**2**

**Imagination and Creativity: The School Based Paradox**

*“...those who have been required to memorize the world as it is will never create the world as it might be”* [7] (*p. 219).*

**Who is Creative and Why Does it Matter?**

People who are considered 'creative' are generally respected and sought after in our society, both in the professional and social realms. Yet among the many paradoxes of our educational system, it does little to encourage a child's imaginative and subsequent creative potential. As discussed by Judith Groch in her book *The Right to Create* [7], one reason might be a strongly held belief that creativity is innate and something one is born with. You either have it or you don't. Another reason might be the difficulty in objectively assessing creativity. Unlike questions and problems with only one right answer, how can you make an objective value judgement on a student's creative output?

But imagine if young Pablo Picasso were growing up in 21st Century America and attending a public school dominated by high stakes testing. According to a case study by Howard Gardner in *Creating Minds [6]*, our young Picasso had great difficulty with mastering his numbers, and other than his artistic inclinations, which were nurtured by his family, he was an unremarkable student. In most of today’s public schools, he would be force-fed a fairly proscribed curriculum that would ensure mastery of test taking techniques, but would be mostly devoid of opportunities for personal self-expression. In fact, in a climate focused on high stakes testing, little attention will even be focused on the arts. Picasso's unique and imaginative vision of the world would probably be

squelched for not conforming to the accepted adult views of how one draws the sun, trees, or sky. According to Feldman, Csikszentmihlayi, and Gardner, in *Changing the World: A Framework for the Study of Creativity [5]*, creative people are shaped as much by their early experiences as by the natural abilities they are born with. Absent a home life where artistic insights are valued and nurtured, how many future Picassos are walking around America’s schools right now who will never know it because they will never come into contact with those experiences? How many future inventors, performers, scientists, and composers, are currently being stifled by a system that is at odds with providing the conditions that would sow the seeds for imaginative and creative experiences?

Consider the following scenario for a moment. If Gena and Jesse walked into a cocktail party who would be considered the more 'creative' of the two? Why certainly you would pick Gena. The general perception is that people in the arts are the creative types and by extension the cocktail party attendees would most likely assume that Gena, the musician, would be more creative and by default, the more interesting person to talk to. Yet based on the actual school paths of most music students, the majority of their educational experiences will be focused on the re-creation of art, by learning to master their instrument through the learning of someone else's original music. Little if any of those school experiences will focus on actual acts of creative inspiration, exploration, and

decision making. In fact, their music teachers and ensemble directors will most likely be making the majority of decisions with regard to the music's interpretation. While there is no doubt that a great deal of 'doing' music through performance ensembles will take

place, the point is that in a typical music student's education there is rarely much emphasis on actually creating something original.

Now the computer science students on the other hand, may spend a great deal of educational capital on learning programming languages and sitting in lecture classes memorizing formulas, in what many people would consider to be a technical rather than a creative pursuit. Yet at the end of the day the CS students will more than likely be asked to create something from nothing, though what they are asked to create may be within very limited parameters. Their end results may not be monumental in scope, may only be the result of their own personal world views and understandings, and may not necessarily transform the field of Computer Science. But the very act of being able to create something new from just a germ of an idea, is a very empowering feeling. In both cases the music and CS students are being asked to apply what they are learning, which is certainly preferrable to just passively receiving content. But the CS student might have the edge in problem-solving. Though as a result of our current school system's emphasis on external rewards (otherwise known as grades) and quantifying the learning process, the amount of exploration and risk taking the students will be willing to expend, may be minimal.

As the above scenario suggests, it may actually be a tie as to who is the more creative person but you certainly can't assume that the musician will be more creative than the computer scientist or that one field of study is more creative than another. This chapter is in no way making any claims that if you follow our suggestions you and

your students will magically be transformed into creative geniuses. However we do believe in the value for you as teachers to create those conditions that will support a student's curiosity and imagination through risk taking and divergent thinking; even within a system designed more for conformity and convergent thinking. Why should this matter?

**The What and Why of Education**

Well, what is it that we truly hope to teach our students? In reality, how many names, dates, and places do people really need to know in their jobs, in their lives? Facts are facts, and with the proliferation of technology, one can find much of the information needed through a couple of computer keystrokes. The bigger question is **what** should be the purpose of learning these facts, and **why** do your students need to learn them? Just knowing the facts will be pretty meaningless unless your students are given a context within which they can explore, discover, and understand how these events and facts will affect them.

Unfortunately, over the past few decades there has been a major push to increase the types of courses that are fact oriented, as the numbers of courses that allow for multiple solutions and judgement skills, have dwindled. Is the point of all this schooling to turn out a mass array of walking and talking encyclopedias, or are we looking to turn out leaders and thinkers who will be able to come up with solutions to problems no one has yet thought of? Elliot Eisner believes, it is through the process of imaginative transformation that human beings are able to conceive what is not, but what will be [3].

Therefore one of your objectives might be to help your students develop their creative potential and encourage dispositions that will focus them on experiencing the

world from multiple perspectives. As teachers, you will want to utilize all the means necessary to create the kinds of learning environments that encourage students to take

risks, be adventurous in their thinking and problem-solving, and unleash the imaginations that our present system tries so hard to stifle. And therein lies the rub! As Sawyer makes clear in *Group Genius: The Creative Power of Collaboration*, ''creativity is associated with low pressure work environments'' (p. 48) [10]. The time constraints built into the very structure of school, with regard to testing and class schedules, can work against the type of less pressured environment that supports creative thinking. And a low pressure environment is also one that can turn out students who might be motivated more by their own curiosity than by just getting a good grade. Before we get into how you may create those environments even within the limitations of a typical school day, let's review a very brief synopsis of some key points with regard to creativity research along with how we view our work within the context of current research.

**A Bit of Background**

In the early part of the 20th Century, researchers linked creativity to intelligence. There was a belief then by behavioral psychologists that intelligence and creativity were innate biological traits, and not affected by outside influences. During that time intelligence tests (IQ) came to dominate and impact the educational landscape and were used as a means of sorting students according to their level of 'giftedness' as determined by these tests [2, 5, 7, 10]. Groch however [7] points out that,

As a predictive measure of “intelligence” the tests, in fact, inspect a narrow range of intellectual performance, placing heavy emphasis on the ability to recall, to recognize, and to solve certain kinds of problems, but ignore other, equally important aspects of intelligence: imagination, innovation, discovery, and the ability to recognize what is relevant (p. 87).

These were tests of convergent thinking and shaped much of the educational methodologies at that time. By mid-century, tests measuring divergent thinking were

introduced; first as developed for adults by Guilford and later modified for children, by Torrence [5]. The early 60's also brought us the Sputnick era which generated a great deal of interest in the creativity test to identify the most promising young students for intense training in technology and science to help serve the national interest [5]. This fact underscores for us the important role creative thinkers can and do play across all disciplines.

By the mid 20th Century, cognitive psychologists began to look at the study of creativity as ''a distinctly human process...showing that much of what goes into the process of creativity actually comes from outside the individual...''[5] (p.3). This shift in thinking of creativity as a process rather than a trait, suggests that one can build upon and improve one's innate capacities. Which as Feldman points out, isn't to deny a person's biology or the fact that some individuals may be more gifted in some areas than others [4]. In this regard, Piaget's contribution to developmental psychology and creativity research can not be understated. Piaget developed constructivist theories regarding how one's experiences with the world and how one interprets those experiences can change, impact, and reorganize an individual's knowledge structure over time. He laid the groundwork for psychologists, sociologists, and educators to develop new theories of cognition and development with regard to creativity. Piaget's research led to

understandings of creative people as those who have the ability to transform existing bodies of knowledge [4].

Defining what creativity is, how it manifests itself, as well as who according to those definitions is creative, has occupied creativity researchers over the years, and for

the most part is beyond the scope of this book and this chapter. However for our purpose two views of creativity epoused by Feldman, Csikszentmihalyi & Gardner [5] would be a

good place to start. They define creativity as either Big 'C' Creativity or small 'c' creativity. In their view, Big 'C' Creativity refers to,

Achievement of something remarkable and new, something which transforms and changes a field of endeavor in a significant way [5] (p.1).

They go on to suggest that this type of Creativity has enduring value. Feldman, Csikszentmihalyi & Gardner's framework for studying creativity focuses on three areas. The field, which focuses on the job or craft; the domain which centers on a body of knowledge; and the individual person, who through the acquisition and transformation of knowledge has the ability to affect and change a field and a domain [5].

Small 'c' creativity on the other hand is ''the tendency to bring a fresh and lively interpretation to any edeavor, whether humble or exalted [5] (p.2)''. While we would be thrilled to have the next Mozart or Einstein in one of our classes, we suspect that other forces that shape those Big 'C' Creatives, both internal and external, are probably beyond the capacity of traditional schooling to take credit for. It is therefore this second view of creativity, the small 'c' interpretation, that can more readily be fostered within an educational setting in general, and an interdisicplinary approach in particular.

In fact we believe that before you can get to the little 'c' creativity, you have to first move your teaching closer in practice to Peter Webster's [11] perspective of

concentrating on developing ''creative thinking.'' Webster believes this way of looking at creativity places the emphasis on the ''process itself and on its role in music teaching and learning'' (p. 23). Though in this instance he is discussing creative thinking in the context of a music classroom, we believe this perspective is relevant to most classrooms as he further describes creative thinking as a ''dynamic mental process that alternates between

divergent (imaginative) and convergent (factual) thinking, moving in stages over time. (p.28)'' As David Perkins discusses with regard to the relationship between critical and creative thinking, “The creative thinker has to be critically aware, because creative thinking, except in the simplest situations, involves the generation and sifting of possibilities and reworking them. That has to be a critical process” [2] (p. 15).

Perkins' research has led him to believe that, ''In general, creative people call upon their minds with questions different from those less creative people ask of themselves'' [2] (p. 14). So how might you move the needle in your class towards a culture of creative and critical thinking?

**Building a Better Mousetrap: Learning Environments that Foster Imaginative and Creative Experiences**

Consider a typical lecture based classroom for example. The teacher is in the front of the room delivering information. The students, depending on how engaging the teacher is, are either receiving the information through listening or note taking, or they are counting the minutes until the next class, bringing them closer to the end of the day.

Either way, most of the thinking being done in that classroom is being done by the teacher. More likely than not the students will be assessed through some kind of test

rather than being given an opportunity to apply what they are learning. Think of it this way, most tests are designed for there to be one right answer, not a range of possibilities. Not exactly an optimum environment for encouraging those 'what if' moments brought about by analytical, critical, or creative thinking. In an overall school culture where your students are programmed to seek the 'right' answer, courses designed to let their imaginations take over, underscoring the importance of exploring problems that can have multiple solutions, will help prepare your students for the reality of a world that is far from neat and orderly.

As you will see in Chapter 4, we have had a variety of permutations of our Found Objects project. In our Synchronized course, students re-purposed jacket zippers, irons, shoes, recyclable garbage, and cereal boxes for musical ends. Over the many offerings of this course we have had several fans and other electronic appliances serve as musical instruments, yet no two compositions or sets of notations have been identical. And let us not forget there is a student who through exploring the sounds created by the various speeds of her electric hand mixer, discovered she could play ''Taps'' on her mixer. Were these students involved in critical and creative thinking? Certainly. Were there some that demonstrated greater engagement than merely fulfilling yet another assignment? Absolutely! Several years ago in the Music Methods class a student devised a ''recyclophone'' from his collection of recycled garbage. He created an inventive notation

system that was intuitive enough so that when another student began to perform his composition, to everyone's delight we were hearing a quirky rendition of the opening

phrases of ''The Blue Danube.'' In reflecting upon this activity, the creator of the ''recyclophone'' noted that,

One thing I noticed in this lesson was how unique our "instruments" were and how many different ideas about tone colors and notation we had as a class.  Everybody was trying to express a distinctive musical thought with their instruments, whether it was a melody or just a combination of sounds.

Playing other people's instruments really made us think analytically and creatively about figuring out how to "break the code".  It also made us work together and use each other's ideas.

We can never predict the outcomes of this project and there are always surprises, but on some level we are devising situations that support setting their imaginations loose.

So by now you are probably thinking, 'what is the optimum environment?' Just as we wouldn't espouse creating projects with one best outcome, we think there can be a variety of optimal classroom environments, which of course will ultimately be determined by the goals of your course. For our purposes we think it is:

* Playful and fun. While we are serious about our work we don't necessarily take ourselves so seriously that we come off as unapproachable and/or absolute authorities in our subjects; where only one perspective would be welcomed.
  + All questions are welcomed and multiple perspectives are encouraged
* A collaborative environment where students are encouraged to ask a lot of questions: of the teacher, of each other, and of themselves.
* A space for exploration and discovery. This may require careful planning to find the right balance between delivery of content and ample time for your students to

mess with the materials, absorb, and apply the information in a meaningful context.

* An environment that supports and encourages risk taking; for the students and professors alike. We as teachers need to be comfortable with not always knowing the answers, and sometimes our students may know more about a given area than we do, but we must be willing to explore and discover along with our students.
* It is one where you can set your students up to unleash their curiosity and internal motivation, without the fear of ridicule or failure; either from the teacher or their fellow classmates.

**Towards Creating Meaningful Projects**

**Playful and Fun**

Let's take a closer look at each of the above points with respect to some projects you and your students might do. For starters, there is the not so benign aspect of *playfulness and fun.* While we believe there should be a sense of *fun* and *play* in the classroom, they are getting a bad rap in educational circles. Yet a great deal of research suggests that having fun, a sense of play, and a lack of external controls all contribute to the fostering of creativity [2, 8, 9]. Yet another paradox when considering teaching for creative thinking in a school based environment. If you follow the discourse on the American public education system and its shortcomings, particularly with regard to the push to test students at earlier and earlier ages, you will no doubt notice that recess, playtime, and

those subjects where students can express themselves, are being squeezed out of the curriculum.

In the *Social Pschology of Creativity,*  Beth Hennessey states that...'' while engaging in a task that they find intrinsically interesting, individuals feel that their involvement is free of strong external control: they get the sense that they are playing rather than working. [8]’’ In our culture, through listening to our elders' stories and taking our cues from TV shows and movies, we have an image of the worker as a drone, and work as the

drudgery one does in order to satisfy the basic needs of existence. Should we have any energy left, this hard work will allow us to eventually play, providing we have any spare time. On the other hand Gena's mother, who performed in both professional and amateur orchestras never said she was ''going to work.'' Rather she would declare that she was ''going to play.'' To her, work was not synonamous with being a chore. It was merely what she loved to do and with any luck, she would get paid to do it. However in all of the talk about standards and accountability in public education, we can assure you that *fun* and *play* will be noticeably absent from the conversation. We can also assure you that without encouraging *fun* and p*lay* in your class and your projects, intrinsic motivation will be absent as well.

What could be more *playful* and *fun* than asking your students to listen to their favorite music and then create a 300 second, not a second more or a second less (5 minute) mashup that will reveal to the listener something about who they are as a person? We call this our 'audioethnography' project. Students get a chance to revisit and explore some of their favorite music and re-mix it to create a musical narrative about their

favortie topic; themselves. The real purpose of this of course is to get them to explore the audacity program that we will cover in chapter 5. To complete this project though they will need to play around with the different effects and hone their editing skills. But that is so far in the background that it never intrudes on their personal motivation to create something they are proud to share with the class. We have found that the exact timing aspect of this assignment serves to keep them organized and their ideas succinct which forces them to critically reflect on and edit their work.

**Collaboration**

Obviously the 'audioethnography' project is not a collaborative project, and we think before we can ask students to work together on projects we need to first let them get their feet wet working with music and technology on a couple of solo projects, then moving up

to pairs and larger groups. As we point out in Chapter 3, the 21st century workplace is a collaborative environment, whether people are in the same room or oceans

apart via the internet. Since a great deal of schooling takes place on the individual level, building in opportunities for collaboration will help your students sharpen those skills that will be needed in the world of work. Being a good collaborator requires certain skill sets such as listening, social interaction, positively critiquing the work and ideas of others, accommodation and teamwork.

As you may recall from Chapter 1's flowchart assignment, the students were asked to work in pairs. Now of course this could be an individual project but by pairing students off who have different strengths, the goal is to have them teach each other and ultimately produce something together that would be better than they could have

accomplished individually. In this case, critically analysing a piece of music aurally may not be an activity many students are comfortable with, just as creating a flow chart may

be a new experience for others. As our students pointed out, in most cases they were each able to contribute something different to the whole.

How did the above mentioned collaborative skills manifest themselves in the flow chart assignment? Well for one thing, they first had to agree on a song: accommodation. Then they had to have multiple listenings of the music, to its lyrics and the music itself, and then discuss and listen to each other on how they might chunk the music: listening, positively critiquing the ideas of others, and social interaction. And lastly, teamwork as one student noted in her blog,

Andy and I, as music majors, were able to listen to the song and analyze the form.  We also picked out certain instrumental timbres, such as a whistle or a guiro.  Chris, a computer science major, put the flowchart into a document so it looked neat and legible and could be easily followed by one who was listening to the song.  Overall, I think we made a good team.

Now certainly not every group will have such smooth interactions and you may find yourself with students unwilling to accept the ideas of others or willing to relinquish control. You might need to be a mediator for some groups and it might take some trial and error before you find the right groupings for your students.

These are complex social dynamics in play, while there are certain challenges to group collaboration, the benefits can far outweigh them. This brings us to the *control* factor, which is another one of those educational paradoxes. Too much of it will stifle creativity and too little of it will lead to chaos. This is a concern for teachers as well as your students. One of the issues Sawyer points out with regard to workplace creativity

and group dynamics is the fact that group flow increases when people feel autonomous, which requires members to manage the parodox of both the need to be in control and at the same time maintain flexibility and openness to the ideas of others [10].

**Exploration and Discovery**

A space for exploration and discovery in this interpretation is referring more to your being able to carve out enough time in each of your classes to allow students to freely explore the material just learned. This is of particular importance when you are introducing new concepts either musically or in a computer program such as Scratch. In one such class we introduced two specific musical intervals and their respective inversions, as well as how to represent those intervals within the Scratch program. In this instance, before even getting to those specific intervals, Gena introduced the class to a chromatic scale and how it would look in traditional notation and how that same scale would appear in Scratch. Since each note in a chromatic scale is a semi-tone from the next note she was then able to demonstrate how musical intervals such as Major 2nds ( 2 semi-tones) and Perfect 5ths (7 semi-tones) are formed. While music students are generally comfortable with intervallic concepts, translating that into the language of Scratch made their heads spin. And it was equally problematic for the non-music majors. By giving them time to explore some simple exercises together in class, ask questions and play around with the program, the students were then able to tackle the next composition assignment in Scratch based on the 2nds and 5ths intervals covered in class.

**Risk Taking and Curiosity**

We will be the first to admit that maintaining a sense of low pressure, when you have a syllabus to get through within a limited time frame and looming deadlines, is challenging. Perhaps with the right environment and projects your students can even get

beyond thinking about their grades enough to let their imaginations and curiosity take over. That's probably wishful thinking since most of their schooling will be focused

on grades in either a positive or negative way. But if you can design a series of tasks and projects that pique your student's interests, as some of the above projects demonstrate, you can be sure a fair amount of students will begin to focus on the questions and problems they are interested in solving, while hopefully thoughts about grading recede into the motivational background.

We are not just interested in creativity as it relates to student output. We also

believe that creativity and creative thinking has an equally important role in the teaching process. Your actions as a teacher, both in how imaginatively you execute your lesson and how you interact with your students will affect your students' own thinking and

creating. As proposed decades ago by composer Warren Benson [1] and equally relevant today,

The creative child could be any child. The teacher's responsibility may not be to separate those who are creative from those who are not, but rather to encourage all

students to be creative, to enjoy the pursuit of creation… To decide that a certain child has a limited future is to shut off the teacher's opportunity to help him achieve

a goal that is still unknown to both of them. p.40

In setting the stage for enabling creative experiences for students, both Wiggins [12] and Benson [1] suggest the need for teachers to “get out of their students’ way.’’ Which we believe is pretty good advice.

Perhaps the greatest creativity parodox built into our education system is the fear of failure, which as Sawyer emphatically states, ''there is no creativity without failure'' [10] (p. 55). In fact, most successful people will often point to a particular failure of theirs that prompted one of those 'ah-ha' moments leading to their subsequent successful

product, project, or business plan. Since most schooling and most high stakes testing is predicated on questions that have only one right answer, our students are conditioned from an early age that knowing the right answer is its own reward. Mistakes, whether in answering a question in class, a test, playing a wrong note, or even writing bad code, will

result in feelings of failure. Enough of those negative feelings will eventually cause students to retreat from speaking out, taking tests seriously, or putting themselves out there to try a new idea. It also sends the subliminal message that only certain kinds of

ideas are welcome; leaving students to be less willing to take risks in the future. We think devising a curriuculum around meaningful projects which support multiple outcomes that students can gear towards their personal interests, is one way to send a message to our students that their ideas do matter.

**The Yin and Yang of Creativity and the Collaborative Process**

As we have attempted to point out in this chapter, teaching in a manner that encourages students to engage in all manner of imaginative, critical and creative thinking, will take a careful amount of curriculum re-envisioning and planning. Deeply ingrained systems that often run counter to a more constructionist pedagogy that will foster creative thinking may involve several iterations before you find the right balance of instructional approaches for you, your students, and the goals of your class. A good rule

of thumb would be to consider every class and every project a work in process, since in order to be true to this type of experience for your students, you yourself will need to be open to ideas presented by your students that you may not have thought of yourself.

Becoming an effective collaborator is a learned skill and like anything else, it takes practice. Putting people together and asking them to work together will reveal an array of character traits and issues that your students will need to negotiate. This is where listening to others, learning to be flexible, and letting go of control is central to positve results. An interesting point raised by Sawyer [10] with regard to the collaboraive process and the notion of group brainstorming, is that ''critical analysis should be put off for later'' (p. 60). He cautions the reader to hold off on evaluating ideas until you have finished generating them. The rationale Sawyer presents is that groups generating a larger quantity of ideas will have a greater chance of finding that one good idea in the mix. In closely examining the issues that prevent our own student collaborators from being successful, we often hear that at least one of the members of the group will feel as if their ideas are being shot down by one or multiple members of their group. It takes a fair amount of self-control to be able to listen to ideas that you don't necessarily agree with without making some kind of comment.

One way to help your students understand how to develop positive group dynamics would be to first model a group brainstorming session in one of your classes. Start with a simple problem where you just generate ideas first by just making a list.

Taking a cue from Sawyer, it's a good idea not to solicit any critiques until all the ideas have been generated and then ask students to come up with a positive and negative critique for each of the ideas until they run out of critiques and start to narrow down the list. Another approach you might take so that no student is identified with any particular idea would be to ask each student to generate a list of ideas, write them down and put them into an *idea box* so that every idea generated is anonymous. Then you can go through the critiquing process.

We realize changing your pedagogical approach towards instruction might take a bit of a leap of faith at first, but our own experiences with our students confirm that the benefits outweigh the challenges. Not to suggest this will be an easy transition. Just that once you find your risk/flexibility sweet spot, like a good brainstorming session, the ideas will just keep flowing.

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