

CREATIVITY AND INVENTIONS IN SCIENCE EDUCATION NIGERIAN INSTITUTIONS

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Abstract

In this paper an attempt was made to examine creativity and inventions which can be effectively and efficiently applied as a strategy for the promotion of sound science education development in Nigeria Institutions. Today, science education at all educational levels seem to lack creativity and inventions and can be attributed to inability of the teachers and students to be creative and innovative in science teaching and learning methods. Science teaching and learning in Nigeria Institutions seriously need creative and innovative ideas before any meaningful scientific inventions can be attained. Inventions mean making something new for the society through the generation of new ideas or trying to improve on the existing ways of doing something in a new way. In conclusion, recommendation is made towards improving the teaching and learning of science through creative and innovative techniques.

Creativity and inventions in science education for Nigerian Institutions is an attempt to x-ray how Science Education programme can

prepare science students to be useful to themselves as well as better the society after graduation. The bane of sound science education in Nigeria ranges from

curriculum contents, teacher's quality, instructional and learning approaches, uncreative learning environment, students and teachers attitudes just to mention a few.

In this paper focus is more on making Science Education programme better for Nigeria Institutions through creative and inventive science teaching and learning. Most of the science graduates from the Nigerian Institutions can be rightly said to be half baked which could be attributed to the fact that science education which aims at preparing the students to be scientifically and technologically literate as well as for the betterment of the society is yet to achieve this objective due to poor science education programme. For Instance, science teaching and learning today are being taken for granted by both the teachers and students particularly at the primary and secondary school levels due to poor quality science standard and the right skills to impart to the learners for a worthwhile science knowledge and experience.

Science Teachers and Students

To improve the standard of science education for Nigerian Institutions in the 21st century requires creative and inventive science teachers and students and an enriched learning environment. Creativity is vital in attaining the objectives of science education for Nigerian Institutions particularly at the primary and secondary schools where little or no

proper science teaching and learning are seen to be taking place. Creativity is about generating useful ideas to make something new which is known as "invention" or to improve on the old ways of doing something in a new way which is known as "innovation". By creating inventive and innovative ideas in science education by science teachers and students, Nigeria will be better for it than the traditional emphasis on theoretical acquisition of factual science knowledge only. Creative and inventive option is seen as an effective strategy of teaching and learning of science through inquiry, problem solving, practical activities and research works in the sciences Abdullahi (2007) Uncreative and uninventive science teaching and learning strategies rampant in Nigeria institutions only promote abstract Scientific knowledge devoid of scientific experiences and technological break throughs.

Onose (2009) confirmed that "science teachers using the traditional method of teaching makes science lessons boring and the students finding it difficult to grasp some scientific concepts, skills and principles. Most institutions in Nigeria without creativity, inventions and innovations in their science education programme only promote poor and shallow scientific ideas and knowledge. The teacher who sees himself as a custodian of knowledge waiting to be transmitted to the students, which is a common trend in Nigerian institutions does not promote creativity and inventions among the

science students. Well man (2001) asserted that the most valuable resource brought to your work and to your firm or institution is your creativity more than what you see done, more than the role you play, more than your title, more than your own output, it's your ideas that matter. Science education programme for Nigeria institutions must be developed along creative and imaginative thinking by both science teachers and students.

Promoting Creativity and Invention in Science Education in Nigerian Institutions

Science learning and teaching in Nigeria institutions have not measured to an internationally accepted standards because of the endemic traditional nature of teaching and learning science. To make science teaching and learning better, emphasis should shift from the teacher domination and custodian of knowledge as is currently practiced to that of creative, innovative and inventive learners or students centered programme.

The old and new strategies of teaching and learning of science for the Nigerian institutions has been represented diagrammatically in figures I and II

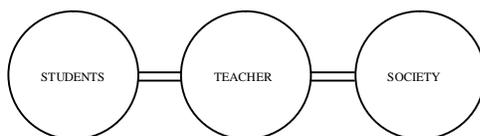


Figure I: Old Science Education System with the Teacher as the Custodian of knowledge

In the old system the child's and society's interest are not considered paramount thereby making the students not to be useful to themselves or developing a better society after graduation.

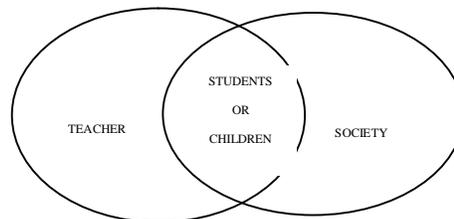


Figure II: New Creative and Inventive Science Education Programme with the Students Assisted to Generate new Ideas and Skills.

This new strategy promotes learners or students interest to enable them become successful and useful to the society by inventing something new.

The key ingredients required for a new science education programme for Nigerian institutions being highlighted include an interdisciplinary comprehensive science curricula framework, quality and standard science assessment and tests instruments, quality science education instruction and learning techniques and quality enriched learning environment.

Interdisciplinary Comprehensive Science Curricula

All science institutions science programme from primary to the university should use an interdisciplinary and comprehensive standard science curricula designed by seasoned science educators and practitioners to attain the goal of a uniform standard of science education for Nigerian institutions. For instance, the science curricula for Nigerian institutions today are differentiated, separated into single subject or course disciplines which are not so relevant to the child or the society.

There are incoherencies and inconsistencies in the Nigerian and African educational systems. Okebula (2015) pointed out these deficiencies in his convocation lecture at Convent University that “plans are under way to adopt a uniform quality assurance framework as minimum standard of education for higher institutions in Africa..

There is no uniform quality assurance framework for science education at both the primary and secondary institutions in Nigeria thereby promoting poor science foundation. A quality and standard test instrument in science education at all levels should provide the students with guides on ongoing, authentic and accurate target tests of students learning outcomes through multiple formative and summative assessments which must be aligned with the psycho motive and cognitive stages of development of the

learners to achieve excellent performance and also acquire worthwhile experience and essential learning skills by the science students, the assessment instruments should place more emphasis on the appropriate innovative and imaginative thinking faculty of the students (Akinyemi, 2006).

Teachers’ Quality Instructions and Students’ Learning Techniques in Science

Quality science instructions in the classrooms and laboratories should aim at preparing students who should be literate scientifically, technologically and environmentally through planned learning strategies, opportunities and standard practices integrated with useful science concepts and core disciplinary course principles. The students must learn how the scientific processes of observation, inquiry, experimentation, measurement, data collection, discussions, drawing inferences and conclusions based on evidence could be used to acquire new knowledge experiences (Omoifo, 2012). Also, Onose (2009) noted that “many inexperienced teachers teach science in abstraction, thereby making science lessons boring and the students finding it difficult to grasp some scientific concepts, skills and principles. There is therefore an urgent need to develop science teachers and students mentoring programme or clubs for newly employed science teachers for Nigerian institutions if qualitative and innovative science

teaching and learning are to be achieved in science education in Nigeria.

Some of the creative skills of science teachers and students are:

- a. Ability to generate more ideas
- b. Ability to invent new things
- c. Allow gifted and non-gifted learners to do things at their own pace
- d. Ensure learners readiness to accept failures or mistakes and to try again
- e. Promote divergent ways of doing or finding out something
- f. Set high objectives and standards
- g. Promote imaginative thinking
- h. Use good sense of humor and motivation
- i. Be conscious of individual differences
- j. Promote a creative and stimulating learning environment
- k. Promote creative skills and scientific attitudes in the learners

Good Quality and an Enriched Science Learning Environment.

An exploring , creative and inventive science learning environment play a vital role in helping students cultivate a habit of learning science by inquiring or problem solving through generating their own ideas and finding best solutions to their problems without undue interference or imposition of ideas by the teachers. According to Morris and Pai (1976) the “quality of

learning climate in which no threats, punishment and regimentation are observed will be effective in stimulating critical and creative thinking and will encourage the students to be independent as well as expose them to an integrated learning experience”. The Nigerian institutions must provide sufficient and relevant science learning resources for the students such as classrooms, seats, laboratories, textbooks, manuals, teaching aids, models, charts, specimens and a rich environment to expose the learners to experience and interact with things and ideas which prepare them to be scientifically, technologically and environmentally literate students for a better scientific knowledge, thinking and better society (Akinmade 2004).

Conclusion

Science education programme In Nigerian institutions needs to be integrated with creative, inventive ideas, knowledge and experience with accepted international standard and practices which should prepare the students to be technologically and environmentally literate for a better development of the society. This can only be achieved through qualitative and innovative science programme at all levels of the educational system. At the primary and secondary school levels there is an urgent call for reorganization and restructuring of the curricula to provide a more interdisciplinary, comprehensive and coherent science curricula with quality and standard test

instruments, introduction of effective quality instructions and learning techniques, formation of science teachers and students mentoring clubs and a good, exploring and creative child or learner - environment.

References

- Abdullahi A. (2007). Functional Science, Technology and Mathematics Education for National Economic Empowerment and Development. A Speech delivered at the 2007 school of science National Conference held at Federal College of Education, Zaria, April, 2-5.
- Harris (1998) In Ada, N.A. & Ortese, P.T (2000). *Creativity, Intelligence and Scientific Thinking Introduction to Scientific Thinking, General Studies Series No: 1* Makurdi – Nigeria Abogom press p.22.
- Akinmade C.T.O (2004) Effective Primary Schools Science Teaching, Meaning, Scope and Strategies. The Practice of Teaching Perspectives and Strategies. *A Resource Manual for Today's Teachers*. Institute of Education, University of Jos.
- Akinyemi, F.O. (2006). Curriculum Enrichment of Science Technology and Mathematics Education as a basis for Sustainable Development. *Journal of Science Teachers Association of Nigeria* 3 (1).
- Morris V.C. & Pai Y. (1976). *Philosophy and the American School. An Introduction to the Philosophy of Education*, 2nd ed. Boston: Houghton Mifflin Company.
- Okebukola P. (2015) Higher Education and African Future: Doing what is Right. A Convocation Lecture Delivered at Covenant University. *The Nation Newspaper* vol. 10. 3263.
- Omoifo, C.N. (2012) Dance of the Limits, Reversing the Trends in Science Education in Nigeria. Inaugural Lecture University of Benin, Benin city.
- Onose, G.M. Okogun. E. A & Richard J. (2009). Reforms and Innovation in Training and Retraining of Science and Mathematics Teachers to Meet with the Challenges of Global Development. *Journal of Teacher Perspective*. 3 (2).
- Wellman, A.M (2001). The Five Faces of Gennius. The skills to Master Ideas at Work. New York: P.6.