

To the Editor

Funmatics: The future generation of African mathematical scientists - How their minds works

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Received 28 March 2020; Accepted 7 May 2020

Mathematics is the science that deals with the logic of shape, quantity and arrangement, and mathematical sciences have become important aspects of everyday life. It underpins many fields that provide benefits for humanities including but not limited to Internet search, medical imaging, computer animation, numerical weather predictions, and all types of digital communications (Hu, 2016).

In the field of mathematics, issues of gender imbalance grossly exist. To date, less than 15% of the tenure-track position in the academia is held by females (Committee for Women in Mathematics (CWM), (2019), only 3.6% of all gold medalists at the International Mathematical Olympiad up until 2019 were women and only one of the 61 Field¹ medal awarded since 1936 had gone to a woman (African Women in Mathematics Association (AWMA), (2019). Furthermore, 17 of the 589 Nobel Prize winners in Physics, Chemistry or Medicine were women (Bellos, 2010), and similar analysis for the percentages of females in computer science (18%) and engineering (14%) as compared to the perceived 'softer sciences' like psychology (55%) and biology (34%) exist (Committee for Women in Mathematics (CWM), (2019).

In Africa, data on female-level enrolments in natural science, mathematics or statistics are lacking largely (Bellos, 2010), only four countries have associations for women in mathematics including Cameroun, Kenya, Senegal and Tunisia, and there is a continental level association, the African Women in Mathematics Association (AWMA) (National Research Council, 2013; McNeill, 2019). Globally, the proportion of women with basic degree that may go on to pursue careers in research regresses significantly compared to men as they approach PhDs (Bellos, 2010). Among its goals, the AWMA intends to increase the girl-child appreciation of mathematics as a way to recruit the best brains into the field. Currently, the AWMA has country-level coordination in only 12 African countries as listed on its website. Of the 10 best mathematicians to date, only one woman (Hypatia, AD 360 – 415) made the list (Hoyos, 2019), yet a recent post by the BBC has profiled Hilda Geiringer as a 20th Century woman who thread the field of mathematics where gross underrepresentation of women exists (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2017). In a recent analysis of approximately 13,000 editorship positions on a total of 435 mathematics and related journals, just under 9% of all math journal editorial positions are held by women, with a median journal editorial board level of 7.6% for editorships held by women, and a total of 10% of all journals having no female editors (Committee for Women in Mathematics (CWM), (2019); United Nations Educational, Scientific and Cultural Organization (UNESCO), (2017); hence the need to promote girl child education in mathematics and similar fields. To ensure this, girl and women must necessarily be provided with equal access to education and careers in science, both from the human right and development perspectives (Bellos, 2010).

The ecological frameworks for influencing girl-child participation, achievement and progression in education have been detailed in the science, technology, engineering and mathematics (STEM) document (Bellos, 2010). A blend of individual level, family and peer level, school level and societal level support to women and girl child will increase girl's and women's interest in education. Identifying and promoting the girl child and individual talents and the right push towards achieving their desired goals using suitable curricula and learning materials will play important roles in

¹ Fields medal is equivalent to 'the Nobel prize for Mathematics'.

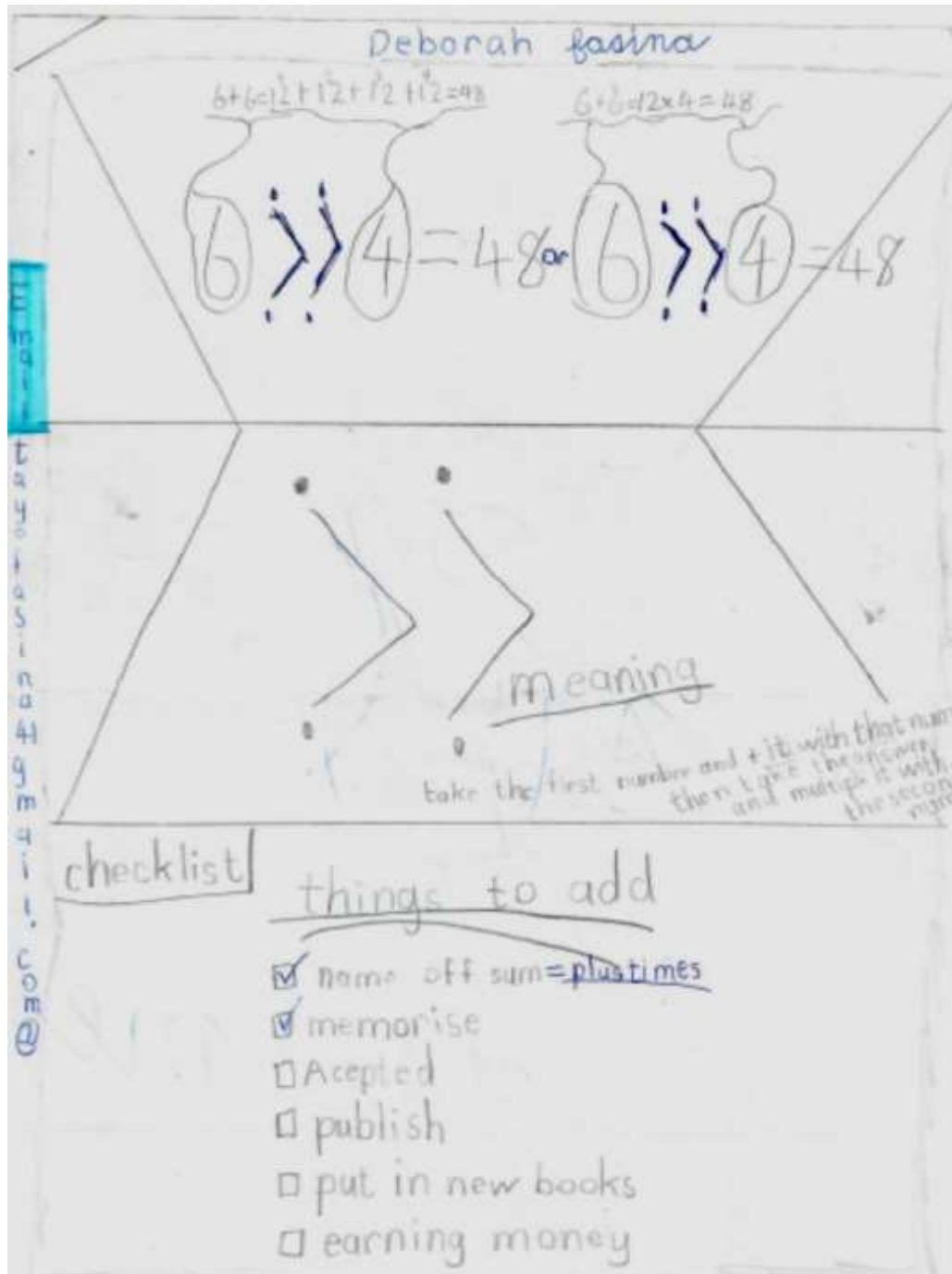


Figure 1. Funmatics

promoting girls' interest and engagement in science. This may include gaming but also promoting parent-child dialogue and outputs, however imperfect it may appear (Figure 1), (Bellos, 2010), Morris et al., 2013; Li and Tsai, 2013; Vlachopoulos and Makri, 2017).

Recent study had confirmed that a socio-cultural factor is an emerging theoretical paradigm that draws attention of

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researchers to the role of games in science in recent years (Li and Tsai, 2013). Future generation of mathematicians, particularly from the African continent will need to be bred and homegrown to contribute to science globally through the utilization of indigenous gaming technique. Currently, Asia will appear to be playing a dominant role in the field of mathematics and continues to provide targeted mathematical programs aimed at development in the Asian countries (African Women in Mathematics Association (AWMA), (2019); Peng-Yee and Sy, 2019). The AWMA will need to define clear guidelines to promote mathematical education and indigenize the training of mathematics for the girl child on the African continent.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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