee Wilkins and his colleague, Howard Potter. The musical element pitch was assessed thoroughly, and the considerations resulting were applicable to the remaining seven elements. The consideration needing priority was the irregularity of simplistic forms among all eight elements. The formulated application generated a positive affirmation creating an opportunity for a formal presentation to the doctoral students at Eastman School of Music. This presentation encapsulated this thesis into four separate categories, beginning with an overview of the mission, goals, and objective plans. The research and analysis stage was presented in a summarization of the documentation structure. The synthesis stage was displayed through visual organizational relationships between music and design, creating a transition for the visual stimulus for potential applications in the ideation stage. The visual illustrations of the eight musical elements dominated the conversation. Feedback in the form of questions, comments and discussion helped the designer identify remaining concerns for specific project goals.

Stage 3

Presentation to R.I.T professors and graduate design students

The development of a visual presentation using the PDF format showed the current status of this thesis. This presentation was made to the graphic design graduate students and professors on February 4, 2004. The presented research showed the process stages of dynamics, one of the eight musical elements. This visual demonstration involving research methods and conceptual sketches produced clarification of the objectives and strategies of this thesis. The feedback reaffirmed that this thesis was addressing the project goals.

Stage 4

Individual evaluation

Individual evaluations occurred throughout the documentation process. However, to comprehend the unity and the visual message content of the ideated musical elements, an evaluation form was constructed. The form, devised from the semiotic theory, systematically brought order and clarity to the information of the evaluation. Semiotics is the theory of signs and the study of problems of sign production and interpretation. Semiotic theory, a discrete branch of linguistics, evolved out of Charles Morris' beliefs that effective communication could come through the analysis of visual and verbal signs. This theory produced three elements that enabled this thesis to evaluate form and the relationship between the user and the viewer. The three principles became an applied method for clarifying and identifying the most effective way to communicate the eight musical elements. The three principles generated valid considerations, which organized the musical elements into clear communication.

Symbol Signs

American Institute of Graphic Arts

Semiotic Analysis

pp 19, 20

The applied method from *Symbol Signs* was used to measure and analyze imagery, color, typography, language, composition and overall context. The questions for evaluating each principle are as follows:

Semantic

The semantic dimension refers to the relationship of a visual image to a meaning.

How well does the symbol represent the message?

Do people fail to understand the message that the symbol denotes?

Do people from various cultures misunderstand this symbol?

Do people of different ages fail to understand this symbol?

Is it difficult to learn this symbol?

Has this symbol already been widely accepted?

Does this symbol contain elements that are unrelated to this message?

Syntactic

The syntactic dimension refers to the relationship of one visual image to another.

How does this symbol look?

How well do the parts of this symbol relate to each other?

How well does this symbol relate to other symbols?

Is the construction of this symbol consistent in its use of figure/ground, solid/outline, overlapping, transparency, orientation, format, scale, color and texture?

Does this symbol seriously contradict existing standards or conventions?

Is this symbol, and its elements, capable of systematic application for a variety of interrelated concepts?

Pragmatic

The pragmatic refers to the relationship of a visual image to a user.

Can a person see the sign?

Is the symbol seriously affected by poor lighting conditions, oblique viewing angles, and other visual 'noise'?

Does this symbol remain visible throughout the range of typical viewing distances?

Is this symbol especially vulnerable to vandalism?

Is this symbol difficult to reproduce?

Can this symbol be enlarged and reduced successfully?

In logically isolating specific qualities within the process of this thesis, an evaluation form was constructed. The following example was taken from *Symbol Signs* and was redeveloped for evaluating the problem statement.

Semiotic Evaluation

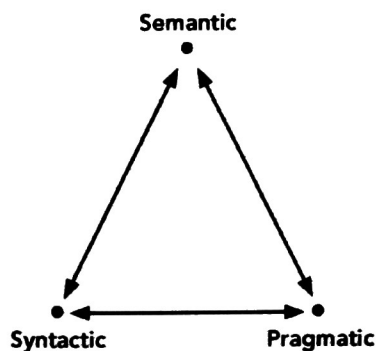
5 excellent
4 good
3 average
2 poor
1 failure

			Number
Evaluation	Dynamics	5 4 3 2 1	5
Semantic	Form	5 4 3 2 1	3
Syntactic	Harmony	5 4 3 2 1	4
Pragmatic	Pitch	5 4 3 2 1	5
	Rhythm	5 4 3 2 1	4
	Tempo	5 4 3 2 1	5
	Texture	5 4 3 2 1	4
	Timbre	5 4 3 2 1	4

	Semantic	Syntactic	Pragmatic	Average
Overall Evaluation	Dynamics	5	5	5
	Form	2	4	4
	Harmony	4	4	5
	Pitch	5	4	4
	Rhythm	4	4	5
	Tempo	5	5	5
	Texture	4	4	5
	Timbre	3	5	4

Descriptive Evaluation

- THE ELEMENT FORM NEEDS FURTHER ANALYSIS
- THE INTENDED CONTENT OF FORM WAS NOT UNDERSTOOD VISUALLY.
- TIMBRE NEEDS EVALUATED THOROUGHLY ON THE ORGANIZATIONAL LEVEL.



Stage 5

Presentation to educator,
Donna Fox

The general attributes from the documentation processes evolved into exploration of a child's narrative. A meeting was arranged with the pedagogical educator Donna Fox, at Eastman School of Music on February 5, 2004. The meeting began the process of understanding children's cognitive functioning. The focus of this meeting was to further discuss the evaluation of this thesis and deepen an understanding of the target audience, children. Committee member Lee Wilkins and Donna Fox analyzed the stages of dissemination and determined that this application was extremely beneficial. The comments addressed how the elements amplified visual movement. Reversing the sequence of the narration format could benefit the intended information system. These recommended approaches initiated research of the narration format. The recommendation to explore the information systems of John Cage was made. The reason for this investigation was to understand mesostic text.

John Cage

John Cage, a 20th century composer and a leading figure in the musical avant-garde period, interconnected sound with conceptual art. The philosophy to free music from the restrictive definitions is displayed in the theoretical models. These visual aesthetics question the merit of music through explorations of the environment in which it lives. The motifs of Cage depict the matrices in which to organize rhythmic structure. The atmosphere in which the sound is produced controls the outcome, not the composer. This thought process of making music conceptual for the viewer suggested how to articulate the narration for the eight musical elements. The text, structured along a centralized string of capital letters, creates a vertical and horizontal linguistic fugue. This is recombinatory interplay of three deistic voices. The fugue is developed to seize any preconceptions about the syntax and grammar of words and their relationship, to allow for a clear novel semantic sense. The densely textured mesostic poetry generated a visual breath for interpreting music.

Figure 5.1

***Musicage : Cage muses on
words, art, music / Joan
Retallack, editor.***

John Cage

The Creative Process

p 7

I
Art is either a complaint or
kinD of thing
uncallEd for in
A
just as gooD
is that it's very fragMented ' in
is A '
iNvolved
arT is either
the question of whAt is a
worK won't
bE '
else my experience of life is thAt
Splitting ' the idea of
the real thing i liKe what i see
and the idea of air in breathing in and oUt '
Like my work to have some vivid indication of
a Large
City and the traffic there
is that it's very fragmented in One place certain kinds of things occur ' and
canVas '

Figure 5.2

John Cage Herausgegeben Von
Heinz-Klaus Metzger und
Rainer Riehn

John Cage

Concert for Piano and Orchestra

p 86



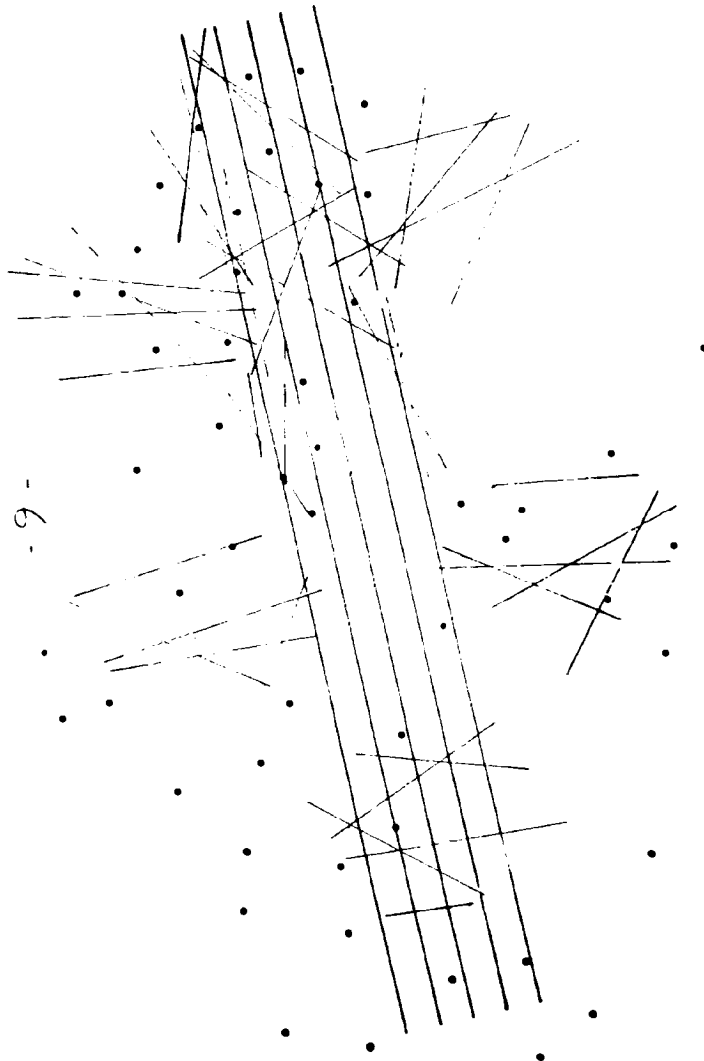
Figure 5.3

John Cage Herausgegeben Von
Heinz-Klaus Metzger und
Rainer Riehn

John Cage

veränderte Aufl: Music Walk

p 84

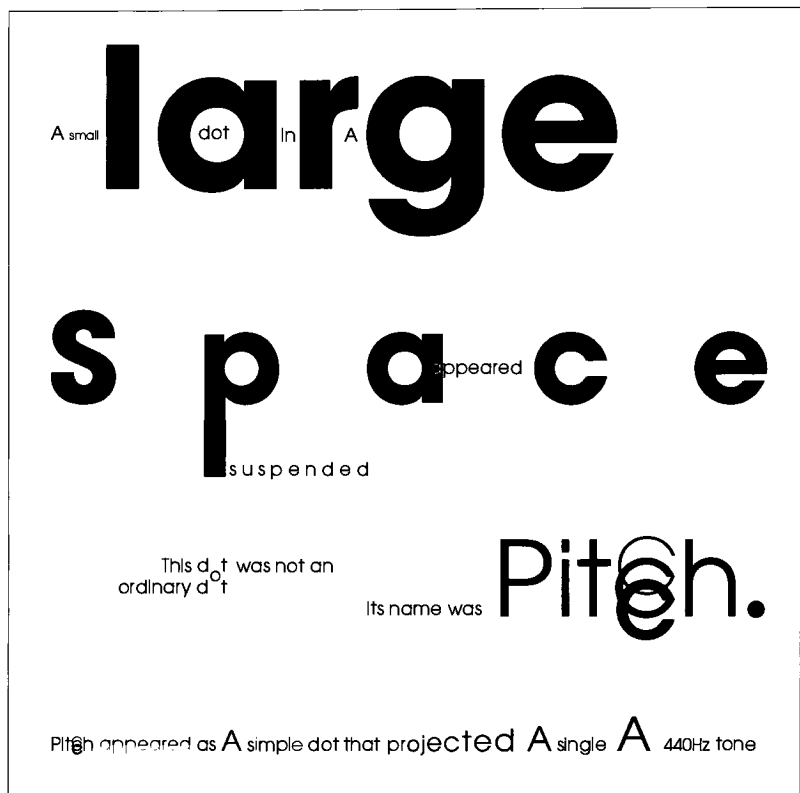


Flatland

Edwin A. Abbott

A Romance of Many Dimensions

Flatland, written in 1884, is an imaginative scientific work exploring a two-dimensional world. The geometrical concepts became figures with human emotions and speak to the hierarchical world of the Victorians. These inhabitants explore Flatland, a world that defies the test of time. This narration of geometrical shapes directly correlates with the narration of the eight musical elements. The physical, physiological, and psychological attributes that thread through music is the sound wave. This qualitative attribute is conditioned by the musical element Pitch that constitutes the existence of the remaining seven. The element Pitch becomes the central figure to resonate the narration. To effectively communicate the musical expression of the narration, experimentation was directed towards the qualities of interpretive typography. The complexity of the typographic message hindered the structure of the narration. The following are the generated compositions (Appendix J).

**Typographic form structure
of musical element narration**


The Design Concept

Allen Hurlburt

The Creative Process

pp 10-15

Freud's three levels of consciousness (conscious, preconscious, unconscious) provided a starting point for evaluating a process. The understanding of inductive and deductive reasoning began developing a direct evaluation form. The questions incorporate the three major levels of consciousness illustrated in Figure 5.4. The left side of the diagram illustrates the intellectual processes, and the right side, the emotional response. The circled numbers indicate the four generally accepted steps in the creative process:

- Analysis
- Incubation
- Inspiration
- Verification

This example was used to focus the evaluation form and generate the most relevant responses.

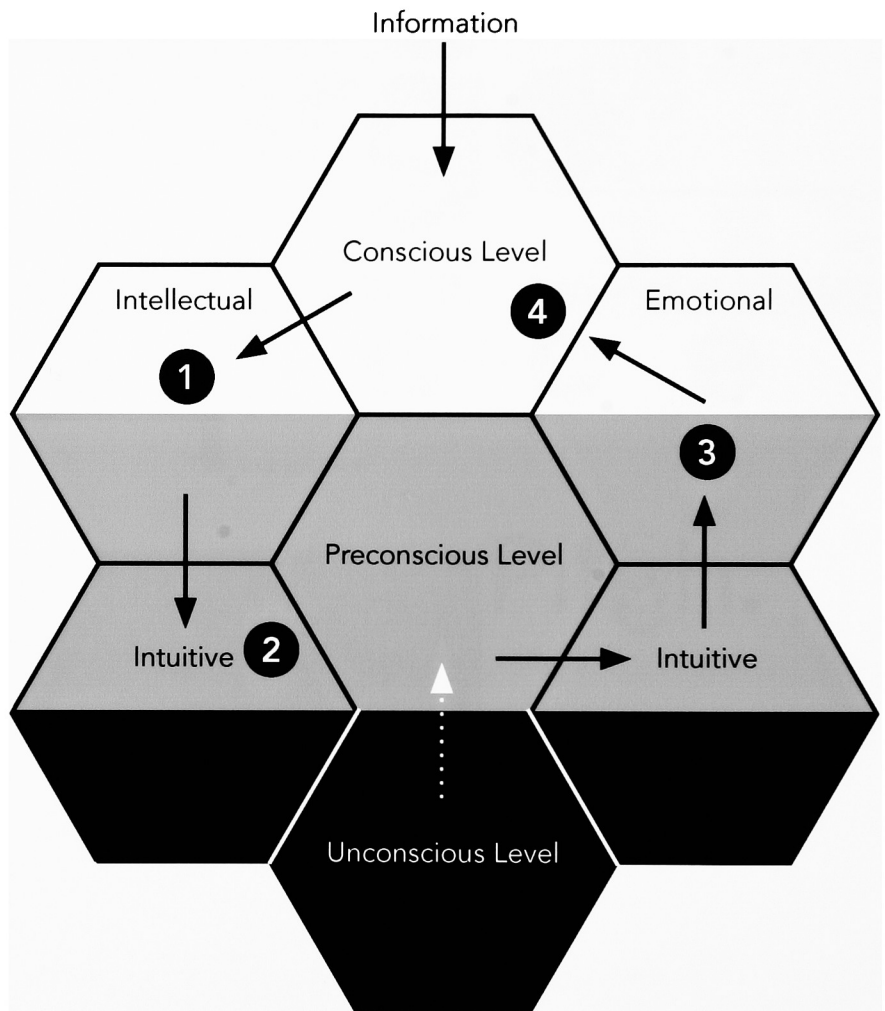


Figure 5.4
Anatomy of the mind
Sigmund Freud
p 13

Intermediate Evaluation for Music Development

4 very clear
 3 clear
 2 somewhat unclear
 1 very unclear

Understandability

Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.

Dynamics	4	3	2	1
Tempo	4	3	2	1
Rhythm	4	3	2	1
Beat	4	3	2	1
Accented Beat	4	3	2	1
Pitch Definite	4	3	2	1
Pitch Indefinite	4	3	2	1
Texture Monophonic	4	3	2	1
Texture Polyphonic	4	3	2	1
Texture Homophonic	4	3	2	1
Timbre	4	3	2	1
Form Binary	4	3	2	1
Form Ternary	4	3	2	1
Harmony	4	3	2	1

Additional Comments

Overall Presentation

- | | | | |
|---|---|---|---|
| 1 | Is the content accurate for each of the 8 musical elements? | Y | N |
| 2 | Are the 8 musical elements delivered in an accessible manner? | Y | N |
| 3 | Is this a useful learning tool for teaching foundation level music? | Y | N |

Comments about the book

Stage 7

Presentation to educators and
doctoral students at Eastman
School of Music

The narration addressing the musical elements was evaluated on April 6, 2004. This assessment took place at Eastman School of Music with committee member Lee Wilkins and Professor Donna Fox. This evaluation focused on the written content of the narrative and its effectiveness at communicating the intended content. An evaluation form was disseminated to strengthen process goals. The evaluation form was arranged to assess four main sections: clarity, focus, accessibility, and usability. These assessment tools revealed the problematic aspects that hindered the success of the application. The element of forms, both ternary and binary, needed re-examination on the visualization. The construction of the horizontal format constituting a thematic approach to the element form was not congruent with the cognitive function of music formation. Music composition follows a linear structure; this understanding, along with the shared visual representation of dots with the element pitch, reassessed the element of form. The element Timbre had to address the underlying repetitive structure of the tonal gradation, which attributed to the lack of understanding of the musical element. The constructions of the unit form of gradation needed to remain correlated to the color spectrum, yet relieve the definition of Timbre. The majority of the intended goals were accomplished (Appendix L).

Stage 8

Presentation to target audience
at Eastman School of Music

A presentation was given on April 28, 2004 to an early childhood music class. This class is implemented into the core curriculum for music education at the Eastman School of Music. The goal of the class is to introduce techniques that will foster an understanding of childhood development in music. The presentation began with a short overview of the thesis objectives and processes. Then the presentation moved into the visual representation of each of the eight elements. The visuals generated very strong affirmation, confirming that the mission statement of this thesis has been addressed. The comment was made that this way of understanding foundational musical elements was a new and intriguing concept. Another comment suggested how each of the eight elements, visually represented, could become individual lessons.

The final narration application was then presented. It began with an overview of the target audience, and then moved on to explain the development of the characters. After this short explanation, the narration was read and concluded with an intrigued audience. The feedback was very positive, and several individual comments addressed the importance of this application. An observation was made that children today are becoming more visual and that music fundamentals have not changed throughout time. This narration addresses this issue and develops a new method of communication, which is very applicable for educating visual learners.

Presentation conclusion

These comments illustrated the importance of this application. These comments concurred that this thesis has begun to develop a method for teaching visually and offers a foundation for many other applications to follow. It also provides the music educators with a new resource method for teaching the eight musical elements. This presentation was valued in understanding the importance of this developed visual method. The individuals in the music education department, at the Eastman School of Music, are waiting to retrieve their copy to implement into their teaching curriculums.



Typographic Design: Form and Communication

Rob Carter
Ben Day
Philip Meggs
Typography
pp 28, 173

The narration was developed from many conditions: the size, the typefaces, writing format, the amount of text, the position of each element, and the mission statement. These organizational process tools helped to focus the message to its intended audience. The designer became sensitized with effective and ineffective narrations. The initial layout was influenced by Leo Lionni's, book *Yellow dot blue dot*. This graphic design pioneer inspired the format of this application, and the format was based on balancing contrast and consistency. The prioritization of the variables for the narration was established through the use of a modular grid. The developed order provided a rhythmic sense of unity and demonstrated visual hierarchy throughout the spreads and pages.

The writing format is laid out in a style that resembles poetic text. The format was composed to invigorate the text, displaying a rhythmic pattern constituting the message. Two typefaces construct the body copy, Century Old Style and Unifers.

Century Old Style

18 point

Morris Fuller Benton developed the typeface Century Old Style between 1908 and 1909. The typeface is renowned for its readability, with its large x-height and short ascenders. The fluidity of this family was the reason the Old Style serif was chosen for the body copy.

Univers 55

18 point

In 1957, Adrian Frutiger designed a twenty-one type family, Univers, a neo-grotesque typeface that is integrated inversely. The sans serif typeface uses numbers to designate variations of weight and width. The typeface was able to be easily understood because of its legibility. In addition the typeface helps to identify the terminology of the musical elements.

Making and Breaking the Grid

Timothy Samara
Modular Grid
p 50

The layout environment is formed with type size, line spacing, and column widths, developed from the modular grid. The page organization is formulated with the body copy, which is on the left lower portion of the spread and is suspended by the strong horizontal center axis. The implementation of color floods the left page to actively enhance the content and to develop a system of color relationships to categorize the different components of the eight musical elements. The visual representation of the eight musical elements, which is suspended in white space, dominate the right portion of the spread. The following figure displays the narration format.

[illegible]

This thesis was developed to provide an understanding of the foundational elements in music using a visual system. The development of this visual method was compiled into a narration that personified one of the elements, Pitch. This application was arranged as a textbook for teaching the eight musical elements, and also as a reference book that could be used outside the academic environment. This allows for the learner to pace for individual comprehension and understanding. The primary audience for this application is children between the ages of 8–14 who are beginning to study music theory. This resource can also provide an understanding of music vocabulary to musically illiterate individuals.

To increase awareness of the application sample copies could be sent to colleges and universities that offer music education courses. The application could become integrated into a music education conference, presented as part of a lecture or display.

This application also serves as a resource for individuals investigating cross-discipline communication between graphic design and music. The visual design concepts provide understanding into design principles and offer terminology that can be acquired by designers. This foundational resource has the ability to parallel with systems thinking in design concepts.

The general content of this thesis investigation has been summarized into a manuscript (Appendix N) that could become the subject of an article for publication in an appropriate journal. Two journals one from each discipline, have been targeted preliminarily.

Music Educators Journal

The first is a journal that addresses music educators. The Music Educators Journal is designed to teach practical instructional techniques with the main goal of encouraging the professional development of music educators. This journal will enable the visual application of the eight musical elements to become accessible for review and enable the visual system to become implemented into music educator's curriculum.

Editor, Music Educators Journal
1806 Robert Fulton Drive,
Reston, Virginia 20191–4348

National Art Education Journal

The second journal is the National Art Education Association (NAEA) founded in 1947. The Association's purpose is to promote art education through professional development, service, advancement of knowledge, and leadership. To that end, the Association holds public discussions and publishes books, journals, reports, surveys, flyers, and other materials.

IR Coordinator: Elizabeth (Beau)
Vallance, School of Art,
Northern Illinois University,
DeKalb, Illinois 60115

The final application developed out of many design processes and investigative interest. The main visual method used for clarity in communicating ideas and modifying gathered research was the semiotic model. This method offered insight into visual expression.

The documentation structure provided a process format for resolving an application suitable to the mission statement. The initial implementation was an interactive application. It displayed a complexity that did not foster clarity in understanding the musical elements. The committee members also raised many unforeseen circumstances, which hindered the initial proposal, the majority of which dealt with motion. The designer was open to criticism, which enabled further exploration into a variety of applications. The research was reevaluated to simplify the visual representations of the eight musical elements into single two-dimensional forms, disregarding the three-dimensional ambiguity. The expressive ornamentations provided insight into the final application. The research process began to formulate the concept of a narration. A method of generating insight into the fresh thought began with brainstorming, a way to develop dramatic results that were uncensored. The editing of the master list resulted in a perception that initiated the framework for the final application. The conception evolved around a centralized character Pitch. The character became personified and acquired an understanding of individualism through acquaintance of each of the other elements.

The intermediate evaluation of this narration produced valid criticism. The visual representations of the elements form, harmony and timbre were misunderstood, and revisions were needed. The layout of the narration was redeveloped with the placement of the revised elements. Color was added behind the text block to the left of the spread and typographic decisions further defined. The ability to understand the cognitive consonance or dissonance within each phase of the documentation structure enabled this visual method of teaching the eight musical elements to succeed.

The future plans for this application are to investigate the element of sound. That will coincide with the narration and incorporate one more of the visual senses for addressing another theory of multiple intelligences. The investigation into an interactive CD-Rom is another prospect that this application could consider. The valid criticism and comments provided a strong and innovative resource for teaching music fundamentals.

It is difficult to formalize a codified educational method to meet teaching standards with a multitude of circumventing theories that force educators to construct a new curriculum for higher education. The development of this application was designed to enhance the core value of music education and add to the existing curriculum. The current implemented curricular strategy for advocating the eight musical elements does not respond to the needs of the visual spatial intelligence.

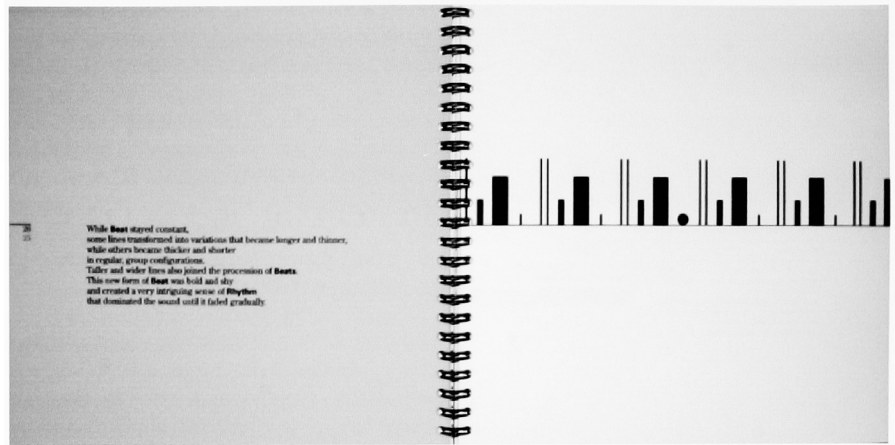
The composite of this visual design method was conceived from cognitive psychology, a study of all human activities relating to knowledge. The importance of focusing on the objectives in this form of information processing provided an understanding of the child's learning development. The application was also heavily influenced from semiotics, a visual communication method founded at the Ulm school in West Germany. This is a linguistic technique that teaches perceptual processes.

To teach music theory with this visual communication method, an understanding of the eight musical elements, which are the foundational principles to theoretical understanding music, began. The thorough research developed an understanding of structural language of music's rhetoric and grammar. The experience moved into the psychology of music that provided the blueprint for formulating visuals for each of the eight elements.

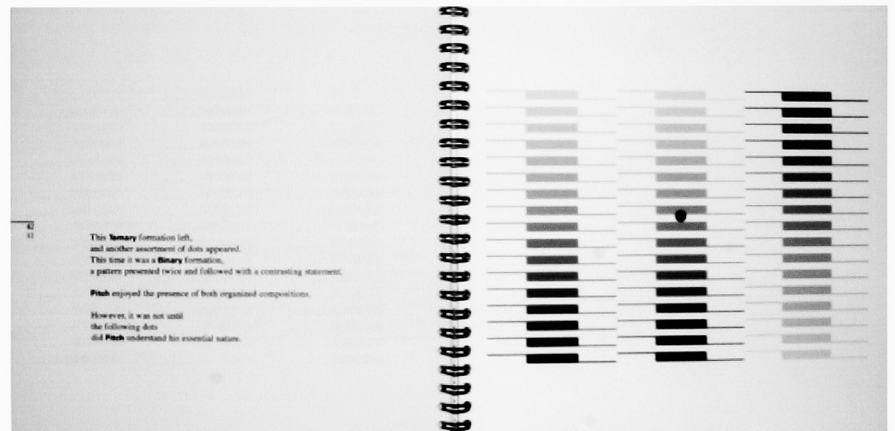
The constructed ideological visual elements amplified the linguistics of each form and enforced social content. The visual system was generated into a narration that can serve as a textbook or reference material to enrich collaborative learning. The application enriches the music field, maintains integrity of the elements' content, and also adjusts the methods of teaching music theory. The ability to enhance the core value of music education is acquired through experimentation and fostering an original concept.

The assessment of the application and processes displays an understanding of music theory and the principle forms in design. The narration provides a visual vocabulary through experimentation that educates individuals on the critical, analytical, and perceptual skills that produces an overall expressive force in visual communication.

The Journey of Pitch:
One of the eight musical elements
pp 26, 27
Rhythm



The Journey of Pitch:
One of the eight musical elements
pp 42, 43
Ternary



The Journey of Pitch:
One of the eight musical elements
pp 52, 53
Halfnote of violin



The Journey of Pitch:
One of the eight musical elements
Andrew Dennis Baker
PDF CD-Rom

Glossary

Aesthetics	Aesthetics is the concern with artistic qualities of form (Robert Bone, David Cayton, Otto Ocvirk, Robert Sinson, Philip Wigg, 54).
Analysis	Analysis is a time for gathering facts and for examining how all the collected data fits together (Don Koberg and Jim Bagnall, 52).
Asymmetry	Asymmetry is having unlike, or noncorresponding, appearances – “without symmetry” (Robert Bone, David Cayton, Otto Ocvirk, Robert Sinson, Philip Wigg, 52).
Beat	The beat found within music is the regular recurring pattern which can be divided into equal units of time (Kamien, 43).
Evaluation	Evaluation review of process (means) as compared with products (ends) to determine worth or values received; making plans for future improvement (Don Koberg and Jim Bagnall, 26).
Form	Form is recognized as the constructing or organizing element in music (Whittall, 92).
Graphic Design	The business of making or choosing marks and arranging them on a surface to convey an idea (Richard Hollis, 7).
Harmony	Harmony is as an aspect of music that pertains to simultaneous combinations of sound. (Grout and Palisca, 812).
Ideation	Ideation, a divergent thinking stage, is the first sub-stage of synthesis. Once a problem situation or goal has been defined in clearly solvable (achievable) terms, the search begins for the best way to bring it to a successful conclusion (Don Koberg and Jim Bagnall, 78).
Implementation	Implementation is putting the plan into operation; translating intentions into physical action or form; realization of the expectation or ‘dream’ (Koberg Don and Jim Bagnall, 26).
Irregularity	Irregularity, as a design strategy, emphasizes the unexpected and unusual, not conforming to any decipherable plan (Robert Bone, David Cayton, Otto Ocvirk, Robert Sinson, Philip Wigg, 54).
Melody	Melody is defined as a series of single tones which add up to a recognizable whole (Kamien, 53) or as pitched sounds arranged in musical time (Ringler, 363).
Methodology	Referencing theoretical analysis of the methods appropriate to a field of study or to the body of methods and principles particular to a branch of knowledge.
Musical Elements	The sensory components used to create and talk about works of music. These components are dynamics, form, harmony, pitch, rhythm, tempo, texture, and timbre.

Pitch	Pitch is defined as highness or lowness of sound and is determined by the frequency of vibrations. The faster the vibrations, the higher the sound; the slower the vibrations, the lower the sound (Kamien, 4).
Pragmatic	The pragmatic refers to the relationship of a visual image to a user (The American Institute of Graphic Arts, 20).
Regularity	Regularity in design is the favoring of uniformity of elements and the development of order based on some principle or method that is undeviating (Dondis, 113).
Rhythm	Rhythm is a combination of different note lengths in a piece of music, of even and uneven sounds that convey a sense of movement (Kamien, 43).
Semantic	The semantic dimension refers to the relationship of a visual image to a meaning (The American Institute of Graphic Arts, 20).
Semiotics	Semiotics is the theory of signs in which one studies problems of sign production and interpretation (The American Institute of Graphic Arts, 20).
Symmetry	Symmetry is axial balance. It is a totally resolved visual formulation in which every unit on one side of a center line is replicated exactly on the other side (Dondis, 112).
Syntactic	The syntactic dimension refers to the relationship of one visual image to another (The American Institute of Graphic Arts, 20).
Tempo	Tempo is described as the musical speed or pacing of a musical composition (Fallows, 270).
Texture	Texture is the character of the different layers of horizontal and vertical sounds (Sadie & Tyrrell, 323).
Timbre	Timbre is identified as the characteristic color or sound of an instrument or voice (Grout & Palisca, 821).

Bibliography

Thesis Content

The following resources were used to interpret, critique, and understand the visual message through exploration in design. The fundamentals, methods, process, and principles that are explored in these resources were used to translate the eight musical elements into understandable visual form.

Abbott, Edwin

Flatland, New York: Dover Publications, Inc. 1952

Anderson, Donald

Elements of Design, New York: Holt, Rinehart and Winston, Inc. 1961

Bone, Robert
Cayton, David
Ocvirk, Otto
Sinson, Robert
Wigg, Philip

Art Fundamentals Seventh Edition Theory and Practice (pp 50–55) Wisconsin: Brown and Benchmark publishers, 1994

Bowers, John

Introduction to Two-Dimensional Design: Understanding Form and Function (p 38) New York: John Wiley and Sons Inc, 1999

Dondis, Donis

A Primer of Visual Literacy Visual Expression (pp 50–55, 59) Massachusetts: MIT Press, 1974

Gasson, Peter

Theory of Design (p 39) Great Britain: The Anchor Press Ltd, 1981

Gregory, Richard L.

The Intelligent Eye, New York: McGraw-Hill, 1970

Gregory, Richard L.

Concepts and Mechanisms of Perception, New York: Charles Scribner's Sons, 1974

Hurlburt, Allen

The Design Concept (pp 10–14, 22) New York: Watson–Guptill Publications

Hambidge, Jay

The Elements of Dynamic Symmetry (pp 3–12, 59–64) New York: Dover Publications, Inc. 1920

Herter, Christine

Dynamic Symmetry a Primer (pp 84–88) New York: W. W. Norton and Company, Inc. 1966

Holtzschue, Linda
Edward, Noriega

Design Fundamentals for the Digital Age (pp 51–53, 77) New York: George Wittenborn, 1997

Klee, Paul

Paul Klee Notebooks Volume 1 The Thinking Eye New York: Van Nostrand Reinhold, 1961

Kober, D. and Bagnall, J.

The Universal Traveler: A Soft-Systems Guide to Creativity Problem-Solving, and the process of Reaching Goals (New Horizons Edition) (pp 26, 52, 78) California: Crisp Publication, Inc. 1991

Scott, Robert	<i>Design Fundamentals</i> (p 11) New York: McGraw-Hill, 1951
Wallschlaeger, Charles and Busic-Snyder, Cynthia	<i>Basic Visual Concepts and Principles</i> , New York: McGraw-Hill, 1992
Semiotics	The semiotic method of evaluation was used to assess the meaning, form and use of the visual system representing the eight musical elements.
American Institute of Graphic Arts	<i>Symbol Signs</i> , (pp 19, 20) New York: American Institute of Graphic Arts 1981
Bowers, John	<i>Introduction to Two-Dimensional Design: Understanding Form and Function</i> (pp 17-26) New York: John Wiley and Sons Inc, 1999
Innis, Robert	<i>Semotics An Introductory Anthology</i> , Indiana: Indiana University Press, 1985
Saunders, Frederick	<i>Physics of Music</i> (pp 7-12) San Francisco: W.H. Feeman and Company 1948
Graphic Design	The development and identification of graphic design enabled this thesis to focus on conveying and arranging marks to properly display the musical elements.
Hollis, Richard	<i>Graphic Design A Concise History</i> (pp 7-10) New York: Thames, Hudson Inc. 1948
Communication Theories	To understand the relationship between language and speech research will be directed towards communication theories.
Baines, Phil and Haslam, Andrew	<i>Type and Typography</i> (pp 34, 35) New York: Watson-Guption publications, 2002
Shigley, Joseph and Mischke, Charles	<i>Mechanical Engineering Design Sixth Edition</i> (pp 753, 230) New York: McGraw-Hill companies, Inc. 2001
Ward, Allen	<i>Design Theory and Methodology DTM'94</i> (p 81, 82) New York: ASME Technical Publications, 1994
Perception and Sound	An understanding of the nature of auditory systems interpreted the patterns of music and speech.
Warren, Richard	<i>Auditory Perception A New Analysis And Synthesis</i> (pp 1-4, 74-76, 165) New York: Cambridge University Press 1999
Hartmann, William	<i>Signals, Sound, and Sensation</i> (pp146, 267, 326, 353) Baltimore, MD: United Book Press, Inc. 1997

Analyzing Music

To begin to understand what constitutes musical meaning and the processes that form the eight musical elements the following resources were used.

Cage, John

Musicage : Cage muses on words, art, music / Joan Retallack, editor (pp 6–42)
London: Wesleyan University Press, 1996

Cage, John

Herausgegeben von Heinz-Klaus Metzger und Rainer Riehn version 1(pp 65–96)
New York: C.F. Peters Corp., 1990

Cage, John

John Cage: Composed in America / Marjorie Perloff and Charles Junkerman, editors
(pp 14–42) Chicago and London: University Chicago Press, 1994

Dahlhaus, Carl

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 858–877) London: Oxford University Press, 2001, Harmony

Fallows, David

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 270–279) London: Oxford University Press, 2001, Tempo

Grout, D.J. & Palisca, C.V.

A History of Western Music, Fifth Edition (pp 277–285) New York: W. W.
Norton & Co, 1996

Haynes, Bruce

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 793–804) London: Oxford University Press, 2001 Pitch

London, Justin

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 277–309) London: Oxford University Press, 2001 Rhythm

Meyer, Leonard

Emotion and Meaning In Music Chicago: The University of Chicago Press, 1956

Pritchett, James

Music of John Cage (pp 109–119) New York: Cambridge University Press, 1993

Ringler, Alexander

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 363–373) London: Oxford University Press, 2001 Melody

Sadie, Stanley and Tyrrell, John

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(p 20) London: Oxford University Press, 2001 Beat

Sadie, Stanley and Tyrrell, John

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(p 323) London: Oxford University Press, 2001 Texture

Saunders, Frederick

Physics of Music (pp 7–12) San Francisco: W.H. Feeman and Company 1948

Thiemel, Matthias

S. Sadie & J. Tyrrell (Eds.), Dictionary of Music and Musicians Second Edition
(pp 820–824) London: Oxford University Press, 2001 Dynamics

Information Design

The visual display of information and understanding the design strategies that communicate information enabled the arrangement of the intended application to effectively communicate to the target audience.

Wurman, Richard Saul

Information Anxiety 2, Indianapolis: Que, 2001

Tufte, Edward

The Visual Display of Quantitative Information Second Edition, Connecticut: Graphic Press, 2001

Tufte, Edward

Visual Explanations, Connecticut: Graphic Press, 1997

Tufte, Edward

Envisioning Information, Connecticut: Graphic Press, 1990

Samara, Timothy

Making and Breaking the Grid, Gloucester, MA: Rockport Publishers, 2002

Labanotation

Labanotation, a system designed to understand and display movement, was researched as an important attempt to communicate music visually.

Hutchinson, Ann

Labanotation The System of Analyzing and Recording Movement, Third Edition (pp 499, 506, 397) New York: Theatre Arts Books, 1977

Multiple Intelligences

Gardner's *Theory of Multiple Intelligences* (music, spatial relations, interpersonal knowledge, mathematical and linguistic ability) informed this thesis with respect to enabling the musical elements to be communicated effectively in the academic setting.

Gardner, Howard

Multiple Intelligences: The Theory In Practice, New York: Haper Collins Publishers, Inc. 1993

Gardner, Howard

Frames of Mind: The Theory of Multiple Intelligence, New York: Haper Collins Publishers, Inc. 1983

Music an Appreciation

Roger Kamien

Pitch

pp 4–5

According to Kamien, pitch is defined as highness or lowness of sound and is determined by the frequency of vibrations. The faster the vibrations, the higher the sound; the slower the vibrations, the lower the sound.

Pitch can be sub-divided into two categories, definite and indefinite pitch. Definite pitch, or tone, has regular vibrations and reaches the ear at equal intervals. Indefinite pitch has irregular vibrations and may include sounds like squeaking brakes or clashing cymbals.

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Bruce Haynes

Pitch

pp 793, 794

Pitch is determined by the frequency of regular vibrations and then given a particular value and a corresponding note name, expressed as Hertz values (Hz). For example, if a is 440 Hz, g will be 392 Hz.

Prior to the second half of the sixteenth century, singers found their pitch according to the music and the range of their voices. Instrumentalists found pitch in relationship to one another. It wasn't until voices and instruments began playing together that pitch standards became an issue. As a result, pitch standards had to be agreed upon. The International Standardizing Organization met in 1939 and later confirmed the existence of a single standard of a=440 in 1953.

Several factors affect pitch: timbre (sound of a particular instrument or voice), loudness and music context (Haynes, 793). Some factors can even distort pitch, the physical environment, temperature, physical alterations to an instrument, natural alterations (wood expansion or shrinkage) or the way in which an instrument was manufactured.

Music an Appreciation

Roger Kamien

Melody

pp 53–59

Melody is defined as a series of single tones which add up to a recognizable whole (Kamien, 53) or as pitched sounds arranged in musical time (Ringler, 363). It is recognized that a melody begins, moves in small steps or leaps, and ends (Kamien, 53). It is designed within the context of a designated pitch center, dependent upon its contour or linear design, its structure with regard to contrast and repetition, and variation and development (Ringler, 364). A melody has a sense of direction which may convey tension, release, expectation, or arrival (Kamien, 53).

The smallest melodic–rhythmic unit of a melody is a motif. It requires a minimum of two distinct pitch levels. Melody is based on motivic substance, advances from problem to solution, and by and large is self-sufficient (Ringler, 364).

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Alexander Ringler

Melody

pp 363–368

A melody is affected by historical perspectives and stylistic contexts, and, therefore, musical styles are identifiable. Melody is part of the culture or sub–culture to which it owes its existence. Melodic styles share national characteristics and respond to a variety of social and functional needs. Political movements, for example, use strict rhythms and sharp melodies that convey the sense of dignity. Similarly the emotion of enthusiasm can be expressed through rising triadic patterns and dotted rhythms.

Melodic expression (melodic association of non–musical subject matter) is an intrinsic feature of Western music. It may suggest rational thought or affective complexities of the sub–conscious. The functional intent of a melody is recognizable within its melodic design (Ringler, 368).

A History of Western Music

D.J. Grout and C.V. Palisca

Harmony

p 812

Harmony is defined as an aspect of music that pertains to simultaneous combinations of sound (Grout and Palisca, 812). The word 'harmony' has been used to describe the position of higher and lower notes in relation to one another, both in the placement of its vertical and horizontal design (Dahlhaus, 859).

Music an Appreciation

Roger Kamien

Harmony

pp 4–5, 59

The harmony which accompanies a melody may be done several different ways (Kamien, 59), primarily through the use of intervals and chords. An interval is the distance between two pitches (Kamien, 4–5). Chords are made up of intervals, with three or four notes sounding simultaneously. Intervals and chords serve as the foundation of harmony and are regarded as a primary element when music is initially constructed in both harmonic and polyphonic music (Dahlhaus, 859). Experimentation with different types of chord progressions are considered to determine the chord that will best fit the melody and mood, for example, surprise, suspense, or finality (Kamien, 53).

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Carl Dahlhaus

Harmony

pp 859–862

Intervals and chords cannot simply be random notes. They are based on tonality, the primary key the piece or section of the piece revolves around. Notes outside the key may be used to create dissonance. After a firm understanding of harmony is established, one may be able to incorporate the use of dissonance within the music. Dissonance creates tension within the music, so the listener anticipates the corresponding resolution.

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Stanley Sadie and John Tyrell

Texture

p 323

Texture refers to the sound aspect of a musical structure and may include one of the following:

- The way in which individual parts or voices are put together
- Tone color or rhythm
- Characteristics of performance (articulation and dynamic level)

According to Kamien, texture refers to the layers of sound heard at one time, the type of layer (melody/harmony), and how they are related to one another.

Music an Appreciation

Roger Kamien

Texture

pp 70–73

Three different types of texture are monophonic, polyphonic, and homophonic. Monophonic texture utilizes a single melodic line without accompaniment (this may include one or more people singing or playing an instrument in unison). Polyphonic texture consists of a simultaneous performance of two or more melodic lines with equal importance. Polyphonic writing often includes imitations when a melodic idea is presented by an instrument or voice and then restated immediately after by another voice or instrument, as in a round (Kamien, 71). Within the context of polyphonic writing several parts move independently or in imitation of one another (Sadie & Tyrrell, 323). Homophonic texture is a single melodic line accompanied by chords. Attention is primarily focused on the melody (Kamien, 72). All parts are rhythmically dependent upon one another, or there is a clear distinction between the melodic part and the accompaniment parts.

Music an Appreciation

Roger Kamien

Beat

p 43

The beat found within music is the regular recurring pattern which can be divided into equal units of time. Beats are basic units of time (or pulse) by which all notes are measured (Kamien, 43). Beats are designated by a conductor by the movement of the hand or baton (Sadie & Tyrrell, 20). A single note may last less than a full beat or more than a beat (Kamien, 43).

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Stanley Sadie and John Tyrell

Beat

p 20

Music an Appreciation

Kamien, Roger

Rhythm

p 45

Rhythm is a combination of different note lengths in a piece of music (Kamien, 43) or a regulated succession of strong and weak elements. Rhythm refers to patterns of duration, whereas rhythmic feeling characterizes a piece as more or less regular or specific events occurring at regular time intervals (London, 277–279).

The rhythm of a melody is an important part of the melody's design (Kamien, 43). Rhythm is an important parameter of musical structure, and the other is pitch. Alteration in either parameter may result in a new or different work. Rhythm is dependent upon duration and durational patterns. They may be more or less regular, may or may not provide a sense of beat or tempo, and may be more or less continuous. Rhythm covers a wide variety of patterns of duration, both regular and irregular. Regular patterns involve meter, and irregular rhythms include syncopated figures and asymmetrical phrase structures (London, 278).

S. Sadie & J. Tyrrell (Eds.),**Dictionary of Music and Musicians**

Justin, London

Rhythm

pp 277–285

Those who listen to music look for rhythmic regularity or a coherent sense of motion. One's experience of music will vary according to the music context. If two successive durations are judged as different, then their differences can be conceived and represented in different ways. For example, durational differences may be perceived as differences in intensity or loudness. Judging whether two successive durations are the same or different is an important factor when determining rhythm. Other factors of consideration are ordering (whether the longer note comes first or last), pitch proximity (close to each other or far away), and differences in loudness.

A rhythmic group is two or more musical durations combined into a larger unit. Two principal facts that influence group boundaries are proximity and similarity. Group boundaries are marked by changes within a musical parameter, which may include dynamics, timbre, and texture.

It is important to consider several factors when describing a rhythmic group:

- overall size (duration and number of elements)
- number of structural elements
- the variety of its elements (number of different durational values)
- the degree of repetition in its organization.

Simple rhythmic groupings exhibit a high degree of repetition in its grouping and metric structure, while more complex rhythms involve a variety of contrasting durational values. Rhythmic complexities such as hemiola and syncopation result from the interactions between rhythm and meter. Ambiguity of group organization and/or boundaries adds to rhythmic complexity as does constantly changing patterns of rhythm and/or shifting meters.

Rhythmic notation requires three basic symbols:

- Atomic (smallest) durational unit
- A rest of equal duration
- A ligature to bind notes or rests together into units of greater value.

Once the proportional relationship among successive durational units has been identified, the tempo may be indicated by establishing a unit of duration (time signature) or by giving a general indication of the sense of movement the piece was initially intended to represent (an expressive description such as *con anima*, *dolce*, etc.).

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

David Fallows

Tempo

pp 270–275

Tempo is the musical speed or pacing of a musical composition. It may be indicated by a metronome designation that links a particular durational unit with a particular duration in clock time or by a description of speed and gestural character (*Andante*, *Allegro*). Tempo markings located at the beginning of the piece offer a loose association between metric notations and tempo (3/2 slow; 3/4 moderate; 3/8 quick).

Tempo determines the appropriate durations for the various rhythmic units given in a score. Tempo is a speed that allows the overall, integrated elements (themes, rhythms, art, breathing, motion, harmonic progressions, tonal movements, and contrapuntal activity) to flow together at an appropriate pace.

Tempo involves the perception of motion within rhythmic groups and encompasses entire phrases. Finding the right tempo is often a difficult task for the performer. Tempo changes may occur through a written indication of *accelerando*, *ritardando*, or may happen gradually or abruptly. Tempo is dependent on a regular series of pulses and allows the listener and/or performer to distinguish subdivisions from beats and beats from downbeats.

Tempo is often subjective and may be ambiguous in nature. Tempo is dependent on several factors including dynamics, instrumentation/voicing, phrasing, physical environment, expressiveness, performer's preference, and discrepancy of editor's additions, all of which create a variety of degree in which tempo may be expressed.

**S. Sadie & J. Tyrrell (Eds.),
Dictionary of Music and Musicians**

Matthias Thiemel

Dynamics

pp 820–824

Dynamics are defined as the intensity of volume with which notes and sounds are expressed (Thiemel, 820). Dynamics are indicated in the music by the composer to indicate a certain degree of loudness or softness (Grout and Palisca, 753).

Generally, dynamic indications are approximate and relative and require the performers to use their own judgment (Grout and Palisca, 753). The inclusion of dynamics within music is a natural phenomenon that can often be assumed even when specific indications are not available. In cases where dynamic indications are not provided, dynamics may be inferred from the performer's understanding of form, content, and expression. The best guideline, however, is to follow the internal sense of the music (Thiemel, 822).

A History of Western Music

D.J. Grout and C.V. Palisca

Dynamics

pp 753, 230

One of the earliest forms of dynamics was the indication of *piano* (soft) where each singer was performing alone and *forte* (loud) when both were performing together (Grout and Palisca, 230). In the Renaissance era, dynamic values were reflected in changes in the number of voices and their registers. Indications of *piano/forte* within the music were used to indicate both echo effect and alternation between choirs. The use of the term *piano* often meant echo. In the Baroque era, dynamic markings only occurred sporadically. In the Classical era, the intensification and climaxes within the music of the symphony and sonata demanded a more flexible system (Thiemel, 820).

Several composers expanded and adapted their own system of dynamics within their music. C.P.E. Bach used abrupt changes and contrasts, Beethoven used sudden and powerful dynamic contrasts, and Rossini and Berlioz used dynamics as a means of expression. Schumann used dynamics to represent distance. Composers provided more and more performance indications recognizing dynamics within their music. In the postmodern era, composers used dynamics at extreme ends of the dynamic spectrum. For example, Ligeti's piece for two pianos moves from *fffff* to *pp* in a single bar.

Uniformity of dynamic indications as they are known today were passed down from one composer to the next. Leopold Mozart documented the meaning of dynamic indications in his text *Versuch einer gründlichen Violinschule* (1756, p 50–51) *forte*... *loud or strong*, *piano* means *quiet*. Many composers adapted this meaning within their own compositions (Thiemel, 821).

A History of Western Music

D.J. Grout and C.V. Palisca

Timbre

p 821

Timbre is identified as the characteristic color or sound of an instrument or voice (Grout & Palisca, 821). Changes in tone color create variety and contrast. When the same melody is presented in successive order by two different instruments, the music takes on an expressive effect, or by contrasting a new melody and presenting it in a new instrument, a new idea may be highlighted (Kamien, 8).

Music an Appreciation

Roger Kamien

Timbre

p 8

S. Sadie & J. Tyrrell (Eds.),**Dictionary of Music and Musicians**

Arnold Whittall

Form

p 92

Form is recognized as the constructing or organizing element in music. Form organizes musical ideas and can be found in short and long pieces alike. The basis for the concept of form is to organize and divide parts of the structure into definite sections and to determine how those sections are related to one another (Whittall, 92). Phrases within the music can be repeated, contrasted, or presented as a variation of the original idea, repeating some patterns while contrasting others (Kamien, 75).

The design of a piece may be within the context of a formal template such as ternary, canon, or sonata. Not all composers decide to use a pre-established template as a basis for their composition; they instead may opt to depart from it. Therefore, form is very hard to define (Whittall, 92). Two basic types of musical form are binary (two part) and ternary (three part). Other commonly used types of form are sonata and strophic.

Binary form gives a feeling of statement (A) and counterstatement (B). A composition in AB form may be represented AABB, AAB, or ABB if either or both of its large sections are repeated. Differences between A and B sections can be of any kind, and the two sections can be equal or unequal in length.

Music an Appreciation

Roger Kamien

Form

pp 75–79

Ternary form is represented as a statement of the original idea (A), contrast or departure (B), return/restatement of original idea (A). In some cases the composer may decide to vary the returning statement of the A section; this is indicated ABA' (A, B, A prime). Contrast between A and B sections can be of any kind, sections can be of equal or unequal length, and the return of the material within the A section the second time can be a smooth transition or an abrupt change (Kamien, 76).

A History of Western Music

D.J. Grout and C.V. Palisca

Form

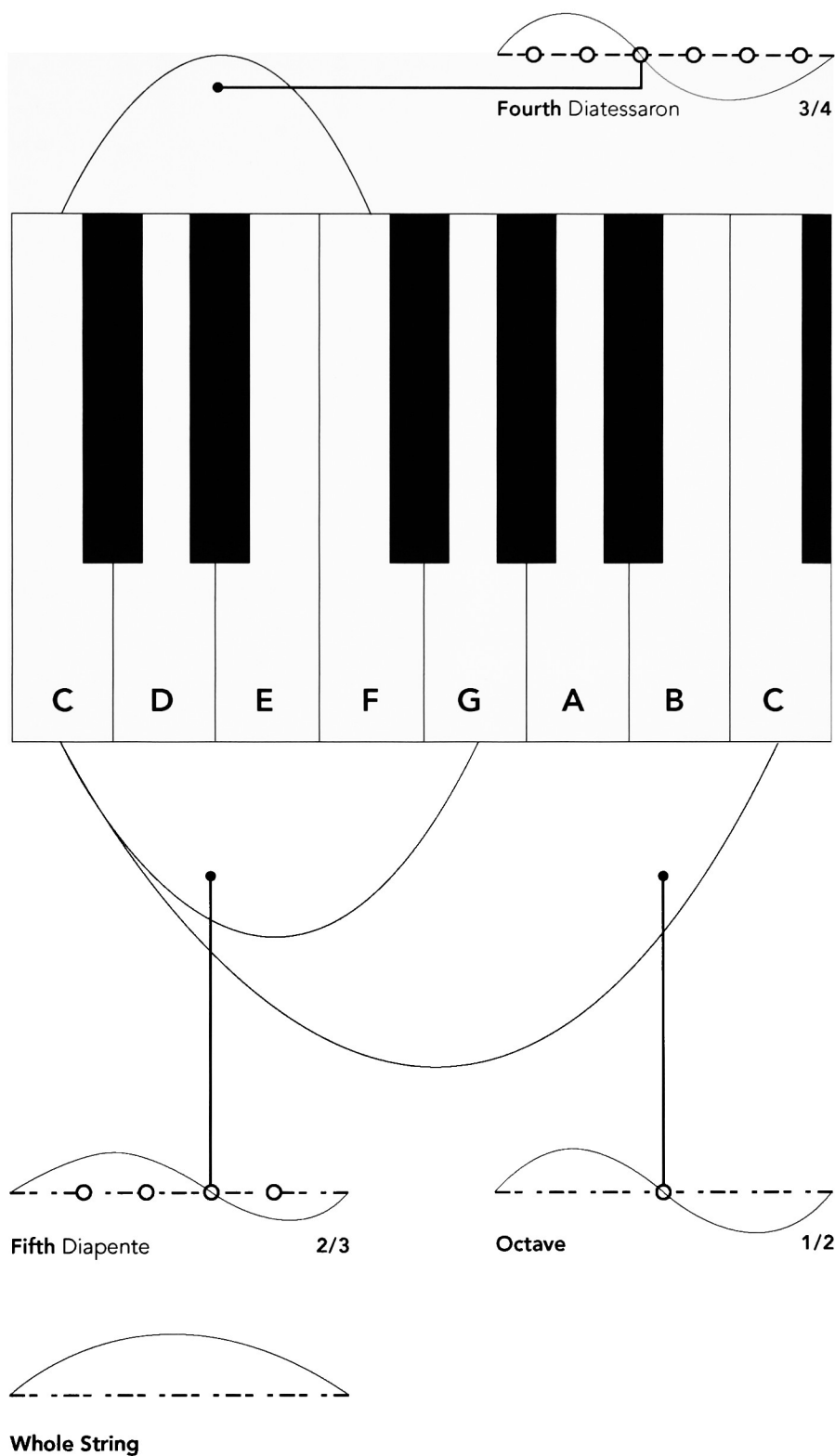
p 471

The sonata form is divided into three sections:

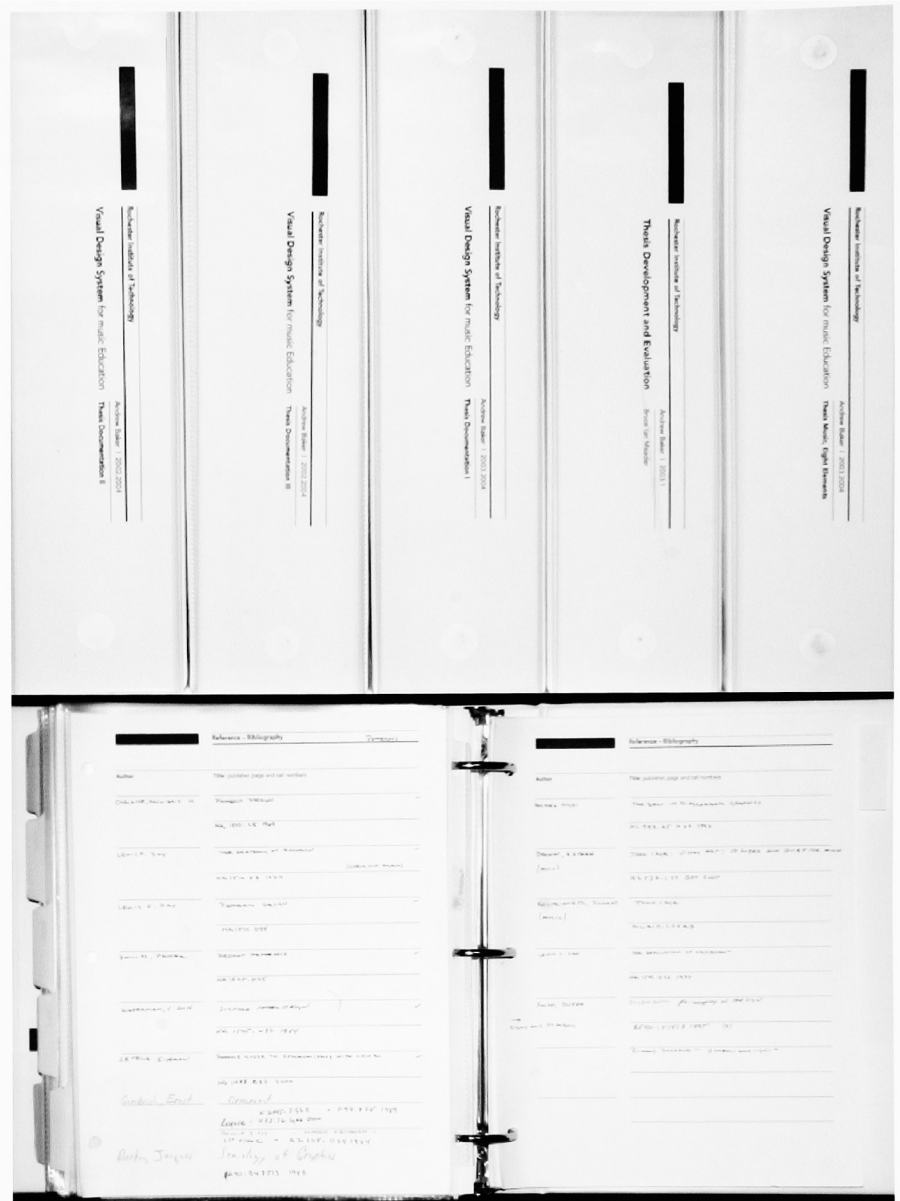
- Exposition (often repeated): themes are presented first in the tonic key and then the dominant key or relative major if the movement is in a minor key (I–V, i–III).
- Development: motives or themes presented in the exposition are presented and manipulated in new ways.
- Recapitulation: material of exposition is restated in the original order, but all themes are in the tonic key (I or i) (Grout and Palisca, 471).

Strophic form is a vocal form in which the same music is repeated for each stanza of the poem (Kamien, 78). Typical examples of this form are found in hymns.

Figure 6.1
The Power of Limits
Gyorgy Doczi
Musical Root Harmonies
p 8



Developmental Notebooks



Reference of Bibliographies

Reference - Bibliography

DYNAMICS

Author

Title: publisher, page and call numbers

PAUL KIEE
 AUTHOR: CRONE, RAINER

LEGENDS OF THE SIGN
 NEW YORK: COLUMBIA UNIVERSITY PRESS, 1991

XD 588 .K5 C76 1991

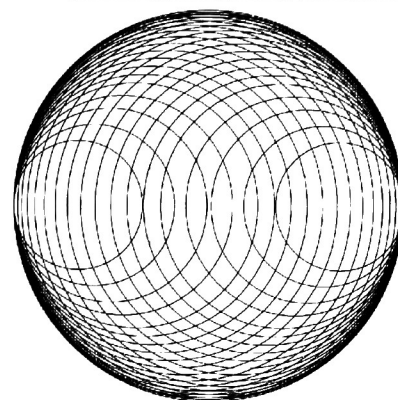
PAUL KIEE

NOTEBOOKS "THE THINKING EYE"
 LONDON: LUND HUMPHRIES, 1961 -

Concept Sketches

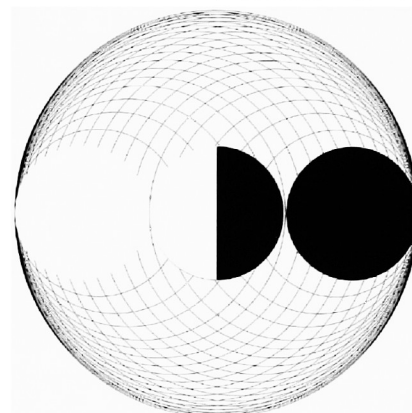
Phase 1

The unit form of a circle is the linear shape that has an established fixed center radius, which allows for structural subdivisions. The repeated geometric shape around a centralized point produces a pattern of radiation. The radiation structure creates optical vibration and the gradual sense of progression is a division of gradation. Several of these unit forms were organized to give a strong sense of regularity to determine a visual representation for the element pitch.

**Concept Sketches**

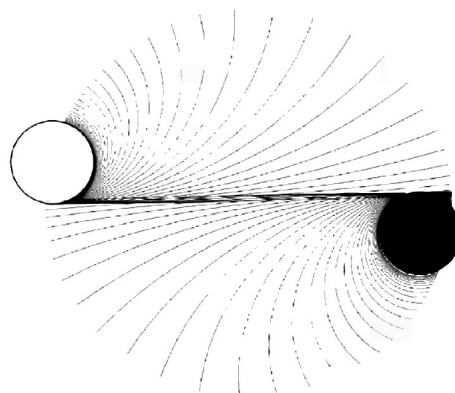
Phase 2

The frequency of vibrations can become a measurement to express the element pitch. The ability to count the length of successive waves determines a fixed ratio for each note. The intensity of waveforms determining frequencies separates sound into two main categories of high and low pitch. The adjacent figure is a representation of this division.

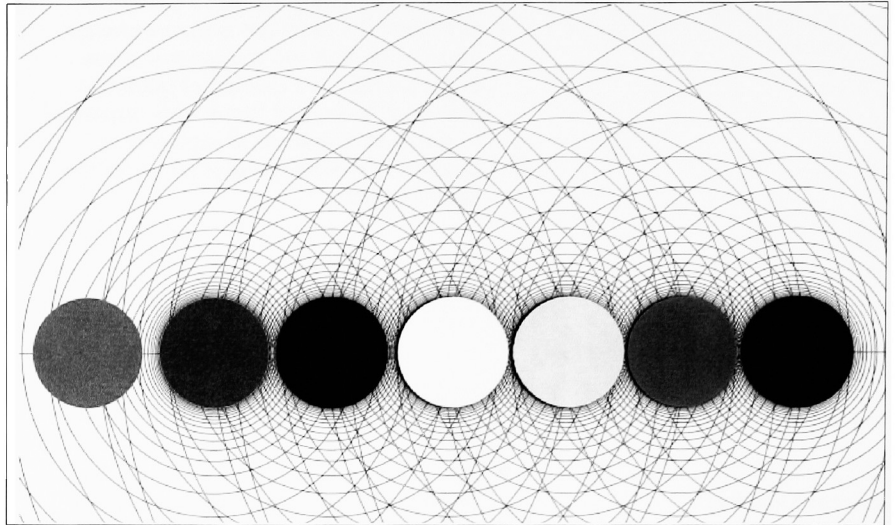
**Concept Sketches**

Phase 3

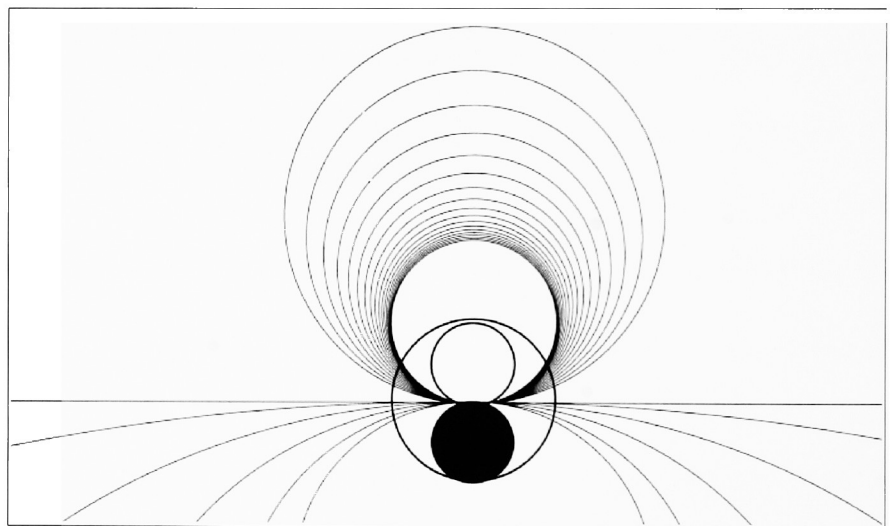
The radius of a circle is the measurable distance from the center to its edge. This division length measures the amplitude of vibrations to capture a visual representation of a unit of time. This visible structure arranges the visual unit, time, to form equilibrium to convey a degree of highness or lowness of tone.



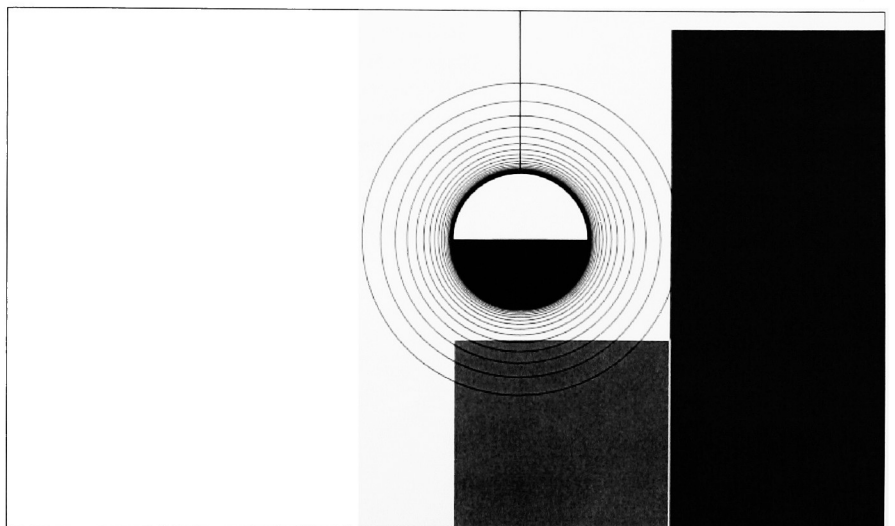
Concept Sketches
Phase 4



Concept Sketches
Phase 5

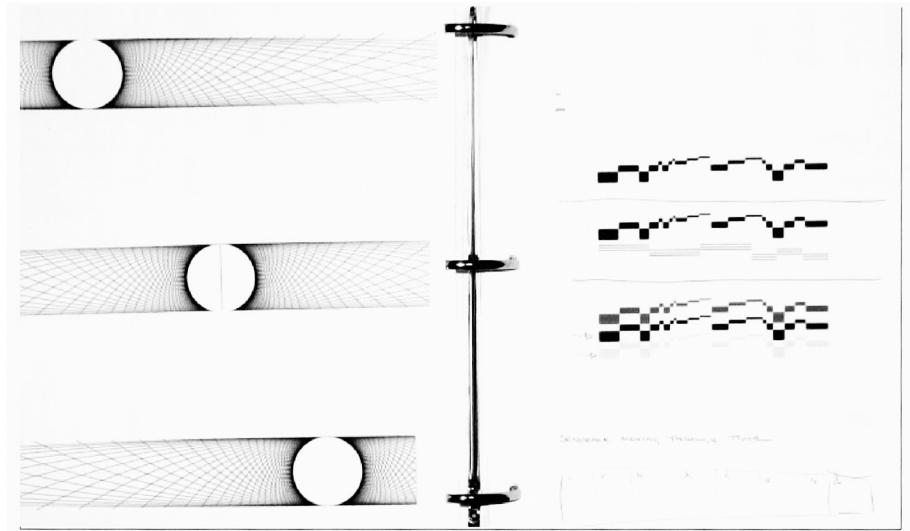
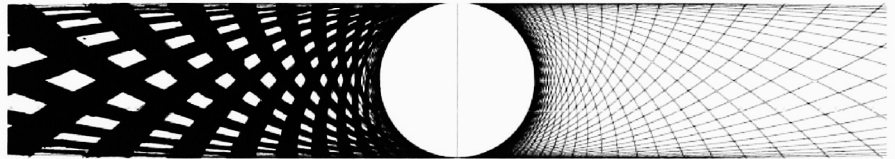


Concept Sketches
Phase 6

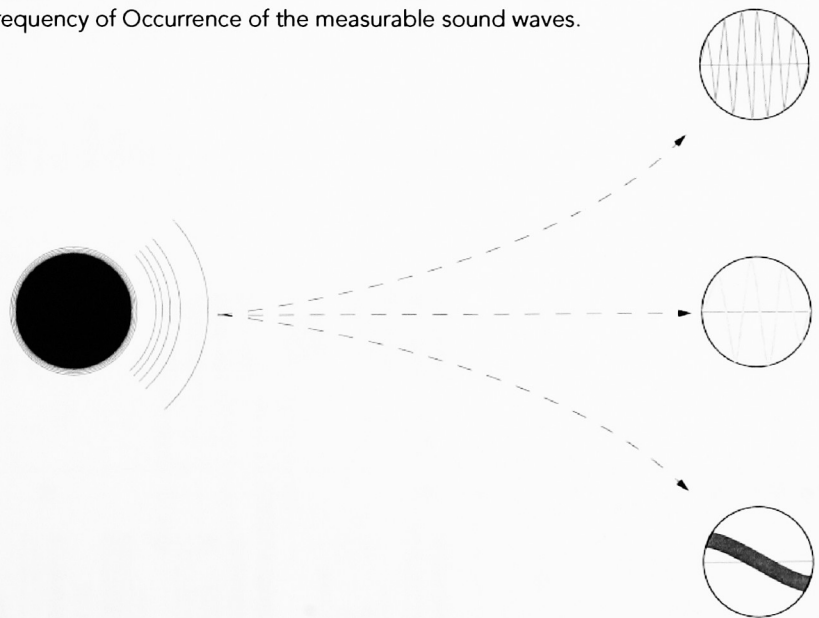


Documentation Sketches

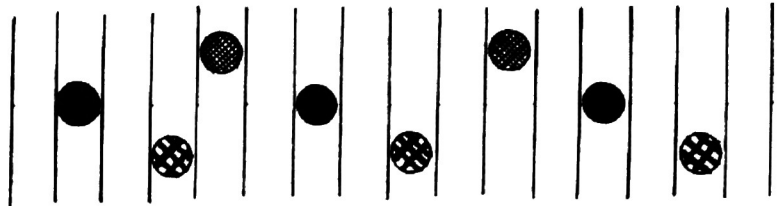
Contrast of texture happens when some forms display fine details and others are plainly visualized forms. There is a major gradation of shape that is achieved by the varying degrees of textures. The activity of this structure generated a complexity that did not fulfill the mission statement and the semiotic analysis.


Concept Sketches
 Phase 7

Concept Sketch
 Phase 8

Frequency of Occurrence of the measurable sound waves.



Repeat

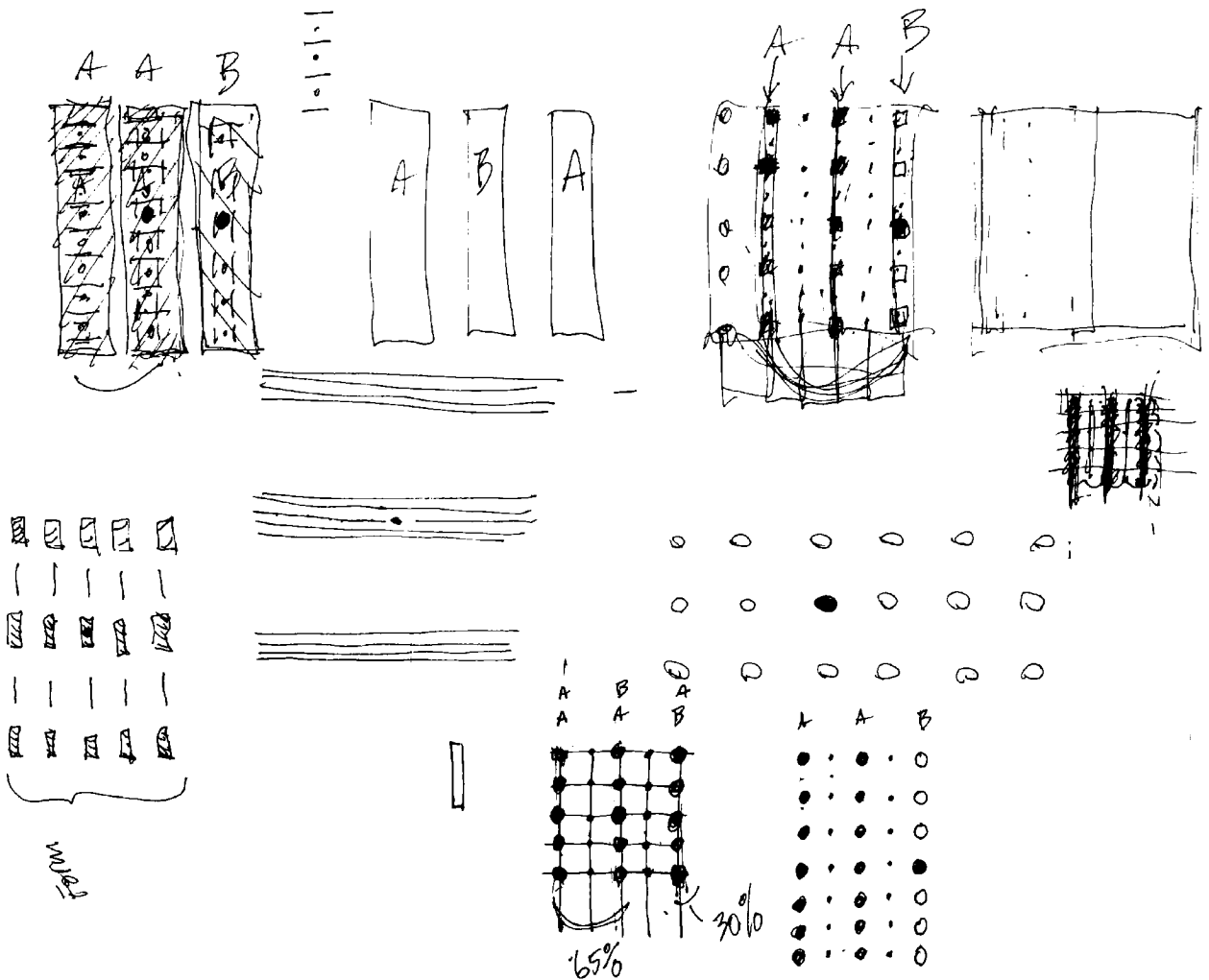
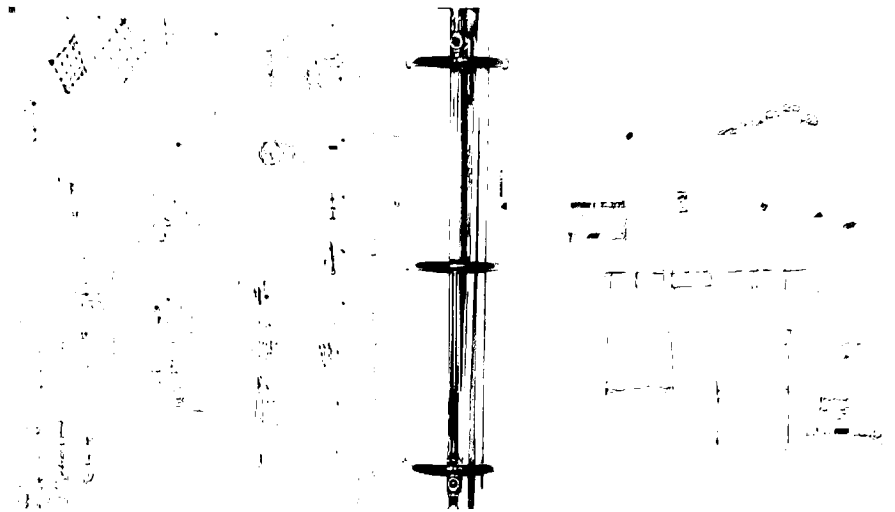


PATTERNS OF SOUND AND SILENCE

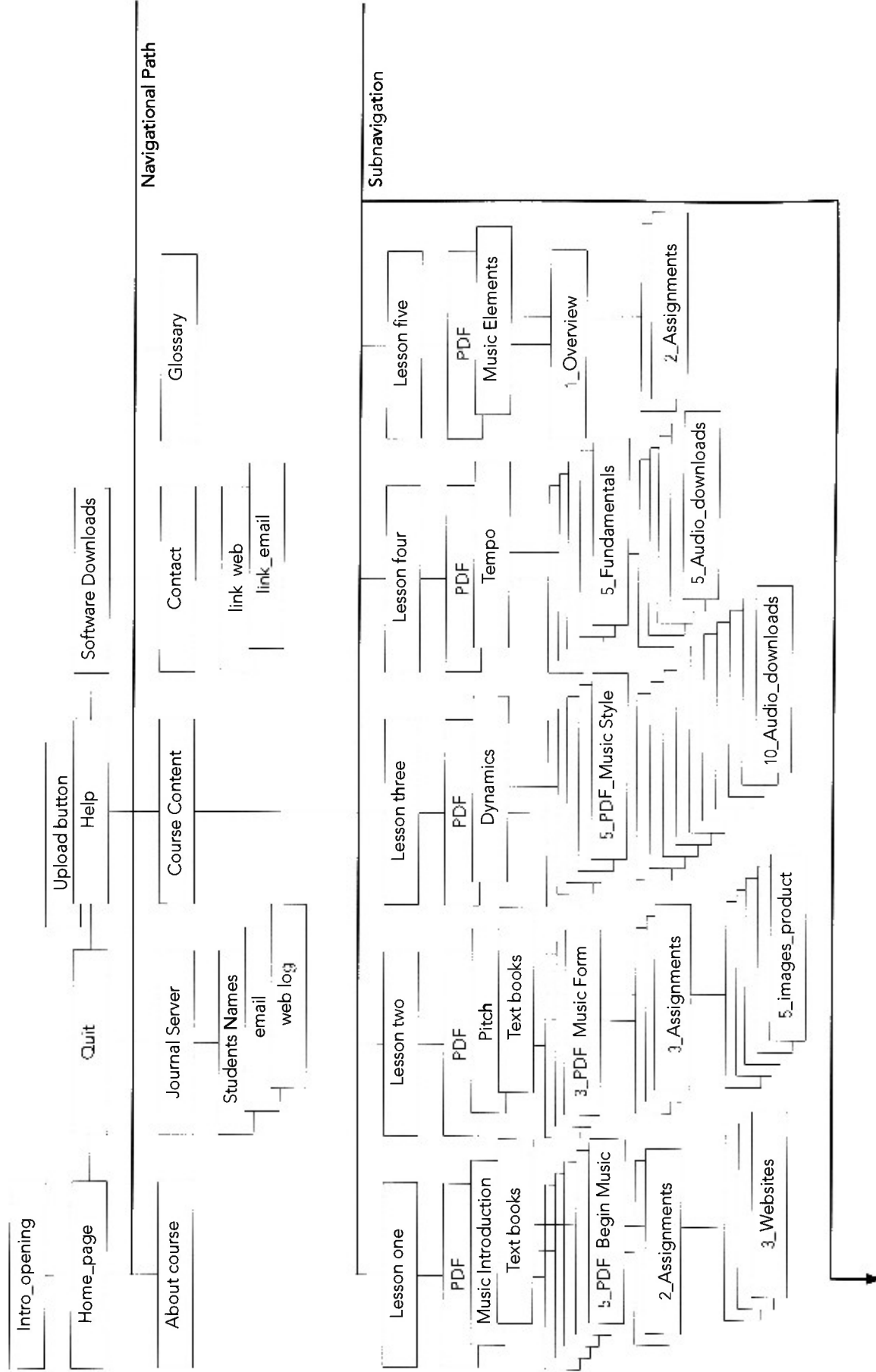
Age Group	Number of People
13-17	10
18-24	90
25-34	20
35-44	90
45-54	10
55-64	90
65-74	30
75-84	90
85-94	10
95+	10

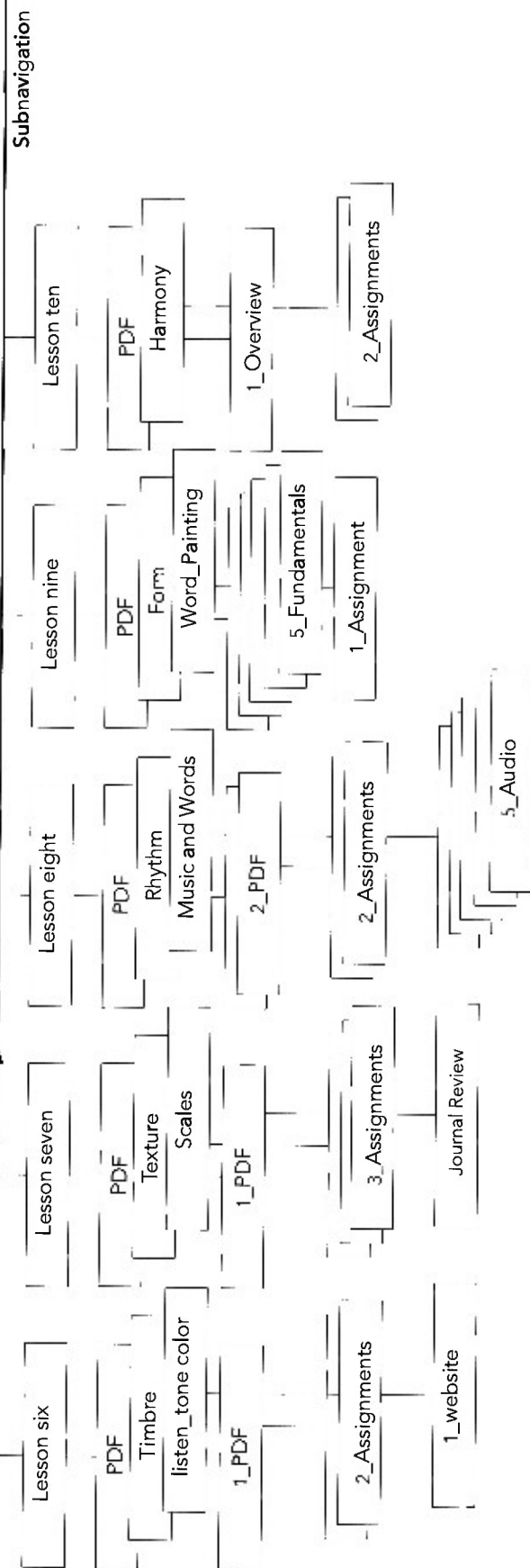
Year	Number of Publications
1980	2
1981	2
1982	3
1983	3
1984	4
1985	4
1986	5
1987	5
1988	6
1989	6
1990	7
1991	1
1992	1
1993	2
1994	2
1995	3
1996	3
1997	4
1998	4
1999	5
2000	5
2001	6
2002	6
2003	7
2004	7
2005	8
2006	8
2007	7
2008	1
2009	2
2010	3

Chief Advisor
Bruce Ian Meader
Committee Notes

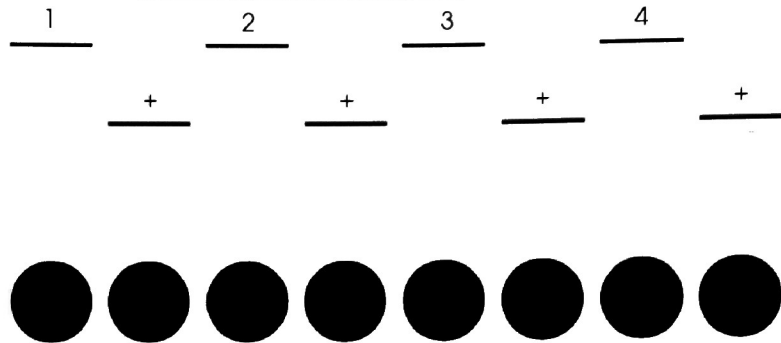


Extended Flowchart

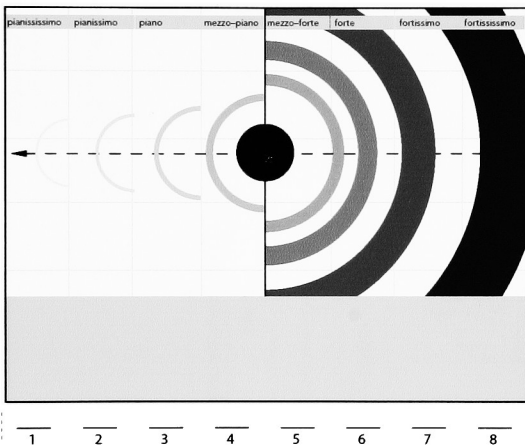




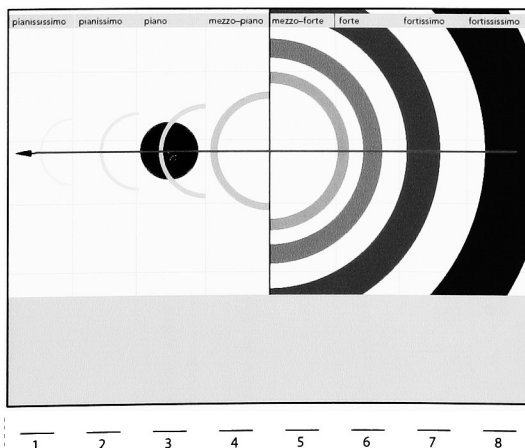
Navigational Implimentations



When time is divided into a regular succession of equal lengths each of these durations is known as a beat. This began the structure to understanding how the elements would formulate in the application. The element beat is the pulse and can maintain order through constant direction in the interactive site.



The interactive site for dynamics follows a hierarchical grid, which houses the various areas of interactive tools. The hierarchy is divided into four main navigational areas. The informational addendum and primary content are not shown. The two additional content menus would be the bars across the top signifying the different dynamic vocabulary. This menu when clicked upon moves the note to the location specified. The horizontal navigational bar seen dotted on the right guides the sound indicating different dynamic levels.



The accompanied sound is activated by a click of the mouse and will sustain until the mouse button has been released. The dynamics of the sound are manipulated when moved across the horizontal line.

Sound will increase or decrease

8

musical elements

- Pitch
- Dynamics**
- Form
- Harmony
- Rhythm
- Tempo
- Texture
- Timbre

Home
Quit

pianississimo
pianissimo
piano
mezzo-piano
mezzo-forte
forte
fortissimo
fortississimo

Dynamics are defined as the intensity of volume; the certain degree of loudness or softness of musical notes and sounds indicated by the composer. Move the center symbol to hear the difference in dynamics.

Add to Dynamics

Pitch

Harmony

Rhythm

Tempo

8

musical elements

- 1 Pitch
- 2 Dynamics
- 3 Form
- 4 Harmony
- 5 Rhythm
- 6 Tempo
- 7 Texture
- 8 Timbre

Binary

Binary form gives a feeling of statement (A) and counterstatement (B). A composition in AB form may be represented AAB, AAB, or ABB. If either or both of its large sections are repeated, Differences between A and B sections can be of any kind and the two sections can be equal or unequal in length.

Ternary

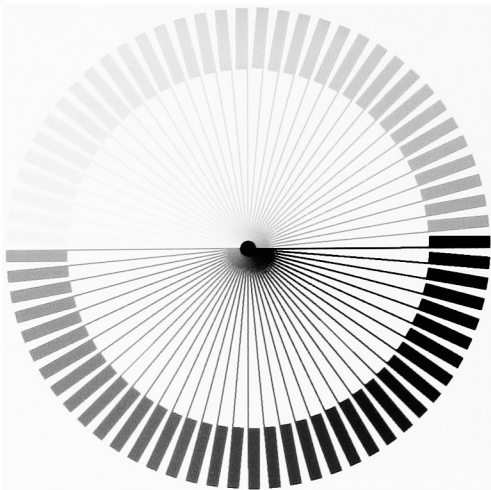
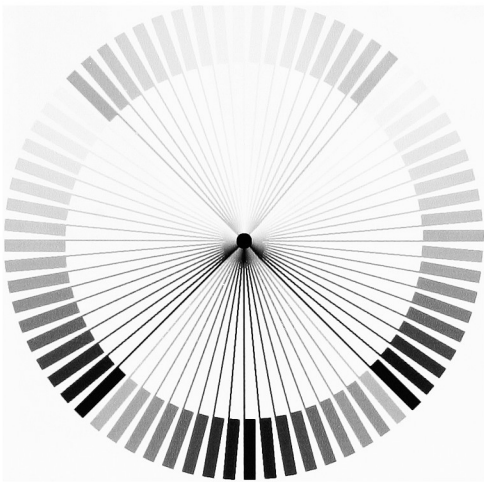
Ternary form is represented as a statement of the original idea (A), contrast or departure (B), return/restatement of original idea (A). Contrast between A and B sections can be of any kind, sections can be of equal or unequal length and the return of the material within the A section the second time can be a smooth transition or an abrupt change.

Sonata

- 1 Exposition themes are presented first in the tonic key and then the dominant key or relative major. If the movement is in a minor key.
- 2 Development motives or themes presented in the exposition are presented and manipulated in new ways.
- 3 Recapitulation, material of exposition is restated in the original order, but all themes are in the tonic key (1 or 1).

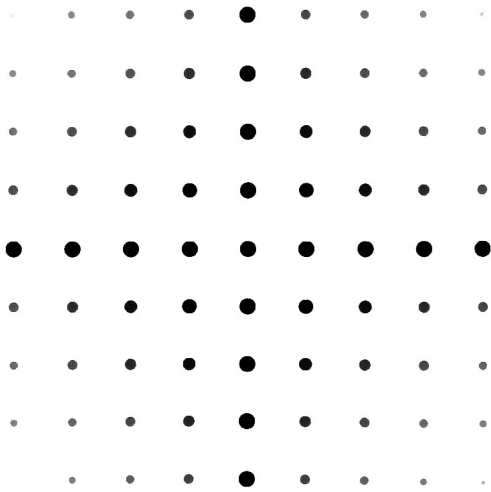
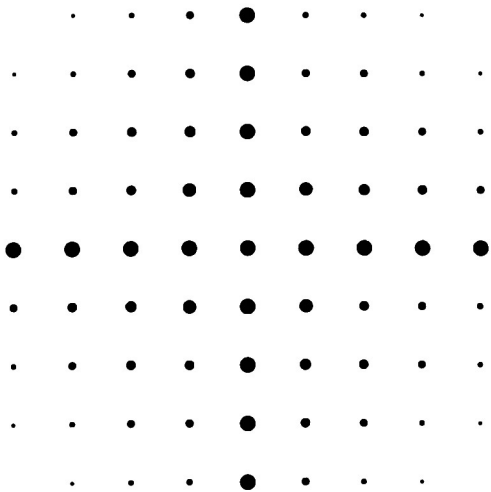
Concept Sketches Timbre
Phase 1

The variety and contrast of the element needs to express the color of tone but still remain expressive. The beginning stages to the visualization of the element timbre began with layering linear lines to allow for tone color. This then formulated into gradation patterns. This complexity yielded itself for miscommunication and the form was then analyzed to address the high and lowness of frequency along with the soft and loudness of sound. This can be seen in the strong horizontal plane that differentiates the two notions.



Timbre
Ideation 1

Timbre
Ideation 2

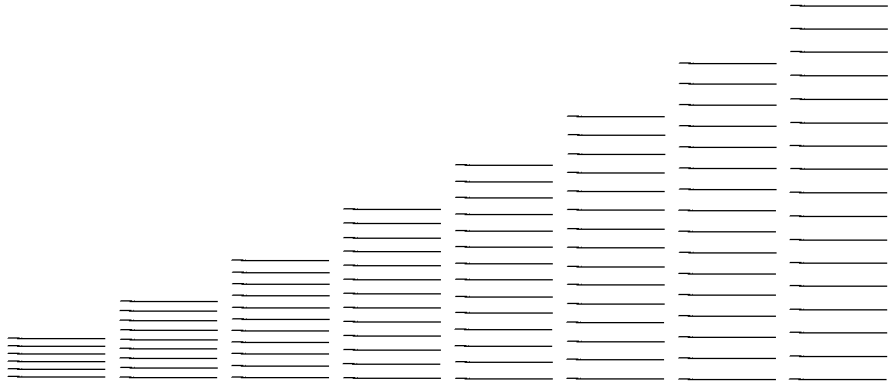


Harmony
Phase 3

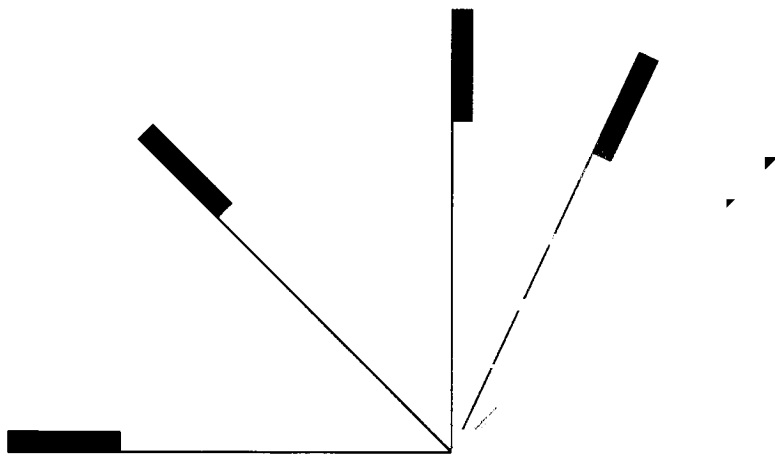
Harmony
Phase 3

Concept Sketches Timbre

Phase 1



Phase 2



Phase 3

Typographic form structure

day

after

day

Pitch

sat,

and sat,

and sat,

getting very tired of being

all alone,

with nothing to interact with

Pitch was not defined and
not active without other elements present

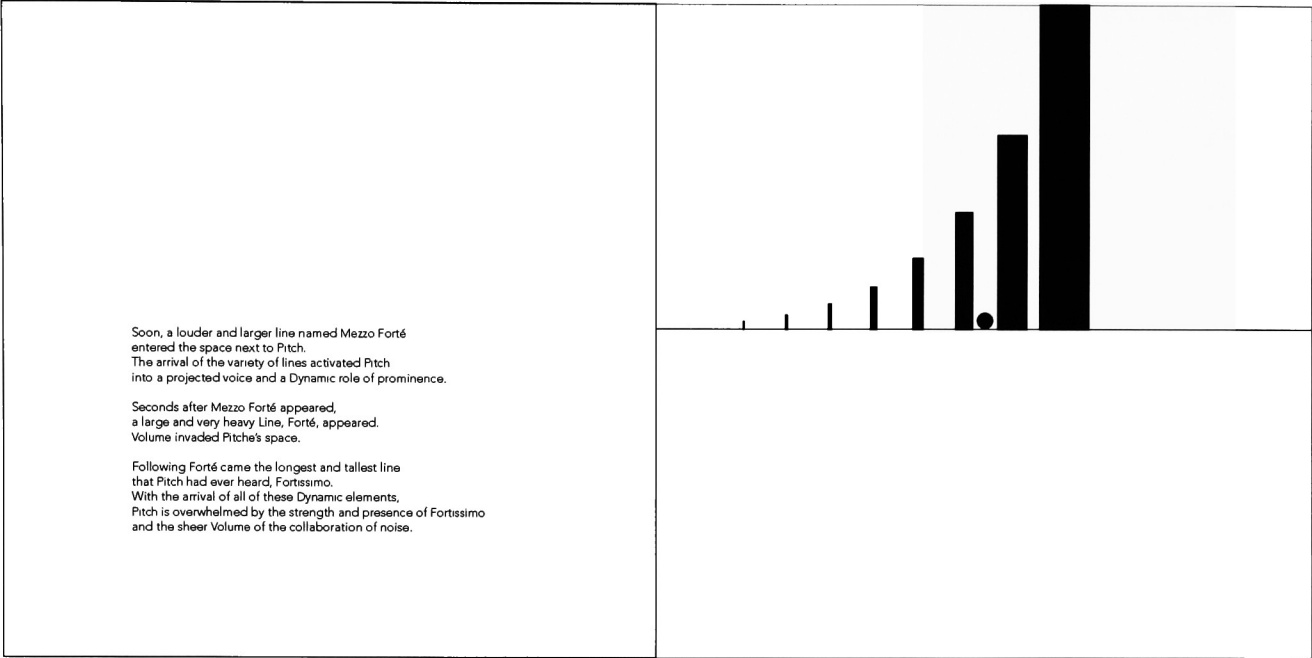
In Time

appeared dots
very low to
the ground,
carrying the element of LINE.

They were in a **hurry**

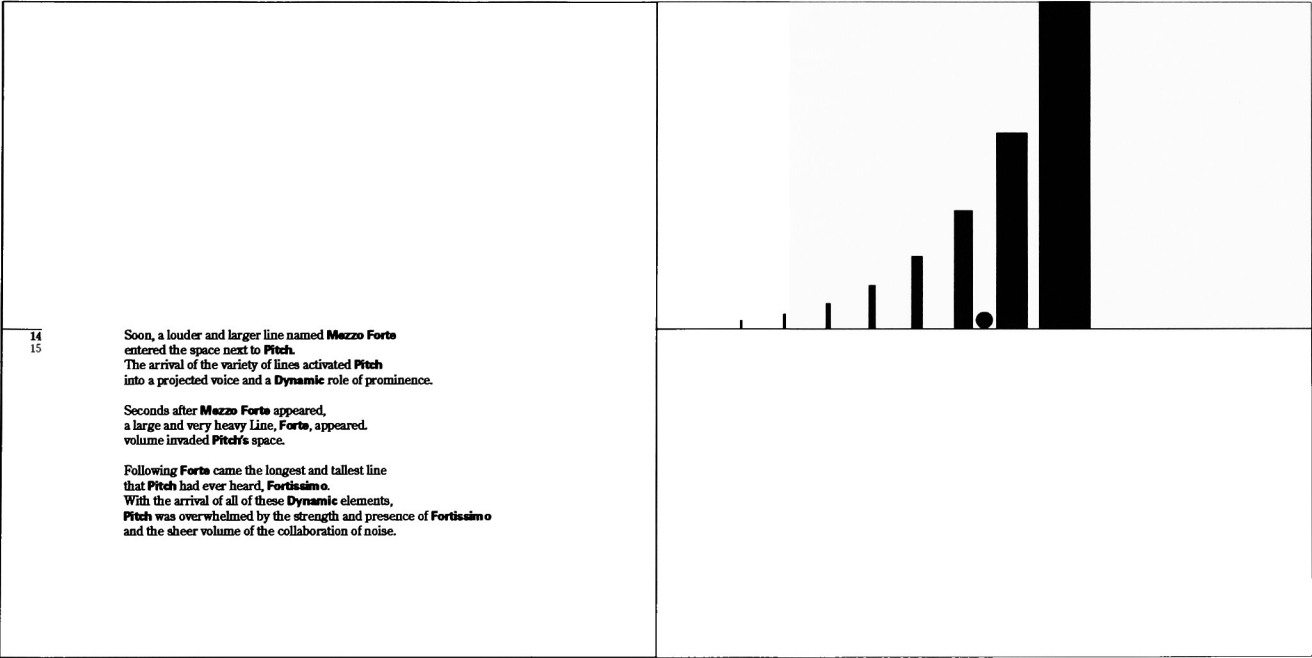
Pitch did notice that LINE caused a lot of **ension** between the dots and they
did not stay long

LINE obliges dots into a relationship which gave the dots meaning and **voice**
voice



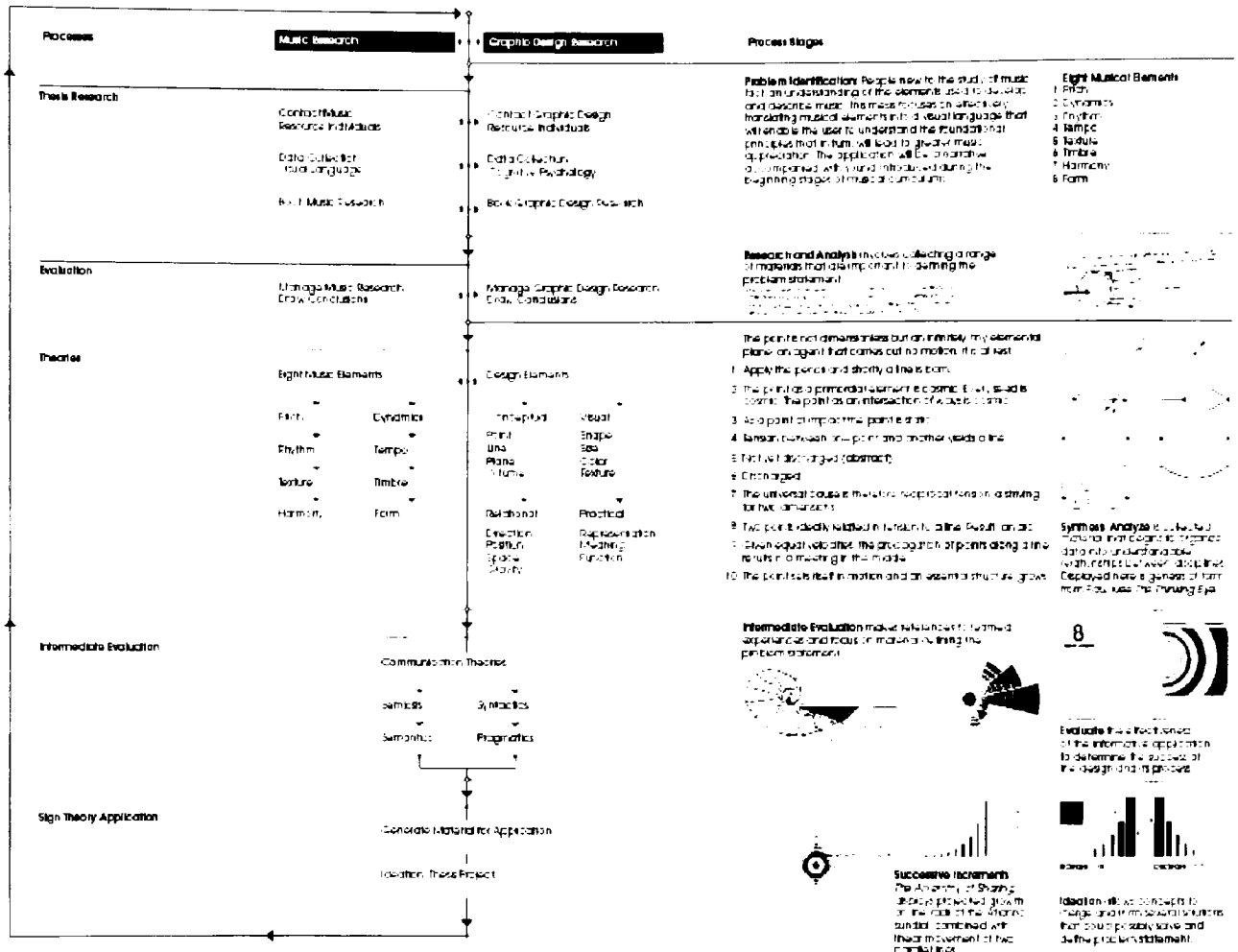
Dynamics Narration Concepts
Phase 1 and 2

The narration follows a hierarchical grid although assessments were needed after the first evaluation. Phase one of the dynamic section displays the format prior to the intermediate evaluation. Phase two displays the format with the developed type size, line spacing, and column width. The left page has also been implemented with color.



Gallery documentation panel

The format for the large panel in the gallery presentation was 44"x44" proportional to the 11"x11" panels of the eight musical elements. The layout follows the thesis content documentation structure, adapted from the mechanical engineer Shigley.



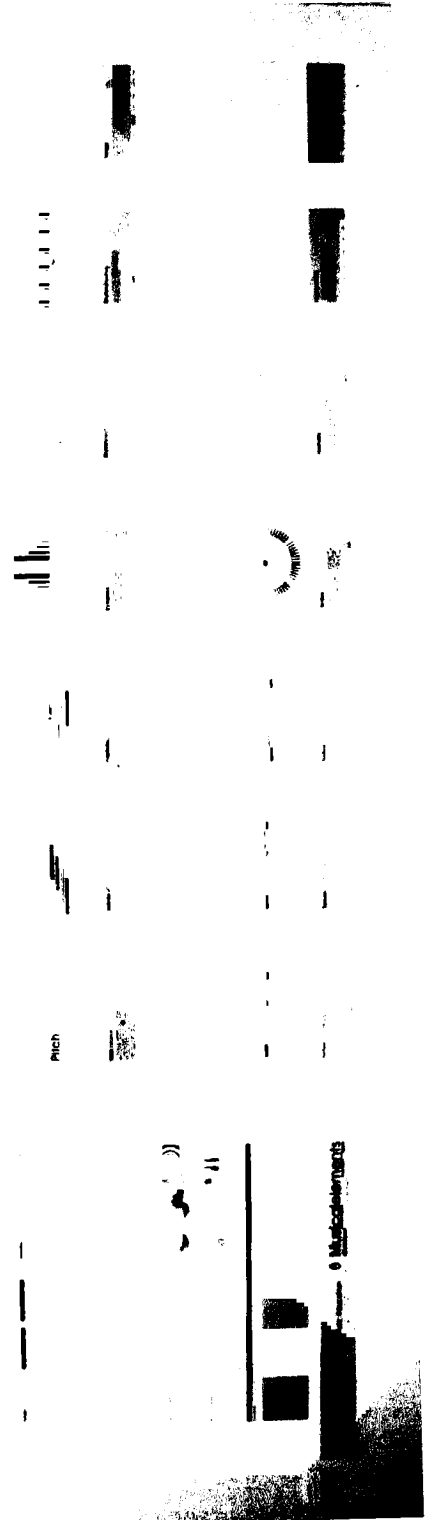
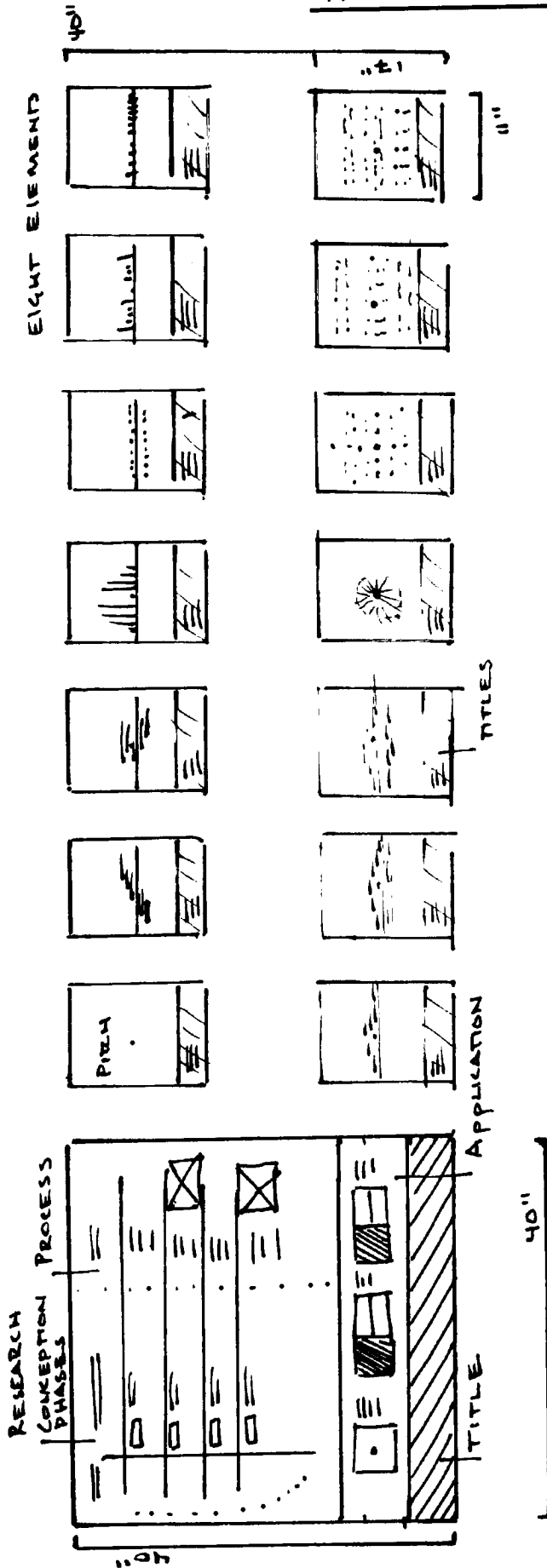
Normative of Eight Musical Elements

Implementation: Information on objects should be reflecting the semantic and pragmatics of problem statement.

Visual Design System for Music Education

Visual Design System for Music Education

Visual Design System for Music Education



Intermediate Evaluation for Music Development

4 very clear
 3 clear
 2 somewhat unclear
 1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1
Additional Comments	This is a very interesting way to think about pitch -				
	I feel that maybe because I wasn't able to read the words that went with the book,				
	some of the pictures were a first a little mind boggling,				
Overall Presentation	1 Is the content accurate for each of the 8 musical elements?	X			N
	2 Are the 8 musical elements delivered in an accessible manner?	X			N
	3 Is this a useful learning tool for teaching foundation level music?	X			N
Comments about the book	Great Job !! Very impressive look to the book.				
	It definitely shows that you put A LOT of thought and care into this project.				
	Bravo!				

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics		4	3	2	1
	Tempo		4	3	2	1
	Rhythm		4	3	2	1
	Beat		4	3	2	1
	Accented Beat		4	3	2	1
	Pitch Definite		4	3	2	1
	Pitch Indefinite		4	3	2	1
	Texture Monophonic		4	3	2	1
	Texture Polyphonic		4	3	2	1
	Texture Homophonic		4	3	2	1
	Timbre		4	3	2	1
	Form Binary		4	3	2	1
	Form Ternary		4	3	2	1
	Harmony		4	3	2	1
	Additional Comments	Especially like the forms - well planned and thought through Should or is texture part of a form? 				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?		X		N
	2	Are the 8 musical elements delivered in an accessible manner?		X		N
	3	Is this a useful learning tool for teaching foundation level music?		X		N
Comments about the book	Love visualization of these concepts that are usually only heard 					

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	2	2	1
	Beat	4	2	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	2	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1
Additional Comments	I think maybe some of these criteria are hard to apply to this book. <hr/> <hr/> <hr/> <hr/>				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?	X	N	
	2	Are the 8 musical elements delivered in an accessible manner?	X	N	
	3	Is this a useful learning tool for teaching foundation level music?	X	N	
Comments about the book	Great Job. <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>				

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability

Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.

Dynamics	4	3	2	1
Tempo	4	3	2	1
Rhythm	4	3	2	1
Beat	4	3	2	1
Accented Beat	4	3	2	1
Pitch Definite	4	3	2	1
Pitch Indefinite	4	3	2	1
Texture Monophonic	4	3	2	1
Texture Polyphonic	4	3	2	1
Texture Homophonic	4	3	2	1
Timbre	4	3	2	1
Form Binary	4	3	2	1
Form Ternary	4	3	2	1
Harmony	4	3	2	1

Additional Comments

Overall Presentation

- | | | | |
|---|---|---|---|
| 1 | Is the content accurate for each of the 8 musical elements? | Y | N |
| 2 | Are the 8 musical elements delivered in an accessible manner? | Y | N |
| 3 | Is this a useful learning tool for teaching foundation level music? | Y | N |

Comments about the book

I think the book is very thorough and extremely clear but I am not sure I would use this to teach fundamental music. The ideas are abstract and I believe the eight musical elements are not necessarily discussed until later in a students' musical development. I am amazed at the creativity and thought that went into this project and hope to see it on the market soon.

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability

Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.

Dynamics		4	3	2	1
Tempo		4	3	2	1
Rhythm		4	3	2	1
Beat		4	3	2	1
Accented Beat		4	3	2	1
Pitch Definite		4	3	2	1
Pitch Indefinite	Maybe try something that's more transparent	4	3	2	1
Texture Monophonic		4	3	2	1
Texture Polyphonic		4	3	2	1
Texture Homophonic		4	3	2	1
Timbre		4	3	2	1
Form Binary		4	3	2	1
Form Ternary		4	3	2	1
Harmony		4	3	2	1

Additional Comments

I think this one is slightly difficult for an adult's eye, because we like organization, and this one is a little harder to find the pattern, but should be good for kids.

I love what you did here, but maybe since the facing page is white and timbre tends to be very spectrum- related, you might consider color.

Overall Presentation

- | | | | |
|---|---|--------------|---|
| 1 | Is the content accurate for each of the 8 musical elements? | X | N |
| 2 | Are the 8 musical elements delivered in an accessible manner? | X | N |
| 3 | Is this a useful learning tool for teaching foundation level music? | X | N |

Comments about the book

An excellent book that can be presented to all ages, lending multifaceted opportunity to cover a wide spectrum of musical ideas without imposing the boundaries of western notation.

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1

Additional Comments

How does the position of the dot relate to these elements

Overall Presentation

1	Is the content accurate for each of the 8 musical elements?	X	N
2	Are the 8 musical elements delivered in an accessible manner?	X	N
3	Is this a useful learning tool for teaching foundation level music?	X	N

Comments about the book

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability		Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.			
Dynamics		4	3	2	1
Tempo		4	3	2	1
Rhythm		4	3	2	1
Beat		4	3	2	1
Accented Beat		4	3	2	1
Pitch Definite		4	3	2	1
Pitch Indefinite		4	3	2	1
Texture Monophonic		4	3	2	1
Texture Polyphonic		4	3	2	1
Texture Homophonic		4	3	2	1
Timbre		4	3	2	1
Form Binary		4	3	2	1
Form Ternary		4	3	2	1
Harmony		4	3	2	1
Additional Comments	Timbre - spectrum - like sphere ? Form - Linear 				
Overall Presentation	1 Is the content accurate for each of the 8 musical elements? 2 Are the 8 musical elements delivered in an accessible manner? 3 Is this a useful learning tool for teaching foundation level music?	X X X	N N N		
Comments about the book	Shows great promise! very fun! 				

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1

Additional Comments

Overall Presentation	1 Is the content accurate for each of the 8 musical elements?	X	N
	2 Are the 8 musical elements delivered in an accessible manner?	X	N
	3 Is this a useful learning tool for teaching foundation level music?	X	N

Comments about the book

Creative, thought - provoking project-

Intermediate Evaluation for Music Development

4 very clear
 3 clear
 2 somewhat unclear
 1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	✖	3	2	1
	Tempo	✖	3	2	1
	Rhythm	✖	3	2	1
	Beat	✖	3	2	1
	Accented Beat	✖	3	2	1
	Pitch Definite	✖	3	2	1
	Pitch Indefinite	✖	3	2	1
	Texture Monophonic	✖	3	2	1
	Texture Polyphonic	✖	3	2	1
	Texture Homophonic	✖	3	2	1
	Timbre	✖	3	2	1
	Form Binary	✖	3	2	1
	Form Ternary	✖	3	2	1
	Harmony	✖	3	2	1

Additional Comments

Overall Presentation

- | | | | |
|---|---|---|---|
| 1 | Is the content accurate for each of the 8 musical elements? | ✖ | N |
| 2 | Are the 8 musical elements delivered in an accessible manner? | ✖ | N |
| 3 | Is this a useful learning tool for teaching foundation level music? | ✖ | N |

Comments about the book

It was an amazing idea to put this book together. I haven't seen something like this done before, that's why I think this is unique. It was interesting to see another way of representing the musical elements.

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1
Additional Comments	Because I already know how to read music, I was confuse at first - However - this was entirely my fault! I loved the book - very professional. 				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?	Y	N	
	2	Are the 8 musical elements delivered in an accessible manner?	Y	N	
	3	Is this a useful learning tool for teaching foundation level music?	Y	N	
Comments about the book	Beautiful! Impressive layout, great colors, very artistic etc etc! I loved the look and feel. 				

Intermediate Evaluation for Music Development

4 very clear
 3 clear
 2 somewhat unclear
 1 very unclear

Understandability

Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.

Dynamics	4	3	2	1
Tempo	4	3	2	1
Rhythm	4	3	2	1
Beat	4	3	2	1
Accented Beat	4	3	2	1
Pitch Definite	4	3	2	1
Pitch Indefinite	4	3	2	1
Texture Monophonic	4	3	2	1
Texture Polyphonic	4	3	2	1
Texture Homophonic	4	3	2	1
Timbre	4	3	2	1
Form Binary	4	3	2	1
Form Ternary	4	3	2	1
Harmony	4	3	2	1

Additional Comments

Overall Presentation

1	Is the content accurate for each of the 8 musical elements?	X	N
2	Are the 8 musical elements delivered in an accessible manner?	X	N
3	Is this a useful learning tool for teaching foundation level music?	X	N

Comments about the book

great concept, great design !

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	2	2	1
	Accented Beat	4	2	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	2	2	1
	Texture Polyphonic	4	2	2	1
	Texture Homophonic	4	2	2	1
	Timbre	4	2	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
Harmony	4	3	2	1	
Additional Comments	Quite an interesting way of approaching this information - its hard to step out of what you know to look at something like this objectively, but from what I could do, it was a fine piece of work.				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?	X	N	
	2	Are the 8 musical elements delivered in an accessible manner?	X	N	
	3	Is this a useful learning tool for teaching foundation level music?	X	N	
Comments about the book	Very complete, obviously well presented. Would this be good to use along with "traditional" methods? just a thought - good job and good luck with this project.				

Intermediate Evaluation for Music Development

4 very clear
 3 clear
 2 somewhat unclear
 1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1
Additional Comments	This was very interesting 				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?	X	N	
	2	Are the 8 musical elements delivered in an accessible manner?	X	N	
	3	Is this a useful learning tool for teaching foundation level music?	X	N	
Comments about the book	Very well presented. 				

Intermediate Evaluation for Music Development

4 very clear
3 clear
2 somewhat unclear
1 very unclear

Understandability Please rank the clarity of each visual image (representing one of the 8 musical elements) to its corresponding meaning.	Dynamics	4	3	2	1
	Tempo	4	3	2	1
	Rhythm	4	3	2	1
	Beat	4	3	2	1
	Accented Beat	4	3	2	1
	Pitch Definite	4	3	2	1
	Pitch Indefinite	4	3	2	1
	Texture Monophonic	4	3	2	1
	Texture Polyphonic	4	3	2	1
	Texture Homophonic	4	3	2	1
	Timbre	4	3	2	1
	Form Binary	4	3	2	1
	Form Ternary	4	3	2	1
	Harmony	4	3	2	1
Additional Comments	Because I already know how to read music, I was confuse at first - However - this was entirely my fault! I loved the book - very professional.				
Overall Presentation	1	Is the content accurate for each of the 8 musical elements?	X	N	
	2	Are the 8 musical elements delivered in an accessible manner?	X	N	
	3	Is this a useful learning tool for teaching foundation level music?	X	N	
Comments about the book	Beautiful! Impressive layout, great colors, very artistic etc etc! I loved the look and feel.				