

Teaching Technology to Artists Using Creative Problems  
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I. Introduction

Art is becoming more linked to technology each day. As technology advances and becomes more accessible, artists are able to get their hands on tools that they may never have imagined even ten years ago. Young artists at the start of their career are entering a world where they must be conversant with this technology if they expect to be competitive. A graphic artist must be as proficient with pushing pixels around a computer screen as he is with pushing paint around a canvas. A music composer must rely on her skills in manipulating audio in the digital domain just as much as her skills with the piano. These artists are not only looking for ways to acquire this technology, they are also looking for someone to teach it to them. This causes a problem in the classroom when students who are primarily skilled in creative thinking must learn principles of science and technology in order to create their art. The following will suggest some strategies for teaching science and technology to artists.

II. The Problem

When I decided to study the performing arts, I hoped it might lead to a profession where I could use my skills in creativity without having to concern myself with concepts of mathematics and science (subjects I struggled with my entire student career). I suspect my story is not uncommon. It seems that most artists tend to struggle with concepts of math, science, and technology. The problem arises when artists realize that most of the tools with which they need to be proficient require an understanding of science and technical expertise, the very areas they've been avoiding their whole life.

The challenge of the art teacher is to find a way to teach these concepts and technical skills to the students in a way they understand. The prevailing strategy seems to be to teach the tools and technology first and once these have been mastered, the instructor can move on to teach the students how to use the tools to create their art. This method usually takes the form of step-by-step tutorials written by the manufacturer of the technology (or someone on their payroll) where the students follow instructions to create something meaningless. In this scenario, the teacher is usually disappointed to find that the student absorbed nothing substantive by going through the exercise.

III. The Point of Need

I believe the reason these exercises ultimately fail in their mission is because the project has no meaning beyond the technology. I have observed in my own students that no matter how many of these exercises they complete or how much time I spend in the classroom trying to teach them the tool, they will never learn it until the

moment their lack of knowledge impedes their own creative process. It is at this moment, which I call the “point of need,” when the students will be motivated to learn and understand the scientific or technical principle required to accomplish their goal.

An example of this concept can be found in a recent experience I had with a student. I teach sound design for live theatre, and I had a student who spent two years with me in class being taught all the concepts and tools he would need to design and install a sound system in a theatre. In his junior year, I gave him an assignment on a play being produced on campus. He prepared well and thought he understood everything. When he arrived in the theatre none of the technology worked as expected. It was clear to him that he did not understand everything as well as he thought. Well the show must go on, so he called me on the weekend in a panic and asked me to come over and help him figure out what was wrong. I came over and spent fifteen minutes helping him sort everything out. When everything was working and I was preparing to leave, the student thanked me and said that he had learned more in the last fifteen minutes than he had in the last two years in the classroom.

Now I had previously taught him in the classroom all the things we worked on that day. What was different about this experience? The difference was that I was able to be there at his point of need to teach him what he needed to know in order to accomplish the creative task at hand.

#### IV. Manufacturing the Point of Need

It is not realistic for the instructor to expect to be with every student at his or her point of need. The concept of the point of need, however, seems to poke holes in the traditional practice of teaching technology to artists. Maybe we’ve been doing it backwards this whole time. Maybe we should be teaching them to be passionate and conscientious artists first. Then we encourage the students to use that creative drive to motivate themselves to learn the technology that allows them to create this art that they are so passionate about.

The point of need can be manufactured in the classroom. Rather than spend a term completing meaningless tutorials from a book, start with an artistic project that will require the use of technology. Get the students to come up with an idea that they can be passionate about without considering the technology required to pull it off. Once they have the idea, they can begin to learn the tool required to accomplish the task. All of this can happen in the classroom with the instructor nearby to help them through each point of need they encounter along the way.

#### V. An Example of Point of Need Teaching

Each year I teach an introductory class in sound design to my freshman students. These students come from varied backgrounds, but they all have one thing in common: they are artists who are motivated by the creative process. I have

approximately eight weeks to teach them Sound Forge, Pro Tools, Reason, Logic, and SFX. This will be the only formal training they will receive in these programs, but they will be expected to use them almost daily as sound designers for the rest of their career. I could easily spend that entire eight weeks putting them through a book full of Logic tutorials. They would remember almost none of it, and we would never get around to learning the other four programs. Using the point of need teaching, they can become proficient in all of these programs and create an original design by the end of term.

I start by giving them the following assignment:

For this project you will produce a radio drama. A radio drama is essentially a story using sound. You will come up with a story that you want to tell. You will acquire the sounds and compile them into a radio drama approximately 2 minutes in length.

For the first phase of the project I want you to focus solely on the story. Come up with a good story and figure out how to tell it using sound. You cannot use any spoken dialog. You will put your radio drama together using a simple tape recorder. Go around town and record the sounds you need using a handheld tape recorder or boom box. We're not looking for great quality here, just creativity. You can use two pre-recorded sound effects obtained from our sound effects server, the Internet, or CD sound effect libraries. The rest you will need to record yourself. You will hand in a written description of your story, a sound plot, and a cassette tape of your radio drama. You will present your radio drama in class.

Here's an example of a radio drama. The story is titled "Jail Break". We start in the jail cell with the sound of someone sawing away at the bars in the cell. We hear the clank of the bars falling off and the sound of footsteps running. The alarm at the jail goes off. Gunshots are heard as the person runs. We hear the person climb and jump over the chain link fence. A helicopter flies over and police cars chasing. The person is stopped by the police, handcuffs are put on and the person ends up back in jail with the sound of the cell door slamming.

This project purposely forces the students to ignore the technology. We spend the first couple of weeks discussing sound design and how to tell stories using sound. All this time they are working outside of class creating their radio drama with a cassette recorder. These projects will be very crude and will never make it into their portfolio. When the project is turned in, however, they have gained two things they didn't have when they started. First, they have a greater understanding of their art form (telling stories with sound). Second, they have a design idea that they are now artistically invested in. They've identified some problems with their storytelling and they have a desire to make it better.

Now they're given the next phase of the assignment:

For the second phase of this project you will take what you learned from creating your cassette tape version and use digital technology to produce a high-quality radio drama. For this phase you can use unlimited sound effects from the server, commercial libraries and web sites, as well as the sounds you recorded from your first go around. This time you should include layered sound and even music underscore where appropriate. You will present your final radio drama in class."

For the remainder of the term I spend the first part of each class introducing them to a new program. I walk them through the interface, explain what the program can do, and guide them through the process of creating a simple sound sequence from one of my designs. I then instruct them to play with the program and see if there's anything in there that will help them create their radio drama. This is where the point of need learning takes place. Remember that the point of need is the moment when their lack of knowledge impedes their creative process. As they work on their individual projects and encounter problems, I'm there to talk them through it and advise them on the best application of that technology for their purpose.

By the end of the term, they have created their radio drama and used all five programs to pull it off. They've seen what the technology can do for them and they're not afraid of it anymore. They have learned about analog to digital sampling including sample rates and resolution in order to record their sound content. They have learned about MIDI sequencing in order to include music underscore. They have learned the basic principles of dynamic range and gain structure so their sound will be heard well in the listening environment without digital clipping. They have learned a lot about computers. They have learned both the Mac and Windows operating systems as they use the software. They have learned about network file sharing as they browse our sound effects server and transfer those files over the network to their workstation. They have learned principles of logic and sequential programming as they program the SFX sound playback system in order to perform their final design for the class. As they use the various audio plug-ins in the software, they've learned the basics of audio signal processing including frequency processing, dynamics processing, and effects processing. They don't know everything, but they know enough that they can teach themselves the rest as they work on future projects.

## VI. Points to Consider

While this process is not an exact science, here are some observations I've made that you'll want to consider.

### a. Involve the Students in the Plan

The students should know what is going on. They should know what you're trying to do and know that they'll be using the technology later in the process. They should also know they need to ignore the technology for the first part of the assignment. Some students will get very depressed by the technological limitations and completely forget about the point of the exercise, which is to learn something about their art form.

### b. Use Real Examples

You can't expect just to throw the students into the technology without an introduction. With this introduction, resist the temptation to take them through

one of those textbook tutorials. Demonstrate the technology using a real project that is applicable to their field. In my case I draw on my own sound design work in the theatre. I pick a sound sequence I created that was interesting and meaningful. I explain the sequence to them including my artistic intentions and problems I encountered that I used the technology to solve. Then I take them through the process of recreating that sequence themselves. This is usually enough for them to see the program do something interesting and show them around the interface.

### c. Ignorance is Bliss

The students will generally be more successful if they don't know that this is supposed to be hard. Don't let on that most artists struggle with these concepts. This is another reason to use real examples. If they go through the process of creating a simple project that is meaningful, they'll have more confidence that they can use this tool for their own idea. If they get the sense that most people take several months learning this technology before they are ready to create something of their own, they'll back away from it and move on to something else that looks easier.

## VII. Conclusion

Teaching technology to artists can be a challenge and the common methods are usually disappointing. Students in the arts have an intense drive to create. When learning difficult technology without a connection to their own work, students have a hard time being motivated to truly master the tools. The teacher can take advantage of this drive to create by beginning technology training with the student's existing work. By beginning with a creative problem generated from the student's own artistic idea, the students can then be motivated to solve the problem utilizing the technology that is being taught. In this situation the students are now in a position to make decisions and use their natural creative drive to solve the problem with the aide of their instructor. The result is that students learn a technical skill or scientific principle to create a meaningful work of art.