

FOSTERING STUDENT CREATIVITY USING BRAIN-BASED LEARNING

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Abstract

The right kind of education, proper care and provision of opportunities for creative expression inspires, stimulates and sharpens the creative mind. Good teachers concerned with optimizing student achievement are always exploring different means to do so. Recent innovations in the field of science have allowed an unprecedented look into the way the brain works. The new findings into the working of the brain & its impact on learning have the potential to revolutionize teaching and learning. Brain research has provided new knowledge about the many different ways and situations that can be created for optimum learning. Brain-Based learning has resulted from the educators and researchers applying the the findings of brain-research to better teaching practises and foster creativity. Brain-Based Learning provides the much needed stimulation and nourishment to nurture creativity. Most creative talent, unless it is given proper training, education and opportunities for expressions is wasted. Each child possesses some creative ability and it is for the teachers and parents alike to realize the need of creating an environment conducive to cater to the creative ability of the child.

Brain-Based Learning emphasizes on creating a relaxed environment and providing the students with stimulating and innovative experiences, challenging techniques of learning which involve all the bodily senses that allows them to hypothesize, predict, pose questions, research, investigate, imagine, invent, link old knowledge to the present & form their original concepts.

Key words: *Brain-Based Learning, Creativity.*

Introduction

The right kind of education, proper care and provision of opportunities for creative expression inspires, stimulates and sharpens the creative mind. Good teachers concerned with optimizing student achievement are always exploring different means to do so. It is often argued that the pressure on teachers to cover significant amounts of curriculum content in order to prepare pupils for examinations inhibits the development of teaching and learning methodologies that foster creativity. As the effectiveness of schools is measured in academic attainment, it is perhaps not surprising that some teachers and parents view the promotion of creativity and enterprise as distractions from the real business of schools - to prepare pupils for tests and examinations. In recent years, however, there has been a growing understanding of creativity and how the development of creative thinking in young people can bring about effective learning achievement coupled with creativity. Historically, creativity has been seen as a mystical process, the province of geniuses, artists and eccentrics, a trait which is supposed to be inborn and one which cannot be acquired.

With progressive researches in the field of education creativity is recognized as a practical skill, one which can be taught and which everyone can achieve. It is a way of thinking in which we look at familiar things with a fresh eye, examine a problem with an open mind about how it might be solved, and use our imagination to explore new possibilities rather than established approaches. To foster creativity teachers must encourage learners to think laterally and make associations between things that are not usually connected. They must be able to reinterpret and apply their learning in new contexts, look at things from different points of view and experiment with alternative approaches to solving problems. Teachers must help learners to see possibilities and challenges and all of these skills can be taught.

Creativity is clearly an important issue on a national and global level for economic growth and development. But there is an increasing recognition that it is important at an individual level also. Creativity improves the self-esteem, motivation and achievement of learners. Pupils who are encouraged to think creatively:

- become more interested in discovering things for themselves
- are more open to new ideas and challenges
- are more able to solve problems
- can work well with others
- become more effective learners
- have greater ownership over their learning.

Children - particularly younger children - are inherently creative. Around the age of 8-10, the opinions of others become more important, the fear of failure emerges and they lose their willingness to try new things. The children then become concerned about knowing the right answer and are not ready to take risks in exploring different pathways.

Creativity, as a natural endowment, needs stimulation and nourishment. Most creative talent, unless given proper training, education and opportunities for expression, is wasted. Moreover, creativity though not equal, is universal. It is not the monopoly of a few geniuses only. Every individual possesses some creative ability and can create, manifest and produce. It becomes essential, therefore, for teachers as well as parents to realize the need for creating an environment which supports the growth and development of the creative abilities of the children. Proper stimulation and nurturing of the traits which help to develop creativity traits like originality, flexibility, ideational fluency, divergent thinking, self-confidence, persistence and sensitiveness, ability to see relationships and make associations are essential. This can be achieved by using a different approach which incorporates a methodology different from the traditional approach.

The challenge for educators is to nourish and develop the children's natural creativity, not stifle it. There are many approaches that can help practitioners promote creativity in their learners. Recent innovations in the field of science have allowed an unprecedented look into the way the brain works. The new finding into the working of the brain and its impact on learning has the potential to revolutionize teaching and learning. Brain research has provided new knowledge about the many different ways and situations that can be created for optimum learning. Brain-Based learning has resulted from the educators and researchers applying the findings of brain-research to better teaching practices and foster creativity. Brain-Based Learning provides the much needed stimulation and nourishment to nurture creativity. Most creative talent, unless given proper training, education and opportunities for expressions is wasted. Each child possesses some creative ability and it is for the teachers and parents alike to realize the need for creating an environment conducive to cater to the creative ability of the child.

Creativity

I define creativity as the entire process by which ideas are generated, developed and transformed into value. It comprises what people commonly mean by innovation and entrepreneurship.' John Kao, 1997

'Creativity is about liberating human energy.' Howard Gardner

'Creativity is the process of developing ideas that are original and of value. Creative intelligence is dynamic, diverse and distinct.' Sir Ken Robinson, 2001

Creativity can mean different things to different people. For some it means being imaginative or inventive, taking risks or challenging convention. For others it is about original thinking or producing something that nobody has come up with before. Some believe that the term 'creativity' only applies only to those who possess artistic talents. Traditionally, creativity has been associated with the achievements of extraordinary people such as Mozart, Einstein and Leonardo Da Vinci and a good deal of the early research into creativity has focused on the work of highly creative people or those considered to be geniuses.

Focusing on extraordinary individuals, however, simply perpetuates the myth that creativity is about special people doing special things. Research shows that there is no specific personality type associated with creativity. It is possible to be creative in any activity that engages our intelligence because intelligence itself is essentially creative. Creative processes are rooted in the imagination and our lives are shaped by the ideas we use to give them meaning. We all have creative capacities but in many instances we do not know what they are or how to draw on them.

Broadening the meaning of creativity:

In recent years researchers and educational writers have extended the general meaning of creativity so that it incorporates ideas about inventiveness and imagination.

This reflects a growing acceptance that creativity it is not simply about coming up with big ideas, but coming up with practical solutions to everyday problems and then applying them to real life situations. Everything around us - our homes, cities, medical services and transport and communication systems - are conceived and developed by practical people who know how to implement creative ideas. Creativity can be readily associated with a wide range of everyday tasks and activities, and the importance of creativity at a personal level is often greatly underestimated.

Hard and soft thinking

'Hard' and 'soft' thinking are terms often associated with creativity and they reflect the neurological processes associated with different hemispheres of the brain. Research suggests that the right side of the brain is visual and processes information in an intuitive and simultaneous way, looking first at the whole picture then the details (soft thinking). The other hemisphere - the left brain - is verbal and processes information in an analytical and

sequential way, looking first at the pieces then putting them together to get the whole (hard thinking).

The right side of the brain is often associated with characteristics such as intuition, imagination, emotions, feelings and artistic creativity. The left side is more usually associated with planning and organization, logic, analytical thinking and deduction. The right side of the brain is sometimes referred to as the 'artist', whereas the left side is regarded as the 'judge'.

The distinction between hard and soft thinking can be illustrated in the following way.

| Hard thinking | Soft thinking |
|----------------------------|------------------------------|
| certain | doubtful |
| close down | open up |
| one right answer | many right answers |
| exact | approximate |
| fast | slow |
| looking | waiting |
| black and white | many shades of grey |
| analysis | hunches |
| logic | intuition |
| differences and categories | similarities and connections |
| rational | dreamlike |
| precise | diffuse |
| serious | playful |
| familiar | new |

Creative thinking must be recognized as a process that involves both hard and soft thinking and that it is important to know when each is appropriate. Every individual has a 'judge' and an 'artist' within, and both are required in order to be creative. Even those who are very inventive, and thrive on spontaneity and uncertainty, also need to seek order and be analytical if they are to be successful.

It is now believed that the most powerful creative thinking occurs when the left and right hemispheres of the brain combine to apply both generative and evaluative processes. By understanding how the brain works, educators are better equipped to help students with everything from focusing attention, increasing retention to fostering creativity. That's the promise of brain-based learning, which draws insights from neurology, psychology, technology, and other fields. Bringing this information to the classroom can help teachers engage diverse learners, offer effective feedback that leads to deeper understanding, and

create a rich creative learning environment that also attends to the students' social and emotional needs along with their developing brains.

Brain-Based learning

Brain-Based Learning is the active engagement of practical strategies based on learning and behavioral principles derived from neuroscience. This learning theory is based on the structure and function of the brain. As long as the brain is not prohibited from fulfilling its normal processes, learning will occur. Brain-based learning has brought forth a new discipline now known by some as educational neuroscience, or by others as mind, brain, and education science (Sousa, 2011). It is a comprehensive approach to instruction using current research from neuroscience. Brain-based education (educational neuroscience) emphasizes how the brain learns naturally and is based on what we currently know about the actual structure and function of the human brain at varying developmental stages. Using the latest neural research, educational techniques that are brain friendly, provide a biologically driven framework for creating effective instruction. This theory also helps explain recurring learning behaviors and is a meta-concept that includes an eclectic mix of techniques. Currently, related techniques stress allowing teachers to connect learning to the student's real lives and emotional experiences, as well as their personal histories and experiences. This form of learning also encompasses such newer educational concepts like Brain-based Education.

The human brain is an "equal opportunity" organ. Humans have approximately 100 billion brain cells (neurons). It is therefore not the number of these neurons but the connections between them that is important for learning because learning occurs when the neurons connect, or in other words, when we form neural networks in our brain. The more connected these neurons are. The better we learn. If we don't have a neural network for a certain thing, it simply doesn't exist for us. That is why it is difficult to grasp new concepts at first as the brain lacks the neural network. The teachers must therefore encourage more neural networks in the student's brains for better learning. The only way to this is to bring the classroom experiences as close to real life as possible. People often say that everyone **can** learn. The reality is that everyone **does** learn. Every person is born with a brain that functions as an immensely powerful processor. Traditional schooling, however, often inhibits creative learning by discouraging, ignoring, or punishing the brain's natural learning processes.

The core principles of brain-based learning state that:

1. The brain is a parallel processor, meaning it can perform several activities at once, like tasting and smelling.

2. Learning engages the whole physiology.
3. The search for meaning is innate.
4. The search for meaning comes through patterning.
5. Emotions are critical to patterning.
6. The brain processes wholes and parts simultaneously.
7. Learning involves both focused attention and peripheral perception.
8. Learning involves both conscious and unconscious processes.
9. We have two types of memory: spatial and rote.
10. We understand best when facts are embedded in natural, spatial memory.
11. Learning is enhanced by challenge and inhibited by threat.
12. Each brain is unique.
13. The three instructional techniques associated with brain-based learning are:
 1. **Orchestrated immersion**--Creating learning environments that fully immerse students in an educational experience
 2. **Relaxed alertness**--Trying to eliminate fear in learners, while maintaining a highly challenging environment
 3. **Active processing**--Allowing the learner to consolidate and internalize information by actively processing it

How Brain-Based learning impacts Creativity

Curriculum--Teachers must design learning around student interests and make learning contextual. Instruction—Educators must let students learn in teams and use peripheral learning. Teachers structure learning around real problems, encouraging students to also learn in settings outside the classroom and the school building. Assessment--Since all students are learning, their assessment should allow them to understand their own learning styles and preferences. This way, students monitor and enhance their own creative learning process. How the brain works has a significant impact on what kinds of learning activities are most effective to bring out the latent creativity in the student. Educators need to help students have appropriate experiences and capitalize on those experiences. According to Renate Caine three interactive elements are essential to this process -

- Teachers must immerse learners in complex, interactive experiences that are both rich and real. One excellent example is immersing students in a foreign culture to teach them a second language. Educators must take advantage of the brain's ability to parallel process.

- Students must have personally meaningful challenges. Such challenges stimulate a student's mind to the desired state of alertness.
- In order for a student to gain insight about a problem, there must be intensive analysis of the different ways to approach it, and about learning in general. This is what's known as the "active processing of experience."

As every brain is different, educators should allow learners to customize their own environments. Designers of educational tools must be artistic in their creation of brain-friendly environments. Instructors need to realize that the best way to learn is not through lecture, but by participation in realistic environments that let learners try new things safely.

Optimizing Creativity by applying the principles of Brain-Based learning to the classroom-

Climate - The learning environment and instructional processes must be carried out in stress free environment which fosters creativity not fear. The neo-cortex is the largest portion of the human brain, while some thinking occurs in the limbic region, the majority of complex thought, and memory storage occurs in the ne-ocortex. Through scientific testing it is now known that the neo-cortex doesn't function properly when humans are stressed or afraid. A classroom environment that is safe - one where it is safe to make mistakes and take academic risks goes a long way in enhancing creativity.

Stress Reduction - Teaching stress reduction and relaxation exercises help the learners to be in a relaxed frame of mind.

Metacognition - The students must be given opportunities to examine their own metacognitive structures. The teacher must create a classroom where students are allowed to think and explore their own thinking and learning patterns as to how they think and learn best. The students must be given the opportunities to develop and create their own learning and study techniques.

Environment –Teachers can optimize the learning of the students by creating different learning environments for different types of activities. Using different types of lighting, music, or aromas, or silence can help to create different or enriched learning environments. Music can stimulate or relax listeners and can induce compatible brain wave patterns that enhance learning and retention.

Grouping Information - Pacing and grouping material so that it fits the cognitive structure of the students is very important. The average retention chunk that can be held by the human brain is seven bites of information. This can vary from human to human by + or - two, 5-9

bites. Organizing material that is presented to the students provides opportunities to encode information in different ways and channel it into the long-term memory.

Individual differences – The teacher must be willing to make allowances for individual differences. Knowledge about learning disabilities, modalities, learning styles, and multiple intelligences is a must for every educator. Using a variety of techniques based on these concepts and creating instructional bridges from one intelligence into another or from one learning style into another helps the student to be involved and interested in the learning process at all times. The instructional delivery should meet different learner modalities - auditory, visual, and kinesthetic/tactile. Varying and combining these and using all the three methods frequently is the key to fostering creative learning based on understanding.

Classroom strategies based on the principles of Brain-based learning to enhance creativity and bring about effective learning.

- 1. Embracing creativity as part of learning-** The classroom environment must be a place where students feel safe to share novel ideas. Allow for flexibility and create norms that foster creative approaches. Creation of a classroom that recognizes creativity by doing simple things like asking the students to design bulletin boards, come up with ideas and different ways of solving a class related problem, or discussion of creative solutions to a real world scenario. Design some classroom space for exploration, such as a thinking table, a drama stage, a drawing table, or a space for groups to discuss ideas. Use of audio-visual aids is also an effective tool to enhance innovative learning.
- 2. Thinking of creativity as a skill-** Like resourcefulness and inventiveness, creativity is less a trait and more a proficiency that can be taught. Teachers can use this premise and find ways to encourage its use and break it down into smaller skill sets. Psychologists tend to think of creativity as Big-C and Little-C. Big C drives big societal ideas, like the non-violence movement or political power to common man. Little C is more of a working model of creativity that solves everyday problems. Both concepts can be included in the classrooms.
- 3. Use emotional connections.** Research suggests that the best creativity instruction lies in the emotions of the learner. Programmes like helping addicts to get rid of their vices or sensitive handling of the problems of the elderly can be discussed and a solution can be devised. Research suggests that the best creativity instruction lies in the emotions of the learner.

4. **Use a creativity model.** The Osborne-Parnes model is oldest, widely accepted model. It is often used in education and business improvement. Each step involves a divergent thinking pattern to challenge ideas, and then convergent thinking to narrow down exploration. It has six steps:
 - Mess-finding - Identify a goal or objective.
 - Fact-finding - Gathering data.
 - Problem-finding - Clarifying the problem
 - Idea-finding - Generating ideas
 - Solution-finding - Strengthening & evaluating ideas
 - Acceptance-finding - Plan of action for Implementing ideas
5. **Use of divergent and convergent thinking.** Standardized tests do a great job of measuring convergent thinking that includes analytical thinking or logical answers with one correct response. Divergent thinking considers how a learner can use different ways to approach a problem. It requires using association and multiplicity of thought. We should design assignments that consider both types of thinking models.
6. **Creativity flourishes in a “congenial environment”.** Creative thinking needs to be shared and validated by others in a socially supportive atmosphere. Researcher Csikszentmihalyi (1996) coined this term, to explain the importance of reception from others. Encourage students to ask questions by thinking out of the box. See creativity in a positive light. If we are teaching to creativity, we need to embrace it too. Reward students for thinking of problems in varied ways by recognizing their efforts. Allow room for mistakes. According to Sir Ken Robinson, “If you’re not prepared to be wrong, you’ll never come up with anything original.” Students should be encouraged to ask questions. Teachers should incorporate opportunities for students to ask questions. Lessons should be intentionally designed to allow wondering and exploration.
7. **Using the Incubation Model.** E. Paul Torrance designed this model. It involves 3 stages:
 - Heightening Anticipation: Making connections between the classroom and student’s real lives. “Creating the desire to know”.
 - Deepen Expectations: Engaging the curriculum in new ways. Brainstorming and creating opportunities to solve a novel problem.
 - Keeping it going: Continuing the thinking beyond the lesson or classroom. Finding ways to extend learning opportunities at home or even the community.

8. **Creativity builds confidence.** Students are capable of learning on their own. During class exhibitions students can decide their own projects related to their syllabus and make their own presentations based on their understanding. This not only encourages curiosity but also builds confidence. Consider what is important to the students. Student interest is a great place to start on what drives their own thinking tank. Creativity is intrinsic in nature. The teacher must understand their viewpoint to find what motivates them.
9. **Using a collaborative creative thinking model and multidisciplinary approach-**
Collaborative problem solving is catching on quickly. Content can be read by breaking it into paragraphs and then the group can have a list of questions which can be discussed. Many schools have implemented creative thinking models into their curriculum. A multidisciplinary approach can also lead to better understanding and better retention on part of the learner. For example, geometry can be taught using different art forms. Value education can be taught using role-playing.
10. **Tapping into multiple intelligences.** Creativity requires us to use different parts of our brain. We often bridge connections between seemingly unrelated areas to make new concepts emerge. Allow students to use their strengths to find new ways of approaching a topic or solving a problem.
11. **Teach creative skills explicitly.** According to Collard, “Creative skills aren’t just about good ideas, they are about having the skills to make good ideas happen.” He suggests creative skills should include 5 major areas:
 - Imagination
 - Being disciplined or self-motivated.
 - Resiliency
 - Collaboration
 - Giving responsibility to students. Have them develop their own projects.

Creativity undoubtedly can be fostered by proper care and provision of opportunities for creativeness. The role of providing the right environment to be innovative and creative keeping in mind the physiology and the working of the brain cannot be denied.

“Creativity is a great motivator because it makes people interested in what they are doing. Creativity gives hope that there can be a worthwhile idea. Creativity gives the possibility of some sort of achievement to everyone. Creativity makes life more fun and interesting.” Edward de Bono.

References

- Caine, Nummela, Renate. & Caine, Geoffrey. (1991). Making Connections Teaching and the human brain. ASCD. Alexandria, Virginia.
- Denham, S.A. (1998). Emotional Development in Young Children. New York, NY: Guilford Press.
- Goldberg, D. & Stevens, J. (2001). For the learners' sake: Brain-based instruction for the 21st century. Tuscon, AZ: Zephyr Press.
- Goleman, D. (1995). Emotional Intelligence. New York: Bantam Books.
- Jenson, Eric. (2005). Teaching with the brain in mind. ASCD. Alexandria, Virginia.
- Slavkin, M. (2004). Authentic learning: How learning about the brain can shape the development of students. Lanham, MD: Scarecrow Education.
- Sowmya, S. & Betsur, N. (2010). Emotional Intelligence in Relation to Personality, Psycholinguia, Vol. 60.
- <http://www.opencolleges.edu.au/informed/features/30-things-you-can-do-to-promote-creativity-in-your-classroom/#ixzz2qQngiFCo>.
- www.jlcbrian.com/truth.html.
- www.unocoe.unomaha.edu/brainbased.htm.
- www.pathsoflearning.net/articles/makingconnections.php.
- [www4.uwsp.edu/education/lwilson/links/Brainbasedlinks .htm](http://www4.uwsp.edu/education/lwilson/links/Brainbasedlinks.htm).
- www.talkingpage.org/artic011.html.
- www.superduperinc.com/handouts/pdf/81_brain.pdf.
- kimberlysheppard.wiki.westga.edu/.../The%20Principles%20of%20Brain..
- ww.ted.com/speakers/sir_ken_robinson.html.