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Transforming the Teaching of Junior Secondary Mathematics for the Attainment of Vision 20:2020

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Abstract

The Nigeria vision 20:2020 is an economic, social, and political projection that by the year 2020 Nigeria will be one of the twenty (20) largest economies in the world, able to consolidate its leadership role in Africa and establish itself as a significant player in the global economic and political arena. This paper highlighted the needs and objectives of the vision 20:2020. It further stated four ways of transforming the teaching of mathematics particularly at the Junior secondary level of Education and discussed how the improvement in the teaching of mathematics at the Junior secondary school can be used in the attainment of the vision 20:2020. Finally recommendations and conclusion were highlighted.

Education constitutes the core of human development. It opens up opportunities for both individual and group empowerment. It is a vital tool for transformation and the key to the sustainable development of a nation. Human capacity development which anchored on strong learning system is central to the attainment of vision 20:2020. Education is the most crucial instrument for empowering young people

Journal of Resourcefulness and Distinction, Volume 8 No. 1, August, 2014

with knowledge and skills which in turn provide them access to productive employment in future. The goal of vision 20:2020 in education sector is to ensure that all children, irrespective of ethnicity, gender or disability, complete a full course of basic education which is 12 years of formal education comprising three years of Early Childhood Care Development and Education (ECCDE), six years of primary schooling and three years of Junior secondary schooling.

Junior secondary education/schooling is the education received by children after primary education. The broad goals of secondary education as stated in the National policy of education (2004) are to:

- i. Prepare the individual for useful living within the society.
- ii. Prepare the individual for higher education.

At the Junior secondary school level the curriculum is both pre-vocational and academic and mathematics is one of the core subjects. The inclusion of mathematics as a core subject at the Primary, Junior secondary and Senior secondary school shows the importance throughout the world as an essential tools in many fields including natural sciences, engineering, medicine and the social sciences etc.

Over the years, emphasis in the Nigeria education system has been to produce individuals who could make some impact on the economy of the country that would lead to achieving a self reliant nation. The problem therefore is how these skills and knowledge are instilled through the teaching process.

Objectives and Need for Vision 20:2020

The vision 20:2020 is a conglomerate of the meetings held by some third world countries that saw the need to improve upon the predicament, the penury, and the abject poverty being experienced by most of the African nations. In line with this therefore, it is imperative to see to the upliftment of the education, economic, health and the socio-political status of the citizens of the said third world countries.

The two broad objectives of vision 20:2020 are to:

- i. Make efficient use of human and natural resources to achieve rapid economic growth and to,
- ii. Translate the economic growth into equitable social development for all citizens.

The development aspirations cut across four dimensions

1. Social - building a peaceful, equitable, harmonious and just society;
2. Economic – developing a globally competitive economy;
3. Institutional- having a stable and functional democracy; and
4. Environmental – achieving a sustainable management of the nation’s natural resources (Suleman & Toyin, 2012).

Nigeria has had a relatively long experience in development planning beginning with the Colonial Development plan (1958 – 1968). Fixed medium term – term development plans and National Rolling Plans were also developed and implemented with mixed results. Other strategic efforts such as the Structural, Adjustment Programme, (SAP) National Economic Empowerment and Development Strategy (NEEDs), the strategy for attaining the Millennium Development Goals (MDGs) and the 7-point agenda were not effectively implemented, and therefore, recorded modest success. Weak implementation of these strategic development initiatives has constrained the country's growth and development. Another reason for plan under achievement and failures was lack of political will to see the development strategy through to the end. Nigeria has, therefore, adopted a long-term approach to development planning and set for itself the goal of being among the 20 largest economies of the world by 2020. This is why it has chosen the following vision statement:

By 2020, Nigeria will have a large, strong, diversified, sustainable and competitive economy that effectively harnesses the talents and energies of its people and responsibly exploits its natural endowments to guarantee a high standard of living and quality of life to its citizens.

Obioma, (2011) asserted that a modern and vibrant education system entails wide-ranging activities that would ensure functional and qualitative education of the highest possible standards at basic, post-basic and tertiary levels. The primary goals to achieve include providing access to quality education at all levels, improved learning and teaching infrastructure, according greater importance to science, information technology, technical, vocational education and training. He went further to say that “The ability to acquire and utilize knowledge and skills effectively” is the key to the growth and development that will propel Nigeria to become one of the 20 largest economies by the year 2020.

Ways of Transforming the Teaching of Mathematics

Teachers are always interested in looking for ways to improve their teaching and help students to understand.

Gambo and Usman, (2010) wrote that the teaching of mathematics with the use of manipulatives (concrete materials or objects from the real world) which the students can feel or see by the teachers in illustrating/teaching will help students to understand clearly what mathematical is all about. For example, putting four oranges and 5 oranges to get 9 oranges is the real world situation but on the mathematical level we say $4 + 5 = 9$. These manipulative which are concrete models appeal to several senses of the students for they can be touched and moved around by the students. An appropriate

concrete materials/objects must be selected for a particular concepts to be taught in mathematics.

The teaching of mathematics can also be transformed when teachers improve on their modes assessment by listening to students talk about their mathematics thinking, observe their students working individually and in cooperative groups, asking students why and how questions rather than asking yes or no questions have their students write a solution to a problem rather than by only responding with correct or incorrect values.

The teaching of mathematics can be transformed through the use of teaching strategies/methods such as scaffolding strategy, problem solving, group work or discovery approach, expository -method etc rather than rote learning which involves the teaching of mathematics results, definitions and concepts by repetition and memorization typically without mathematical reasoning. The teaching of mathematics at all levels using problems-solving will develop in the students that cultivation of mathematics ingenuity, creativity and heuristic thinking.

Lastly, the teaching of mathematics can as well be transformed through homework. The homework so given should be the type that will lead students to practice past lessons or prepare future lessons which are more effective than just going over today lesson. There should be a mixture of easy and hard problems and ideally based on the students learning style. The teachers should always make sure that corrections of such mathematics homework are done so that the students get feedback. Shorter homework given at regular intervals are better than long homework and rewards particular in form of praises should be given.

Transforming the Teaching of Junior Secondary School Mathematics for the Attainment of Vision 20:2020

Recall that vision 20:2020 is one of the long term development plans embarked upon currently by the Nigerian Government to move the country to a higher status. According to Wikipedia free Encyclopedia, the logo of the vision is to make Nigeria one of the largest economies in the world by the year 2020, consolidate her leadership role in Africa and establish itself as a significant player in the global economic and political arena. According to Obioma (2011), vision 2020 was aimed at achieving sustainable human development in Nigeria by eradicating poverty, improvement in the lives of at least 100 million km dwellers and to ensure that all children remain in school and receive a high quality education. This shows that the vision is for all the overall development of the nation and education given at primary and secondary levels are among the priority of the vision.

The Nigerian Educational Research and Development Council (NERDC, 2007) has six themes for Junior secondary school 1-3. They include:

- i. Number and Numeration
- ii. Basic operations
- iii. Measurement
- iv. Algebraic process
- v. Geometry and mensuration
- vi. Every day statistics

One of the vision of 20: 2020 is to give functional and qualitative education to all its citizens. This can be achieved if the students are taught not in abstract terms but by the use of concrete objects/materials, that will make them to understand that mathematics is real. The students within Junior secondary level are still young and so they need to relate what they have been taught with what goes on around them. The teachers can ask students to bring some materials depending on the topic he/she is teaching; for instance, bring a scale to the classroom to weigh some items within the classroom to indicate their weight and this will enable students to have an idea of objects that can be weighed by seeing them; A tape rule should be brought to the class to give the idea of distance when the students measure the distance around and within their classroom.

The achievement of productivity (food security and Agriculture) in the teaching of mathematics will enable the students to identify small and large numbers. One of the topics in the JSS (Junior Secondary School) mathematics curriculum is number and numeration. Here the students are expected to count, write and read in millions, billions and trillions etc. when the students can link objects with numbers, they can understand when the government mapped out the total population (in figure)to plan food for and be able to know the necessary provisions made for fertilizer, tractors and other products made available for the population.

To achieve power, labour and productivity, governance, safety of lives and property and the provision of an environment where people will feel happy and fulfilled (i.e. security), regular assignments will always be given to students so as to keep them busy. The teacher further explained that the students/people that causes insecurity in the country was as a result of idleness and jobless, and these set of students are always ready to get involve in riot and even go about burning people's houses for the sake of politics, religion and otherwise. The teacher encourages them to always behave very well, talk to their friends, brothers and fellows students who are idle to get something doing rather than getting involved in activities that will bring insecurity to the nation.

Mathematics is the key to the development of a nation. The role being played by mathematics in the day-to-day activities of man is suggestive of the fact that mathematics is needed by all not only for scientific or technological development, but also for all forms of development. The social, cultural and utilitarian and disciplinary values of mathematics worldwide also place the subjects at a vantage position for ensuring all round sustainable development. No wonder Usman and Gambo (2010), wrote that the better mathematician, the better engineer he becomes and more likely he is able to make effective use of the mathematics to understand how solar, hydro, thermal source of energy can be generated. Through teaching techniques /strategies like scaffolding, discovery and group work etc, the mathematics teachers can always take the students on excursion to car, bicycle or lorry factory etc to see how they are being constructed and assembled. He/she encourages them to make toy models of such vehicles (Ugwuda, 2008).

Conclusion

Achieving Vision 20:2020 In Nigeria depends to a large extent on Nigeria's determination in science and technology. Mathematics is very relevant to those areas as they cannot do without it. Therefore, if the above recommended strategies are implemented, it is hoped that mathematics (Junior Secondary Level) education will be reposition for transforming Nigeria in attaining vision 20:2020.

Recommendations

The following recommendations when fully and sincerely implemented will help to change (transform) the ways mathematics is taught and learnt in our schools (Junior Secondary School) for the achievement of vision 20:2020 not just in the educational sector but in other sectors of the economy.

1. Necessary incentives such as handsome pay package, special allowances, sponsorships to conferences, seminars and workshops and regular promotions should be provided to mathematics and science teachers to improve their job commitment.
2. Establishment of state mathematics centers: States in the Federation should establish mathematical centres where research, training and production of mathematical teaching materials will be done as in the national centre. With the vital activities of the national centre is brought closer to the mathematics teacher at the local level.
3. Provision of mathematics laboratory: Our schools should be provided with mathematics laboratory to encourage active and discovery learning. Government at all levels should join hands together to execute this project. This can be done in phases.

4. Junior secondary school mathematics curriculum should be simplified and easy to understand. It should have standards that set high expectations for all students and serve as guide for teachers as they plan, implement and evaluate their instruction and students learning (Usman and Gambo, 2010).
5. Mass awareness campaign on the importance of mathematics: Government and private organizations should join hands to enlighten parents and students on the usefulness of mathematics in their daily life and the overall development of the country which is what vision 20: 2020 is all about.
6. Curriculum innovation in mathematics and science: A mathematical science summit needs to be organized by the Federal Government to consider reviewing and injecting new mathematical ideas relevant to our present need for vision 20:2020. Collaboration with key sectors (Science, technology and VTE) is recommended to work out the new documents and ensure its proper implementation.

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