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Motivating the Girl-Child in Science-Oriented Areas for Nation Building

[1] Olatunde Faith Ozofu, [2] Olatunde Michael Banji

[1, 2] Department of Surveying & Geoinformatics, School of Environmental Studies, Auchi Polytechnic, Auchi, Edo State, Nigeria

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Corresponding Author: **Olatunde Faith Ozofu**

Abstract

The participation of girls in science, technology, engineering and Mathematics (STEM) education is important for nation building, as it can lead to increased innovation, economic growth and social development. However, girls often face barriers in pursuing STEM fields, including stereotypes, lack of role models and limited access to resources. This paper highlights the importance of motivating the girl child in science-oriented areas and provides recommendations for educational institute, parents, policymakers and the media to promote girls participation in stem education. This study observed that by encouraging and supporting girls in STEM subjects, can unlock their potentials, drive progress, and build a brighter future for all.

Keywords: The Girl Child, Nation Building, Science-Oriented Areas, and Nation Building

1. Introduction

Gender discrimination is a global phenomenon ravaging the whole world-Africa and Nigeria not left out. Women are considered as men's properties, pleasure objects and machine making children in Africa. As a result of these concepts about women, they are therefore considered as less important in the society compared to their male counterparts. It still sounds normal to celebrate the arrival of a male child than a baby girl because it is believed to be the only one who can bear the family flag. Based on this premise, boys are usually better trained in school, held sacred and catered for as golden eggs while girls are neglected and are given out as Christmas gifts or at best sent to marry rich men in the city. According to Enejere, (1991) [1] women are considered as second class citizens and gender inequality is promoted by religious and communal customs in the traditional Nigeria society. Most young girls in the northern part of Nigeria are usually denied benefits of education hereby leading them to teenage marriages.

Obinaju (2014) [4] sees education as inalienable right of all irrespective of the person's circumstance while Michael (2011) described education as the most important aspect of human development, a key to a successful living especially girl-child education. Girl–child education is a catch-all term for a complex set of issues and debates. The neglect of the female child education has led to all sorts of undesirable social vices, including immorality, human trafficking, street hawking, fraud, armed robbery, husband snatching, home breaking and the likes (Osagie-Erese, 2010) [6]. Denying the girl-child access to education implies making her a dysfunctional member of the society. Statistics show that many girls are not enrolled in school. The global figure for out of school children is estimated at 121 million, 65 million are girls with over 80 percent of these girls in Sub-Sahara Africa including Nigeria (Omede and Agahiu, 2016) [5].

Education is the bedrock for any sustainable development. This is because education is an inevitable tool and its mastery is a basic condition for sustainability and development of any emergent world. In Africa and with reference to Nigeria, despite the fact that education is a veritable tool the girl-child is still lagging behind in formal education (Nwokolo, 2016) [3].

2. Science Oriented Areas (STEM)

Science oriented areas refer to subjects or fields of study in the sciences, technology, engineering and mathematics. It is mostly referred to as STEM as an acronym. According to Gonzalez and Kuenzi, (2014) STEM is the teaching and learning in the fields of science, technology, engineering and mathematics. It cuts across all levels of education from pre-school to post-doctorate in both formal (e.g classrooms) and informal (e.g after school programmes) setting.

A career in science, technology, engineering and mathematics (STEM) is exciting, challenging, ever-changing and highly in demand globally. Currently, 75% of jobs in the fastest growing industries require workers with STEM skills and with worldwide STEM-skills shortages, this need is only expected to grow. Examples of STEM occupations are: Civil Engineering, Surveying & Geoinformatics, Mechanical Engineering, Electrical/Electronic Engineering, Architecture, Science Laboratory Technology, Medical Laboratory Science, Medicine, Industrial Safety and Health Engineer, Microbiologist, Quality Control Analyst, Clinical Data Manager, Biostatistician, Product Safety Engineer etc. Professionals in STEM use scientific, technological, engineering and/or mathematical processes to do research and solve problems.

According to the U.S Department of Commerce, STEM occupations are growing at 17%, while other occupations are growing at 9.8%. STEM degree holders have a higher income than in non-STEM careers. STEM education creates critical thinkers, increases science literacy and enables the next generation of innovators. Innovation leads to new products and processes that sustain our economy. STEM is important because it pervades every part of our lives. Science is everywhere in the world around us.

Technology is continuously expanding into every aspect of our lives. Engineering is the basis of designs of roads and bridges and lots more. Mathematics is in every occupation every activity we do in our lives. It is therefore important to note that STEM is important in life and the girl-child should embrace this opportunity to compete favorably with her male colleagues.

3. Importance of the Girl-child Education in STEM

Women remain under-represented in science, technology, engineering and mathematics (STEM). In the field of engineering for example, women earned fewer than 20% of doctorates in 2014, such gaps however are not the results of differences in intellectual ability. If girls have the intellects needed for success in STEM, then what factors explain why they don't pursue education and careers in these fields (Jilana and Andrei, 2018) [2].

There are two types of beliefs that discourage girls from pursuing STEM at early age according to Jilana and Andrei (2018) [2].

(i) Negative stereotypes about their intellectual abilities

(ii) stereotypes about the people who work in STEM careers are being 'nerdy' or socially awkward.

The girl-child is not a less specie compared to the boy though the Holy Bible refers to females as weaker vessels; but this is not an assertion that females cannot compete favorably with their male counterparts in certain areas of life especially in academic pursuit or course of study. The same Holy Bible described a Virtuous Woman as one who is endowed with countless gifts and talents it means therefore that the girl-child is well talented to undertake STEM related courses and she is bound to excel.

STEM education helps to bridge the ethnic and gender gaps sometimes found in Mathematics and science fields. Initiatives have been established to increase the role of females (women) and minorities in STEM related fields. STEM education breaks the traditional gender roles. In order to compete in a global economy, STEM education and careers must be a national priority.

The importance of empowerment programs for girls cannot be overstated and the benefits of getting more girls into STEM cannot be contained in a single piece of write up but think of the increased diversity in your pools of engineers, developers, environmentalists, scientists. Then consider the impacts this new landscape could have in creating a wider reaching line up of products, services and solutions that reflect the needs of the world's entire population and not just half of it. ID Tech is a program designed to create awareness and motivate the youths in STEM education for nation building.

The pervasive gender gap in STEM is acknowledged and has long been dedicated to creating inclusive learning environments that bring out the best in both girls and boys. Since the inception of ID tech, they have continually made a point to run awesome camps that are welcoming to both genders but also noting that the female perspective is vital and getting more girls in STEM is beyond important. Their goal is to help balance the scales by inspiring girls to dream BIG. It also created an all-girls technology camp, Alexa Café where they teach tech with an emphasis on entrepreneurship, leadership and social impact. It has since become the nation's leading and largest summer tech camp just for girls and due to its success in past seasons they have expanded the program to over fifteen campuses across the country

4. Strategies in Motivating the Girl-child in STEM Education

International women's day was celebrated March, 8th 2025, where people from all over celebrated the social, economic, cultural and political achievements of women. The theme was 'for all women and girls: Rights, equality, and empowerment." It was a call for action that can unlock equal rights, power and opportunities for all and a feminist future where no one is left behind. There is need to strive for gender balance in everything from boardrooms and government, to wealth, sports coverage and beyond.

The big question here is how to get the girl-child inspired in STEM. Looking at different opinions at different times and occasions it is worthy to note that there is no straight jacket or stereotype format to follow in designing strategies in motivating the girl child in STEM. It is from these we take cues on how to inspire, motivate and encourage more girls to get into STEM. All in all, it is a challenge that requires every single organization to actively strive for change. It is therefore imperative that parents, educators, individuals, organizations, government should take part in this campaign in order to bridge this gender gap. The following strategies can be adopted in motivating the girl child in stem education:

(i) Ignore negative stereotypes

The girl-child is not less importance. She is equally made and created as her male counterpart by God. She is highly talented by God and endowed with knowledge and wisdom to be the best in life. The girl-child should be helped to build a mindset that she has the abilities to develop and succeed in STEM as against the assumption that they are less human and lack the innate ability needed to succeed. It takes efforts and strategies to build ability.

(ii) Build and instill confidence

Confidence makes you believe in yourself. The girl-child should be taught on how to build and instills confidence. It is confidence in our bodies, minds and spirits that allows us to keep looking for new adventures 'Oprah Winfrey'. Confidence gives us the permission to be different and unique. Confidence is our fuel. A person without confidence is like an air plane sitting on the runway without fuel, obviously it will go nowhere

(iii) Enlightenment on female role models

Motivation can also be by exposing the girl-child to examples of female who have succeeded in STEM related professions and have become role models. The key is to present those female to the younger ones to follow their footsteps of courage and determination to become great like them. This enables them to envision possibility of achieving success. E.g Mae Jerrison is the first female African-American Astronaut in 2003.

(iv) Failure is a learning opportunity in life

Failure should be considered a learning opportunity in life. It is most often unavoidable and should not be brushed under the carpet when it occurs. The girl-child should be taught to focus on learning processes by discovering the origin of the mistake and create new strategies for the next opportunity.

(v) Rise up to challenges

Challenges are part of life. They make life interesting, overcoming them make life meaningful. If you don't climb the mountain you can't view the plain. You are not paid for having brain you are only rewarded for using it intelligently. A path without obstacles leads nowhere. If these are understood by the girl-child then she can rise up to challenges to build her dreams. A confident person does not concentrate on his weaknesses but develop and maximize his strengths.

(vi) Work in teams or collaborate

The girl-child should be tutored that scientists often work together in teams. They collaborate with one another to invent things or carry out discoveries or experiments that help people in their everyday lives. This goes a long way to build the mind to be strong, dedicated and resilient in developing deeper purpose for learning STEM related subjects.

(vii) Creates grounds or opportunities to succeed

Parents, individuals, philanthropies, educators, governments and other concerned bodies can create grounds or opportunities to succeed for the girl-child especially in a society or environment where the girl-child is usually abandoned and not catered for due to gender discrimination. These grounds or opportunities can be in the form of educating and providing grants, prizes and gifts for brilliant performances like late Engr. (Mrs) Osiki's foundation which was saddled with giving out of prices to the best female students in Mathematics, Physics, Chemistry and Biology at the senior secondary school levels in her community.

(viii) Dream big

It is important to dream big in life. The girl-child can only be limited in her dream if she accepts defeat. She needs to build her dreams to actualization irrespective of the size. If she does not build her dreams she will be hired to build some ones else's dream which automatically make her become unfulfilled, because what she failed to learn might teach her lessons later.

5. The Role of the Girl Child in Nation Building

The girl child plays a vital role in nation building and her contributions can have a lasting impact on the social, economic, and cultural development of a country. Some key roles of the girl child in nation building are:

1. Future Leaders:

The girl child can grow up to become future leaders, making important decisions that shape the nations policies, laws, and institutions.

2. Educators and Innovators:

Girls can become educators, scientists, and innovators, contributing to the development of human capital and driving technological advancement.

3. Economic Contributors:

As women, girls can participate in the workforce, contributing to the nation's economic growth and development.

4. Social Change Agents:

Girls can become agents of social change, promoting values such as equality, justice, and human rights.

5. Cultural Ambassadors:

Girls can help preserve and promote their country's culture, traditions, and values, contributing to national identity and pride.

6. Caregivers and Nurturers:

Girls can grow up to become caregivers and nurturers, playing a vital role in family and community well-being.

7. Role Models:

Girls can become role models, inspiring others with their achievements, resilience, and determination.

6. Wayforward

1. Provide Access to Education:

Ensure girls have access to quality education, empowering them to reach their full potential.

2. Promote Equality And Inclusion:

Foster a culture of equality and inclusion, eliminating discrimination and stereotypes.

3. Support Girls' Empowerment:

Provide opportunities for girls to develop their skills, confidence, and leadership abilities.

4. Protect Girls' Rights:

Ensure girls' rights are protected, and they are safe from exploitation, violence, and abuse.

7. Summary

Motivating the girl child in science-oriented areas is vital for nations-building, as it can lead to increased innovation, economic growth, and social development. However, girls often face barriers in pursuing STEM fields, including stereotypes, lack of role models, and limited access to resources. To address these challenges, it's essential to encourage and support girls in science, technology, engineering, and mathematics (STEM) education.

8. Conclusion

The importance of the girl-child education and its relevance in the development of the nation at large cannot be over-emphasized. The education of a girl-child is her right and it is a key transforming her life and making her responsible member of the society. Their productive role in nation building can be hindered if they lack education. In Nigeria, a lot of efforts have been put in place to ensure improvement

in the education of the girl-child nevertheless there are still a lot to be done if the females must realize their potentials and be able to contribute to the political, socio-economic, scientific, technological, etc advancement of the nation.

It is from these we take cues on how to inspire, motivate and encourage more girls to get into STEM. All in all, it is a challenge that requires every single organization to actively strife for change. This write up is to create awareness that will enlighten and expose students most especially the Girl-child at early age to science, technology, engineering and mathematics (STEM) related areas giving them the opportunities to explore STEM related courses and concepts by developing passion and hopefully pursuing career or jobs in STEM fields.

9. Recommendations

The following recommendations are made to motivate the girl child in science–oriented areas for nation building.

1. Parents and communities should participate by encouraging STEM interest in the girl child through provision of adequate resources and celebrating achievements
2. Educational institutions should incorporate STEM subjects in their curriculum, organize hand on activities in science experiments and projects, invite female role models to share their experiences and inspire the girl child.
3. Policymakers should develop inclusive policies, provide scholarships and train personnel to effectively support girls in STEM Subjects
4. The media and technology department should promote positive representation of women in STEM fields and disseminate such resources as online tutorials and educational apps.

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