MATHEMATICAL CREATIVE DEVELOPMENT AMONG CHILDREN: A PRECUSOR FOR COUNSELLORS AND MATHEMATICS TEACHERS

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Abstract:

This paper attempts to define Mathematical Creativity to establish whether every child is born creative mathematically or not and whether Mathematics teachers and counsellors should take necessary steps in developing and motivating children mathematical creative behaviour. Mathematics is a logical creation and imagination of the mind on space and figures for which every child need to exhibit at every piagetic level of development. Ironically the complaints on learners poor performance in Mathematics is so pathetic that counsellors and Mathematics teachers needs to bail out the situation. Hence this write up suggested 3 strategies for improving MCDAC and provided four (4) recommendations.

Keywords: Mathematics, Creativity, Development, Teachers, Counselors and Children

Introduction

Mathematical creativity as a special talent has been given little or no attention in the educational institutions of Nigeria most especially in Primary schools. The schools have failed to keep alive the curiosity of some children and their unconventional idiosyncratic modes of thinking. Creative students are seen as threats, probably because they see what the teachers say and unchallenging. Students who are conventional in thought and readily conform to the school norms are considered better for academic tasks and they are highly recognized by society. The creative person, whether musician an artist, an inventor or a

scientist, primarily has the main objective of trying to achieve something by trying to solve a particular problem in a naval way.

Harbour – Peter (2000) maintained that Mathematics enables man to be disciplined and orders the pattern of his life by enhancing creativity, imagination and reflective thinking.

Definition OF Creativity

Creativity refers to the invention of origination of any new thing.

` Mathematical creativity is psychology of invention in Mathematical field. Hadamard (2012) suggested that imagination play central roles in Mathematical creativity.

Graham (2011) describe a creative person as an individual who presents unique and unusual solutions to problems setting him apart from other people.

International Commission on Mathematical Institution however, sees Mathematical creativity as the capacity of person to produce logical and imaginative numerical literacy which are essentially novel and previously unknown to the producer.

Method Of Measuring Mathematical Creativity

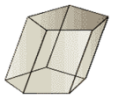
In measuring Mathematical creativity the following methods are been suggested:

Uses for Things

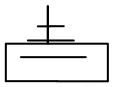
A child is asked in this method to think of as many different uses as he can of common object such as bricks, blanket, paper, bucket, stone and others. This test was derived from one originally designed by (Kola Ibrahim 2004), in his factor analytical work on cognitive ability. In this method, is only interested in the number of uses given by an individual, but in the uniqueness. That is, originality, newness, and appropriateness of the responses are prerequisite. The children may be timed and they should be made to understand that only uses are acceptable. But a score is given for every use and additional score to whoever gives a unique answer.

Word / Object Association

The child is presented with complex object or words such as bold, field, built, sand and so on, object like prisms. The child is asked to give many meanings as he can think of each of the word or as many shape that can be obtained from the prisms. The variability of

the meaning is very important in this case. E.g. Prisms  How many shapes can be obtained from this object?

Fables

The child is required to make up three different endings for folk stories or describe the properties common in the objects identified. E.g. Pyramid 
Identify the shapes with common properties and mention objects that have the type of property.

Problems Devising

The child is presented with a long paragraph containing many numerical statements. He is expected to produce as many mathematical problems as possible based on the data given in the paragraph. It is also possible that an incomplete drawing is presented to the child. In this case, the complexity, the uniqueness and meaning fullness of the drawing are more important variable to look out for in assessing creativity.

Visual Bias Tests

This test demands for a drawing from the children. But with the drawing, a title is given and such title may be playing tag in the school premises. Other methods include hidden shapes which consists of simple geometrical shapes, each of which is followed by a complex figures. The child is asked to find which of the complex figures contains the simple geometric shapes. It also includes the ability to shift easily from one type of thinking to another or flexibility in one's thinking as well as the ability to be sensitive to problems and the penniless of the individual to the unknown or the known.

Characteristics of Creative Individuals

Some attempts were made at understanding the nature of creativity by focusing attention on creative products, responses, and creative processes. Among them is creative product, which can only be regarded as creative if it posses the following properties or characteristics. There is also the unusualness, if it is new, novel and has not been seen before. Appropriateness is another characteristic. They must meet the needs of people if not, there would not be transformation changing the existing idea. It is not approved on what is existing

but creating a new form. It is not traditional, but something overcoming conventional constraints in many instances, the product is radical on approach and dramatic. Lastly, there is condensation which reveals hidden meaning when really examined. It involves simple presentation or complex information or vice versa.

Something is unusual when it is against the prevailing norms of the society. In a corresponding aesthetic response, a creative product must arise surprise from the audience to judge whether it serves the purpose for which it is intended, you judge it against the content. Creative response must be original in remoteness, it must be useful always, it must be correct, when it serves the purpose. It must have aesthetic value. That is good eye catching and bring surprise.

Problems Hindering Creativity

A number of problems have been hindering the fostering of creativity, most especially when the counsellor discovers that an individual posses certain characteristics of features of creativity. Such factors can be briefly discussed below:

1. **Attitudes of Parents:** This would arise from the parents when the parents of the creative child stop or hinder the child from participating in some activities. This is because some parents fails to realize some importance attached to a creative child. In this case, they find it difficult to differentiate between the creative child and the non creative child.
2. **School:** In school syllabus, no creative time is allocated or no room is granted to the creative child for incubation.
3. **Teacher:** It has been discovered that convergent students who are more obedient and more creative, are likely to be far from their teachers. This happens especially when the teacher is not creative and, therefore, may refuse to reinforce creative response. Such a teacher fails to utilize equipment that can foster reasoning and creativity. The teacher's method of teaching is in such a way that discourages creativity, because of the desire of finish the syllabus, which as a result hinders the opportunity for incubation necessary for creative individual.
4. **The Individual:** The creative child can be an obstacle to himself if he accepts the teacher and the texts as ultimate authority, and if he fails to understand the problem. Forgetting the element of the problem and insufficient knowledge, can be another obstacle. The fixed prior belief, the belief of, "that is the way they have been doing it", will make learning difficult to comprehend as well as fear of failure. This may not allow some people to be creative since they, don't have that confidence in them.

How Counsellors can Foster Creativity

From the above listed obstacles, the counsellor can encourage or foster creativity by encouraging the teachers to adopt informal approach to teaching. In situation where the child is allowed to do something by himself, this will foster creativity. Deferment of judgment can be used whereby the judgment is withheld when one is working a particular problem. This is done so that many ideas are generated without any immediate attempt to evaluate or at finding an immediate solution to the problem. For example, impulsive individuals usually raise their hands which always give wrong answers, while the opposite is reflective individuals who always weigh the pro and cons before giving answers. In this case, the counsellor can foster creativity by encouraging the teachers to adopt such method of teaching. Brainstorming is another method the counsellor can use by advising the teacher to adopt in fostering creativity. This is a period where response are delayed so as to allow the students to think for an answer and later, evaluated. Brainstorming is probably the best known studio workshop that can easily be adopted in secondary schools and in an on group basis.

One important thing about this method is the development of many ideas and solution to any given problem. This means thinking up a large number of possible alternative with the rationale that the more solutions suggested, the more the changes that one might be creative. In addition, the counsellor can also encourage creativity by involving the teachers to ask the students questions that will encourage reasoning and divergent thinking. For example, the question that will allow students to know consequences of an events. Teachers should also be trained on creativity by encouraging divergent thinking, scientist equipment and different approaches to problem solving. The counsellor can enhance conducive atmosphere by encouraging the teacher in order to foster learning which will eventually increase creativity.

Finally, the counsellor can apply the placement service to actually decide where a child can be fit into. This is because it has been observed that some children may be creative but many not be good in educational background. In this case, the parents of such a child can be called upon to fix the child where he can learn hand work. This will enhance creativity.

From the above it can be seen that a counsellor can foster creativity in schools only when he can direct the teachers especially on what method and approach of teaching to adopt.

Relevance of Creativity to Counsellors

It enables the counsellor to actually understand the client which will enable him know how to advise him/her. It has been observed that a creative child is always an intelligent child. This will fosters an intimate relationship between the child and the counsellor in the

sense that the counsellor can get more information from the child. Creativity helps counsellor to be able to understand where a child belongs to either a diverger or a converger group. This is because convergers are always good in science while divergers are good in art subjects. This will help the counsellor to place the child in the right place in terms of difficulties in academic performance. Creativity greatly helps the counsellors in devising a child in terms of career choice opportunity. For example, it will be advisable for a diverger to specialize in arts and social sciences while a converger to specialize in sciences to become a medical doctor or an engineer.

Conclusion

From the above, it can be deduced that many people seem to posses the seeds of creativeness, but the environment fails to provide the proper nourishment for growth as seen in the obstacle to creativity above. Training in creativity. Training in creativity has been found to improve student's creativity. Hence the counsellors have to do all they can to encourage and foster it. The counsellor should see that the school locate the needs of the creative child, use informal approach in place of formal/traditional approaches. Education can do much also to help individual achieve self-actualization.

Recommendations:

1. Curriculum developers, counsellors and mathematics educators should try to incorporate mathematical creative development programme in secondary school mathematics.
2. The ministry of education should introduce mathematical creative development activities in mathematics syllabi at both primary and secondary school levels.
3. Schools should include special programme on mathematical creativity development such as numeracy quiz, mathematics club etc.