Creativity and Pre-Service Teacher Education: What You See is What You Get

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Abstract

This essay discusses creativity in the classroom, constraints and the lack of creativity modeling in undergraduate teacher education programs, and some simple changes that can be made. This lack of models and modeling of creativity in the teacher education classrooms leads to a lack of creativity in teaching, activity design, tasks, and assessments. Issues related to lack of creativity in the education system are discussed from the student, faculty, state, and government levels.

Introduction

"This is a worksheet factory" –Olivia age 8
"If we have to present one more poster…" –
Caitlyn age 20

This essay is both academic and personal. It is the culmination of over two decades in the K-12 system as a high school teacher, department chair, and Professor of Education. The essay's genesis stems from a colleague's daughter who found herself in trouble for passing a note that stated the classroom was just a worksheet factory. I view most classrooms as worksheet dungeons. I begin this essay with a focus on creativity for all students but focus on what is occurring from my perspective in teacher education. I also recognize that I am discussing these topics from a stable education system where teachers show up every day. Next, I discuss issues and constraints in the U.S. teacher education system, writ large, related to why more creative environments are not occurring. Finally, I discuss changes individual faculty can make in their classrooms to promote a more creative environment.

Creativity in the Context of Learning

Classrooms are micro-environments that are affected by macro-environments (Bronfenbrenner, 1977) which provide opportunities for interactions of knowledge and skills reciprocally (Bandura, 1977) to create new learning among all the participants. Scholars have long recognized the relationship between

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creativity and learning (see Beghetto, 2016a for an overview). Guilford (1967) argued that creativity and learning represent essentially the same phenomenon. I agree that they are interwoven, but they have unique elements. Along these lines creativity is part of the learning process and learning can result in creative contributions (Beghetto, 2016a, 2016b). More recently, I have been focused on the more subjective experience of creativity (Beghetto & Schreiber, 2017; Guilford, 1967; Stein, 1953; Vygotsky, 1967/2004). Specifically, subjective or mini-c creativity involves the new and personally meaningful interpretations of new experiences, actions or events (Beghetto & Kaufman, 2007). Mini-c is different than Big C acts which are revolutionary in nature and the vast majority of people see them as creative. Pro-C is a professional- level of expertise that has been developed after years of deliberate practice-e.g., professional chef or musician. Little-c is the creative expressions of the everyday, such as a handmade card for a friend. In the classroom setting, the more subjective mini-c leads to more objective little-c, after feedback from peers and teachers (Beghetto & Schreiber, 2017).

As such, when students learn something new and personally meaningful they are, by definition, engaging in a creative act, mini-c. This process like other more objective creative processes is a *combinatorial* process (Mumford, Medeiros, & Partlow, 2012; Rothenberg, 1996). The creative learning process occurs when students attempt to make sense of a new, discrepant experience in light of what they already know and believe. If successful, the creative combination of the new experience and the learner's prior knowledge will result in a new and personally meaningful understanding. This argument is in agreement with a long line of creativity scholars and learning theorists that state anytime someone learns something new and personally meaningful they have engaged in a creative process (Guilford, 1950; Littleton & Mercer, 2013; Piaget, 1973; Sawyer, 2012; Vygotsky, 1967/2004).

A key feature of mini-c is the micro-moment. Micro-moments are surprising incidents of creative potential that occur in everyday situations (Beghetto, 2013). They are the point where you are off-script and the possibilities open up because there is a difference between what was expected and what is occurring. This is what Charles S. Peirce (and other pragmatists, such as John Dewey) argued as a state of doubt. The creative process that is triggered in these moments of doubt represents a special form of reasoning called abductive reasoning, which in turn can result in creative resolution and the development of a new and personally meaningful understanding. This can be represented graphically (Figure 1).

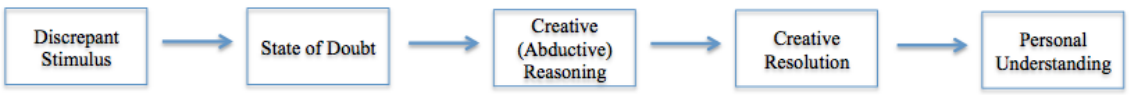

Figure 1. Basic doubt resolution process

The schematic represented in Figure 1 elaborates on aspects of the creative learning model presented in Beghetto (2016a). Specifically, Figure 1 zeros-in on the more micro-motivational and micro-reasoning process experienced by students engaged in creative learning. As displayed in Figure 1, this motivational process starts with a discrepant learning stimulus (i.e., something that differs from one's prior understanding and expectations). If the learning stimulus is not discrepant then it will be ignored or simply incorporated into what students already know. If, however, the learner experiences a discrepant event they are moved into a state of doubt. This state of doubt serves as the motivational engine for creativity in support of learning. As will be discussed in the following section, a state of doubt triggers a special kind of creative reasoning (called abductive reasoning) that when successful allows learners to (at least temporarily) resolve their doubt by generating a new and personally meaningful understanding (Arici, Schreiber, Sugioka, & Cunnigham, 1998; Cunningham, Arici, Schreiber, & Lee, 2002; Josephson & Josephson, 1996). Importantly, this new understanding is never finalized. It is always open to revision and modification.

Prior to elaborating on this process of creativity in doubt, it is worth stressing a few key aspects. New and personally meaningful understanding results from this personal creative process. I align with John Searle's Chinese Room argument (in Cole, 2014; Searle, 1984) that simply being able to perform a task is not the same thing as having a meaningful understanding. I also recognize that students learn things all the time and can demonstrate a learning performance in a basic behavioral model and others would state the student has learned. But this is far from personally meaningful learning and may simply be from accepted compliance of the student.

As Searle argued, a person who does not speak a word of Chinese could be locked away in a room, receive questions written in Chinese through a slot in the door, and using an algorithm, could appear to understand Chinese by producing accurate written responses written using Chinese characters. The same can be said of the student who memorizes a mathematical algorithm. The appearance of a correct response is not sufficient to make a claim that the student understands the content, task, or procedure (Beghetto & Plucker, 2006). One of the best ways for students to demonstrate their understanding is to provide a response that is both original (at least in the context of the classroom) and task appropriate (i.e., meets the contextually specific task constraints). The combination of originality and task appropriateness as defined in a particular context represent the core defining elements of creativity (Beghetto & Kaufman, 2014).

A discussion on creativity has to also include a discussion on failure. More recently, failure discussions have mainly occurred in social medial and news reports (e.g., Haele, 2016; Paul, 2013). Failure is important from a cognitive restructuring perspective. When failure occurs, our beliefs about a task, a situation, or a problem, are put into a state of doubt (Figure 1). This is a point where the current beliefs and habits do not work and a cognitive restructuring must occur through abduction, and you or the student will think differently after the restructuring.

When this restructuring occurs, the beginning of the removal of doubt, the reasoning process begins. When abducting to resolve doubt, Peirce termed this experimentation in reference to ways we come to believe. In Peirce's experimentation, one seeks to remove doubt by collecting more and more observations, generating potential hypotheses to account for experience and, finally, reaching a conclusion

based upon an inferential process. Experimentation entails skepticism, openness to alternatives, discernment, negotiation, cooperation, and compromise to fix or stabilize beliefs (Cunningham, 1998; Cunningham, Schreiber, & Moss, 2005). This inferential process includes, abduction, induction, and deduction. Peirce stated,

> "Deduction is the only necessary reasoning. It is the reasoning of mathematics. It starts from a hypothesis, the truth or falsity of which has nothing to do with the reasoning; and of course its conclusions are equally ideal. The ordinary use of the doctrine of chances is necessary reasoning, although it is reasoning concerning probabilities. Induction is the experimental testing of a theory. The justification of it is that, although the conclusion at any stage of the investigation may be more or less erroneous, yet the further application of the same method must correct the error. The only thing that induction accomplishes is to determine the value of a quantity. It sets out with a theory and measures the degree of concordance of that theory with fact. It can never originate any idea whatsoever. No more can deduction. All the ideas of science come to it by way of Abduction. Abduction consists in studying facts and devising a theory to explain them. Its only justification is that if we are ever to understand things at all, it must be in that way." (CP5.145)

When in a state of genuine doubt, we start studying the facts we have, search for information, and devise an explanation to test. This is where we can be our most personally creative and where deep personal learning and understanding can occur. Therefore, engagement in the state of doubt and abduction allows for personally creative acts and thoughts. Even countries with long histories of exit exams recognize the need for creativity and activity in the classroom (see Burns, 2016; Bloomer, 2016). But this type of reasoning and the associated creative acts must be valued through the educational system before it will be effective in the classroom.

Constraints

Teacher education programs do not promote creative moments in the classroom. Education programs should be a place where pre-service teachers have the opportunity to see (i.e., have modeled) and experience, abductive reasoning, personally meaningful creative acts, and develop the skill set to help their students harness their own creativity in their future classrooms. I am not discounting the deep integrated knowledge of the content they need to know. Not every day will have creative moments, but allowing for them, let alone designing for them, is desperately needed. I am arguing for creativity as part of teacher education programs (Kennedy, 1999), and specifically what the students experience, see, and learn how to do and can be transferred to their future classroom (LaBoskey, 1994; Barone, Berliner, Blanchard, Casanova, & McGowan, 1996; Kennedy, 1999; Bullough & Gitlin, 2001; Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001; Loughran, 2006). But what are some of the factors from macro to micro levels related to this lack of modeling of creativity?

Charter School Movement Failure

Charter schools, a national macro level movement, were developed under the idea of being test beds of innovation where teachers were to explore new approaches and be laboratories for pedagogy (Shanker, 1988). Charter schools have not turned into test beds of innovation. As charter schools have moved away from Shanker's original focus, they have no real ability to become test beds of innovation, abductive reasoning, or creativity. These schools should be the ones that are driving creative

micro-moments, but I have not consistently seen any completely fulfilling this promise. There are "hot spots" such as the West Hawai'i Explorations Academy, but these are few and far between. I think the failure of this major component of the charter school movement has aided in the lack of innovation in the classroom. If charter schools would have become centers of innovation and successful, it would have created pressure or a tipping point for others to move in that direction.

State/Commonwealth/Accreditation Rules

As every other state or commonwealth, we have basic rules and guidelines that we must meet for the Commonwealth of Pennsylvania and multiple accrediting groups that create constraints. States do act as gatekeepers of the students who desire to be teachers and the state and accrediting bodies are the gatekeepers for us. The language used is similar to the arguments of "Back to Basics" Education in the 1970's and its derivatives in the 1980's. For some who have seen all of this, we see it in aspects of Common Core. The language used creates an environment where creativity cannot thrive.

The reason for the failure to thrive is that state level constraints focus on the structure of the programs (e.g., 4 years, alternative, 5 year) and core courses offered, but do not focus on what is going on with actual experiences (Kennedy, 1999). From one perspective, some might argue that it is good for the state education group to not be involved that deeply, the issue is the faculty are spending their time making sure every checklist is met and thus valuable time is removed from developing rich courses. As long as you meet a checklist of requirements then you are doing your job from a gatekeeper standpoint. This does not do much to aid in the development of creative flexible teachers.

Lack of Modeling

We learn a great deal of behaviors and skills from watching others (Bandura, 1977), especially those in our micro-world (Bronfenbrenner, 1977). This was highlighted by Dan Lortie's sociological study of teaching, demonstrating that teachers teach how they were taught (Lortie, 1975). If there is no modeling of creative moments in pre-service, we will not see them when they are in-service. The "teacher" behaviors and interactions that students have witnessed and experienced from their K-12 experiences and college faculty, explicit vs. implicit or blatant vs. nuanced, provide the foundational schemas and scripts of their future teaching behaviors. Then they see the same schemas and scripts in the pre-service programs. Though students continually bring the "horror" stories of "bad" teachers, I am not so worried about those. Every field has people who are not competent at what they do and are eventually removed in a normal system. I worry about the quiet little nuanced statements and behaviors from former teachers and now their professors that reside in future teachers' cognitive milieus they do not know are there, and do not realize they are making decisions and executing behaviors based on them (Eagleman, 2011). Beghetto (2013) discusses how we kill ideas softly; the soft dismissals of student interest or questions that are modeled in K-12 and teacher preparation programs that are most problematic from a modeling perspective.

Faculty—Averse to Risk

Discussions with education faculty members over the past 15 years at work, but mainly at conferences, have rarely included experiences related to mini-c moments or environments conducive to abductive reasoning. When I ask colleagues what they do to move students forward, I hear comments related to pragmatic aspects of course assignments, class sizes too large, or too many meetings; none of which,

answer the actual question. I was finally confronted this year during a conversation by a colleague about what I did. I gave this story as my answer:

I was being observed during that normal once a semester observation and the students were all on the ground trying to figure out how to piece together a learning theory model. All of the parts of the model and their specific roles were sent before class and I brought extra working copies. Students had to abduct to a visual scenario of how all these parts worked together to create "learning." Then they had to try and test their scenario with a question such as, "How does someone come to be able to recite the capitals of all the individual United States?" After class, the observer asked me how I came up with the activity. I said, like many others, this type of experience was modeled for me (Bandura, 1977) and the development of these activities has been challenged to me by mentors and most importantly my students.

The observer also inquired about the risk related to the activity not working as planned. This risk question was a surprise, but made more sense on reflection. There are not a great number of activities or pedagogical risk takers in the field. One must be willing to have a crash and failure to get at some creative moments for the faculty member and the students. There seems to be no thirst for a "Pedagogy for Risk Taking" in creating a supportive rigorous environment (Belfiore, Auld, & Lee, 2005) let alone a risk taking creative environment.

Therefore, students are not experiencing an environment that allows for that challenge and the creative moments that can come from it. I still see a great deal of safe classes with slides and simple questions that seem to convey the content in slick simplified ways and not allow for the messy cognition and meaning making that is needed. Peter Norvig who was a director of research at Google is quoted as saying (as cited in Dolan, 2015 pg., 130) "...PowerPoint doesn't kill meetings. People kill meetings. But using PowerPoint is like having a loaded AK-47 on the table. You can do very bad things with it" The very bad things are simple bullet point aspects of complex domains. Yet, you can break out of the safe power point and be quite creative with it (Byrne, 2003). These bullet point power points create very safe easy environments where students can easily comply, take notes and complete a 'rigorous' test. This is a pretty easy class to run also. Low time and energy commitment and very low risk.

This low risk or potential low risk desire, I believe is transferred (Price & Driscoll, 1997) down to students in pre-service classrooms because it is the same scenario as they have experienced in their previous education courses. For example, openness to exploring an idea that a student has brought up that is connected for the student cognitively in some way, is risk taking. Most teachers are not willing to do that and their students watch it happen. The students witness the low risk taking and hear comments such as, "We have to stay on (my) schedule" thus modeling to them that examining such a path is bad teaching behavior. But you can use that micro-moment to stretch the knowledge of the students and have them learn the content.

More recently, I am hearing the risk averse comments related to fear of lower student evaluation surveys and the "student-centered" model of education. Faculty have stated they fear trying new things because they will get "beaten up" on the surveys. Related, many faculty are worried the student-centered focus is leaving an impression that they are a hospitality service industry and anything new or different will get punished. Obviously, all of these issues can lead to non-creative environments.

Faculty-IRE

Initiate, respond, evaluate (IRE), I would argue, is the most common if not pervasive system in higher education. In the IRE system, the faculty

member asks a student a question, the student responds and the response is instantly evaluated (Mehan, 1979; Beghetto, 2013). This is the live version of Skinner's teaching machine (Skinner, 1958). It is also the moment when faculty kill any creative opportunity. One reason this pattern is so prevalent is, it is the model faculty probably experienced every day throughout their schooling year. There is comfort and ease using the same model you experienced. A second reason is the old argument "we have so much content to get through, I do not have time to let them figure it out." It is easy to see why IRE can become the default. It is easy, warm, and comfortable.

More recently, I have begun to ask faculty if getting to everything is as important as making sure they have X number of key concepts, ideas, or skills, of the course mastered. This line of questioning typically creates a moment of doubt. I have also asked how many hours they have been involved in the content (for me in statistics alone, it is about 12,000 hours in the past decade or so). And then I ask them how many hours will the students spend on this content for the semester (3 hours in class, 3 out of class, 16 weeks is 96 hours). Then I go back and ask them what they expect or what they might change to get students farther.

Most importantly, to me, by using the IRE framework, we miss the opportunity to understand the level of knowledge and skills in the domains we teach and we miss the micro-moments. Those questions, that many teachers get frustrated with are full of formative evaluative information if we just took the time to listen to what was asked and what that means in relation to the objectives and goals of our classes and the student's mini-c experiences.

Accountability is all the Rage

The IRE model fits the age of accountability. Age of accountability is a macro-level (cultural) factor though it currently affects primary and secondary education faculty most directly in the United States. I left teaching high school mathematics in part because of the disaster that began in 1990 through state legislation for the Arizona Essential Skills. It was in essence a narrowing of the curriculum and what Berliner (2011) termed "creaticide". The current static model of testing on a limited format system does not do much to alleviate the problems with the system and surely does not allow for any creative micro-moments because the sole focus is on those test scores. There is no meaningful focus on learning and what we mean by learning (Sarason, 2004). In addition, the testing and accountability focus has driven the rubrics industrial complex as a way to increase test scores.

The rubric robots, the "rubotics," have risen. Rubrics are everywhere. Ski schools have them, day cares have them, summer enrichment programs have them. I am waiting for a rubric on boredom. Rubrics, like many components in education, are not inherently bad or harmful but all have the ability to be bad and harmful, like poorly designed overheads (Tufte, 2003). Rubrics can help and guide students as they develop knowledge and skills, and can kill any sense of personal creativity. Used properly, rubrics provide the right level of constraint that is needed for creativity (Ward, 2008). This is also similar to P. Berliner's (1994) argument of thinking like an improvisational jazz player. The music, key, time signature, notes, beat counts etc., provide the frame or constraint. Within those constraints, you are free to move and create and be autonomous, take risks-fail and recover.

But most rubrics are used to grade and by that, I mean judge and not in a developmentally positive way or to promote learning or more creative moments. It is easy to forget that the student's perspective of the rubric matters (Moss & Brookhart, 2012). If the students view it as an evaluation or "pre-grade" then that is what it is.

Rubrics have created a rigid focus and implementation of their use, especially detailed checklist rubrics. I recognize the needs for some rigid checklists (e.g., large airliner flights or heart surgery protocols) due to high risks to individuals. But that is not what I am discussing, those are professionals executing their jobs. I am discussing how the use of rubrics actually decreases teachers' ability to be professional and turns them in to simply scoring machines. For the students, this is a time for development and learning. Rubrics can end up becoming a constraint on creative moments.

Then there are the uses of the test scores- the value-added scores. The value-added modeling based scores for teachers created from the accountability (state test) scores. Though many have discussed the problems, both technically and sociologically (Amrein-Beardsley, 2014; Guarino, Reckase, & Wooldridge, 2014; O'Neil, 2016), from my perspective they also have added to the risk averse environment for the teachers where worksheets and drill and kill practice reigns supreme in order to increase test scores in order to increase VAM scores. I agree with Cathy O'Neil's move to put them in her large category of "Weapons of Math Destruction."

Scripted Curriculums

I was fortunate and did not have to teach in a scripted curriculum system or program. There are some positive aspects about this type of system, e.g., consistency in programming if a child were to switch schools or assist a new teacher who is just starting to develop materials. Developing materials and plans is time consuming and having a framed start is helpful. From a creativity standpoint, if there is a script, there is little chance of a creative micro-moment occurring or being allowed to occur. Scripted curriculums are the safe, baseline, narrow, and risk free version of teaching; just like play dates, day camps, and other structured school-like summer activities are the risk-free summer experience instead of just letting the kids go outside and play.

Students –Risk Averse Also

The students I have had are academically talented. They have high grade-point averages, high SAT/ACT scores and were involved in their high schools and communities. The students also tend to be compliant, which seems like an incredible addition, but is not. I had hoped for a bit more interaction (Bandura, 1977) with the course content and with their beliefs and habits. This interaction would lend itself to some interesting contrasts and contradictions thus allowing for creative moments that would help students focus on the learning theory at hand or issues with measuring what they wanted. In addition, I would have moments of doubt and abduction and be a better teacher for it.

My high school teaching experience was more of what I had expected at the collegiate level. There were many instances of creative moments as we tried to answer fundamental questions to understand the mathematics at hand. I once taped a Cartesian grid on the floor and a curve and told the class to figure out the area-exactly. At the university level, I added a regression analysis activity about grocery shopping by Dan Meyer to model for the students a more open interactive and creative class. This is an attempt to model how the future teachers can create a classroom room that has the potential for many personally creative moments for student and teacher (Beghetto, 2013). But many of them just want to know how to get an A or a high score on the next assignment.

My instructional system view assumed students were ready to improvise, talk, discuss, argue, and take risks. Pre-service teaching students appear to have an amazing fear of risk taking, that is failure, from experiences within the layers of their K-12 experience

(Bronfenbrenner, 1977). Students have tended to be on the more performance-oriented side of the continuum (Schraw, 1998). Performance orientation focused students are trying to "prove" their competence (Schraw, 1998). This focus and the related cognitive and behavioral habits leave little desire for trying something new or engaging in an activity that may fail especially when there are extrinsic reinforcers, grades, involved (Amabile, 1985). Their comments in class, their use of office hours, and their general engagement all signal that they just want to perform well, not necessarily develop flexible skills and knowledge.

In addition to the course experiences, I have experienced dozens of exit interviews for student teachers over the past 16 years. In general, student teachers do not develop or engage in creative activities during their student teaching time period. This is unfortunate because it is simply reinforcing a narrow curriculum and view of teaching. I do understand the survival mode aspect, as I was there once, but it has long-term implications. When one student created an interesting activity, such as poetry stations where students had to write a 7-word poem on a bottle cap, the student was told by a university observer that this is not teaching and she would not be evaluated that day. The students actually loved the activity (she collected evaluative data) and it opened them up to the larger poetry domain. The reaction by the observer, which was reinforcing one model of "teaching" and ignoring what students are "learning," continues to be a problem. In addition, it reduces student teachers and in-service teachers' willingness to be creative in the future due to the inherent punishment (risk) in the statement.

Related to reinforcing one view, I have noticed students' comments concerning the need to focus on "best practice." This assumes there is a "best" and ignores the fact that most of it is "what we know now" and many of the "best" are based on seriously limited studies. We have currently supported practices, but not best. But more importantly, it detracts from any chance at seeing a micro-moment because, again, the focus is on the "best" practice of the teacher and not on the learning student.

Thus, the university faculty are not seeing those micro-moments of personal creativity in their classrooms and therefore cannot model it, discuss it, and develop it so it can be transferred later. The faculty were trained in a right from wrong and good from bad system and their activities and projects sometimes give the appearance of the same "worksheet factory" that occurs in K-12 schools every day. With their overly specified rubrics, they have come out of non-risk taking environments and are creating more non-risk environments. The pre-service students desire low risk environments because they have had to do well on tests, e.g., they want to know the correct answers, and we have enabled them by creating "rubotics" risk free environment.

Changes

I am continually asked to observe colleagues' classrooms both formally as part of our performance system and informally as part of improvement and development. Many of them are excellent in a traditional content delivery sense, but there is an abundance of controlling motivational strategies. You can also see these at the student, teacher, program, school and so on levels. These are also known as:

- Surveillance, e.g., I will be watching you or we will see what your Value Added (VAM) score, grade, behavior, etc., is at the end of the year,
- Compliance getters, e.g., if you do x you will get y; if your VAM is above X, you get Y, and
- Imposed goals, e.g., goals without a means to get there (you must meet x requirement on your own), and competition (schools with the highest scores get more state money).

These, obviously, do not increase motivation for the long-term and will not allow for creative moments. There are changes, some small, that can be completed to open up to a more creative moment focused class.

What I have noticed in courses designed, purposefully or not, with a self-determination theory (SDT) core, tend to provide more options and have creative moments (Ryan & Deci, 2000). SDT provides a large frame for examining intrinsic and extrinsic motivation and allows for the interaction between intrinsic and extrinsic motives that are inherent in the individual and act on the individual (Ryan & Deci, 2000). In addition, SDT allows for the discussion of social development, individual differences, and cultural factors that can assist or impede a person's progress (Reeve, Deci, & Ryan, 2004).

Briefly, in social determination theory, there are three core needs (Deci & Ryan, 2010) that should be occurring in a classroom which will allow for creative micro-moments to blossom. The first, competence is the need to be effective in your environment. Essentially, you are being successful and are able to seek out appropriate challenges to demonstrate and expand the skills and knowledge that you currently possess. Within your classroom, promoting competence and development in a positive manner can assist in allowing a more creative environment. Providing appropriate challenges helps develop competence and moves the learner forward. Allowing students to take risks, with a chance to recover, during these challenges will also promote competence and potentially increase creative moments. As students take risks, and sometimes fail, you learn a great deal of where their skills and knowledge exist in your content domain. I provide a pre-test, so to speak, at the start of every semester just to see where the students' skills and knowledge are at, and adjust from there to get to the right level of challenge. The second, autonomy, is the choice in how the activity works and how to engage in the activity (Deci & Ryan, 1987, 1992). An early experiment on this topic was Lewin, Lippit, and White (1939) where boys in an after-school program who were in a "democratic" grouping versus "laissez-faire" grouping were more on task and productive related to the group projects and had better behavior. In my classes, autonomy does not mean the students dictate all the activities, but I do integrate choice and personal/group decision making into the activities.

The key is the students have some choice in the activity and not some system or person forcing every aspect of the activity. Many assignments in courses are required with specific rules without the students understanding the role or the rules of the assignment. Most of the activities or assignments are provided with little student input about the assignment and little engagement about the output. Interestingly, if you ask teachers why students do not turn in work, many of the responses focus on a lack of student motivation or laziness (Deci, Schwartz, Scheinman, & Ryan, 1981). The focus on laziness seems to fail to acknowledge the perspectives of the student and misses the key aspect about autonomy. If you have to engage in a behavior that you do not want to do, it is helpful to understand why it should be done and how it will develop skills and knowledge within and across domains. It makes it a bit easier to engage knowing that. Students are rarely given any explanation or autonomy about the projects. Finally, relatedness is the need to develop long-term secure relationships with people. We desire frequent positive interactions with others in warm caring relationships (Deci & Ryan, 1991). People, especially students, tend to move towards those who provide a caring relationship based on respect. This does not mean, for example, the easy grader teacher, or friendly boss. Those are not really positive relationships in the SDT model. We form social attachments

to people we feel care about us. The bonus is these attachments appear to have positive effects on our emotional patterns and on our cognitive processes (Baumeister & Leary, 1995).

The three of these do not work independently, though they are discussed this way in the literature. When you are working with a boss or teacher and they provide a productive environment, you will be experiencing autonomy, in a safe environment (relatedness), where you can use your skills and knowledge (competence) and develop new ones. When one is missing, the experience is not as strong or functional as it could be.

Within SDT there needs to be a move away from extrinsic and to intrinsic motivation. Extrinsic motivators to action are based on regulating your behavior in reference to an external demand or reward (reinforcement) (Skinner, 1938). External motivation is the lowest level of self-determination and is the same as the core aspects of operant conditioning. With external motivation, students engage in the task to get a reinforcer or to avoid punishment. We know that focusing on external reinforcers does not work in the long run and creates perverse behavior patterns (Deming, 1994; Collins, 2001).

Intrinsic motivation occurs when you are interested in the activity itself and it satisfies your psychological needs. When I talk to students about dissertations, semester long projects, or becoming a teacher, I discuss the aspects of the activity and choosing the topic or career because you enjoy the activity itself. I am not arguing that is should be *your* passion, that is a different topic. But *they* must find it intrinsically motivating. Thus, you have to work towards creating class content and activities that become rewarding and developmentally helpful and not just provide a grade for a performance.

Designing or Examining Your Learning Environment

When designing a new environment or examining a current one, I start with this simple grid (Figure 2).

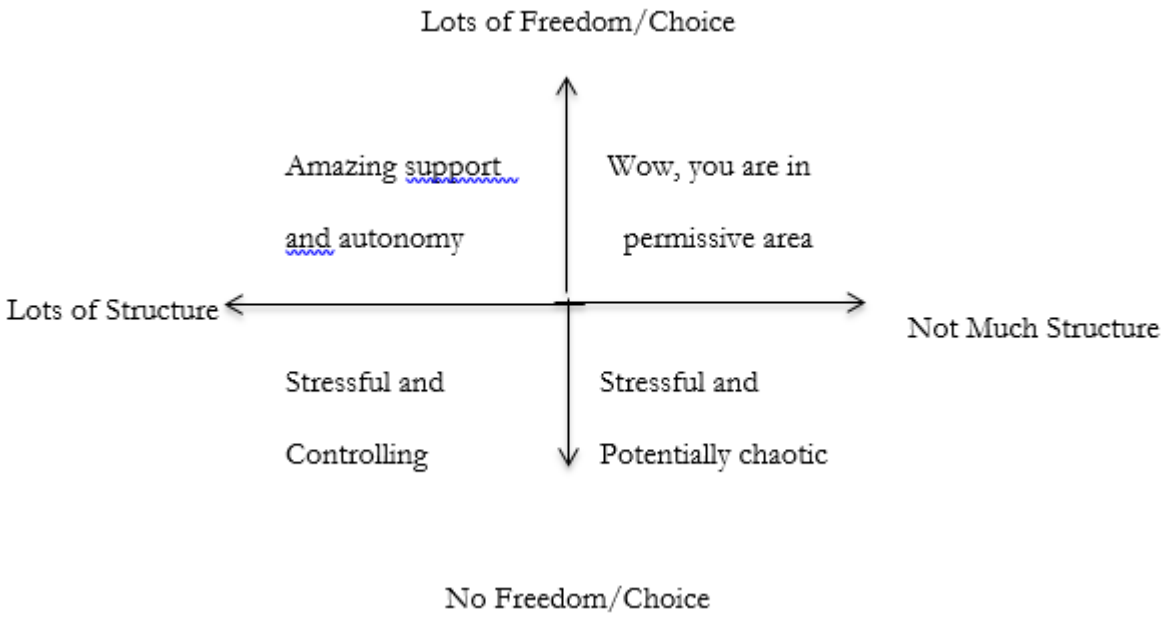

Figure 2. Autonomy Support Focus Grid

To create an autonomy supportive environment that can breed micro-moments, one must have solid structure, such as well-communicated expectations, procedures, and goals. These will allow for an opportunity to engage in optimally challenging tasks. A lack of structure will create a permissive environment or anything goes environment (Lewin, et. al.). The Freedom aspect is based on freedom with limits. It does not mean just do whatever you want. A distinction is that a permissive environment is a complete misrepresentation of autonomy-support. Autonomy-supportive environments provide an opportunity to complete tasks or engage in tasks with an option for how to engage and sometimes an option for the tasks to be completed all within explicit expectations and goals. Think of this as hiring people to do the job, and then letting them do it. Controlling environments have high structure but everything is controlled by the boss, teacher, leader, and so on. There is no room for individual choice or decision-making. Demanding environments have a great number of "carrots and sticks" (rewards and punishments) but one ever knows what is expected or what will lead to a reward or punishment, which creates the chaos. Finally, when people are motived by interest, enjoyment, and the challenge, then we see creative work, not when they are being pressured externally (Amabile, 1985).

In addition to the type of environment, here are a few ideas that I feel are pretty easy to implement and can adjust the focus of the classroom:

1. Have someone come watch your class to see how controlling or "you" centric your classroom is. An autonomy/personal creativity audit if you will.
2. Learn to recognize micro-moments and students' working to connect the dots intellectually. Faculty must notice their IRE patterns and work to reduce them.
3. Focus on what you think you are modeling and try to figure out what you are really modeling.
4. Provide more autonomy within your projects, papers, etc., that will allow students more opportunities to expand what they understand. This will provide you a great deal of feedback information on what they are getting out of your class.
5. Create juxtapositions. In my research design course, I tend to create activities that cross domains and create some doubt such as using multiple designs to figure out how to win the World's Championship Chili Cook-off.
6. Teach like an improvisational jazz musician- know your content so well, so deeply, that you can flow with the class and never be out of sync.
7. Remember that they are not experts and will not be Pro-C by the end of your class. But they should have had their knowledge and skills advanced.
8. Let learning be the messy and inefficient process that it is along with opportunities to try something new and fail.
9. Constantly question the assumption "Teaching Causes Learning" (Cunningham, 2005)

Conclusion

I have pushed hard for many years to increase creative moments and abductive reasoning in classrooms within and across content domains. I have also met a great deal of resistance. Many of our largest societal problems will not be solved educating our future leaders in the current model. I am on the fringe and I know it. I do not think we should teach trigonometry anymore or at least not how we do it. We have modeled the same system over the past 70 years and it has not done what we want. There may be more technology in a classroom, there may be a few

more group projects, but there is very little substantive difference and now we have fewer breaks, arts classes, and recess. This can be seen from first grade to the classrooms for pre-service teachers. But, teachers at the university level can start with little changes which can make a big difference. It is worth the risk and I guarantee your students will still get the content and meet your objectives.

Epilogue

I have recently resigned my tenured full professor position from my school of education. It was time to go. I have put in almost 25 years in the field of education and have been part of the development over 1500 teachers during my time. But the field is still not focused on student learning and development in a deep-meaningful way; most of it is surface level. Students, in general, do not get a chance to develop their skills over time, which would make them better employees, citizens, neighbors, parents and so on and we will incur the cost of this for generations.

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