GOOD VIBRATIONS: ELECTRONIC MUSIC, TECHNOLOGY, AND CULTURE

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"Good Vibrations - Electronic Music: Technology and Culture" is my first Thematic Core class, presented for the first time in Fall 2007. My teaching background is in the areas of engineering electromagnetics, electronics, computational methods in engineering and electromagnetics, engineering mathematics, engineering signals and systems, and recently, engineering economics and ethics. My experience teaching general education consists of a foundations course and a Core course, both under the previous system of general education requirements at DU. The previous Core class was called, "The Art, Science and Technology of Music" and was team taught; Art Bouton of the Lamont School of Music was the "music" half of the team.

Good Vibrations" falls under the "Change and Continuity" theme. Specifically, "it explores the rhythms and complexities of historical and cultural change and continuity; the freedom of individuals and groups to make and re-make history; … the concepts of progress/development and custom/tradition; … the nature of causality; … the roles of purpose and chance in everyday life; the relationship of past, present, and future."

In a sense, most music today is electronic music. Recorded music dominates the listening space for most of us who do not have the time to devote to an evening performance of live music by a group of musicians using natural instruments. Our primary listening spaces include our home, our cars, and movie theaters; with the advent of cassette tapes, compact disc players, and most recently the iPod, the gym, the bike trail or even CORE classes can be added to the list. The course, however, limits the definition of electronic music primarily to that music realized in analog and digital electronic circuits and computers. Even with that limited definition, electronic music is pervasive in western society (in the course, the music is also limited to western music).

The course answers the question, "How did we get here?" History frames the topics of the course. In order to understand characteristics of musical instruments (electronic or not), the course begins with the anatomy, physiology, and perception (psychoacoustics) of the human auditory system. Material presented in class integrates human auditory response and the aural characteristics of classes of natural instruments. A student assignment to study specific natural instruments in more detail follows. There is a natural transition to electronic instruments in that the characteristics of natural instruments are the model for many modern electronic instruments. Although, in the experimental years early in the 20th century, all traditional models of music were questioned, which included musical notation (in place since Charlemagne's rule in A.D. 800), the number of notes within an octave, the number of notes within a span of time.

History also frames the motivation for the development (the engineering side) and use (the compositional and performance side) of new musical instruments. The synergy of history (both music and general), culture, technology, and art are explored by looking at the inventions, the compositions, the aesthetics and the acceptance of electronic music by western culture. The development of electronic technology in general in an historical context is essential to understand the "means" (transistors, integrated circuits, computer on a chip, etc.) of electronic instrument development. The instruments themselves are studied from a systems or functional level.

After reflecting on the first offering of "Good Vibrations" I decided that a better pedagogical approach should include a more intense writing component. The first offering included three essays on various topics, integrating the readings on human auditory response, the technology of electronic music, the historical events surrounding the technological developments, and the musical and social cultures at various times during the developments. The course also had listening assignments where students were expected to critique electronic music and films where electronic music is the subject and where it is used in a score. These listening and viewing assignments required a fairly short, but structured response. My expectations for student performance were not met in the essays or in the listening assignments.

The basic structure of the assignments will remain the same; however, participation in the Writing Intensive Core Workshop has enabled me to write better assignments and support these assignments with proven pedagogical methods. The methods include students writing ungraded drafts, the use of idea maps or tree diagrams instead of outlines, incorporation of instruction on how to do idea maps and tree diagrams, instructions on how to critique a piece of music or the soundtrack of a film, and creating a rubric for evaluation of assignments. These methods will allow the students to learn the material and achieve the goals that I have for the course, which are listed below along with the three main essay assignments (rewritten after being critiqued in the workshop):

Essay 1

Outcome 1: Explain the anatomy, physiology and psychoacoustics of human auditory response.

Outcome 2: Describe and quantify the characteristics of a select number of natural musical instruments.

We have been reading a little bit about electronic means of making music and a lot about human auditory response. Little has been offered in the way of how natural musical instruments produce sound. Preparing for this essay will give you a chance to expand your knowledge about two musical instruments; specifically, how they produce sound, what determines their timber, their pitch and loudness ranges, etc. Given what you already know about these characteristics in the context of human auditory response, write an essay that includes physical descriptions and acoustic characteristics of two natural instruments of different families not covered in the class discussions and present them considering the characteristics of the anatomy, physiology and psychoacoustics of human auditory response.

There are a number of references available through traditional and electronic reserves (please read the list provided below). Submit a list of possible references and an idea map or tree diagram at least two weeks prior to the due date of the essay. Your audience consists of your fellow students in this course. Liberal use of pictures, charts, graphs and other diagrams to help explain the instruments is encouraged.

Essay 2

Outcome 1: Reflect upon musical and general historical events leading to development of technology, social change, and the shaping of electronic music and its technology.

Outcome 2: Describe the relationship of technology to the aesthetics of electronic music.

Write an essay addressing at least one technological development in the context of an electronic instrument, an artist or performer, and the relevant social and cultural environment at the time. The paper should address historical events, musical events, and social changes that lead to or influenced the development of the technology and visa versa. The technology should be described using appropriate terminology along with its relationship to the aesthetics and instrument(s) of choice of one composer or performer of electronic music. Liberal use of pictures, charts, graphs and other diagrams to help explain the instruments and their technology is encouraged.

Students will submit a list of possible references and an idea map or tree diagram at least two weeks prior to the due date of the essay. Your audience consists of your fellow students in this course.

Essay 3

Outcome 1: Investigate the history of electronic music and instruments with emphasis on the period starting with the voltage controlled synthesizer.

Outcome 2: Compare and contrast the technologies of electronic music and address how they are constrained or their design is influenced by the anatomy, physiology and psychoacoustics of human auditory response.

Write an essay describing the history of an electronic instrument not covered in the class and different from the one chosen for Essay #2. If an instrument from any of the assigned readings of the course is used, significant additional material from other sources must be presented in the essay. The essay should compare and contrast the technologies (digital, analogue, FM, hybrid, mixed signal, etc.), capabilities (voices, sampling capability, input controllers, etc.) and market (price, types of users, etc.) of the chosen electronic instrument with at least one other type of electronic instrument (no restrictions and can be from essay #2 or the class readings). The instruments should be presented within the context of the history (historical and musical events, and social changes) of electronic music, and the limitations imposed by the anatomy, physiology and psychoacoustics of human auditory response (frequency range, loudness range, loudness contour (ADSR), spectra, changing spectra, etc.). Extra credit will be given for added material (at least two pages) related to the use of the instrument by performers and/or composers of the time.

Students will submit a list of possible references and an idea map or tree diagram at least two weeks prior to the due date of the essay. Your audience consists of your fellow students in this course.

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I was also given the opportunity to select, modify, or create a rubric for the writing assignments. Fortunately, after a little modification, a rubric that was provided on the internet by Western Washington University was very useful for my purposes.

Adapted from
http://www.wwu.edu/wis/WritingRubric.shtml

CONTENT	strong	accept	weak	not accept
1. How appropriate is the topic in terms of the assignment? 2. How evident is the purpose for writing? 3. How ambitious is the content in terms of concepts and connections? 4. To what extent is the evidence/information relevant, accurate, necessary, and complete? 5. How effectively does the writer provide a context?				
REASONING	strong	accept	weak	not accept
1. How significant are the claims/ideas/purpose? 2. What is the quality of the evidence? 3. Is the quantity of evidence sufficient? 4. To what extent does the writer provide discussions that				

explicitly connect evidence to claims? 5. Are references to the literature suitable and sufficient? 6. To what extent does the interpretation and analysis of evidence/information/visuals show depth of thinking, logical reasoning, complex reasoning, and accurate conclusions?				
ORGANIZATION	strong	accept	weak	not accept
1. How well does the overall organization capture the designated purpose? 2. To what extent does the ordering of information/evidence lead the reader through the text? (e.g., signposts, transitions, headings, bullets) 3. How well do the parts connect with each other and the governing ideas? 4. How well integrated are the visual and verbal elements?				
RHETORIC OF THE DISCIPLINE	strong	accept	weak	not accept
1. To what extent is there sufficient knowledge of the subject demonstrated? 2. To what extent does the use of specialized concepts demonstrate understanding? 3. How appropriate to the discipline are the language and tone? 4. To what extent is there evidence of disciplinary ways of thinking and an appropriate sense of audience?				
CONVENTIONS/PRESENTATION	strong	accept	weak	not accept
1. To what extent is there clear evidence of crafting, editing and proofreading? 2. How appropriate is the documentation style? 3. How effective is the format used, including visuals and diagrams?				
OVERALL EVALUATION	strong	accept	weak	not accept

The Writing Intensive Core Workshop provided ample opportunity for general philosophical discussions about writing, Thematic Core, and general education at DU. As I am the Chair of the Faculty Core Committee and a member of the General Education Review Committee, I was very interested in and especially enjoyed these discussions. I came away from this two and a half day experience with a new appreciation for the role of writing as a pedagogical tool to foster deep learning, critical thinking, and reflective judgment. I believe that this pedagogy has not been used extensively in the engineering curricula. We expect our engineering students to have critical thinking skills upon graduation, however, I don't think that we have fully addressed how to accomplish that in our programs. I think that making some key courses in the engineering curricula writing intensive would increase our students' critical thinking skills, and more importantly, their creativity.

While writing in the discipline is probably included in most program learning outcomes (yes, I'm also on the Committee for Learning Assessment of Students) it doesn't provide the same experience that writing in Thematic Core offers. Our discussions in the workshop about expectations for writing in Thematic Core revealed that those expectations are different from expectations in the disciplines. In Thematic Core, content, organization, and creativity are valued; modes of writing specific to the discipline are generally not expected as the audience is a general audience. If we are to be a "great private university dedicated to the public good", we must produce graduates who can not only write and express themselves within their discipline, but who are also able and feel a responsibility to participate in public forums. Currently, we have a writing intensive Thematic Core requirement. I feel that a requirement for a course ore courses such as we now offer in Thematic Core should remain in our general education experience no matter what that looks like in the future.