

Teaching for Creativity: Science Teachers to the Rescue

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Abstract

The paper examines the need to teach for creativity and how science teachers can feature prominently in the move. The aim is to ensure that students' learning is creative, and students develop creative thinking abilities that will help them to be productive and outstanding at the end of their career. The paper conceptually discussed the need to teach for creativity, and how teaching could be done creatively. Some practical steps to creative teaching were discussed. Some of the factors that hinder development of creativity in both students and teachers were highlighted. The paper concluded that teaching creatively and for creativity will bring about the solution to our national economic problems. Therefore, efforts should be made by the government to provide enabling environment in schools, for the promotion of creative teaching and learning.

Keywords: Teaching, Creativity, Science, Teachers, Rescue

1. Introduction

The ability of human beings to find creative solutions to problems is essential for the wellbeing of human race. Creativity can help people break out of routines they dislike and get incorporated into desired lifestyle. As an important attribute of a successful entrepreneur, it is often subtle and may not yield apparently to the untrained eye. Unlike many phenomena in science, there is no single authoritative perspective or definition of creativity. However, Omeke (2011) opined that creativity is a mental process involved in the generation of new ideas or an association between existing ideas, and devising alternative ways of solving human problems. Although properly associated with art and literature, creativity is an essential part of innovation and invention, and is important in professions such as architecture, industrial design, advertising, sculpture, music, engineering and humanities. Holt (2006) had earlier defined creativity as the ability to bring something new into existence. This emphasizes the ability, not the activity of bringing something new into existence, but a phenomenon whereby a person creates something new (a product, a solution, a work of art among others) that has some kind of value.

Creativity is inherent in all humans, and therefore has a universal distribution. It is likened to a driving force that drives human behaviours to shape their lives, and calls for talent, an innate ability which can be developed. It utilizes time and space to fashion out something that will fill in the gap or solve problems. Creativity in this context refers to the generation of ideas that results in the improved efficiency and effectiveness of a system or organization. Therefore, one is said to be creative or have creative thinking, if he has the skill and ability to produce something new for self-reliance.

Creativity is characterized by the ability to think divergently or differently, and is the bedrock of every development. Kaur (1998) contended that one should not confuse creativity with talent. While talent is a specific aptitude in specific area, creativity happens when various forces, be they environmental, motivational or psychological, interact to create something unique. It is obvious that new and good methods of creativity would ensure changes, break in new grounds, make alterations, modernize and remold things within the society. Creativity has been used in the past to solve human problems, like the provision of light, transport, calculator, toilet and bathroom facilities among others. With creativity, profit is made by individuals.

Learners need ideas to pursue, and ideas materialize accidentally. Ideas usually evolve through a creative process whereby imaginative people generate ideas, nurture them, and develop them successfully (Agu, 2010). Creative ideas are often generated when one discards preconceived assumptions and attempts a new approach or method that might seem to others unthinkable. Science teachers while teaching, need to encourage generation of new ideas as students discard obsolete ones.

The Nigerian institutions mostly teach for formal wage and salary employment. The learners should be properly trained to believe that if they are not creative, there will be no employment opportunity and self-reliant enhancement. Ejionueme (2007) posited that education in Nigeria needs improvement at all levels, but essentially in all aspects of teaching and learning. The Federal Ministry of Education (FME), (2004) in the educational policy among other things, acknowledged the acquisition of appropriate skills and the development of mental, physical and social abilities and competencies, as equipment for the individual to live and contribute to the development of his society. Unfortunately, the Nigerian educational goals seem only to be good on paper and theory, but not in practice. Abiogu (2009) stated that the creative aspect of the Nigerian educational system has gone to the dogs, and the survival of its educands and the larger society is on the brink of disaster. This statement is true judging from the quality of secondary and tertiary institution graduands in Nigeria today. They

can hardly cope with new technological challenges of the 21st century.

As technology advances our society at an unprecedented rate, creative problem solving will be needed to cope with its challenges as they arise. Creativity help students identify problems where others have failed to do so. In teaching students, there is need for fostering of intrinsic motivation and problem solving skills. Students are more creative when they see a task as intrinsically motivating, and valued for its own sake (Omeke, 2011). Educators need to identify what motivates their students and structure teaching around it. Providing students with a choice of activities to complete, allowing them to become more intrinsically motivated, and therefore creative in completing their tasks. The reasons people are motivated to be creative include need for novel, varied, and complex stimulation; need to communicate ideas and values; and need to solve problems. It is important that teachers bear these attributes in mind while teaching in order to motivate students' interest through creative teaching.

2. Teaching Creatively and Teaching for Creativity

Teaching is an act common among people everywhere in the world. It can be described as the presentation of learning experiences and guidance activities to enhance the opportunity of learning by the learners. Classroom teachers have a constant struggle between teaching content and incorporating creativity into daily instruction. It is the teacher's responsibility to generate lessons and centers that encourage students to be creative. It is vital that the incorporation of creativity in the classroom is encouraged so that students of varying learning styles are exposed to different ways to learn (Papaleo, 2013). The author added that there are two possible ways to incorporate creativity into the classroom. The first option would be to designate a space in the classroom to pique the student's creative outlet. This area is dedicated to creative activities such as a thinking table, drama station, readers' theater or group discussion. An advantage to this solution would be that students are able to move around the classroom throughout the day and are not confined to staying at their desk. It also encourages students to use their imagination through planned or spontaneous dramatic actions. The second possible solution would be collaboration of content material with specialized teachers (art, science, gym, computer, among others). By getting the specialized teachers involved in the creation and implementation of lessons, the students would gain a varied understanding of the content materials.

In order to teach creativity, one must teach creatively, that is, it will take a great deal of creative effort to bring out the most creative thinking in learners. Teachers should know their fields and know how to create an appropriate learning environment, and when it will be most appropriate to offer direct instruction. Jeffrey and Craft (2004) noted that teachers teach creatively when they use imaginative approaches to make learning more interesting and effective, and teaching for creativity is a form of teaching that is intended to develop young people's own creative thinking or behavior, which has learner empowerment. Teaching for creativity involves teaching creatively where students' creative abilities are most likely to be developed in an atmosphere in which the teachers' creative abilities are properly engaged. However, teachers can incorporate creativity across the content areas simply by asking students deeper, open-ended questions. Teachers should also be open-minded and allow students to explore questions and topics. Rather than just providing students with facts, they should provide them with information that they can explore and utilize to develop their own understanding and draw their own conclusions.

Students need to make the choice about what is being changed. It is the students that need practice in being creative. Teachers should not be creative for the students. Teachers can raise questions to produce awareness. However, the student needs to be given autonomy to make choices about what seems important. Otherwise, the motivation to be creative would be lost. Students who are often directed, feel they are being forced to do as instructed for some external reward, but they easily get bored and lose interest in the process.

Teachers should encourage the imitation of creative thinking habits. True creativity happens when intuitive imagination brings forth the previously unknown and unimagined. Once students tackle an assignment creatively, they will naturally be curious to see what experts have done in the past related to the problem they have struggled to solve. Bartel (2013) expressed that creative teachers teach that creative ideas can be generated by making lists and sketches of an idea, consider opposites—such as finding successes when they look at things upside down, inside out, and from back to front, considering practice of the ideas, direct involvement with materials and processes, thinking process rather than product, considering assessment and grading paradigms on students, considering the tone and nature of responses to students' ideas such as in encouragement and reassurance, using common everyday experiences and issues that students are very familiar with such as content assignments for art.

Teachers should teach for creativity by giving time and space for the creative process and assigning homework of the mind. Good teachers prepare their students so that when they leave the classroom, their minds are prepared for homework that is no work. They expect to get ideas at unexpected times. Good teachers understand the surreal powers of subconscious minds, of imagination, and of creative thinking habits.

A creative teacher has the responsibility to review the results of a lesson or a unit, assesses the results,

and imagines other ways the lesson could have been taught. A creative teacher needs a good system to record ideas for next class. However, creative teachers go beyond imitating their role models. They go beyond their mentors. They do this by virtue of critical review of their own teaching – by carefully reviewing what happens and then searching for alternative things to try. Creative teachers make mistakes, but they also search for ways to overcome mistakes (Bartel, 2013). Each time they try something, they review the outcomes and try to imagine ways to make improvements, and have a habit of looking for new alternative methods. Creative teachers do not worry about pointing out mistakes. When the students begin to notice their own mistakes, the teacher knows how to use questions that help students learn to see and eventually answer their own questions.

3.0 Practical Steps for Teaching for Creativity

Teachers are expected to provide support for students to explore and develop their understanding. This implies that science teachers serve as facilitators and guides in discovering knowledge not as directors and molders of students' learning. The science teachers can take the following practical steps in teaching for creativity:

3.1 Teaching students to solve problems that do not have well defined answers.

Science teachers should teach their students to solve problems that do not have well defined answers. For instance, Health and physical education teachers may ask their students to design or construct a sport for the atypical in consonance to the norms. The physics teachers may ask their students to construct a machine that supports human mechanically to write on a paper or other things. This is accomplished by allowing students to explore and redefine the problem, possibly drawing on knowledge that at first may seem unrelated to the problem, in order to solve it.

3.2 Teaching on other aspects of creative learning interventions.

The teacher can stimulate class discussions as to how different topics in a science lesson such as floatation, prevention of disease outbreaks, designing of facilities for a cohort, experiments among others can be used to transform the learning experiences and abilities of the learners to apply to the models in real life. For instance, in a science lesson involving investigating the nature of invention in engineering thermodynamics, the teacher may ask the students questions that forces debates about the nature and current state of knowledge in thermodynamics. Giving students assignments to research about thermodynamics, its application to some other fields will enable them to recognize how to contribute knowledge in the area and evaluate the novelty of a thermodynamic construct and solution to a problem.

3.3 Creating opportunity for investigation of issues.

The science teacher should ensure that any class-based investigation should begin with a question, and should arise from what was learnt in class or from general observation in the social and natural environment. As lesson progresses, students often ask questions about what they did not understand clearly. Some of those questions create opportunity for initiating investigations into issues raised in the class rather than giving students the answers immediately. The class should be guided to find the best response to the questions raised, if no good response is forthcoming from the class, the teacher should request every member of the class to carry out investigations to obtain plausible answer to the questions raised, such investigations may come from group or individual projects, laboratory or field experiments, embarking on excursion, interviewing people, library and internet search on the issue.

3.4 Engaging learners in self-regulation and reflective thinking.

In a science lesson, the teacher should help learners become self-regulated and reflective by explaining to them how to solve problems, design experiments, control variables, construct models, create stories, tell stories, write essays, evaluate statements and arguments, find solutions to problems of others as well as that of oneself, develop realistic knowledge of self and abilities in learning among others.

3.5 Making effective use of classroom questioning technique.

A science teacher should not conclude a lesson without having asked students questions to evaluate their abilities. When appropriately used, questioning is important for generating critical thinking, sustaining learners' interest, focus on the objectives of the lesson, creating an atmosphere for brainstorming in order to find solutions to problems in the class. Teachers are expected to ask questions in the higher order level than in the lower order level. In asking questions during teaching, ability level and gender should not be factors of consideration, as such biases can undermine the purpose of teaching. The teacher may ask students to write their responses to questions and then read them out to the class for comments and evaluation.

3.6 Teachers should identify what motivate their student.

Teachers are expected to structure learning experiences around what motivate their students. For instance, the Health and Physical Education teacher can provide students with a choice of activities to complete, which allows them to become more intrinsically motivated and therefore creative in completing the tasks. For the science teacher, a well planned hands-on-minds-on activity could throw up challenges that motivate students' creative abilities.

3.7 Teaching students to brainstorm on idea.

The teacher can teach students to brainstorm on ideas to create new ones. The ideas should be relevant to the students and the objectives of the lesson. For instance, in a health science lesson involving outbreak of diseases due to environmental pollution and contaminants, the teacher may cause the students to brainstorm to create solution to tackle the problem. One person may be appointed as note-taker, and ideas or solutions should be studied and evaluated after the session on how to solve the problem. The teacher should create opportunity for students to brainstorm on the problem which could be coming up with the ideas of constructing improvised pit latrines, burying pollutants, engaging in environmental sanitation, creating localized drainage system among others.

4.0 Factors That Hinder Creativity

Some of the factors that hinder creativity in students as highlighted by Abe (2006) are discussed below:

4.1 *Inconsistency in educational policy, where policy changes with new political administration.* Every administration in the governance wish to be identified with a peculiar policy on education which never saw the educational sector through success. Another instance is the way our tertiary institutions are run which places emphasis on passing examination rather than acquisition of knowledge. These affect creative thinking.

4.2 *Cultural factors in terms of people's resistance to change.* The dependence of most Nigerians on culture 'the way of life of people', the accepted ways of doing things and the traditional inheritance of property of parents limit their creative abilities in the economic structure of the society.

4.3 *Political and social factors inhibition, where ideas are not often shared and recognized into new assemblage with others.* For instance, professional, skilled men and women abandon their professions for politics where they think they can make it faster in terms of material and wealth acquisition, the ultimate in the minds of most Nigerians. The attitude of most Nigerian students show that a lot of them no longer develop interest in creative thinking to engage in painstaking research work, but rather depend on piracy, copying other people's experimental results. This is also evident in most manufacturing firms like pharmaceutical and cosmetic industries among others.

4.4 *Creative people not putting their creative ideas forward for development.* Sometimes people with creative ability feel reluctant to put their creative ideas forward because, they believe they may create precedents that may go beyond the accepted standard of doing things and thus insist on behaviours and beliefs that derail them from thinking creatively.

4.5 *Problem of originality in terms of looking for the right answer to every situation.* This constraints divergent thinking and prevent people from finding alternative answers to problems.

4.6 *Problem of logicity in terms of always trying to be logical when faced with a familiar problem.* This can pose a barrier to creativity when little relevant experiences are present, when there are a few potential solutions, or when brand new solution is needed.

4.7 *Strict observation of rules and regulations which constrains creativity.* This conditioned behaviour encourages students to keep problems to themselves and find quick fixes that involve as few people as possible. Students are forced to think in a prescribed way and thus limit their potential of creativity.

4.8 *Fear of ridicules and avoidance of failure, and avoiding ambiguity among others.* This behaviour can paralyze students into not acting on their good ideas. Many valuable and lasting lessons are learnt from our mistakes and failures. Students should not be deterred by fear of being ridiculed and then bury their creative ideas.

On the part of the teachers, Ozioko (2006) pointed out factors which hinder teaching for creativity to include : teacher strategies that do not contextualize learning and provide students with opportunities to work and reflect over an extended period of time, emphasizing self-reliance and flexibility; strong emphasis on memorization and imitation by learners; instructional strategies that do not engage learners in experiential learning, but lead them to observe, interpret, analyze, make and consider consequences, teachers not serving as facilitators allowing students to construct their own knowledge through learning, application, action, review and reflection among others.

5.0 Conclusion

This write up has shown that unlike many phenomena in science, there is no single authoritative perspective or definition of creativity. Although some people tried to explain the concept in their own views, creativity was revealed to be clearly part and parcel of the entrepreneurial skills required to successfully start a venture. Nigeria educational system has to be reviewed tilting towards teaching for creativity. There is the need for the teacher to identify students' creative abilities, motivate them, reward, and place them on competition. Conducive educational environment that nurtures creativity in the learners is needed, where the learners will have freedom of thought and expression to stimulate initiative, fluency, originality, flexibility and elaboration, which are attributes of creativity. Creative thinking skills have to be infused into the curriculum to promote outstanding

results. The authors believe that teaching creatively and for creativity will bring about the solution to our national economic problems. Therefore, efforts should be made by the government to provide enabling environment in schools for the promotion of creative teaching and learning.

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