

Creative Thinking – Skills for an Electronic World

By Dr. Gary Schornack

Abstract

To instill creative thinking in students requires a shift in thinking for the faculty, which begins with a shift in their own thinking. The faculty obviously must be a knowledge expert or have a significant level of knowledge. However, to become effective in the classroom the faculty member must develop new creative thinking skills for themselves so they can help students develop those skills. This change requires a new attitude on the part of both the faculty and the students so that they can expand themselves to meet a higher standard in developing the potential of the mind.

To develop creativity and a new level of creative thinking, this paper will first examine the significance of individual backgrounds and then briefly educational theory as it applies to creativity. The theory is not sufficient by itself: what is needed is an organizational environment that can enhance the students' efforts. By understanding the nature of creativity, the professor can create a new climate for effective learning. This paper identifies ways to create an effective communication climate to instill creativity, highlighting the approach of using non-threatening questions so that students feel free to explore their unique and creative thoughts.

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*“... the brain can learn far more
than we have the skill or knowledge
to teach it.”*

Bennett Daviss

To instill creative thinking in students requires a shift in thinking for the faculty, which begins with a shift in their own thinking. The faculty obviously must be a knowledge expert or have a significant level of knowledge. However, to become effective in the classroom the faculty member must develop new creative thinking skills for themselves so they can help students develop those skills. This change requires a new attitude on the part of both the faculty and the students so that they can to expand themselves to meet a higher standard in developing the potential of the mind.

Having a creative mind leads to improved problem-solving abilities. New and different concepts arise from asking questions such as why, how, what if, what about, when, and who.... Creative thinking also involves the capacity to deal with conflicting ideas, vagueness, uncertainty, or self-contradictory statements. Paradoxes often express a possible truth and doubt can be converted into an opportunity to be creative.

Tom Verberne

To develop creativity and a new level of creative thinking, this paper will first examine the significance of individual backgrounds and then briefly educational theory as it applies to creativity. The theory is not sufficient by itself: what is needed is an organizational environment that can enhance the students' efforts. By understanding the nature of creativity, the professor can create a new climate for effective learning. This paper identifies ways to create an effective communication climate to instill creativity, highlighting the approach of using non-threatening questions so that students feel free to explore their unique and creative thoughts.

Individual Background

In approaching classroom learning, a familiar discussion concerns whether intellectual ability is inherent with an individual or is it learned. Robert Sternberg gives us a perspective on this issue:

Creative giftedness is, in effect, a gift one can give to oneself. Abilities are like any other form of expertise: they represent an interaction between genes and environment. Anyone can develop their abilities, at least to some extent, within broad limits set by genetic endowment.

Robert J. Sternberg

As professors approach individual students, they must recognize that creativity development for students involves a wide range of approaches in their thought patterns. Some students may be stronger in some areas than others, but these types of patterns reflect the ability of students to become creative thinkers. Table 1 identifies these practices.

<i>Active imagination</i>	<i>Acceptance of own differentness</i>
<i>Flexibility</i>	<i>Tolerance for ambiguity</i>
<i>Curiosity</i>	<i>Trust own senses</i>
<i>Independence</i>	<i>Openness to subconscious material</i>
<i>Ability to work on several ideas simultaneously</i>	<i>Ability to abstract from the concrete</i>

Arthur J. Cropley

Some of the characteristics listed above may be inherent in students or they already are highly developed. However, the faculty member can enhance these characteristics in the students if the faculty can create the appropriate environment for creative thinking. Within the categories listed by Cropley, we do not emphasize the degree to which students have achieved these or precise measurements: rather, we're trying to expand the range of ways of thinking so that students indeed can expand their ability in creative thoughts. Robert Sternberg sees creativity as a decision process that applies to a given task:

Ten decisions characteristics [describe] people who decide for creativity. They can be the present view, the bases for identification, development, and assessment of creativity, rather than any allegedly fixed traits of abilities or even personality. They are what enable people to produce work that is novel, high in quality, and appropriate to the task at hand.

Robert J. Sternberg

Educational Theory

Some educators see educational theory as unnecessary, boring, irrelevant background: in contrast, some educators see this as the be all and end all. Among the more recent buzzes in educational theory is Howard Gardner's "Seven Intelligences":

Verbal and linguistic
Logical and mathematical
Musical
Visual and Spatial
Intrapersonal
Kinesthetic
Interpersonal

Howard Gardner

While Gardner provides a concise list, it is often difficult to take such a list and provide something meaningful in the classroom. To help us in this process

Elizabeth Shaunessy identifies how “Questioning Techniques” can permit the faculty member to easily create an effective learning environment.

To help students grow through questioning, they must be provided a safe, nonthreatening, encouraging, mutually respectful environment. Teacher behavior strongly affects the learning environment:

Tone of voice, facial expression, body language, and other nonverbal cues must be appropriate to learn to foster an inviting, stimulating atmosphere that encourages risk.

Elizabeth Shaunessy

Robin Fogarty takes the broad concepts of the intelligences and provides a general set of instructions that faculty can use in approaching the classroom.

- 1. Set a safe emotional climate.*
- 2. Create a rich learning environment*
- 3. Teach the mind-tools and skills of life*
- 4. Develop the skillfulness of learning*
- 5. Challenge the experience of doing. (Active, experiential learning is the norm, as the learner is invited to become an integral part of the teaching/learning process.*

Robin Fogarty

Creativity

The area of creativity is one that obviously contains diverse perspectives. Different authors approach it in a variety of different ways. We begin this discussion with a generalized description of creativity by Joseph Anderson.

Creativity is the process of searching for or using relationships among objects, people, and ideas. Only three broad types of creativity exist: making, combining, and changing. Each type is equally creative.

Creation is the act of making something out of nothing.

Synthesis is the act of relating two or more previously unrelated phenomena. Modification is the act of altering something that already exists so it can perform its function better, perform a new function, perform in a different setting, or be used by someone new.

Surmount obstacles. Others will oppose ideas because they go against the current way of doing things; so creative people expect and welcome opposition as a way to refine ideas.

Joseph V. Anderson

If we accept Anderson's definition of creativity, then the faculty member must create the environment so that creativity can indeed arise in the classroom. Ken Lizotte gives us four broad tenets based on his summary of experts in creative thinking:

Let ideas flow
Make failure ok
Mix in color and music
Travel down roads rarely taken
Ken Lizotte

With the four categories for the Creative State of Mind that Lizotte presented, the faculty member can make these practical, primarily by focusing on questions.

When you ask a question, you set boundaries of relevance:

"Can you think of anything from your experience that would explain this?"

"How do you feel about this?"

"Can you imagine?"

Charles H. Kepner and Iikubo Hirotsugo

Communication Climate

Within the literature dealing with creativity, many of the techniques and guidelines actually fall within the broader context of communication climate. In general, communication climate is a two part continuum, defensive versus supportive.

A defensive climate is closed, where individuals are reluctant to raise ideas or try possibilities. They basically feel threatened and tend to restrict themselves as a survival technique. In contrast, a supportive environment is open: It invites question, new ideas, and new ways of thinking in non-judgmental ways. By providing a supportive communication climate, the faculty member can ultimately build the kind of environment that will enhance creative thinking. Elizabeth Shaunessy combines the focus on questioning as well as the focus on communication climate in presenting guidelines for instructors:

To help students grow through questioning, you teachers must provide a safe, nonthreatening, encouraging, mutually respectful environment. Teacher behavior strongly affects the learning environment:

Probe beyond simple, convenient, yes/no questions
Consider specificity or vagueness of questions and purposes

Divvy up summarizing and concluding responsibilities among students

Respond to questions in an encouraging way

Wait for responses to questions - give adequate think time

Pose a variety of types of questions
Address students by name during questioning
Avoid judgments, criticism, condescension

Tone of voice, facial expression, body language, and other nonverbal cues must be appropriate to learn to foster an inviting, stimulating atmosphere that encourages risk taking and divergent thinking.

Elizabeth Shaunessy

In general, communication climate follows the principles established by Gibb in addressing six different continuum that contribute to climate. The continuation of our discussion will use these categories. Gibb provides the categories for discussing creativity and the climate that the faculty members can create. See Table 2.

<i>Table 2: Communication Climate Continuum: Defensive versus Supportive</i>	
<i>SUPPORTIVE</i>	<i>DEFENSIVE</i>
<i>Problem Orientation Description Empathy Spontaneity Equality Provisionalism</i>	<i>Control Evaluation Neutrality Strategy Superiority Certainty</i>

Problem-Orientation vs. Control

The first category within supportive versus defensive climate is problem-orientation vs. control. Faculty tends to seek control based on their own knowledge base of expertise. To promote creativity, however, they need to back away from control and focus on problem-orientation: defining the problem, analyzing the problem, and seeking questions and perspectives that have evolved from the problem. Shaunessy provides the obvious choice to begin this discussion as a continuation of her focus on questioning techniques.

A variety of questioning techniques . . . focusing on the higher end of Bloom's taxonomy to engage students in higher-level thinking. Teachers can incorporate questions effectively by knowing the various purposes, types, and intended outcomes; and they must also establish a classroom climate that promotes active engagement, student exploration, and student inquiry to further student achievement.

Researchers indicate that questioning strategies are essentials to the growth of critical thinking skills, creativity, and higher level thinking skills.... Unfortunately, even though this practice can positively affect achievement, most classrooms operate devoid of these types of questions as a regular part of learning.... In reality, "there are

many classrooms in which teachers rarely pose questions above the 'read-it-and-repeat-it' level."

<i>Table 3</i>
<i>Bloom's taxonomy as a guide to structure questions at each level</i>
<i>Inference questions</i>
<i>Interpretation questions propose that students understand</i>
<i>Consequences</i>
<i>Transfer questions</i>
<i>Reflective questions to encourage thinking process and strategies</i>
<i>Provocative and hypothetical:</i>
<i>Comparison-analysis,</i>
<i>Synthesis</i>
<i>Evaluation</i>
<i>Sensitivity to problems</i>
<i>Clarifying problems</i>

The most commonly recommended is the divergent thinking question that probes beyond the convergent, one-correct-answer question to delve more deeply into an idea...teacher questions should be broad or open so that students will be free to respond with their own thoughts. (See Table 4).

<i>Table 4</i>	
<i>Other uses</i>	<i>Can it be put to use as is?</i>
<i>Adaptation</i>	<i>What else is it like?</i>
<i>Modification</i>	<i>What new twist could be made?</i>
<i>Magnification</i>	<i>What could be added?</i>
<i>Minification</i>	<i>What could be omitted?</i>
<i>Substitution</i>	<i>What else can do it?</i>
<i>Rearrangement</i>	<i>Can you use a different sequence? Can you do the opposite?</i>
<i>Reversibility</i>	<i>What items can be blended?</i>
<i>Combination</i>	<i>Can you change its form in any way?</i>
<i>Transformation</i>	

Elizabeth Shaunessy

In focusing on problem-orientation versus control, the questioning process becomes a guided method of providing brainstorming. Brainstorming sessions do not just happen; rather, they take thought and preparation. As Winston Fletcher says,

Brainstorming can just happen, but most inventive thinking results from hard work and practice plus having the confidence to see it through.

Winston Fletcher

Description vs. Evaluation

Within the communication climate a significant category is description versus evaluation. The process of evaluation closes off students or creates a defensive environment where students feel threatened,

feel uncertain, and tend to restrict their thinking. In contrast, by focusing on description, the educator takes the focus away from evaluation and allows students to more directly focus on the problem or issue at hand. Copley provides significant techniques to focus on description (See Table 5).

recognize that students think in their own ways and think in a variety of new ways. The professor in particular needs to recognize that students are special individuals, despite the fact that individuality makes it more difficult for the professor to manage all unique needs in the classroom. Ultimately, there is no single approach that can be ideal because we are dealing with a range of individual students. From the student perspective, faculty must enhance a climate in which students can believe in themselves. As Robert J. Sternberg indicates:

Table 5: Techniques to Foster Description

<p><i>"Uncensored" perception and encoding information</i> <i>Fluency of ideas (large number of ideas)</i> <i>Problem recognition and concentration</i> <i>Unusual combination of ideas (remote associates, category combination, boundary breaking)</i> <i>Construction of broad categories (accommodating)</i> <i>Recognizing solutions (category selection)</i> <i>Transformation and restructuring of ideas</i> <i>Seeing implications</i> <i>Elaborating and expanding ideas</i> <i>Self-directed evaluation of ideas</i></p>
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Arthur J. Copley

Empathy vs. Neutrality

Empathy versus neutrality implies looking at students as individual persons. Neutrality looks at students as cogs in the wheel or numbers of credits. To develop a sense of empathy educators need to switch from education stimulus response to a learning environment of challenge and discovery. In this process, educators must

Believe in yourself. Especially in view of being poorly received by others.

Robert J. Sternberg

By looking at students as individuals and responding to their individual needs the professor can indeed help create a supportive communication climate that encourages creative thinking for everyone.

Spontaneity vs. Strategy

In this category, the professor must overcome the tendency to follow strict lesson plans to the nth degree and allow room for the spontaneity that encourages creative thinking. Jeffrey Shields provides a way of getting started.

Prime the group to think creatively from the start by focusing creative energy on a subject other than the task at hand.

Consider employing an icebreaker activity to trigger outside-the-box thinking.

Ask the group open-ended questions unrelated to the problem at hand.

Jeffrey N. Shields

Spontaneity requires that professors re-think their objectives, process, and environment. The Creative Group provides a series of techniques that can encourage, and create spontaneity in a variety of dimensions. (See Table 6).

Table 6: Techniques to Encourage Spontaneity

<p><i>Change music and colors in work environment to keep it creative</i></p> <p><i>Think out loud. Talk to yourself</i></p> <p><i>Write down every idea, whether you use it or not.</i></p> <p><i>Maintain a good sense of humor and engage in laughter</i></p> <p><i>Take in as many cultures and trends as you can and draw form them</i></p> <p><i>Don't allow interruptions. Just turn off the phone.</i></p> <p><i>Allow time for personal rejuvenation. Spend time on outside hobbies and interests</i></p> <p><i>Start a project well in advance and stay one step ahead of the game</i></p> <p><i>Keep your mind open at all times, avoiding parameters</i></p> <p><i>Have a solid strategy and sufficient information to solve the problem from the start.</i></p> <p><i>Be courageous. Don't fear anything; just dig into it.</i></p>
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Creative Group

Equality vs. Superiority

Within the classroom, superiority and the challenge for excellence is a given. Professors are hired for their expertise, and they go to the front of the class because of this expertise. Students are expected to

follow their example. This knowledge superiority can get in the way of creative thinking process. Rather than a sense of superiority, the faculty member needs to develop a sense of equality in searching for knowledge. "We are in this together is the teaching philosophy." Although, the faculty member has more experience, he or she does not have a complete lock on knowledge or creative approaches to knowledge. To provide the supportive climate, the faculty member needs to instill a sense of equality. From the student perspective, developing equality is being able to stick up for him or herself, to stick through with ideas and to follow them to a conclusion. As Sternberg identifies this quest for knowledge:

Surmount obstacles. Others will oppose ideas because they go against the current way of doing things; so creative people expect and welcome opposition as a way to refine ideas.

Robert Sternberg

Provisionalism vs. Certainty

The final category of provisionalism versus certainty actually reflects the scientific method. The scientific method uses the best theory that seems to work, yet it always remains open to another better theory in discovering new truth. Provisionalism does not mean being wishy-washy but is open to new ideas. Anderson praises the sense of provisionalism by

undoing the wall of rationality that often locks us into a final way of thinking.

Undoing the wall or rationality - most people live within a wall of rationality that is defined by the real and apparent limits of the world they inhabit.

Mind mapping is the tangible representation of stream-of-consciousness thinking, which constantly branches, rejoins, and branches once again.

Joseph V. Anderson

To instill the sense of provisionalism and break down the barriers, the faculty member must get beyond the assured assumptions and beyond the 'shoulds' that seem to guide thinking in general.

Creating thinking helps us get beyond all the "shoulds" and "spozed-to's," revving up the lesser-used parts of the brain that prompt breakthrough ideas. This process is essential in a marketplace that reverberates with quick-shifting customer expectations."

Ken Lizotte

As a practical method for insuring provisionalism, the faculty member needs to be ingrained with common question words that will help refocus and revamp any chain of thought.

Keywords for the questioning process:

**Why What (if)
How What (about)
Who When**

Ways to stimulate new ideas:

**Make new combinations (break up problem or product into major components)
Reverse the problem
Carry a notebook (ideas come spontaneously)
Practice**

Tom Verberne

Conclusion

Creative thinking requires a climate that encourages students to become free to develop their inherent abilities. Following the context provided by Elizabeth Shaunessy, professors set the tone by way that they ask questions. By asking questions in the proper manner, they can create a challenging climate for creativity.

Through modeling of questioning and appropriate behaviors, educators encourage students to move into role of facilitator, which is essential to development of lifelong learning skills.

Elizabeth Shaunessy

Faculty have a key role in developing creativity within their students by focusing themselves on aspects of creative thinking and in particular, providing the environment in which creative thinking can occur.

Great thinking is about people . . . Innovation is about the tools of the trade. If there's a trade-off between the two, always go for the thinking. If you can get both, you are on to a winner.

Paul Simons

If professors provide the proper climate, then students feel free to develop themselves more fully. They can indeed make the decision to become creative and follow the models and patterns that the professor provides.

In sum, anyone can make the decision to be creative . . . But students will probably not do so unless they are encouraged to do so. It is our responsibility as teachers to provide such encouragement and to reward students who decide for creativity. We need to teach students not only to learn the facts, and not only to think critically about them. To become the people they are capable of being, we need to teach students to decide for creativity.

Robert J. Sternberg

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