BREAKING THE BARRIERS: EMPOWERING GIRLS IN INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION

Lafifa Jamal1, Munir Hasan2 & Mahbuba Sultana3

1Department of Robotics and Mechatronics Engineering, University of Dhaka, Dhaka, Bangladesh
e-mail: lafifa@du.ac.bd
2,3Bangladesh Open Source Network, Dhaka, Bangladesh
e-mail: munir.hasan@bdosn.org, mahbuba.sultana@bdosn.org

ABSTRACT

Gender inequality is one of the main factors of the digital divide in developing countries. In Bangladesh, the participation of female students in the STEM (Science, Technology, Engineering & Mathematics) and ICTs (Information and Communication Technology) is not satisfactory. Despite of an improvement in recent years, there is a shortage of women pursuing careers in ICT in Bangladesh. In this paper, an initiative namely ”#missingdaughter” was discussed which is taken to engage more women in ICT education in Bangladesh. The impact of this initiative in STEM was explored.

Keywords: Women in ICT Education; Gender Inequality; Missing Daughter; Women Empowerment; Gender; Technology Education

INTRODUCTION

Patriarchy is a social construct in which men and masculine qualities are valued more highly than women and feminine qualities [1]. In the patriarchal society of Bangladesh, men dominate women through private and public patriarchy [2]. In most of the families, woman is considered to be dependent on her male family members. The private patriarchy is maintained in the family. Whereas, public patriarchy is maintained in the public arena through limiting women’s movement in the public space [3]. Due to the patriarchal structures of Bangladesh, most women do not have decision making role in their families and in the society.

The participation of women in STEM is not remarkable not only in developing countries like Bangladesh but also in developed countries like USA and UK. According to a statistic of Women’s Engineering Society [4], in 2017, 11% of the engineering workforce was female. This is a positive change from the 9% in 2015. The study of UNICEF, Bangladesh [5] shows that around 30% of the Bangladeshi female students take STEM as a choice from a range of possibilities in their higher education. When it comes to women’s participation in professional career in STEM only 10% of them in career was recorded and thus, a leaky pipeline was observed.
Bangladeshi undergraduate students, studying in ICT related subjects, are participating in the Regionals of ACM International Computer Programming Contest (ICPC) since 1997. Since 1998, Bangladesh is participating in the world final of ACM-ICPC. The saga is now twenty-one years old and every year at least one university team participated in the world final. However, it is very unfortunate that no girls have ever participated in this prestigious world final from Bangladesh! However, it is worth to mention that one out of 4 students now studying ICT related subjects in different universities is a girl. Since 2005 Bangladeshi students are participating in the International Mathematical Olympiad (IMO), the most prestigious knowledge-based competition for the senior school and college students. From 2005 to 2011, the Bangladesh team always has one or two girls in the team. But, from 2012 there were no girl representation in Bangladesh IMO team. Similar situations are happening in Physics Olympiad, Informatics Olympiad and Astronomy Olympiad. So, it is important to find the reason behind the very weak presence of girls in STEM education and to take necessary actions to increase the number of women participations in STEM.

There are some reasons behind the poor involvement of women in STEM which are socio-economic barriers such as lack of visible women leaders, lack of proper guidelines and support, fear of uncertain career etc. To pull out from these barriers, a program titled as “#missingdaughter” was initiated which aims to bring out the girls and women in STEM and ICT, motivating and encouraging them to participate in the related events and thus build up their career in ICT.

METHODOLOGY

Starting in mid 2015 and designed only for girls and women with an aim to bring more girls and women in ICT and STEM, awareness are organized, raising campaigns, online programming contests, training and workshops and organized National Girls Programming Contest (NGPC). However, apart from these, #missingdaughter has been arranging some very insightful programs around the country which are discussed in this section.

Ada Lovelace Programming Camp

This programming camp is arranged for female school and college students once in a month in different districts of Bangladesh. The purpose of this camp is to motivate girls in programming and helping with proper support to bring them in ICT. Figure 1 shows an Ada Lovelace programming camp in Narayanganj Ideal School, Narayanganj, Bangladesh.
Grace Hopper Girls Programming Training Camp

Grace Hopper Girls Programming Training Camp is arranged only for ICT related female undergraduate students all over Bangladesh. The aim of the camp is to provide practical knowledge on programming to motivate the girls in the technology to adopt programming as their career. An online contest is also arranged at the end of the camp. A pool of mentors is established to run the programme through residential camp. The participants' capacity in each training camp is 20-30. We already reached 22 districts in this 3.5 years journey with #missingdaughter. Figure 2 shows a Grace Hopper programming camp which was held in Central Women’s University, Dhaka, Bangladesh.
International Girls in ICT Day Celebration

International Girls in ICT Day is celebrated on the 4th Thursday in April every year aiming to create a global environment that empowers and encourages girls and young women to consider careers in the growing field of information and communication technologies (ICTs). But, in Bangladesh, the celebration is in a wide scale from 2015 covering a whole month with events, programs, competitions, career sessions and many more. In 2018, a measurable response from the participants was obtained. Nine Career Talks in Dhaka, Khulna, Comilla, Chittagong, Rajshahi, Dinajpur, Rangpur and Gopalganj were conducted. Also, there were 8 company visits, 4 school programming quiz contest, 1 day-long girls innovation boot camp and online awareness raising program. Doing so, the programme has reached more than 6,000 girls and women around the country. Figure 3 shows a picture of Girls in ICT Day celebration in Dinajpur, Bangladesh.

National Girls Programming Contest (NGPC)

NGPC is a team competition. Each team consists of three students and they must be girls. Participants must be from the same institution. For the university team, it should be from the same university while from the high school category, three students from different institutions may form a team, if not possible in their own institution. Each team can access to one computer to solve problems in the contest. The team which can correctly solve most of the problems becomes the winner and thus, the placement of teams is determined by the sum of the point
that they get for each successful submission. Figure 4 shows a picture of the winners of National Girls Programming Contest 2017.

![Figure 4. National Girls Programming Contest](image)

**Open House Day/Seeing is Believing**

Visits were arranged to local IT companies that would allow the female undergraduate students to reach out, explore and dream about opportunities ahead. The purpose is to familiarize these students with the real life working environment that can help them in planning for their career in the relevant field. The day long visit gives an idea of relevant skills and qualifications that the students need pursuing the career. Thus, they get all the necessary information to be a professional in the relevant skills from the company visit.

![Figure 5. Open House Day in Fifo Tech](image)
Career Talk

Female technology leaders of the country were invited to share their experiences and motivate the young girls and women in different universities. The interactive session helps the participant girls to come out of their cocoons and interact with the leading guests. Among many, Sonia Bashir Kabir of Microsoft Bangladesh Limited, Luna Samsuddoha of Dohatec new media and Rubaba Dowla of Airtel limited were invited and so on in these career talks.

Onsite and online Programming Contest

Regular onsite and online programming contest were arranged throughout the year exclusively for female students so that female students can have hands-on experiences of the programming contest environment and can build their confidence in competitive programming.

Girls Innovation Boot Camp

This is one of the insightful arrangements for the country’s girls to come forward to the ICT field. The first ever Girls Innovation Boot Camp was organized in April 2017. Fifty two girls from all corner of the country participated in this session. They worked under some renowned mentors for the one year, to make their business ideas viable and visible. One of the purposes of the boot camp is building the participants students as an Entrepreneur in the ICT sector and build their career.

Take Back the Tech

Women are mostly harassed through online. To help them fight back and be secured in virtual world, we arrange three hour long session at different universities. There were 10 female campus leaders who could share relevant knowledges with their peer and support them in crisis moment.

RESULTS AND DISCUSSIONS

Over the last 3.5 years journey, the programme has reached more than 15,000 girls in 35 districts from all over the country. The most fascinating fact are shown in Figure 6 and Figure 7. In 2015, only five female programmer teams participated in the preliminary round of Dhaka Regional ICPC. After the extensive training of #missingdaughter program, 129 female programmer teams participated in the same contest in 2016. In NGPC, only 67 teams participated in 2015 whereas 384 teams participated in 2017.
After the successful completion of Innovation Boot Camp, some innovative ideas were turned to successful start up. Angel investors are funding those start ups to encourage girls. A residential mega boot camp for girls in remote areas are planned.

CONCLUSIONS

It is high time to take necessary steps to ensure girls’ participation in the field of science and technology, especially in the field of ICT. Promoting competitive programming contests among the girls by arranging participatory workshop and competition is a milestone to achieve the goal of Digital Bangladesh. #missingdaughter is the timely respond to that stimulus that can surely help the nation to achieve this goal. If the more programs can be arranged in a bigger scale, the women and girls will come forward and participate in the ICT field spontaneously.
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