Electronic Music Education

Constructivist Educational Solutions for Creative Evolution in the 21st Century

What is Music Production?

- **Producing** - a category of behavior, not a category of person.
    - In broad terms, a producer simply creates, using whatever medium, in whatever style.
        - A student who has made a playlist in Spotify has already experienced a form of musical creativity. The playlist itself is a form of musical composition.
        - From here, one may learn to DJ, sequencing entire songs. From there, a developing beatmaker begins sequencing loops, then sequencing individual notes and drum hits.
        - Producing in a Digital Audio Workstation encompasses sound selection/design, composing/arranging, experimenting with the pitch, timbre, placement and balancing of sounds to create music.
        - Music production can be scaled from a single desktop/laptop computer all the way up to a state-of-the-art studio facility, and anything in between. The barriers between an aspiring creative and the discovery of their sound have never been easier to transcend.

What is Music Production?

- "The recording studio is a creative medium unto itself, one with different requirements for musicality from composition and performance. No "composing" or "performing" has to ever take place in modern studio practice. I am an example of this. I cannot read or write notation. I am no expert at any instrument, though I have tried many and can make musical sense on a few. We need a new word for people like me. The musical studio has collapsed the distinction between musicians, composers, and engineers, and the word **Producer** seems appropriate for creators working across traditional role boundaries."

-Brian Eno

The Valley of Silence: 76% Unenrolled

- Kenneth Elpus and Carlos Abril's 2019 study of American school music enrollment:
  - While 91% of high schools offer curricular music education, only 24% of the class of 2013 enrolled in at least one year of a course in band, choir, or orchestra at some point during high school. **Traditional music departments and pedagogy currently exclude most students.**
- Any adult can tell you how important music was to them at this age, so why do so few young people get involved in it academically?
  - Because of the costs of instruments and lessons, ensemble participants are more likely to be more socioeconomically privileged than the school population generally.
  - The Eurocentrism of traditional ensembles and programs often makes them unappealing to Black and Latino students. Ruth Gustafson in 2008 described a 97% attrition rate of black students from elective music programs in her racially diverse school.

Music Education for Everyone (Not Just the 24%)

- **Music technology allows the other 76% to enjoy music education.**
  - Beyond the absolute number of new students that music tech programs attract, they can also change the demographics of a program by inviting students who might not have been interested otherwise: the rap and techno aficionados, the rock musicians, the singer-songwriters, the DJs, the bedroom producers, and so on.
  - Music Production Education leaves no one behind because it doesn't focus on only one genre, period or culture of music.
  - Music Production educators can leverage accessible technology to support active, social music-making that emphasizes the *doing of music*, rather than solely focusing on learning *about music*.
  - Its inherent constructivist nature combined with its analysis of an ever-evolving popular music culture guarantees that the students' interests drive the subject matter.

Music Education for Everyone (Not Just the 24%)

- Music technology education is also important because of how it changes students' perceptions of each other.
  - Music tech students will come to see their peers who play instruments in a new and more respectful light. Programs embracing this approach will be fruitful with collaboration.
  - Traditional students see that talent doesn't always come from training, and that good taste and creative inspiration can be just as valuable as the ability to play an instrument.
  - Teachers can see a program attain greater unity, and they witness their students' discovery of their creative side and their application of their performance skills in new ways.
  - The community at large will see an engaged and relevant music department focused on the needs of the entire student body, and not just the needs of the ensembles.

Music Education for Everyone − The Moral Imperative

- Musical exposure, knowledge and practice through production will give rise to the benefits reflected in scientific research on auditory processing and neurological health.
  - Rhythm, pitch, timbre, dynamic (volume), placement and balance can all be controlled by the turning of knobs or sliding of faders, by electronic instruments transmitting data, and by recording and resampling sounds.
  - Music production is a language unto itself, involving literacies in multimedia and musical/sonic concepts, physical relationship with sound, and harnessing the means of its creation to give rise to complex meaning.
  - The pursuit-and-reward of experimentation-and-discovery through deliberate repetition induces a **Flow State** that enhances learning ability, neuroplasticity, focus, and memory; this is true of vocal, instrumental, AND production practices.

Solutions for School Districts and Their Cultures

- Expanding a music department in this way will bring in and keep existing money.
  - Administrators may question the need for a large budget required by a class or ensemble that serves only a few students.
  - If the music department is hard to schedule, is expensive, and benefits only a small percentage of the student body, then it must find other ways to make itself relevant.
  - Departments turn to competitions and exhibitions as a way to justify programs, but this strategy relegates a program to the same status as an extracurricular sport. This is a downgrade.

- By engaging multiple fields of intelligence and aptitude by diversifying the points of entry to practicing/creating music, we can break down the paradigm of exclusivity in music programs.

Okay, but how?

- **The Classroom**
    - A successful music tech program requires a change from the teacher-led ensemble model to a creative workshop structure more closely resembling an **Art Class.**
    - The challenge is not the technology itself. The challenge is to foster student creativity. To do that, educators need to develop their own pedagogical creativity.
    - Since no one formula works for every student, the teacher must find ways to stimulate curiosity in their students. With the appropriate guidance, the student will take it from there.
    - In this context, the instructor's job is to inspire and facilitate.

Constructivist Pedagogy in Music Education

- **Constructivism** - The idea that music education will be most engaging and meaningful when the teaching strategies support students' agency in their own learning (Karen Brennan, 2013 MIT dissertation on structure and agency when teaching kids computational skills).
  - Agency in this sense, refers to students' abilities to define and pursue their own learning goals, so that they can play a part in their own development, adaptation, and self-renewal.
  - Learner agency may appear to be incompatible with a structured learning environment, but ideally, structures should be created to support learner agency.

Constructivist Pedagogy in Music Education

o A central tenet of constructivist pedagogy is that learning is most effective when it takes place within a "Zone of proximal development" (Vygotsky, 1978 p. 86)

- o New concepts and experiences relate directly to the learner's understanding of existing concepts and prior experiences; learners create meaning by making connections to understandings that they already have.

- o The level of challenge with the new material is in balance with the student's current knowledge and ability; the student can meet the tasks with the guidance of their instructor.

o Students come into a learning environment with a deep understanding of (pop) music, whether or not they have the tools to articulate that understanding.

o Constructivist methodology doesn't require the teacher to have all of the answers.

- o Learning alongside students is an excellent teaching method, provided that the teacher exercises openness, curiosity, and vulnerability as a learner.

- o This also teaches students one of the most valuable lessons: how to seek out information and learn.

Constructivist Learning: The Benefits of the Flow State

- Music is an effective way to enact **Flow States** - immense awareness, complete occupation of one's attention, deep, sustained concentration, control of the situation alongside the freedom to generate possibilities.

  - In a teacher-led ensemble, students have very little control over their ability to experience the Flow State.

  - If an activity's challenge level is beyond the student's ability level, they experience anxiety.

  - If their ability level exceeds the activity's challenge level, they experience boredom.

  - **Flow** happens when challenge and ability are well balanced. This is why the experience is most effective when **Student-led.**

- **Examples**

  - Shell Lake Music Camp – the longest-running band camp in the United States

  - Slam Academy – the premier Ableton Certified Training Center in North America

Electronic Music as the 21ˢᵗ Century Standard

- Teaching music production through **Non-Canonical Music** - New, fresh, nothing like what came before it, unorthodox
  - Popular and dance styles appear to be most authentically native to the medium.
    - Samplers "want" to create collage-like techno and hip hop.
    - Ableton Live "wants" to make nonlinear, semi-improvised music, though is capable of orchestration!
- It is important to not only learn the history of the founders of these genres but we must preserve the sense of play and discovery that the early house and rap producers felt.
  - This is not just an ideological stance. Since many students have no previous musical experience, a sense of discovery is a practical necessity.
  - Learning through play is how our brains and children's brains learn best.
- Musical tools are often used in ways in which they were not intended.
  - The Grand Piano was adapted to be the first SONAR; pitch correction software evolved from tools originally designed for finding oil underground and encrypting military communications.

On Appealing to Administrators

- Selling the Lab-based music course
  - Show how this class or program **solves problems.** Make sure it doesn't create new ones.
  - Many administrators like the idea of creating/fostering cultural development at their school, especially if it engages students who are not currently being addressed. Try to present a larger vision than "just a class."
  - It will be effective to argue that the new class will promote real-world career paths, that it can lead to internships.
  - To avoid other teachers getting defensive, show how your class can enrich their classes, not compete with them.
  - On budget, emphasize the accessibility/versatility of 21st century musical gear.

Enabling Career Paths − Professional Preparation

- **Music Artist**
  - A basic understanding of Music Production is a must for any person who is pursuing an artistic career at any level, in any genre.
  - These days, thanks to accessible technology, artists are taking matters into their own hands. Even if they aren't carrying every step of the process themselves, they are at least involved in these processes to the degree that they achieve their desired sound.

- **Music Producer**
  - A music producer oversees the production and recording processes for individual songs or albums with artists to ensure their music has the best quality and sound possible.

- **Sound Designer**
  - Films, video games, music and even modern cars all need sounds to bring them to life. These sounds are usually recorded or created using various techniques by sound designers.

Enabling Career Paths – Professional Preparation

- **Digital Audio Editor**
  - Digital audio editors primarily work in the post-production stage of music projects and help to perfect the quality and sound of each project they take part in.

- **Recording Studio Manager**
  - A recording studio manager oversees the business operations of a recording studio. Recording studio managers can own their own recording studios or work for existing recording studios.

Enabling Career Paths − Professional Preparation

- **A&R**
  - An A&R coordinator hires new artists to record labels and looks for new talent in the industry.

- **Foley Artist**
  - A Foley artist creates non-musical sounds for sound editors to include in recorded songs.

- **Music Editor/Supervisor for Film**
  - A music editor who works in the film industry edits music and adds it to film projects.
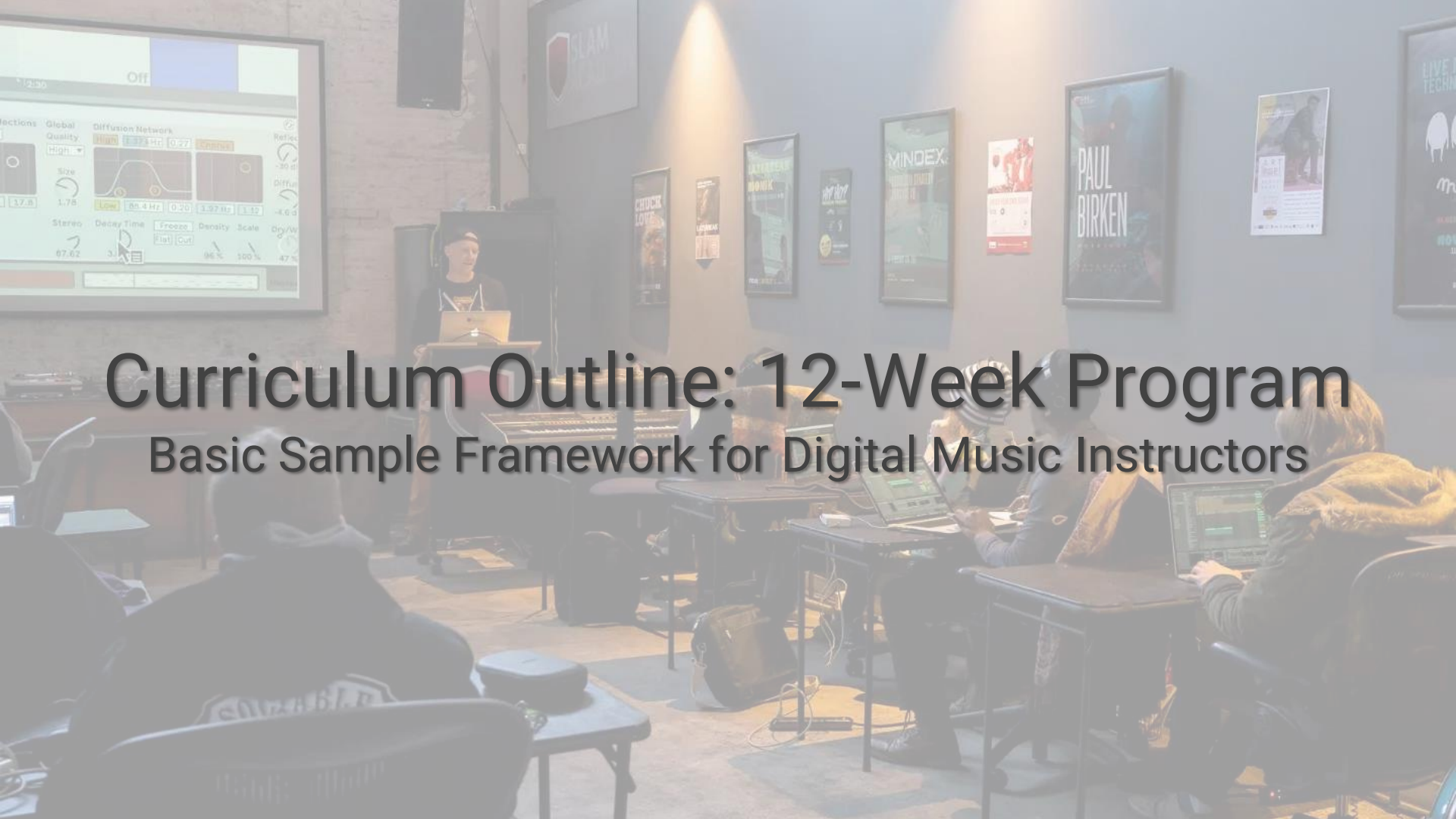
- **Composer/Arranger/Orchestrator**
  - By learning the fundamentals of production, composers not only have access to more sonic palettes and decisions, but can move their digital music data seamlessly into standard notation for distribution to conductors/ensembles.
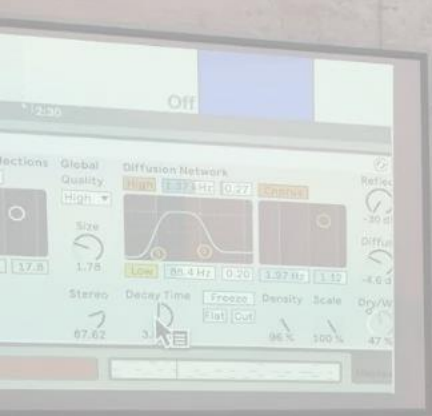
Curriculum Outline: 12-Week Program
Basic Sample Framework for Digital Music Instructors

The following course outline is an arrangement of concepts for instructors to follow, build upon, and use in collaboration with local area professionals in digital music.

As students progress, this framework can be taught at more sophisticated levels as a spiral curriculum.

Week 1: Introduction/What is electronic music?

- Introductions
    - Who are the students
        - Experience with music
        - Interests in musical styles and artists
        - Goals/careers
    - Who is the educator
- What is electronic music
    - History of electronic instruments, famous artists, seminal albums
- Modern production tools
    - What is being used today, from the simplest to the most complex tools
        - Digital Audio Workstation (or, DAW)
        - MIDI Controllers (Keyboards, Pad Controllers, V-Drums)
        - Plugins

Week 2: Digital Audio Workstations

- Look at Ableton Live (or other DAW), show a finished (demo) track
    - Show tracks in the styles that the students expressed interest in
    - Preview concepts that will be explored in the curriculum - Both simple and complex
- Tour of the software
    - Show the necessary features and functions needed for a student to get started
    - Teach students how to use "Info View" and the "Help" menu to independently learn the terms, key commands, and different functions of the software

- A brief description of MIDI

- Show what different beats/drum patterns look like in different musical genres and styles

  - Use genres and styles in which students express interest

- Have students program a loopable drum pattern

- Show how to adjust velocity and move notes off the grid (beats/measures/time chart) to 'humanize' the grooves.

- Show how to quantize notes to get on the grid

Week 4: Programming Harmony and Melody with MIDI

- Show how to draw in chord progressions and melodies
    - Use this as an opportunity to explore the editing functions of MIDI
- Show how to use a controller to record chord progressions and melodies into the DAW
- Recreate a chord progression from a selected popular song to demystify the process and complexity

- How to use an interface

  - Define practical terms for use of an interface to generate a balanced recording.

  - Set the gain to avoid clipping or a weak signal

- Rudimentary microphone technique

- Setting up Audio Inputs/Outputs in the DAW

- Explore the recording functions

  - Punch In/Punch Out – Recording within a specific segment of an existing line

  - Overdubbing – Replacing existing audio with a better take.

  - Comping – Assembling multiple takes into one ideal line.

Week 6: Arrangement/Song Structure

- Create a loop or 'Scene' that involves all of the instruments needed - Drums, Bass, Harmony, Melody

- Create a second loop that varies musically with some or all of the instruments

- Experiment with combining different elements from the different loops and start to tell a story

- Play or arrange clips to create the structure of a song

- Editing audio and MIDI clips on the timeline

- Adding moments, embellishments, fills, etc..

- Automating effects and device parameters to create movement, add tension, tell a story
  - Use this as an opportunity to introduce Audio Effect and Sound Design concepts

Week 8: Sound Design

- Dimensions of sound

    - Use an EQ to explain frequency and timbre

    - Use a compressor to show dynamic range

        - Overcompress a real instrument for best results

    - Use reverb to explain depth, space, and time-based effects

    - Use distortion to explain how to transform sounds

- Manipulating existing audio clips

    - Stretching, warping, reversing, resampling, etc…

    - Demonstrate the versatility of existing sounds and the importance of keeping everything you create. It may come in handy for something else later on that you may not expect!

- Educator uses a complex hardware or software synth to break down the elements of control
    - Oscillators
    - Filters
    - Amplifiers
    - Modulators
        - ADSR Envelopes and LFOs
- Educator and students create a synth from scratch
- Add effects to take the sound further

Week 10: Mixing Concepts

- What is mixing?
  - Puzzle-piecing the individual instruments and elements to create a final song
  - Explore the different balances from different genres and styles
    - Have each student bring in a song to analyze
- Address/process each track individually with EQ's, Compressors, etc.. to make each element fit with the others and within the big picture
- Set the final levels
- Teach listening techniques
  - Listen at high and low levels when making decisions
  - When finding the sweet spot for a given parameter, go too far, not far enough, then somewhere in between

- ## What is Mastering?

  - Mastering is a final step in preparing a track for release or performance through a number of processes on the final mixed-down audio file.

- ## Why do we care?

  - It tempers dynamics and harsh frequencies, and brings it to a radio-ready standard of listening quality.

- ## How does it work?

  - Through a combination of compression, EQ, limiting, and stereo-image processing effects.

- File Management
  - Naming techniques
  - Project management
  - Sample library management
  - Back-up techniques
  - Sending files/collaboration/client work

- These organizational skills can be applied in virtually any career path that involves file management and collaborative projects.

The Spiral Curriculum: Jerome Bruner

- "I was struck by the fact that successful efforts to teach highly structured bodies of knowledge like mathematics, physical sciences, and even the field of history often took the form of a metamorphic spiral in which:
    - at some simple level a set of ideas or operations were introduced in a rather intuitive way;
    - and, once mastered in that spirit, were then revisited and reconstrued in a more formal or operational way;
    - then being connected with other knowledge, the mastery at this stage then being carried one step higher to a new level of formal or operational rigour and to a broader level of abstraction and comprehensiveness.
- The end state of this process was eventual mastery of the connexity and structure of a large body of knowledge…" **(Bruner, 1960, p. 141).**

The Spiral Curriculum in Music Education

- The Spiral is driven forth by the Zone of Proximal Development.
    - Cyclical Repetition with Spacing
    - Increased Depth of Concept
    - Based on Prior Knowledge
- Students learn best when they make their own discoveries.
- This structure is already the basis for introducing advanced repertoire to ensembles.
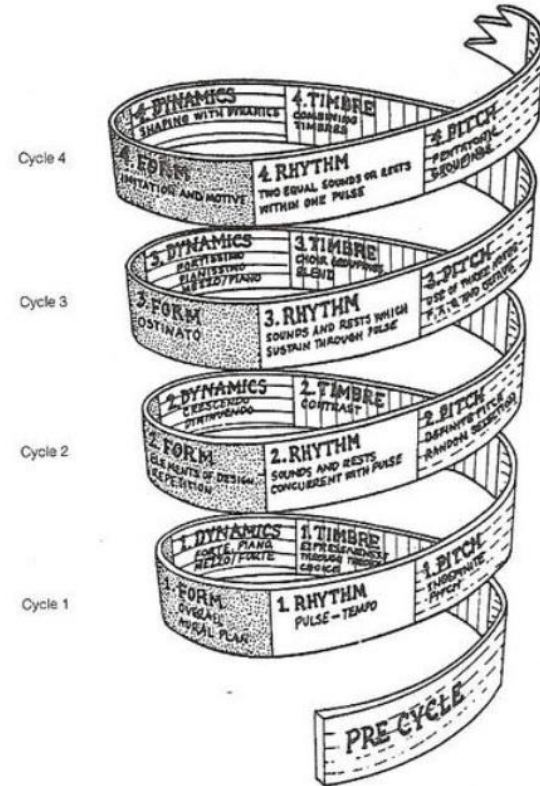
Sample Setups

Making the Tools of Music Production Accessible

Setup: Hardware (In Order of Importance)

- Computer (Desktop or Laptop)
  - Headphones
  - Midi Controllers/Digital Instruments
  - Audio Interface
    - Microphones
    - Monitors (Speakers)
  - Analog Instruments
    - Acoustic
    - Analog Electronic
- Sound Treatment (Room)
  - Foam panels, wall-mounts, Room-within-a-room, soundproof doors, etc.)

Setup: Hardware (Digital Instruments)

- Midi Controller
  - Controls the sounds within the DAW's devices; rarely contain built-in sounds
  - MPK Mini, Launchkey 25, etc.
    - Keys, Octave Button, Pitch Bend, Modulation, Mappable Knobs and/or Faders
- Digital Instruments:
  - Contain Sound Packs for different genres/musical aesthetics; often programmable.
    - Digital Pianos/Keyboards
    - Drum/Percussion Pads
    - EWI: Electronic Wind Instrument
  - Any digital instrument can also act as a MIDI Controller!
    - Can use Automation to cycle through different sounds in the DAW based on timeline (Tennyson, Anomalie)

Setup: Software (In Order of Importance)

- Digital Audio Workstation (DAW) – A viable program for recording, sequencing, and processing MIDI and audio
  - Ableton Live: All-in-one workstation loaded with instruments and audio effects; effective for composition, arrangement and production. also built as a live performance apparatus.
  - GarageBand/Logic: Timeline based sequencing/recording software; Mac exclusive.
  - Pro Tools: Specialized for Mixing and Mastering. Recommended for advanced settings.
  - Audacity: Barebones multi-track audio recording freeware.
  - Cubase: Developed by Steinberg originally for MIDI; inventors of VST.
  - Reason: Todd Rundgren's current DAW of choice, known best for its plugin suite.
- Plugins (VST)
  - Third-party music production software used as modules for DAWs, including virtual instruments, audio processing, and MIDI sequencing devices.

Live Performance − Potential Avenues

- Electronic sound arts education allows more versatility in the performance space, from sporting events to concerts and talent shows.
  - This allows for performance opportunities at sporting events that generally do not get the full pep band to begin with (e.g. junior varsity, volleyball, track and field, baseball, hockey).
- The length of pep band cues is generally short, which relieves the pressure on students to create sprawling musical odysseys right out of the gate and keeps the point of entry relatively accessible.
- Seasonal Electronic Music Showcase −
  - Students have the opportunity to showcase what they've created and rehearsed in class. Performance space is open to students who develop sound art outside of class.
- Can fold into performances for existing musical ensembles as features.
  - E.g. Fusion at jazz concerts. Symphonic applications ala Hans Zimmer. "Paradise Lost" by Eric Whitacre.

Live Performance − Potential Avenues

- Potential configurations are virtually endless:
  - Live Band Setup through Ableton Live − Multiple keyboards, bass, drums, optional guitar, featured solo instrumentalists. Keyboard voicings automated through Ableton Live.
    - Example: Nicolas Dupis (a.k.a. Anomalie) breaks down his live performance setup
    - Allows for instrumentalists to be featured while reducing exposure risk.
  - Solo/Duo Electronic Music Performance − Smaller in scale, can feature compositions and arrangements from individual or small-group students. Performed live through the DAW and virtual/digital instruments in real time, or in tandem with an acoustic instrument.
    - Example: Luke and Tess Pretty (Tennyson) demonstrate a two-person setup at Loop Conference
    - Example: Solo performance in Ableton by Haywyre: "Let Me Hear That (Live)"

    - Best suited to smaller-scale athletic events (i.e. not varsity football/basketball).

Live Performance – Implementation

- The performance space in contemporary sound arts education shall be gradually phased in.
  - The first year or so for sound arts education is every bit as much for instructors as it is for students. An introductory year or term is necessary to familiarize students, tech crews, and faculty alike with the technical aspects of the program being utilized for performance.
  - Live performance can be tested in the classroom and in seasonal showcases before moving into larger events, including sporting events and features in existing ensembles.
  - Live performance can be facilitated by local area professionals and instructors until faculty is technically proficient and music programs are self-sufficient.
- Following the introductory period, performance opportunities can expand to sporting events and ensemble features.

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Thank you!

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