Google Developer Groups
Maseru

Women Techmakers

CONCEPT NOTE

Maneo Mapharisa

SEPTEMBER 21, 2021

GIRLS CODING ACADEMY

Metcash Complex Room 133, King`s way road, Maseru, Lesotho

Table of Contents

Who is Maneo Mapharisa

Maneo Mapharisa is a computer scientist, born and raised in Lesotho Mafeteng District. She is inspired to teach girls and boys STEM programs. Her passion is STEM because there is a world of opportunities in STEM. Discover STEM heroes who have made a difference in our lives, think critically about how STEM careers are portrayed in films and TV and explore different ways to get into a STEM career. She founded Girls Coding Academy in 2017 while she was a student at National University of Lesotho. Girls Coding Academy is an organization that seeks to equip girls and boys with basic computer skills, Coding, Robotics, computer science concepts and enable them to engage experimentally in application development. Our purpose is to offer an opportunity for students to participate in an integrative hands-on program, which includes career and technical education (CTE), science, and digital media concepts, in building a partially-autonomous and remote controlled robot.

Achievements and honors

I was honored to be invited by UNWomen to motivate young girls in Africa/World to pursue STEM programs like I am doing in Lesotho. I am an ambassador of Africa Code Week, WomEng, Google Women TechMakers and a Google Developer Group Maseru Lead. I have won an award of Top 50 Africa Digital Championship 2020 and I also got nominated as a Female-led Empowerment Initiative in Africa Digital Champion 2020. With Girls Coding Academy we have participated in Robotics and Coding Competitions locally and internationally. We won awards in those competitions. We have worked with organizations like Microsoft, Google, UNESCO in UK, Major League Hacking, International Kids Coding Competition, Vex Robotics, FIRST, PARC projects with kids at Girls Coding Academy. I worked as an IT technician at University of Lesotho. I repaired and maintained Computers, library servers, printers and other machinery in the Library. I am a Web Developer specializing in front end development. I am experienced with all stages of the development cycle for dynamic web projects and well-versed in numerous programming languages including HTML5, PHP OOP, JavaScript, CSS, MySQL, C++ and Java. I have a strong background in project management and customer relations.

Maneo Mapharisa (Founder-Girls Coding Academy)

Girls Coding Academy

Girls Coding Academy is an Organization that seeks to equip 80% girls and 20% boys with basic computer skills, Robotics, 3D printing, computer science concepts and enable them to engage experimentally in application development. Our purpose is to offer an opportunity for students to participate in an integrative hands-on program, which includes career and technical education (CTE), science, and digital media concepts, in building a partially-autonomous and remote controlled robot. We are promoting all SUSTAINABLE DEVELOMENT GOALS in Girls Coding Academy but especially quality education, Gender Equality, Industry, Innovation and Infrastructure. Our main goal is to encourage and expose students to activities that relate directly to careers in math-and science-related fields such as engineering, computer science, graphics, CAD, video production, and web-page design.

"When a curious mind is given resources and opportunities to learn, research, test, teach, and invent, the possibilities are limitless."

Goals / Objectives

- To empower girls in Science, Technology, Engineering & Mathematics (STEM) skills and knowledge.
- To help encourage creativity and innovation in STEM.
- To provide participants with the opportunity to gain accredited, marketable work skills which in turn can lead to employment opportunities.
- Great global connections for us and our students by participating on international competitions, conferences and buying international brands into our country.
- To eliminate the perception that Computer Technology is passing people by and to increase the general awareness of possibilities offered by computer training.
- To close the gender gap in technology
- To, not only focus on science, technology, engineering and mathematics (STEM), but also on other facets integral to a successful business. Some of these other activities include marketing, finance, business, communication, and development of professional brochures and presentations. The end product is to design and build machines for a variety of uses, ranging from road maintenance, to recreation, to direct competition, all in the interest of education.
- To not only be a top Tech Innovation hub in the country but to be amongst the best in the world. As it is already, our robots are unique because we are one of the few teams with minimal corporate sponsorship, but even with those limited resources, we still manage make robust and technical robots that can compete with the rest. We have an advantage in the market place because of our dedication and willingness to learn and make our robot as highly capable as possible

Our Services:

We register clients from 5 years old and above. All of the groups learn coding, robotics, 3D Printing and other computer science concepts based on age and level of experience, we offer Beginner, y and Advanced Level (We have 3 groups):

1. Beginner (Primary School):5 -13-year-old
2. Intermediate (High School): 13- 23-year-old
3. University Level or Working professionals: 16years and above

List of services we provide

1. One-On-One / Group Sessions
2. Summer & Winter Coding Camps
3. Lessons on Weekly basis and weekends
4. Host Hackathons e.g. (MSU Hack4Change)
5. Organizations / Working class workshops on coding, computer literacy and robotics
6. Free Women & Girls (Refugees Coding Lessons)
7. Free coding and robotics training for all Basotho during Africa Code Week every year in October and November.
8. Free Engineering programs from WomEng Organization.

Why is the lack of women in STEM field a concern?

- When women are not seen as equals to men in this field, it especially affects girls. Girls and young women don't see role models to motivate them and see themselves in that position. They are undermined by the idea that this is a "man's field" where girls don't belong.
- Women aren't staying in STEM because they feel like they don't belong. Women have interesting and cool ideas, which need to be represented. For the Girls Coding Academy, we have one of the highest ratios of male to women. Women need to build confidence in their workspace to be successful. Girls Coding Academy, not only exposes girls to tech, it's about trying and experimenting with new ideas and technology.
- Programs of Girls Coding Academy, that are so important for that very reason. This programs give an opportunity and an unforgettable experience, to celebrate their diversity and gender in the STEM field. They also create a future path for girls like them! They are able to curate their goals, accomplishments, and stories with the support of past It Girls.
- Along with that, creating an encouraging environment for women to thrive in any field is crucial to create more opportunities. **Girls Coding Academy** is doing their part to support women in technology, and even putting on symposiums that solely represent women in the Information Technology field. With more representation, support, and initiatives more and more women can seize opportunities in STEM

Team (Girls Coding Academy)

Maneo Mapharisa
Founder
Computer Science
Lesotho

Interns

Thabang Pinyane
Tutor
Computing
Lesotho

Nthabiseng Ramanamane
Accounting
Lesotho

Mentors

Mothepane Tshabalala
PhD Candidate
IT Management
Lec. University of Joburg
Lesotho/RSA

Brenda Denbesten
Chemical Engineer in Manufacturing
Australia/Zimbabwe

Daniel Ohm
Learning Sciences Senior Content Specialist, DEI
Vex/FIRST Robotics Tutor
Michigan USA

Matsolo Seloanyane
PhD- Candidate
Chemical engineering
Lec. University of WITS
Lesotho/RSA

Jabulane Mthembu Pilot
RSA

Anusha Mandalapu
Business Technology Analyst India/Netherlands

Mosele Tsemane
Chemical Engineering
Lesotho

Fanie Ndlovu
Chief Executive Officer
Lecture. Durban University of Technology
RSA

Skills we offer through International Collaborations:

1. Google Developers Group Maseru/ Google`s Women Tech Makers Lesotho
2. WomEng
3. 3D Printing
4. Robotics (Vex /FIRST)

This are the programs under Google Developer Group Maseru. **Link:** https://gdg.community.dev/gdg-maseru/

Programs	**Description**
Google Developers Group	When you join a Google Developer Group, you'll have the opportunity to learn new skills in a variety of formats. You'll also meet local developers virtually or in person with similar interests in technology. The community prides itself on being an inclusive environment where everyone and anyone interested in tech—from beginner developers to experienced professionals—all are welcome to join
Google Developers Students Clubs	Google Developer Student Clubs (GDSC) are community groups for college and university students interested in Google developer technologies. Students from all undergraduate or graduate programs with an interest in growing as a developer are welcome. By joining a GDSC, students grow their knowledge in a peer-to-peer learning environment and build solutions for local businesses and their community
Google Developers Experts	The Google Developers Experts program is a global network of highly experienced technology experts, influencers and thought leaders who actively support developers, companies and tech communities by speaking at events, publishing content. These professionals actively contribute to and support the developer and startup ecosystems around the world, helping them build and launch highly innovative apps. Nearly 700 Experts represent 18+ Google technologies around the world!
Women Techmakers	Google's Women Techmakers Lesotho program provides visibility, community, and resources for women in technology. We have the program for almost 6 months now. Our impact, we bring together hundreds of women in technology through our events and leadership programs.
Accelerators	Google Developers' regional accelerators are tailored specifically to their local markets and provide access to the best of Google—its people, network, and advanced technologies—helping startups build great products. Using the knowledge gained from running startup accelerators, this model has been used to reach other audiences such as game developers and non-profits.

WomEng is a multi-award winning social enterprise developing high-skilled girls and women for the engineering and technology industries. Our core philosophy is the promotion of STEM, focusing on engineering and technology from primary school to industry. We believe that cognitive and behavioral skills are vital for the engineering workforce. Beyond these skills it is important for girls and women to have mentorship and leadership development opportunities to create a virtuous cycle of women participating in STEM fields. **Link:** https://www.womeng.org

These are the programs under WomEng:

1. #1MillionGirlsinSTEM
2. Leadership. Innovation. Wellbeing. Employability.
3. Future Skills Program
4. Africa Catalyst: Capacity Building for Women in Engineering Bodies in West Africa
5. Africa Catalyst: Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa
6. Supporting Founders in Africa

FIRST /Vex Robotics Competition teams design, program, and build a **robot** starting with a standard kit of parts and common set of rules to play in a themed head-to-head challenge. Teams also build a brand, develop community partnerships for support, and work to promote STEM in their local community. At VEX, we envision a world where every student has the opportunity to be inspired by the excitement of hands-on, minds-on STEM learning and the feeling of creating something with technology. Robotics and coding are intertwined, and are a fascinating field of Computer Science. Robotics is a great way to introduce your child to STEM-based learning at an early age. Before getting into robotics and coding, it's important to know about robots. A robot is an autonomous machine that is able to perform certain tasks based on the inputs taken by sensors. Also, a robot is merely a mechanical piece, until it's programmed. We live in an era where many human tasks are now automated as a result of robotics. Because artificial intelligence and machine learning are key aspects of robotics, intelligent robots are more accurate and precise than humans.

Why is coding important? Coding is important because we live in an increasingly digital world. Education is not about remembering the facts. With information readily available at our fingertips, we need to teach our kids **how** to think rather than **what** to think. One of the best ways to do that is to give kids tools through which they can figure out the best possible solutions, and coding is one of those tools.

What is a good age to start coding? A good age to start coding is while a child is still young - often in elementary school. Coding is essential now more than ever to prepare students for the future. When students learn the basics of coding, it opens up a whole new world full of exciting opportunities for them. Learning has no age bar, but we believe young minds are more active and can learn new things easily. Around the time that children start learning to read and write is a great age to start coding.

Does robotics need code? Yes, robotics definitely needs coding. Coding is an essential set of instructions that a robot can read and execute. Robotics combines the use of electronics, mechanics, and coding software to program robots to do particular jobs. Robots can easily perform those tasks that humans are not able to perform.

3D Printing

3D is shorthand for three-dimensional. When you print a page on a printer, there are only two dimensions: the front of the page and the back of the page. Three-dimensional printing adds a third dimension, volume. 3D printing uses a printer to create three-dimensional objects, for example, a cup or Yoda doll or phone case.

3D printing has these qualities:

- Objects are created by adding or depositing layers of material, not subtracting or cutting out pieces from a block of material.
- Because objects are created by adding layers, the computer file with details about your model must be converted into slices the printer will create layer by layer.
- Printing a three-dimensional object can take hours or days to complete, depending on the complexity and size of the object.
- Cost is based on materials used, among other factors. In contrast, if you buy a piece of wood then cut out pieces to create your object you pay for the original piece of wood.

Advantages of 3D Printing to kids

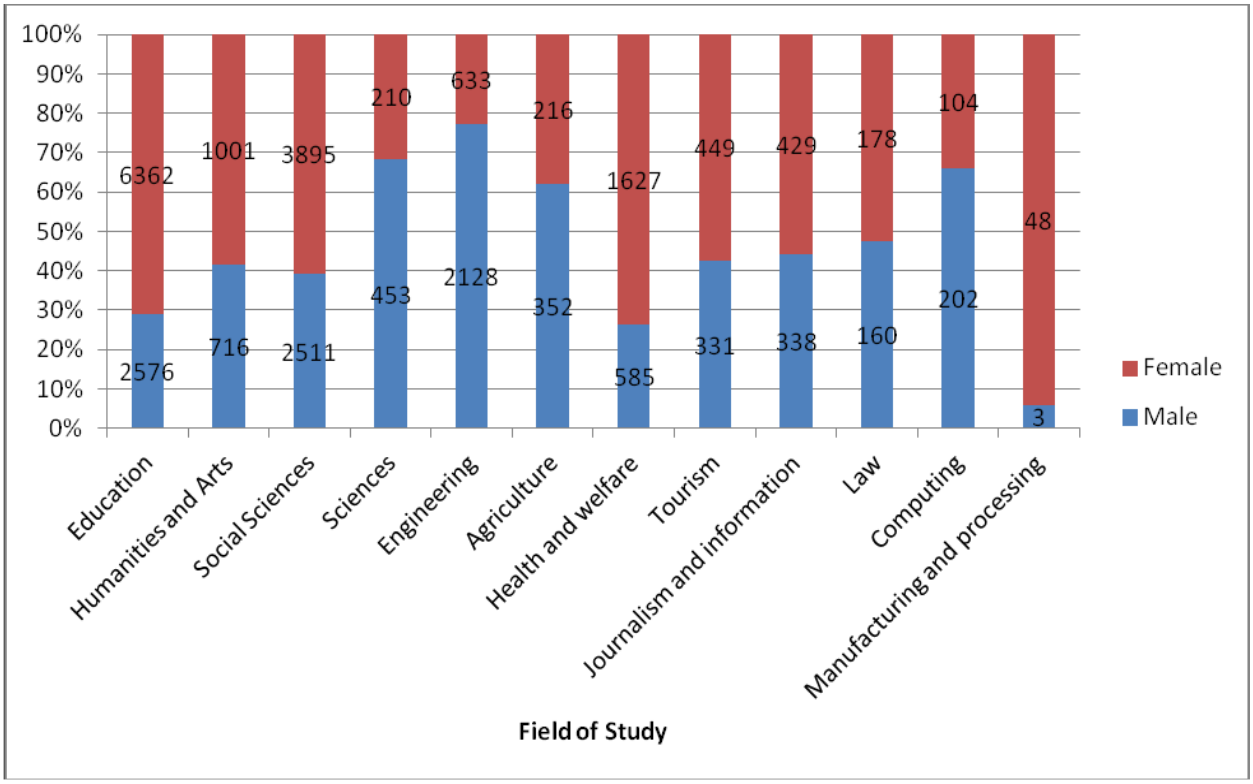
- **Boosting Creativity**-Say no to consuming mass-produced items! Kids receive a possibility to create something on their own. There are plenty of examples of how teens invent and produce useful tools with the help of 3D printers. They see a problem and come up with a solution – efficient, original, and ground-breaking. And with proper tools, support, and resources any kid can become a real inventor!
- **Developing Art skills-**3D printing allows children to visualize their imaginative concepts. In addition, understanding of 2D to the 3D conversion will be helpful to students. And with the implementation of the Arts into STEM education, this way of improving Art skills becomes a real benefit for children of all ages.
- **Great motivator**- We know about 3D printing for quite a while, still, it is a rare guest in the majority of schools. Thus, the novelty of the technology intrigues students and encourages them to take a crack at it. Teachers emphasize that even reluctant learners are motivated to study more when they use unusual and innovative ways of teaching. And 3D printing is definitely on the list of such ways!
- **The perfect source of hands-on knowledge -** Literally, any subject can utilize 3D printing for creating items dedicated to the theme. Such visualizations help to get a better understanding of events and motivate students to research more.
- **Teambuilding-**Many group activities can utilize 3D printing, like friendly 3D printing competitions, a partnership of students of different ages, and collaborations. Thus, apart from tech skills, it helps to improve communication skills and knits children together. During the process of an item creation with the help of 3D printing, children learn to:
    - Identify a problem, Make a research
    - Plan a look of a future item, Visualize it with the help of 3D printing software
    - Try and test the print, Analyze and improve the result

So, with a 3D printer kids get a mini factory that produces different tools and crafts. They become real creators, inventors and artists. They learn a lot and enjoy the process of learning!

Statistics of Lesotho Youth in STEM programs

It has come into my consideration that students graduate from Primary and High School every year but most of them do not have any idea about technology or STEM they end up delaying to find what they are passionate about. Especially most of them from rural areas even if they enroll at Higher Education they delay to adapt to the usage of computers. Apart from that, there are graduates from University and colleges who have enrolled into other courses which are non-STEM courses, not because they loved what they were doing but just because they are known careers that every child dreams about while they are at Pre-School. The percentage of dropouts from tertiary is very low when compared to high school dropouts. This is the right time to motivate and build more skilled people no matter the background of their qualifications. This would also help to reduce childhood marriages due to lack of school fees payment, this will help to bring fresh minds and innovative generation regardless of their problems. They will be able to make career out of this and become future leaders.

Statistics shows that there are more graduates who are unemployed some are graduated with on engineering and technology fields so this could help them volunteer and develop more skills which could enable them to be employed. A picture below is taken from State of Higher Education Report 2011-12 shows an Enrolment by Sex and Field of Education. We have this old report online this show we need to more researchers and developers of content either freelancing or hired



Enrolment by Sex and Field of Education

Target Population

Start with 3 universities in Lesotho. Each of the 3 Universities has to indicate its target populations for this effort, as well as the number of students to serve on the Target Population. Number of students to be served is divided into two parts: 1) students targeted for primary activities and 2) students who will be impacted secondarily through one-time events such as open houses, STEM career fairs, STEM speakers, and STEM exploration events.

The universities will help in creating time and space for both groups of students. Either the trainings will be online or physical.

My team and I would like to reach over 10 000 students in 12 months, in this 3 universities in order to equip them with the greatest technological skills and also producing future leaders.

Objectives and Outcomes:

1. **Google programs-** Apply the knowledge and connections to build great products and advance skills, career, and network. Give back to community by helping others learn, too. Gain Scholarships, Grants and trainings for startups and Mentorship from Google/Professionals. This will produce Google developers which will program on any Google products platforms, Google student club leaders, Google Developer Organizers and Accelerators.
2. **WomEng**: produce Women Engineers (any kind of engineering), access to scholarships for Fellowship, opportunities, networking with people around the World with Virtual Collaboration, support for founders, Learn Artificial Intelligence and Cyber Security
3. **3D Printing:** produce 3D designer, 3D computer-aided design (CAD) modeling, Research and development (R&D), Biological and scientific modeling, Architecture/construction modeling, Education, Lawyers and legal professionals, Business opportunities.
4. **Women TechMakers**: They can be able to became Women TechMakers Ambassadors, Members, gain Google `s Women Techmakers Scholarships and be part of Google industry-wide events, which now reach over 100k women in 190 countries annually
5. **Vex/Robotics**: STEM skills are absolutely necessary if one wants to succeed in the world today. It's really challenging to learn the four pillars separately so why not combine them with something that uses all four? Basically, what we're trying to say that, robotics is one of the only fields in the world that uses all four aspects of STEM learning. Just think about it, the whole procedure or combining components, assembling the circuits, programming the code requires a complete understanding of STEM learning. Hence, learning robotics allows kids to expand their understanding of Science, Technology, Engineering and Math. Robotics programs allow students to understand how things work. Children can put together simple machines using these kits. They can start with setting up the lights of the kit and move on to assembling the robot itself. Children can also develop their problem-solving skills when they run into issues in putting together the robot. They will not mind dealing with these issues since they will have fun putting their robot together. That's why we think is so effective in this era of dynamic education.

Support for Google Programs:

My team and I would like to be supported with marketing and transport. Our aim is to start with university students who can have access to laptops/computers from their respective universities. We also need support for webinars in every three months to be held all around Lesotho, we would like to start with at least 100 candidates. Our aim is impact 10 000 students by the end of 2022. Below is the list of support we need:

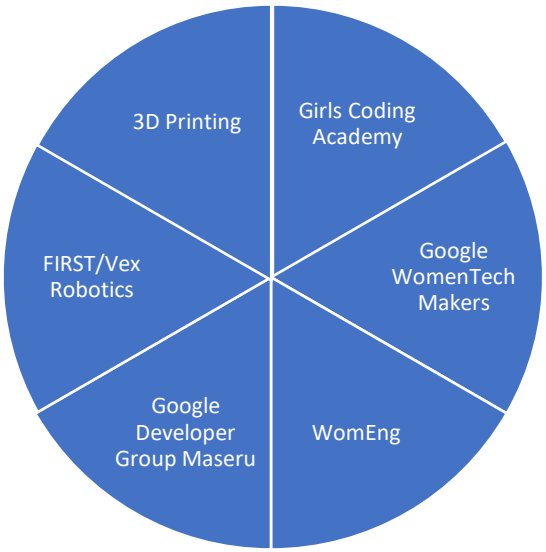
1. **Branded:** T-Shirts, Note books, Flash Drives, Pen, Certificates, Stickers, Bag, Coffee mugs or Sipper bottles
2. Photography and videography
3. **Branded:** Wall Banner, Pull-Up banner (once off)
4. **Marketing:** Social Media Platforms, Flyers, Radio, TV
5. **Transport:** 3 Universities as a start and then other tertiary Schools around Lesotho. Then we will focus on everyone especially under privileged youth those who love technology and those who know nothing about technology.

Future Goals/Dream

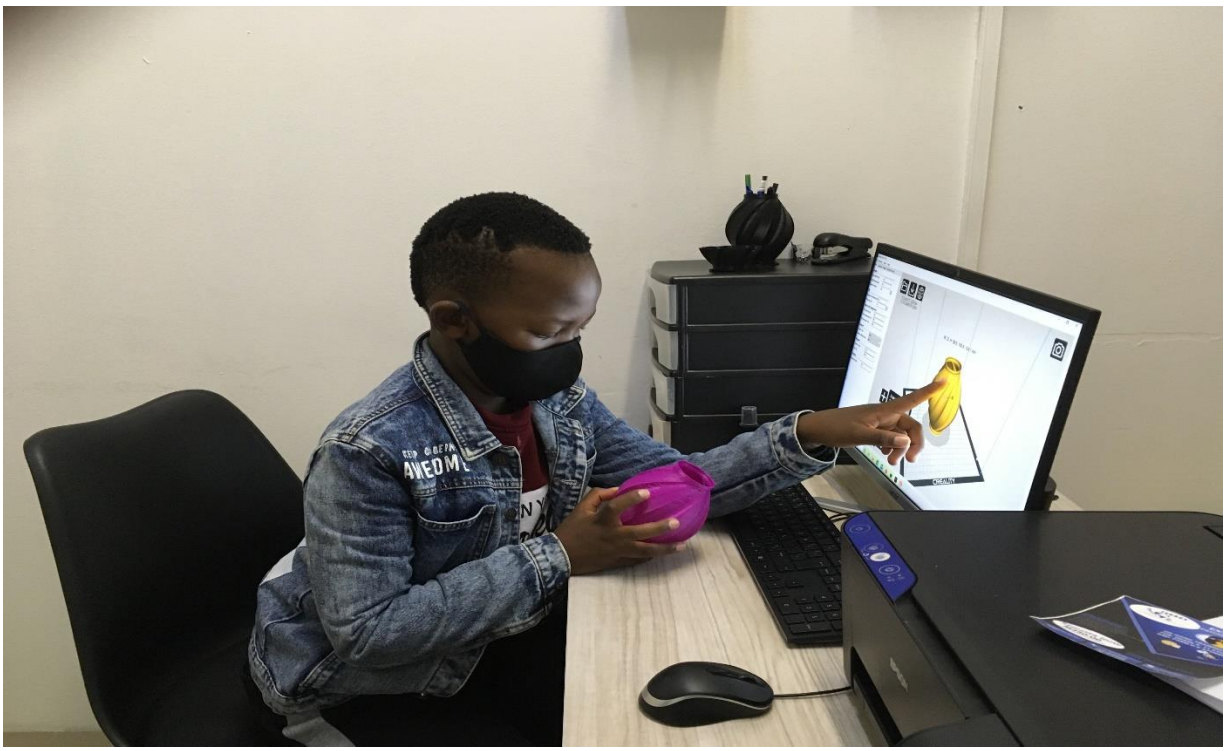
I have 5 years' experience in running EduTech Company at a small scale and I am ready to expand and accommodate more clients and employees with the help of my mentors and interns. My wish is to get a mentor who has founded and managed a Tech Hub successfully since it is not available in the country. I want to know from Management skills, Marketing, Administration, Human Resource and other departments I may not know. I want to build a Tech hub in 2 or 3 years to come. Even if I can start with a container. I want a young generation to learn and love STEM programs at a tender age. With the skills I learned from Professional Development Experience I will distribute in all districts of Lesotho and make tech/STEM famous and create a generation who can innovate and be impactful in tech fields. I have already founded Girls Coding Academy and doing STEM outreach programs in Lesotho but I have learned that I need a center where kids will access STEM programs at all times. I open my center Monday to Sunday even on holidays to make this happen.

Girls Coding Academy is a start-up but already collaborated with big industrial companies. My dream is to have a Tech Hub center where all collaborations that Girls Coding Academy has made be run under one roof but as different apartments. Already doing that but at a small scale with the few clients I have. I also do outreach programs around Lesotho but with the resources I have at the moment I can only access Girls Coding academy clients and few around Maseru and near districts.

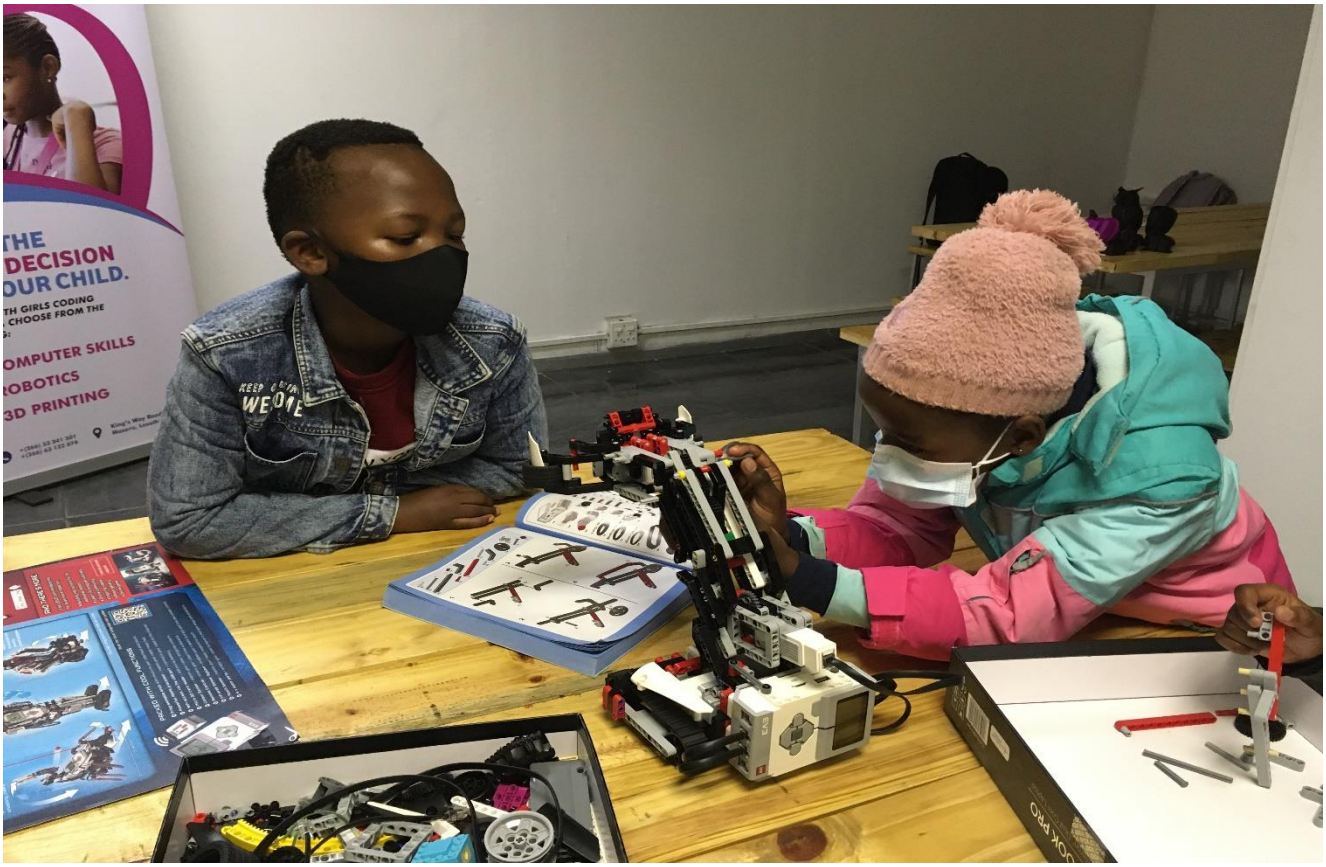
Below are 6 departments I have and I want them to grow independently and have its own manager and individual target audience.



Future Tech Hub Departments



3D Printing Session



Robotics Sessions

Engineering Session / Career guidance