

Techiyalesh Initiative - Promoting Peace by Empowering Women in STEM Fields

Even Naba, Earlham College | July – August 2022, Ethiopia

Inspiration and Background

Women today are told they can be and do anything, yet only 28.8% of STEM jobs around the world are occupied by women. This gender disparity grows even wider for Ethiopian women as they make up only 13.3% of the national science and technology workforce¹ where men outnumber women as students, educators, researchers, and workers in STEM fields. In comparison to the regional average of 31.3% for Sub-Saharan African countries, Ethiopia's low percentage reflects the severe social and cultural barriers that deter women from pursuing these fields and the urgent need to implement systems and support that help to close the gender gap.

As the only woman in most of my physics classes, I have not been spared the outcome of gender disparity. My experiences range from being discriminated against in a classroom to feeling isolated and wondering if I truly belonged in the field. I acknowledge the privileges I have been afforded by residing in the U.S. and attending a liberal arts institution with the core values of peace and justice. I can advocate for myself and receive support on campus when I need it. I have a mentor that actively integrates diversity and inclusion in the subject they teach and continually provides resources to help me succeed. But these struggles are the shared reality of millions of women across the globe, particularly exacerbated in developing countries like Ethiopia where support systems are not widely implemented and accessible to everyone.

Techiyalesh² Initiative is a peace project that aims to empower women in Ethiopian higher education that are pursuing STEM disciplines. It assists in overcoming the social and cultural barriers faced by providing resources to help women succeed. I believe that peace is marked not only by the absence of war but also by the presence of justice and equity, with opportunities allowing individuals to follow their aspirations. Perhaps, it is impossible to talk about a peaceful and sustainable future when women are not integrated as equal participants and contributors. Often STEM careers are regarded as jobs of the future propelling innovation, social well-being, and sustainable development. As a result, the gender gap in the field is extremely concerning. This is why Techiyalesh Initiative is a peace project that is relevant and timely for Ethiopia.

Objectives

There aren't enough support systems or role models to encourage Ethiopian women to pursue and stay in STEM fields³. Hence I am launching the Society of Ethiopian Women in STEM (SEWS), an organization that will bring together women in higher education and equips them with resources to help them succeed. Through Techiyalesh Initiative:

- ◆ My team and I will build the SEWS website, Ethiopia's first nationwide STEM community for women. It will bring together students and professors from Ethiopia and the United States. Moreover, this connection ensures that future STEM women have role models and recognize that what they want to do is possible and attainable.
- ◆ We will implement SEWS clubs in four Ethiopian universities. Each club will have 20 members to receive a set of Arduino⁴ kits and Foldscope⁵ to either work on self-proposed projects or collaborate across disciplines. I chose Arduino because it is inexpensive, simple to get started with, comes with extensive resources, has a large open-source community, and is very robust. It's one of the best resources for allowing students to work on their own or in groups to conduct science projects extensively.
- ◆ We will set up a mentorship program for five undergraduate students to assist with exploring post-graduate opportunities related to their field of study including guidance for graduate school applications.

Project Description

To build the SEWS website, I will collaborate with Batuel Naba and Eden Alemayehu, both students at Ethiopian universities. While Batuel, a computer science student, will be in charge of the website's design and programming, Eden and I will be in charge of the content. The contents include internship, scholarship, and fellowship opportunities both in Ethiopia and the United States. In addition, spotlight sections for female

¹ UNESCO, Women in Science. Fact sheets no 51 June 2018 FS/2018/SC/51. 2018.

² Techiyalesh is an Amharic word meaning "you are capable".

³ A. Melak and S. Singh, "Participation of women in engineering & technology education and employment," Int. J. Manage. Hum., vol. 4, no. 7, pp. 26–32, Mar. 2020.

⁴ Arduino is an open-source hardware and software company, and user community that designs and manufactures single-board microcontrollers for professionals to create devices that interact with their environment using sensors and actuators.

⁵ Foldscope is a simple light microscope that began as an idea to make science more accessible. It is often used in combination with Arduino.

scientist and their contribution, mentorship applications, and SEWS club applications will be included on the website. The Davis fund will support the website for one year, after which the Ethiopian Physics Society in North America (EPSNA) will support it by integrating it into their platform.

Our team, which comprises two professors and three undergraduate students will review all the applications for membership and convening roles. Currently, we have identified the following four universities in Ethiopia to be the first to implement the SEWS clubs: Addis Ababa Science and Technology University, Adama Science and Technology University, Hawassa Institute of Technology, and Gondar University. We chose these institutes because they offer the broadest STEM programs and house the majority of the STEM student population in the country. Therefore, establishing SEWS clubs at these institutions would be more beneficial. We will select 18 individual members and two conveners for each club who demonstrate a strong desire and commitment to exploring science. In August, two leadership workshop sessions will be held with the appointed club conveners. The conveners would also be able to interact through a “Leaders Forum” on the SEWS website where they can discuss their progress, issues, and anything else they'd like to share.

Another important aspect of SEWS is a mentorship program that connects students in Ethiopian universities with Ethiopian women professors. Dr. Kassahun Betre, an Assistant Professor of Physics at Pepperdine University and a member of the EPSNA's executive committee, will assist in the recruitment of mentors through his extensive network. Despite the high demand, the mentorship program will begin with five mentors and five mentees, each working in a relevant field, and will last one year. In addition, five undergraduate students from U.S. institutions have already been identified to join this team to provide additional assistance. The goal of the mentorship program is to assist junior and senior college students as they navigate postbaccalaureate opportunities including their graduate school applications. The application process to be a mentor and mentee will be taken from the American Physical Society where I work as a student ambassador and have been through the application process to find a mentor previously. When the mentorship program begins, communication between mentors and mentees will primarily take place via email and Skype. Since all Ethiopian universities have access to the internet and computer labs in their libraries, this mode of communication is effective.

The short-term goals of this project are: building the SEWS website with the above contents, distributing a set of Arduino and Foldscope to SEWS club members, and initiating the mentorship program. I believe that connecting women across the country through Techiyalesh Initiative would open a dialogue about the shared struggles in a deeply patriarchal society, solutions, and opportunities to nurture each other's dreams. It enables them to fight for a common cause while also serving as agents of peace and empowerment in their communities and at the higher education institutions where they study.

Tentative schedule for the project

Time frame	Task to be completed
February - March	Feven, Batuel and Eden start working on the website Dr. Kassahun will be in contact with potential mentors
April	Launch the SEWS Website
May	Membership signups and SEWS club applications open (Deadline: mid-June) Virtual introductory meeting with mentors
June (first two weeks)	Mentors are assigned one mentee each
June (last two weeks)	SEWS clubs' application review begins
Late July	SEWS club application decisions are announced
Early August	Virtual meeting and workshop with SEWS club conveners Distribute Arduino kits and Foldscope to the clubs

Sustainability

Given the importance of science and technology in decision-making, Ethiopian women in STEM disciplines need this project now more than ever to ensure a peaceful and sustainable future. The Davis Peace Prize would enable the Techiyalesh Initiative to meet the above-mentioned primary objectives before the end of the summer. While Batuel and I will be in charge of the website until the summer of 2023, EPSNA will incorporate both the website and the mentorship program as part of their website afterward.

We are currently in contact with the American Physical Society to support this initiative, specifically to expand the SEWS clubs to more Ethiopian universities.

**Techiyalesh Initiative
Budget Proposal
Feven Naba**

Item No.	Expenses	Category	Grant Amount Requested (USD)	Funded from Others(USD)	Project Totals (USD)
1.	Flight from Indianapolis to Addis Ababa, Ethiopia and back to Indianapolis	Student Travel	1700	0	1700
2.	Cell phone plan and internet service within Ethiopia (for three team members)	Student Communication	150	150	150
3.	Housing for Students ^a	Student Lodging	0	0	0
4.	Bus tickets to four universities from Addis Ababa (for three team members)	Student Travel	300	0	300
5.	Meal expenses (for three team members) ^b	Student Food	400	0	400
6.	Arduino Kits (\$46/Kit for 80 students)	Project Misc.	3680	0	3680
7.	Foldscope Kits (\$20/Kit for 80 students)	Project Misc.	1600	0	1600
8.	Website development including domain purchase	Project Misc.	500	0	500
9.	Website content building	Project Misc.	500	0	500
10.	Tax and Miscellaneous expenses ^c	Project Misc.	1170	0	1170
11.	Grand Total Project		10,000		10,000

- a. My family lives in Addis Ababa, therefore, I will not need to pay for housing. Similarly, my team mates; Batuel and Eden also live in Addis Ababa therefore, they don't need to pay for housing.
- b. To distribute the Arduino kits, we will take buses from Addis Ababa to the four universities listed in our proposal. Although we do return to Addis Ababa after each trip, we budgeted \$400 for four days of meals.
- c. Miscellaneous includes visa, SEVIS, and other contingency costs in the event of a price increase.