

CREATIVITY AND INVENTIONS: THE ROLE OF FUNCTIONAL EDUCATION TO THE TARGET GROUP

Prof. J.O.E. Otuka, Ph.D
Faculty of Education,
Nasarawa State University,
Keffi.

Abstract

This paper is based on the belief that acquisition of creative skills prepares one for inventions and successful living in today's highly competitive world. This is what functional education is meant to achieve. The teacher is expected to play a major role in developing the creative potential of pupils and students to prepare them for future meaningful living.

The start of the scientific study of creativity is sometimes taken as J.P. Guilford's 1950 address to the American Psychological Association, which helped popularize the subject. Other students of creativity have taken, a more pragmatic approach, teaching practical creativity techniques. Three of the best-known are Alex Osbon's "brainstorming" (1950s to present), Genrikh Altshuller's Theory of Inventive Problem - Solving (TRIZ, 1950s to present), and Edward de Bono's "lateral thinking" (1960s to present). Although creativity has been an area of legitimate concern and interest to educators since the time of the Greek philosophers little has been done to encourage creativity in the science classroom. Though, Research into creative process and product has been reported since 1950 it

has had only a merger effect on the literature of education and almost no impact on curriculum development in science

What is Creativity

Creativity is a term derived from the word to create which simply means to bring into being, to do something new novel or to transform something in existence into another entity. Creativity has been defined by different scholars at different times – Notable amongst them are: Torrance (1974) who sees creativity as a process of becoming sensitive to problems, deficiencies, gaps in knowledge missing elements disharmonies, identifying the difficulty, searching for solutions, making guesses or formulating hypotheses about deficiencies, testing and retesting there hypotheses and possibly modifying and finally communicating the result. John

Kao (1997) defines the term creativity as the entire process by which ideas are generated, developed and transformed into value.

Wyckoff (1991) in his own view sees creativity as new and useful as an act of seeing things that everyone around us sees while making connections that no one else has. Creativity for him is moving from the known to the unknown. Sir Ken Robinson (2001) defines creativity as the process of developing ideas that are originals and of value. For him creative intelligence is dynamic, diverse and distinct.

Creativity can mean different things to different people. For some it is the imagination or inventive mind made for others it is about originality. Thinking and producing that which has never existed. Most people believe that the term creativity only applies to those who possess artistic talents thereby associating creativity with the achievements of extraordinary people termed as geniuses. However, it is important to point out that associating creativity to special people doing special things is mythical as past and current researches have proven that there is no specific personality types associated with creativity. It is possible to be creative in any activity that engages the mind i.e. intelligence. Individuals could be guided to develop a creative mind as creativity is essentially rooted in imagination. Therefore, all humans possess creative capacities that

can be harnessed so as to realize creativity.

Invention

Creativity is a fizzy idea and cannot be clarified until it is made into a prototype where you can touch it, see it, test it and show it to others. At this point creativity becomes an invention at the stage where creative idea has been reduced to practice.

Invention is making something new which will do something which will do something new or better. Creativity is the thought process of the idea or invention.

Invention is often a creative process. An open and curious mind allows an inventor to see beyond what is known. Seeing a new possibility, connection, or relationship can spark an invention. Inventive thinking frequently involves combining concepts or elements from different realms that would not normally be put together. Sometimes inventors disregard the boundaries between distinctively separate territories or fields. Several concepts may be considered when thinking about invention.

An invention can serve many purposes. These purposes might differ significantly and may change over time. An invention, or a further-developed version of it, may serve purposes never envisioned by its original inventor (s) or by others living at the time of its original invention. As an example, consider all the kinds of plastic developed, their

this materials invention is still undergoing. [Ken Robinson, 2001)

To invent is to see anew. Inventors often envision a new idea, seeing it in their mind's eye. New ideas can arise when the conscious mind turns away from the subject or problems, when the inventor's focus is on something else, or while relaxing or sleeping. A novel idea may come in a flash- a Eureka! moment. For example, after years of working to figure our the general theory of relativity, a solution came to Einstein suddenly in a dream "like a giant die making an indelible impress, a huge map of the universe outlined itself in one clear vision". Inventions can also be accidental, such as in the case of polytetrafluoroethylene (Teflon).

Insight can also be vital element of invention. Such inventive insight may begin with questions, doubt or a hunch. It may begin by recognizing that something unusual or accidental colour of plastic made by accidentally adding a thousand times too much catalyst led scientists to explore its metal-like properties, inventing electrically conductive plastic and light emitting plastic- an invention that won the Nobel Prize in 2000 and has led to innovative lighting, display screens, wallpaper and much more.

Invention is often an exploratory process with an uncertain or unknown outcome. There are failures as well as success. Inspiration can start the process, but no matter how complete the initial

idea, inventions typically must be developed.

Inventors may, for example, try to improve something by making it more effective, healthier, faster, and more efficient, easier to use, serve more purposes longer lasting, cheaper, more ecologically friendly, or aesthetically different, lighter weight, more ergonomic, structurally different, with new light or colour properties, e.tc

Functional Education

In Western Europe, this term refers to education that comes from the child's needs and that uses the child's interest as a mechanism for activating him and towards his desirable activities; its purpose is to develop the life of the mind that acts from the wholeness of organic life in the present and in the future. (Zeilbeger, 1999).

The process of training and instruction, design to develop knowledge, insight, attitude, values and skills that are adapted to particular functions or use in a nations quest for development. It could also mean acquisition of the above characteristics that can be applied practically or purposefully. (Aigbeyisi et al 2014).

Elombah [2010) saw functional Education as a means of being equipped to excel in his environment, to acquire necessary tools to live in the modern world.

Ezeaku (2007). Education should be geared towards preparing people to undertake specific tasks and

employment functions essential to the transformation of society.

Importance of Creativity

It is important to underscore the relevance of creativity in our daily lives. Our lives are shaped by the ideas we use to give them meaning. These ideas stem from our imagination minds creativity goes beyond issues of originality, exception and value. It incorporates ideas about inventiveness and imagination. Creativity is not simply about coming up with big ideas but coming up with practical solutions to our everyday problems and then applying them to real life situations. Creativity can be readily associated with a wide range of every-day activities and the imaginative of creativity at a personal level is often greatly underestimated. Creativity is important on a national and global level for economic growth and development. (John Pennick)

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

- 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.

Qualities of a Creative Person

Would you like to be more creative in your copy and content? It's really not as hard or mysterious as you might think. That some teachers and parents view the promotion of creativity and enterprise as added extras, or even 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 underpin effective learning and achievement. Two of Scotland's most important national strategies - Curriculum for Excellence and Determined to succeed - address the need to reshape the curriculum at all stages in order to better enable Scotland's young people to develop self-confidence, self-reliance and ambition, and to become successful learners.

Highly Creative People

- Have the courage to try new things and risk failure. Every big breakthrough starts as a harebrained idea.
- Use intuition as well as logic to make decisions and produce ideas.
- Like to play, since humour and fun are the ultimate creative

- act.
- Are expressive and willing to share what they feel and think, to be themselves.
 - Can find order in confusion and discover hidden meaning in information.
 - Are motivated by a task rather than by external rewards.
 - Have a need to find solutions to challenging problems.
 - Will challenge assumptions and ask hard questions to discover what is real. If you want to wield true creative power, you will always take others advice with a grain of salt.
 - Can make connections between old ideas to produce new insights.
 - Will push the envelope in order to expand the boundaries of what is possible.
 - Are willing to test new ideas and compete with others based on results. (Ken Robinson 2001)

These are certainly uncommon traits for most people. But they are not difficult. Watch how the creative people you know solve problems and deal with projects. You may choose one particularly creative person you admire and, when faced with the problem, ask yourself, "What would so and so do in this situation?"

As you begin to "act" like a creative person you will find yourself

actually becoming more and more creative. And likely, more and more successful.

Principles of Creativity

Though creativity is marked with the ability to create to invent or form, however it is not the ability to create out nothing (only God can do that) some creative ideas astonishing and brilliant while others are just simple, good, practical ideas that no one else seems to have thought of.

Everyman has substantial creative ability inherent in him/her all that is needed is a reawakening and committed to creativity. The state of creativity begins with the attitude the asufts to accept charge and newness, a willingness to ping with ideas and possibilities. (Okpara, 2005)

Within Every Individual, Creativity is a Function of Three Components:

- Expertise
- Creative Thinking Skill
- Motivation

Expertise: This has to do with everything that a person knows and can do, his knowledge and technical ability.

Creative Thinking: This refers to how you approach problems and solutions, the capacity to put existing ideas together in new combinations.

Motivation: Motivation has to do with the drive and desire to do something, an

inner passion and interest. People would be more creative when they feel motivated primarily by the interest satisfaction, and challenge of the work.

Developing Creativity

'We really need to stop considering thinking as simply 'intelligence in action' and think of a skill that can be developed by everyone'. (Edward De Bono, 1982)

De Bono believes that in order to foster creativity effectively we have to develop specific thinking techniques. He argues that although the brain is capable of great creativity and ingenuity, it is not designed first and foremost for this purpose and, as we grow older, it is more difficult to think laterally because thinking patterns become so well established and comfortable. Over years, De Bono and other writers have promoted the view that creative thinking is something that can be developed by anyone and they have formulated a wide range of practical techniques to develop thinking skills.

The main messages: •

- Having fun playing with ideas
- Practicing not knowing or tolerating ambiguity
- Being curious
- Facing your fears
- Talking to people about ideas along the way
- Being proactive and going for it

The Creative Process

The process of developing

creative ideas, thoughts, or actions is usually considered to begin with a period of mental labor or preparation which involves sensing a deficiency or need, randomly exploring the problem area, and finally, clarifying the problem (Patrick, 1955; Taylor, 1963; Torrance, 1965; Wallas, 1926). A second stage in the creative process is that of incubation accompanied by discussing, exploring, and formulating possible solution to the problem or looking for logical flaws. The well known act of illumination—a flash of insight, the birth of a new idea - characterizes the third stage. Finally, there is a deliberate effort and experimentation aimed at elaborating, revising, evaluating, possibly verifying and eventually perfecting the idea. This final culminating stage may involve the production of a work of art, an invention, a new theory, or some more new ideas. Creative individuals tend to resist premature closure but actively seek closure itself.

Dinkmeyer and Dreikurs (1963) suggest that we avoid the authoritarian by encouraging rather than praising. Encouragement is characterized by giving attention, watching, listening, questioning, and a whole array of nonverbal gestures.

Creativity and Education

Since creativity is came what a learned ability teachers or educators must find ways of encouraging their students towards developing a creative mind.

They must be able to reinterpret

ideas, apply their learning in new context, look at things from different points of views and experiment with alternative approaches. Studies also have demonstrated that creative people are more observant, seeing and valuing things as others do not. Creative people are viewed as healthier and more energetic (Barren, 1963), and, as Getzels and Jackson have pointed out on several occasions (1958, 1962), creative thinking abilities contribute significantly to the acquisition of new information. Creative people have a well-developed ability to sense problems. They possess originality and flexibility which is spontaneous and adaptive. Their fluency of associations, expressions, and ideas allows them to relate and perceive ideas in unusual ways. This leads to a redefining and juggling of ideas, further visualizing, and still more elaborating. The tendency to think at right angles to the mainstream and to develop an ability to focus attention in many ways while working and thinking on problems is very common (Taylor, 1964). Creative people also show an ability to evaluate their own creativity, ability perhaps related to their general strong drive, inner-directedness, self-confidence, intellectual thoroughness, and aspiration to making theoretical and original contributions. A high degree of self-sufficiency, openness to the irrational, intuitiveness, awareness of their own impulses, and resourcefulness often lead to the creative acts, products, or ideas which characterize creative individuals. Being adventurous,

personally complex, unconventionally employed, dedicated to and involved in their work, and linking to think and to toy with ideas may all promote the stamina and endurance which creative people are seen as having. A need for variety and autonomy, a preference for complexity and challenge, a striving for better and more comprehensive answers, a need to improve on currently accepted systems, a need to adjust the environment (rather than adjust to it), and a tolerance of ambiguity may all contribute to the creative individual's tendency to stand out from the usual, the accepted, and the conservative trends of peers (Taylor, 1964). Strong ego development (Barron, 1963) coupled with a tendency to be assertive about their ideas can often lead creative individuals into conflicts with teachers and peers.

Teachers must help students imagine possibilities and challenges. These skills can be taught and achieved using some of the following:

- People to question, share ideas and talk about their progress.
 - Ensuring that assessment procedures reflect and reward creativity, enterprise and innovation.
 - Creating opportunities to learn through the imagined experience.
- Effective use of encouragement, praise and positive language.

Teachers Should Encourage Creativity in Students by:

- Accepting unusual ideas, questions, or products
- Providing opportunities, including materials, for creative work
- Showing students that we feel their ideas have value
- Asking students to examine causes and consequences in order make personal evaluation
- Providing environment in which it is safe for students to risk, question, experiment, and Test
- Allowing students to make decisions and choices
- Reducing student anxiety
- Allowing students to decide on closure of an idea, experiment, or train of thought
- Allowing students opportunities to take leadership responsibility

Teachers should not:

- Evaluate arbitrarily or prematurely the product or the process " Restrict access to ideas or materials
- Emphasize norms or generalities
- Constrain student freedom unduly through the uses of directions or praise
- Hasten or enforce closure

Students should be Encouraged to:

1. Evaluate themselves
2. Interact with subjects, materials,

and ideas in an atmosphere of intellectual freedom

3. Make decisions about their learning

The Implications for Teachers and Schools

Many teachers feel strongly that current priorities and pressures in education inhibit the creative abilities of young people and those who teach them.' (Brenda Keogh and Swart Maylor, 2011).

It is often argued that the pressure on teachers to cover significant amounts of curriculum content in order to prepare pupils for national examinations inhibits the development of teaching and learning methodologies that foster creativity. Where the effectiveness of schools is measured in academic attainment, it is perhaps not surprising.

It is interesting that people see creativity and critical thinking as being opposed. It is partly because people associate creativity with being totally free and unstructured. But what we really have to get hold of is the idea that you cannot be creative if you do not do something. You can be creative in math, science, music, dance, cuisine, teaching, running a family or engineering because creativity is a process of having original ideas that have value. A big part of being creative is looking for a new ways of doing things within whatever activity you are involved in.

A creative process may begin with a flash of new idea or with a hunch.

It may just start as nodding around with a problem, getting some fresh ideas along the way. It is a process, not a single event and genuine creative process involve critical thinking as well as imaginative insights and fresh ideas. Let's keep in mind the purpose of being creative in teaching. It isn't another requirement to meet or target to aim for when teachers are more creative in teaching they enjoy their job more, children are more engaged, and learning is more effective. Isn't that what we all want?

One last thought. We can kill creative as weir as help it to grow. Creativity dies where teachers:

- always tell pupils what to do
- stifle pupils' ideas with their own
- only value products, not processes
- don't allow time for pupils to struggle
- praise everything
- see creativity as bad behavior

Conclusions

Creativity is about generating ideas or producing things and transforming them into something of value. It often involves being inventive, in genius, innovative and entrepreneurial.

Therefore, for functional education that will accommodate all these attribute for the Nigeria, students the effective teachers remains the key.

References

- Abrami, P.C. Bernard R.M. Borokhorski, Waden A, Surkes M.A. Tanim R. Zhang - Instructional Intervention Affecting Critical Thinking Skills and Dispositions: A State IMeta-Analysis Rev.Edu.Res 2008
- Aigbeyisi (2010) - *Experimental Mathematics, Vol. 2*, Oxford Publishers, London Brenda Keogh and Swart Maylor, 2011
- Dinkmeyer & Dreikurs (1963) - *Children: The Challenge*, Plume: Issue Edition, London
- Edward De Bono (1982) - *Lateral Thinking: A Textbook of Creativity* Penguin Publishers, London
- Ellas Paul Torrance (1974), *Creativity* Dimension Publishing Company, NYC
- Elombah (2010). *Functional Education in a Global Economy in Africa* Leaders of Education Summit, University of Hull, Wembley
- Gretzels & Jackson 1958, 1962 - *Creativity and Intelligence, Exploration with Gifted Students*, John Wiley and Sons Publishers, London.
- John Kao (1997)- *Jamming: Art and Discipline of Business* Sage Publishers, London

John Pennick - Developing Creativity as
a result of Science Instruction in
Journal of Effective Teaching
Pp42-52, Sage Publisher, NYC

Ken Robinson (2001)- *Out of our
Minds: Learning to be creative*,
Capstone Publishers, London

Taylor (1964): *Perspective in Creativity*
Transaction Publishers, London

Wilf-Zeibeger (1999). Proof of Wilf-
Zeibeger Conjective in
Experimental Mathematics, Vol. 2
Oxford Publishers, London

Wyckoff (1997), *Studies in Tape
Reading*, Sage Publishers, USA