

The Multiple Roles of Educators in Children's Creativity

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Introduction

As I began writing this preface in the summer of 2006, two interesting computer technology anniversaries were approaching. Fifty years ago this Fall, IBM brought to the world the first computer with a magnetic disk drive, a gigantic unit that weighed in at a ton and stored about 5 MB of information. By comparison to today's standards, that's enough storage space for about seven photos from my digital camera. Twenty-five years later, in 1981, IBM introduced its PC, which was designed to fit on a desktop, and whose slightly more sophisticated XT cousin a couple years later sported a 10 MB hard drive. Though far from the first personal computer, the IBM PC nevertheless represents one of the important milestones in modern technological progress. In roughly 25 years from the introduction of the first disk drive, innovations in the computer industry made it possible for individuals to have twice the storage of the original hard disk drive in a package only a tiny fraction of its original size.

As we all know, the trend toward greater storage and processing power not only continued but also accelerated over the subsequent 25 years. I will not give examples of specific contemporary devices because the examples would be outdated before this book even went into print, but a simple consideration of the physical size, storage capacity, and sophistication of generic devices such as cell phones, PDAs, digital

cameras, and MP3 players makes clear that enormous technological changes have occurred in a very short time in the way we store and process information, and consequently in the way we live our lives.

The progress described in the preceding paragraphs highlights three important points about creativity and innovation. The first is the simple observation that humans are enormously creative. The mind-boggling technological advancements over the last 50 years mirror on a much smaller time-scale our stunning achievement over about 2 million years of going from chipping away at rocks to form our first tools, all the way to building spacecraft to travel to other bodies in our solar system to examine and retrieve the rocks there. It is in our nature to innovate. And technological progress captures only a small portion of our creative output, which extends to literature, art, music, science, medicine, business, and countless other domains. We do not all use our creative potential, and sometimes it is used for harmful rather than helpful purposes, but we nevertheless share a capacity to use our minds creatively to improve the human condition and to operate in greater harmony with the world around us. Educators, who get a close-up, first-hand look at the way children use their minds are in a unique position to observe and encourage that creative capacity, and the knowledge contained in this book can help them in that endeavor.

The second point is that there is an ever-escalating competition among corporations and countries for economic preeminence. Success is heavily dependent on the capacity of an organization to innovate, which in turn is dependent on having highly creative workers capable of envisioning the next generation of products and bringing those visions to fruition. Consequently, our educational systems and the way they train future innovative thinkers are key to competitive success.

The third point has been made repeatedly in recent years, but nevertheless bears restating. The pace of societal change has accelerated tremendously and continues to do so. Regardless of any drive for economic stature, countries will need to have citizens who are capable of adapting to continued and accelerated change. Again, schools as institutions and teachers as individuals are crucial.

So what role do you as a teacher have in recognizing and fostering the creative capacities of the future adults under your guidance who will inhabit this highly competitive, ever changing world? The chapters in this book provide a broad yet detailed look at the nature of creativity. They can help you to develop an understanding of the richness and complexity of the phenomenon. But perhaps more importantly, they can also help you achieve a perspective on your role as an educator in the creative development of the children who come into your classrooms.

Understanding the Nature of Creativity

In some ways, it may seem a daunting task to foster creativity in young people. But, understanding the nature of creativity can help in at least three ways. First, it can help you to adopt more creative approaches yourself, so that you can then model those approaches for your students. The more you know about the factors that provoke or inhibit your own creativity, the more you should be able to overcome blocks and recognize and pursue creative opportunities in your own life. Second, it can help you to see where and how you might be able to have the most impact on the students you encounter. The more you understand about creativity, the more potential you will have to recognize and foster it in those around you. Finally, it can help you to recognize that you are but one of many factors that together shape the mentality of your students. That is, you need not feel too heavy a burden as the sole determiner of the creativity of your charges.

To provide a perspective on this last point, in an adolescent psychology course I was teaching, during a discussion of sex education, a teacher who was taking the class for continuing education credit commented that she felt a responsibility to help children develop healthy approaches to sexuality, but also a concern that if educators took on the responsibility for that task, they would then set themselves up to be blamed for any subsequent problems, such as increased rate of teen pregnancy. In her view, it was a specific instance of a broader problem for educators. Parents, and society in general want schools to impart knowledge on a host of topics, and to foster citizenship, values, intellectual skills and so on, and are they are inclined to blame it on teachers

if children do not excel on all those fronts. So it would not be surprising if you, as a teacher, had some reluctance about taking on the challenge of helping to make the next generation more creative. If that becomes an explicit goal of the educational system, any shortcomings in their creative thought may be blamed on teachers, regardless of the true source of the difficulty.

Componential or confluence models of creativity are particularly helpful in gaining some perspective on the role of educators in students' creative functioning. Consider just one example, Robert Sternberg and Todd Lubart's classic investment theory, which links creative accomplishment to recognizing and pursuing ideas that have potential before they become popular, and then developing and pushing them so that others begin to see their value (Sternberg and Lubart, 1991, 1999). Like stock market investing, the best approach is to buy low and sell high. But the six main component ingredients of creativity specified in the theory are even more telling than the buy-low-sell-high principle. Creativity is assumed to result from the interactive combination of knowledge, intellectual skills, thinking style, personality, motivation, and the environment.

So where do educators fit into this bigger picture painted by the investment model? For one thing, they are clearly an important part of the child's environment. Historiometric analyses reviewed by Dean Keith Simonton (1999) suggest that, among other factors, eminent creators often have had the benefit of other eminent creators as mentors and role models. The ability to closely observe creativity in action seems to foster creativity. Although the effects of mentors generally refer to those involved in high-level, specialized training in specific domains, the broader point is that teachers, as one component of the child's environment, can serve as models of creative action. But, the environment refers to all the external forces acting on the child. Thus, it is critical to recognize that although you can exert an influence on children through your actions, there may be limits to what you can reasonably expect (and be expected to) accomplish. Children are also susceptible to influences from their families, teams, clubs, religious groups and other cultural and social settings in which children operate. All of those influences can either add to or detract from your efforts

to encourage creative thought. So, it would be an unfair burden to assume that a given teacher is the sole environmental determinant of a child's creative successes or failures.

What about the component of motivation as a contributing factor? Teresa Amabile and her colleagues have distinguished between intrinsic motivation for a particular creative activity and extrinsic motivation from expectations and contingencies (Amabile, 1983; Amabile *et al.*, 1994; Collins and Amabile, 1999). Most would agree that creative products come from those who love what they do. Without that strong internal motivation and drive, it would be difficult to sustain the effort needed to achieve meaningful creative outcomes. But, the sources of that intrinsic motivation are somewhat mysterious. Teachers can certainly present topics in more or less interesting ways, that will make students more or less likely to care about the topic, but the reasons a child might gravitate toward and become obsessed with a topic to the point of loving it are not always clear and they may be largely out of your control as a teacher. Likewise, the factors that determine a child's standing on two other components of the investment model, creative thinking style and a persistent, risk-taking, ambiguity-tolerant personality, are many and not always clear.

Thus, in the bigger picture, developing engaging lessons might contribute to a child's appreciation or even love of a topic, modeling creative thinking styles could conceivably boost the development of similar styles in children, and providing a tolerant classroom atmosphere might encourage even students with risk-averse personalities to come out a bit more, but potentially more progress can be made by educators by a focus on the components of knowledge and intellectual skills. Sternberg and Lubart's distinction between knowledge and skills also may help in clarifying your goals as an educator. You may be reading this book because you want to *teach more creatively* or because you want to *teach creativity*. My assumption is that most readers of this book will be more concerned with teaching creatively than with teaching creativity, though the latter may be a happy, incidental consequence of former.

Teaching Creatively

In the case of teaching creatively, adopting creative approaches to developing lesson plans and engaging students with the material can reasonably be expected to lead to better learning. Knowledge is sometimes overlooked as an ingredient of creativity, perhaps because there has been a strong emphasis in some circles on overcoming or breaking away from prior knowledge as being important to creativity. But, the fact is that nobody has ever made a meaningful creative advance in any domain about which they had no prior knowledge. Knowledge is a key building block of creative accomplishment. So, simply by imparting knowledge from your content area to your students, you are actually providing them with some of the raw materials they will need for creative thought on their own part. Clearly, the more effectively you can do that, the better they will learn, and so seeing how to develop creative teaching strategies that help students to establishing richer understandings of the topic may be one concrete goal you can set for yourself in reading this book.

But focusing on how much knowledge students gain from creative forms of instruction also highlights another concern that some teachers have. Some teachers, who value creativity and want to use it and encourage it in their classrooms, see a conflict between that goal and the pressures and expectations from school administrations and external groups. Nowhere is this more evident than in elementary and middle schools in the US operating under the pressures of the “no child left behind” (NCLB) movement. Although the NCLB principle that all children deserve a good education is laudable, and the fact that schools should be held accountable for providing that education is indisputable, the means of determining accountability in NCLB has the unfortunate, unintended consequence of stifling creative teaching. The near exclusive focus on the percentage of children who pass a basic test at a minimum level of performance has led to forms of instruction geared toward getting the most students to that minimum test performance rather than encouraging students to develop beyond that point and acquire a rich understanding, true domain mastery and love of learning. It also encourages the relative neglect of bright students who

show that they can pass the tests early in the school year. Since they will pass no matter what, schools have little incentive to give them the attention they need to become even better thinkers. In other words, the specific implementation of accountability in NCLB encourages NCGA, “no child gets ahead.”

There are two ironies in this situation that are relevant to educators concerned with creativity. One is that while the US educational system seems mired in this well-intentioned, but creativity-stifling approach, Singapore among others seems on the path toward more and more emphasis on creativity at all levels of education. Thus, many societies may be concerned, ultimately, with competitiveness, but they seem to be taking quite different approaches to getting there, some of which appear to have a lower probability of success.

The other irony is that rote, test-focused approaches are not even necessary as responses to the accountability asked for in NCLB. John Schacter and his colleagues (Schacter, Thum and Zifkin, 2006), in their recent article in the *Journal of Creativity Behavior* found woefully few instances of creative teaching strategies among not only elementary school teachers, but also found that the few creative strategies that were used were associated with *larger* gains over the school year. In other words, rather than shunning creative teaching strategies out of fear that they will detract from time for test preparation, teachers, and school systems might be better served by adopting the most creative teaching approaches possible.

Becoming a Creative Teacher

So how can you become a more creative teacher? This book is full of useful advice in that regard, and absorbing its content and spirit is a good first step. Returning to the six components in Sternberg and Lubart’s model as an organizing framework, there may be little you can do about your environment other than to try to select one that allows you to function as creatively as you can, and to encourage change when those in your environment try to impose unnecessary limitations. It also helps to be motivated by the love of your topic and the opportunity to help shape young minds. Choosing a topic that you really care about

or learning to love the one you have chosen is important. Without that obsession, it may be difficult to maintain a generative, creative thinking style, and to develop the personal traits of persistence and risk-taking in the face of adversity.

But, as with your students' creativity, concentrating on increasing your own content knowledge and developing the intellectual skills to use that knowledge effectively may yield great benefits. The creative cognition approach, as developed by Ronald Finke, Steven Smith and myself (Finke, Ward and Smith, 1992; Ward, Finke and Smith, 1999) provides an organizing framework for thinking about the interplay between knowledge and skills. Within that approach, creativity is assumed to emerge from the application of ordinary, fundamental cognitive processes to existing knowledge structures which results in ideas that are novel and useful. It is important to note that the processes, which are most involved in producing such ideas are ones that are within the capabilities of most, if not all, normal people. In effect, the potential for creative thought is normative, rather than rare for humans, which is why we have made the incredible innovative progress described in the open paragraphs of this preface. Many species use and even modify tools, but none other than humans have manipulated and built upon their knowledge about early versions of tools to develop new ones that ultimately lead them to escape the physical bonds of our home planet.

This is not to say that we all use our creative capabilities productively most of the time, nor does it imply that there are no individual differences in creative capacity. But it does say that most people can use the basic processes needed to produce novel and useful ideas. In addition, however, the creative cognition approach does not claim that there is nothing different about creative and noncreative thought. Although the same basic processes may be used, they are applied differently to produce different types of outcomes.

Of course most theorists, including the authors of the chapters in this book, would agree with the claim that novel and useful ideas emerge from mental operations performed on existing knowledge. Indeed, there is a sense in which this must be true because ideas

will not simply develop in a mental vacuum. But the creative cognition approach goes beyond that generality to talk about very specific processes and very specific interactions with existing knowledge, thereby providing concrete possibilities for deliberately behaving more generatively.

The creative cognition approach also differentiates between phases of creative activity. In the Geneplore model, for example, most creative accomplishments are seen as involving a generative phase in which candidate ideas are brought to mind, and an exploratory phase in which those ideas are evaluated, expanded, revised or otherwise developed. The initial candidate ideas, sometimes called preinventive ideas, are not seen as either creative or noncreative, but merely as having more or less creative potential. It is only through exploration that the potential in preinventive ideas is brought to fruition. The production of a truly creative idea may require several iterations between the generative and exploratory phases.

I will illustrate some aspects of the creative cognition approach by focusing on the basic process of information retrieval. Both creative and noncreative activities rely on retrieving stored knowledge, but some ways of retrieving may be more conducive than others to original, creative idea development. In particular, I will highlight a very general approach to retrieving information that I have called abstraction, because it reveals the interplay between existing knowledge and skill in accessing that knowledge. I also focus on abstraction because it serves to illustrate a favored topic of mine that old knowledge is a friend, not an enemy of creativity. As an educator, it is useful to keep in mind that most of what you know is valuable, and that the trick to being a creative teacher is not to abandon everything you have learned, but rather to use the best types of mental operations to access that knowledge in a way that makes it easier to apply creatively.

Prior knowledge may get some of its negative reputation in the creativity realm because people have a tendency to get trapped by the details of the specific earlier problem solutions they are familiar with. When trying to solve a new problem, it is easy to retrieve very specific examples of solutions to earlier problems. The result is that your new solution is not as creative as you would like it to be, because you

become fixated on the details of those earlier solutions. Examples of this abound, but here are two interesting cases. As detailed in John White's (1978) book on passenger trains, in the 1830s, when passenger rail travel was just getting started in the US, designers seem to have patterned the first passenger cars directly on horse-drawn stagecoaches, including the fact that conductors had to sit on the outside of the car. This approach was efficient in the sense that railway passenger cars became available quickly, but because they were seated on the outside, several conductors fell off and were killed. Another example is that, according to Joel Barker (1993) in his book, *Paradigms*, Sony initially abandoned development of music CDs because they did not think it was economically sensible to put 18 hours of music on a single CD. Why 18 hours? Because they were thinking that the CD would be 12 inches in diameter, just like vinyl LPs of the day. Clearly Sony caught up and overtook many competitors, but the initial narrow thinking about specific prior ideas appears to have slowed their initial entry into the market.

In each of the cases mentioned in the previous paragraph, retrieving specific earlier knowledge got in the way of innovation. Similarly nearly every teacher has encountered the difficulty of having to do things a certain way because "that's the way we've always done it," and even without such pressure, you may have just found it easier to develop new lessons by adapting old ones. If those old lessons are great, that approach may be fine, but if they have flaws or properties that are inappropriate for the new situation, it may result in unnecessary constraints on what you do in the classroom.

Conclusion: Abstraction Strategies

Abstraction is a procedure that helps people to avoid those kinds of traps to see new solutions. But, it does not just say "throw out everything you know." Instead, it encourages people to use their knowledge, but to represent their problems and access their knowledge at a very general level of abstraction. In fact, research from my own laboratory shows that when people are encouraged to take abstract approaches

to using their imagination, they produce products that end up being rated as more original (Ward, Patterson and Sifonis, 2004).

Here I will illustrate these concepts with two particular uses of abstraction, called the “Know Your Principles Strategy” and the “In Common Strategy.” In using the “Know Your Principles Strategy,” you take your abstract knowledge of the principles of your content area and use it to see as many real-world examples of those principles as possible. Of course, the more you know about the principles you want to teach, the better off you are, so constantly increasing the depth and breadth of your understanding of your topic is crucial. But also critical is to begin to develop both the “attitude” of looking around the world for examples of the principles in action and the skill of recognizing and exploiting those examples in lessons. By tying your ever-expanding abstract domain knowledge to concrete, even mundane aspects of the world that might otherwise go unnoticed, you may be able to develop more creative lessons that engage student interest and lead to more effective learning.

For example, if you teach geometry and love and obsess over it, if you think a lot about geometry and geometric principles, you can begin to look around your world and “see geometry everywhere.” You can begin to recognize instantiations of abstract geometric principles in the simplest situations in the world around you. For example, consider the concept of slope. I once visited my niece, Amy, in Utah. She was taking geometry and learning (or rather trying to learn) about slope. She was working through problem after problem without any idea of how slope might matter in her world. She had no appreciation for what she was doing, the calculations were drudgery, and she kept making simple mistakes that would not be expected of a child as bright as she is. She was thoroughly bored, and her boredom was getting in the way of her mastering the material. It was odd too, because there we were in Utah, about to head up into the mountains to go skiing. Amy was very much afraid of going too fast on skis and always stuck to the “Bunny Slopes.” Slope mattered very much in her life right then, but she did not know it. Why, in a state like Utah, where there is so much good skiing, did it not occur to her teacher to get children thinking about ski

slopes as a way to make the concept real to them? What slopes might scare them, what slopes would be just fine? Anyway, I think if Amy's teacher had looked at the world from the point of view of slope and other abstract geometric principles, if she lived and deeply "knew her principles," she might have been in the habit of seeing the principle in action everywhere.

To push this example just a bit further, how does slope come into play in designing a playground? What is the best slope for the slides? How high versus how long can a slide be and still be safe and fun? What would be different if you constructed a playground for adults, or bugs, or put it on the moon where there is less gravity? Maybe you could get students to learn about a lot of interrelated concepts by getting them to do these types of design tasks. Again, this is just an example. It may or may not be a good one from your perspective. The broader point is that by knowing your principles intimately you can apply the skill of noticing those everyday things that allow you to capture students' attention.

So, concretely, regardless of your topic area, try to see whatever abstract principles you teach about in action everywhere. Every time you see it, write it down. That is, keep a journal the way novelists do when they see something that they think they might want to use in a future story. If you just notice, but don't write it down, you're likely to forget. But with a notebook handy, you can always jot down the good examples you notice. You should end up with a big collection of ways to get kids thinking about the topic.

Returning briefly to the Genevieve model, the initial ideas you think of may be preinventive and have potential for creativity, but they may also need to be explored, evaluated and modified before they are worth bringing into the classroom. Share your collection with others to see if they are as captivated by the examples as you are. Keep the good ones and use exploratory thinking to work them into scenarios for your students to learn from.

Whereas the "Know Your Principles Strategy" uses your abstract knowledge in going from the general to the specific, the "In Common Strategy" goes from the specific to the general. In your own experience,

you have probably encountered a wide range of approaches to teaching a given lesson. Even if you have not, you can always go to the internet, which is overflowing with lesson plans that other teachers have posted on how to get across particular topics. Some of them will strike you as useful, and other may seem silly or misguided. Using the “In Common Strategy” your task is to abstract from them the general principles that hold across those that seem most effective. Do they rely on helping students to see day-to-day objects and events in new ways? Do they have particular ways of grabbing students’ attention? Do they encourage learning indirectly through interaction with materials rather than directly through memorization? Whatever the principles are, your next task is to then use those abstractions as guides to develop new lessons. Again, that development may involve iterating between generating candidate ideas and then exploring and developing their potential. Along the way, the creativity emerges, not from rejecting any of your existing knowledge, but by accessing and manipulating it at abstract levels.

One reason for discussing the “In Common” version of the abstraction approach is to highlight one last crucial point. A trite, but nevertheless true adage is that giving a person a fish will feed them for a day, but teaching them how to fish will feed them for a lifetime. So it is with creative teaching approaches. If you find particularly creative and effective lessons that have been developed by others, by all means use them. Accept those fish gratefully. However, if you can generate abstractions from those lessons that help you know how to develop more creative lessons on your own, that will be even better. You will have learned to fish for your own creative ideas, and the skills can stay with you throughout your teaching career.

Abstraction is just one of many types of basic cognitive processes that you are capable of using and that you can exploit to become a more effective teacher. Others include conceptual combination, analogy, mental imagery, problem finding and problem definition, idea valuing and evaluating, and so on. The more you think about and deliberately apply these types of processes, the more likely it is that you will expand your creative potential.

Returning to the question of the role of educators in children's creativity, it is clear that there are multiple roles. These include motivator, supporter, lover of knowledge, source of inspiration and encouragement, highly knowledgeable partner in collaborative learning, and modeler of creative thinking styles and creative strategies. May this book be a useful guide for you!

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