The Trane Project's Guide to Learning by Ear

Introduction

The goal of this document is to present the culmination of a process to attempt to find or develop a method for musical learning by ear that was both fun, effective, and most importantly, musical.

This process is still ongoing and so is this document. It covers the development, organization, and instructions of a process meant to replicate, restore, and augment the traditional apprenticeship model of musical learning through the aural tradition.

For the most part, the musical ideas are not mine. My contribution has been to reimagine them in the context of modern technology, both in the recording and playback side, as well as in the software side.

Introduction

The process is a description of my personal strategy. I claim not only that it works, but that it is the only thing that works. It is what I wish had been my first lesson in music. Had it been, I would be much farther along. Had it been everyone's, our musical culture would be imaginably richer.

Every other way works in the extent to which they get the student to hear the music, either by design or by accident. One can, for example, use notation to recall a passage. The active perception and reproduction of the sounds themselves is, however, what drives the learning process.

You want it to be one way, but it's the other way

In this scene from The Wire (click on the title of this slide), the main antagonist, Marlo Stanfield, issues the death penalty to the security guard with this phrase.

Just in the same way, most of our musical education is based on wanting to take a shortcut that avoids dealing with the actual music: notation, theory, scales, patterns.

We hope that each of these lets us hack our way into the music. If only we played the right scales, chords, patterns, then our music would match the ideal which we long for.

You want it to be one way, but it's the other way

However, there is no other way to musical mastery than through the ear.

- "All music is played by ear" - Hal Galpert

And just like the security guard knew he was a dead man as soon as he caught Marlo's meaning, we know that all the masters we admire went through the same process.

So why do we refuse to follow them?

You think it's one way, but it's the other way

The current musical culture thinks of playing by ear as a struggle. While most agree that it'd be great to be able to play by ear, it's seen as not directly approachable. Hence, all the so-called shortcuts.

The opposite is true. Effective ear training is the easiest, fastest, and most natural way of learning to PLAY music. So how comes we don't learn it this way by default?

You think it's one way, but it's the other way

At the heart of it, I believe, is the transition from music being an oral tradition to a written tradition. What we call "traditional" music learning is not how music was learned for most of its history.

A musical written tradition is put into symbols in a physical medium and then passed from master to student. In a musical oral tradition, the master shows the student the music by playing it, and the student learns it by ear. Not only by trying to accurately reproduce it, but also by treating it as a living, breathing entity that he's meant to internalize in his own playing.

You think it's one way, but it's the other way

The beginning of this transition is the invention of the printing press. As printed music materials became cheaper and more convenient, the oral tradition was replaced by a written one that relied on scores rather than the transference of sound itself from master to student.

Recording and playback technology would not arise until four centuries after Gutenberg's invention. As a thought experiment, imagine if Gutenberg had figured out a mechanism to press a sound into some sort of medieval vinyl, and printed books had not been easily available until the end of the 19th century.

Imagine too, that this original development spurred advances in recording and playback technology that made it very easy for musicians everywhere to record, play, and loop theirs and others' music. What does musical education look like in this world?

You think it's one way, but it's the other way

In this alternate timeline, Bach records and archives all of his music. Musicians everywhere can easily access a copy of those recordings and can use it to learn to play his music. These recordings are treated as the definitive statement of his compositions.

Musicians from every culture and generation follow the same process. In this musical culture, what is the role of notation? What is the preparation of interpreters when the original recordings are available? The score might become easily available at some point, but would they even look at it?

You think it's one way, but it's the other way

It's clear that this transition from an oral to a written tradition would never happen in such a world. Our current situation is the result of a historical lag in the development of recorded music to written music.

And yet, this is the world we live in. We have the required recording and playback technology to do this. Specialized music players can play a song or a specific passage of a song on loop, slow it down, shift its pitch, and even load multitrack recordings where every music stem is isolated. We have access to the recordings of millions of musicians from across time and space. Computerized learning systems can organize and present this material in a way that is tailored to each student and automatically refreshes existing skills and introduces new ones.

How then, do we put them to use and restore the oral tradition to its full, technologically augmented glory?

Transcription

First, let's introduce the specific meaning of the term "transcription" that will be use from now on. Normally, transcription refers to the process of either writing down a piece of music or playing it on an instrument as it was played in a recording.

For our use case, we'll need a wider definition of the term. The process described above is included in this expanded definition, but it's only the last part of it. Furthermore, writing down the music is not required at all, although students are free to do so.

The problem with the first definition is that the process is too focused on the exact notes that were played. There is a lot more to the music than that. Each piece creates a musical context that the perspective student must first learn to navigate.

Transcription

Our process begins by playing within this context without many regards for the intricacies of what was actually played. It is only after this context has been sufficiently approximated by the student that the focus can narrow down to the notes that were played.

However, the focus is always kept slightly open. The end goal is not perfectly accurate reproduction of the music, but its full internalization into the personal style of the student.

Transcription Lessons

There are four main lessons in the process, each of which builds on the previous ones:

1. Singing
2. Transcription
   - Depends on sufficiently mastering the singing lesson.
3. Advanced Singing
   - Depends on sufficiently mastering the singing lesson.
4. Advanced Transcription
   - Depends on sufficiently mastering the advanced singing lesson and the transcription lesson.

Transcription Tips

All of these lessons are performed by playing over and along a recording of the music in question. Any music player could do, but the best results would be obtained with a specialized music player, such as Transcribe!.

Using such a player greatly reduces the friction of the process and allows special functions such slowing down or shifting the pitch of the music to play in different keys.

Transcription Tips

In regard to what notes to play, the best way to start is to play any note. Most music you will want to learn is based on a variation of the Major scale. If you play any note, you either landed on a note in the key or the two notes surrounding your guess are in the key.

This tip, simple as it might appear, is very profound. In practical terms, this tip means that you can navigate almost any melodic and harmonic situation without fear of getting lost. If you do get lost, all you have to do to regain your footing is to once again play any note.

Singing

First listen to the musical passage until you can audiate it clearly in your head. Then sing over the passage. At this stage it's not required to be accurate as possible. Rather, learn to sing the main elements of the passage and experiment with different melodies over it. The goal is to learn to navigate the context implied by the passage.

Transcription

With the basic context implied by the passage now internalized in your ear, try to play over it using your instrument. The goal at this point is not to accurately reproduce the passage, but rather about learning to navigate that context and use it as a basis for improvisation.

You can focus on different elements or sections each time you practice.

Advanced Singing

At this stage, you should sing the passage with more detail and precision using solfège. The recommended solfège system is movable do, with a la-based minor. In this system, the note for the key is always represented by do, and the modes are represented by the different syllables. The minor mode, for example, starts with the syllable la. This system has the advantage that the same syllables can be used for all keys. Using the numbers one to seven is also equivalent. You should also transpose the passage up or down a random number of semitones.

Advanced Transcription

At this stage, you play over the passage, and sing it with more detail and precision. It's at this point that you can engage in what is traditionally called transcription. You should also transpose the passage up or down a random number of semitones.

The passage is still used as a basis for improvisation, but the focus is much narrower than in the basic transcription lesson, and the actual music played in the passage take precedence over the context implied by it.

Trane

Trane is an automated practice system that automates the acquisition of complex skills. While it can be used to learn arbitrary skills, it was designed with the goal of facilitating the process of musical mastery.

While the process was shown first, Trane was conceived and built before the process fully crystallized. This section deals with the specifics of how Trane is used for automating the transcription process.

Anatomy of a Trane Course

A Trane course consists of a set of lessons, each lesson containing a set of exercises that can be practiced in any order among themselves. Lessons and courses might contain dependencies on other lessons or courses. Multiple Trane courses can be grouped together in a Trane library.

The full graph of dependencies created by the courses and lessons in a library is used to drive the student through progressing through all the exercises. This process is at the heart of Trane. While other systems for enhanced memorization exist, no existing solution fully satisfied this basic requirement. There are some systems that behave similarly, but they are either restricted to a single domain (as in the case of MathAcademy) or described in research papers and not available to the public.

Trane for Transcription

While Trane is a general purpose system, it has been modified with the goal of extending it to the transcription process.

Given a list of musical passages, a specialized configuration allows Trane to create lessons for all four stages of the process. Students define which instruments they want to use for practice, and Trane creates separate lessons for each of them. Progress in each instrument is independent of the others.

Trane for Transcription

In addition to the specialized course, Trane aims to provide a full path to music mastery by providing a full set of transcription courses that cover a wide variety of musical styles and provide the students with the modern equivalent of an apprenticeship with the masters.

The main organizational principle of these courses is the historical development of the traditions. For example, to learn jazz, one would start with the African music, spiritual, the blues, New Orleans jazz, and so on. Thanks to Trane's features, these dependencies can form any graph, and are not restricted to follow a linear order.

Trane also allows student to focus on specific courses, lessons, and sections of the graph and only practice exercises from those. This allows students to focus on specific songs, styles, instruments, or other similar criteria if the need arises.

Current status

- The transcription process is fleshed out and does not require Trane to be used. Just pick one of your favorite songs and try it out.
- The core of Trane has been implemented, including the transcription courses. A command-line interface is available, but I recognize it's not very user-friendly to people not familiar with the terminal.
- Some basic transcription courses exist, mostly using the material from the "Improvise For Real" method. The full graph of courses representing the historical development of music traditions is missing for the most part.

Future work

- Work on establishing a submission process so that other people can contribute their own transcription courses.
- A graphical interface. Ideally the tracks are presented along the exercises and can be manipulated in the same way as in Transcribe!. This is, however, a lot of work, and thus it's a long term goal. The current command-line interface will have to suffice for now.

More Resources

Here are some resources that I've found useful when figuring this out.

- Improvise For Real (https://improviseforreal.com/): A method for learning to improvise by ear. It's the first place where I was told that trick about playing any note. Practicing this exercise over a long weekend unlocked my unknown but suspected potential for jamming and having fun with music. As such, it gets the first mention.

More Resources

- Hal Galper - The Illusion of an Instrument (https://www.youtube.com/watch?v=y_7DgCrzil8): A mind-blowing master class by Hal Galper. The core of this process is contained there, although I was not ready to understand it when I first saw it.

More Resources

- The Music Lesson: This book by Victor Wooten contains a lot of the same ideas, and focuses on a lot of elements that are normally not touched on in other books. Also found the tip on playing any note here, although after finding it in the IFR method.

More Resources

- Interview with Hal Galper (https://www.youtube.com/watch?v=cI8xJcipuNk): A full interview with Hal Galper. It's an hour long but worth it. Goes through similar material as the master class, but in full detail.

More Resources

- Interview with Mike Longo (https://www.youtube.com/watch?v=1M3ST_OQDiI): An interview with Dizzy Gallers' pianist, Mike Longo. He's mentioned in the previous interview. Here he talks about the apprenticeship model. Full of gems.