GIZA SYSTEMS
Education Foundation

07 March 2018

H.E. António Guterres
Secretary- General
United Nations
New York, NY 10017
USA

Dear Mr. Secretary General,

I am pleased to reconfirm Giza Systems Education Foundation commitment to supporting the ten principles of the Global Compact on human rights, labour, environment, and anti-corruption. To actively support the UN Global Compact and make an impact on our community, we have launched a project called Fab Lab on Wheels (FLoW).

The Fab Lab on Wheels project aims to serve as a means for the dissemination of digital fabrication know-how and skills across Egypt. FLoW aims to decrease the inequalities between rural and urban environments through providing experiences with advanced tools and technologies to plant the seeds for growing proactive knowledge-based communities.

Since the launch of FLoW in December 2016, our mobile lab has clocked more than 9000 km across Egypt, conducted close to 200 workshops and reached over 3000 beneficiaries. Its various achievements were part of a learning curve for the FLoW team. The model went through various stages throughout the year. The initial plan and KPIs set proved not to reflect the actual on-ground situation.

And even though we may have started with some incorrect assumptions, ran into conflicts with the ever-changing-university-exam schedules, experienced challenges with equipment delivery times-that subsequently affected lab launch dates- and ran into many other logistical issues, the response from the community has been-to say the least-fantastic.

Not only are we working on the ground with (disadvantaged) youth outside of Cairo, but we are creating a new level of awareness in the community. The project is essentially underlining the responsibility of the private sector in social development, outside of the much-touted CSR departments that manage feel-good donation funds in many organizations.

We are striving to become a role model for the private sector in social engagement.

Our role is clear, if not simple: infuse social programs with business know-how, link entrepreneurship to social development and help foster an entrepreneurial-friendly environment across the country.

And this is- by definition - a long road; but one which we shall not walk alone.

I am, therefore, happy to reconfirm our continued commitment to FLoW – at the level of the company as well as the foundation – to ensure our active striving towards making an impact.

We shall continue to seek partners to work alongside us, and we shall always look for opportunities to cooperate with others and to fill the gaps where needed.

We shall continue to be the "glue" that will hold this community initiative together.

And we shall continue to use an evidence-based approach to ensure we are making the right choices, and always strive to learn from our mistakes.

Sincerely yours,

Shehab ElNawawi

Chairman of the Board of Trustees
Giza Systems Education Foundation

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Fab Lab on Wheels

Interim Report 2017

GIZA SYSTEMS Education Foundation

DELL EMC

Fab Lab Egypt
Learn . Make . Share !

Overview

The overarching purpose of the Fab Lab on Wheels project was to serve as a means for the dissemination of digital fabrication know-how and skills across Egypt. As the cornerstone of this project, a mobile Fab Lab was seen as essential to providing easy access to technology in order to raise awareness within the next generation of makers and potential entrepreneurs. Given its outreach potential, FLoW has the capabilities of becoming a powerful resource for technological inspiration. FLoW aims to decrease the inequalities between rural and urban environments through providing experiences with advanced tools and technologies to plant the seeds for growing proactive knowledge-based communities. And in doing so, FLoW attempts to address the UN's Sustainability Development Goals target for 2030 numbers 4,8,9,10, 12, and 17.

Brief Project Description

Since the official launch of the project dated December 2016, the Fab Lab on Wheels has travelled to El Minya, Sohag and Fayoum. It has reached more than 3170 persons; conducted over 190 workshops; given over 470 bus tours introducing visitors to digital fabrication; and worked on the development of more than 50 projects in automation, robotics and crafts.

Some of the challenges faced since the launch of the project:

1) Selection of governorates against targets: affecting capacity building, readiness and outreach
   - No on-ground actual reference of the governorates
   - Lack of engineering schools in some of the governorates, or were recently just established impacting actual level of knowledge in the community
   - Plan was set without factoring university schedules, events or holidays affording no downtime for the bus or team (i.e. exams, Ramadan, summer, etc.)

2) Selection of facilities: affecting smooth operations and outreach of bus
   - Bus parking location challenges
   - Fixed fab labs: difficulties in location and rental

3) Equipment purchase: affecting delivery times and fixed spaces opening
   - Customs clearance
   - Increased security measures
   - No local suppliers

4) Maker Diploma:
   - Timing issue
   - Beginner know-how level of the community in various governorates affecting the ability to provide advanced maker diploma

Accordingly, through the various steering meetings held amongst the stakeholders, the plan, objectives and KPIs were revisited[1]. In addition, a completely new framework based on the Theory of Change[2] was established to serve as a monitoring and evaluation platform, and set the path moving forward for the FLoW initiative. Through funding from the SEED USAID project, Rise Egypt was contracted to assist in the development of the M&E framework, as well as train the team on said framework and the conducting of a stakeholders' analysis to fully assess the various communities.

[1] Appendix (1)
[2] Appendix (2)

Mitigations

Assumptions	Findings	Mitigation
• Availability of community year-round. • Communities are similar to Cairo environment.	During exams and pre-exams, Ramadan, and other times, the community is not available and does not engage	• M&E Framework – Theory of Change • Stakeholders Analysis to identify spheres of influence and power, interests and engagement • Change in positioning of FLoW bus to act as an awareness tool
• High technical background can be found in communities • Governorates that had engineering schools reflect maker or technical background of community • Common landscape and language • Curricula to be structured targeting makers	• A number of the targeted governorates have a much lower technical background than expected: engineering schools do not necessarily reflect the technical level of students (e.g. Sohag College of Engineering had only been established for over a year, so the level of students attending were not as strong as anticipated) • Curricula were developed that far exceeded the actual level of the community	• Adopt design thinking approach when developing curricula and workshops to tailor to actual needs of community • Creating Bus Tours: to serve as quick machine orientation sessions (15-30min). • Mini Workshops: to provide quick know-how, skills, and product oriented to ensure participants felt a sense of achievement (30min – 1hr) • Names of Workshops: changing names of workshops to speak to the audience interests. Example: change name from “laser cutting” to “make your own box” • Restructure Maker Diploma to render it more basic and accessible to build the community from zero to maker. • Possibility to consider one of the governorates as a main hub for area- in this case Upper Egypt (Minya). The hub should be the strongest technically in the area, so that it can cater to the other fixed makerspaces. It would also be more akin to the culture and closer in terms of proximity.

Exploratory Centers were good locations that drove traffic	• Other locations besides the exploratory centers and universities proved to drive in much more traffic (e.g. governorate library, clubs, existing co-working spaces, etc.) • Transportation to location is key in determining where bus is to be parked	• From Stakeholders Analysis, deriving of key accessible locations for bus during stay in governorate. • Development of database from desk and field research, throughout the course of the Stakeholders Analysis. Invaluable data was compiled from the governorates.
FLoW team was equipped to manage, operate and interact with community	Need arose to reformulate how the team operates and communicates including: • How to be able to perform basic maintenance and calibration of machines • How to deal and communicate with non-techies • How to restructure workshops and make them more about applications and products that fulfill immediate needs • How to operate internally, institute feedback mechanisms, establish various processes • How to train the hired staff in the various governorates	• Training of core technical team and fixed fab labs teams to deliver trainings in nontechnical jargon and make the workshops relatable to the various audience. • Establishment of internal processes, feedback mechanisms, plans, KPIs and organizational chart for the various teams to ensure smooth operations and management.
Availability of appropriate spaces to serve as fixed fab labs	Locations were not suitable and easy to find for fixed fab labs, in addition to needing a substantial amount of maintenance	Factoring in longer time for space rental and maintenance.

Additional Mitigation and Recommendations:

- It would be highly advisable to complete the project and ensure its full rollout and operations for an additional year in the five governorates to garner additional lessons and insights, as well as ensure its effectiveness in replication.
- Learning accumulated from this project will be beneficial regionally and internationally, as showcased in the success story.

Main KPIs per Governorate YTD

					Still To Visit				
Main KPIs per governorate	Cairo	El Minya	Sohag	Fayoum	Beni Suef	Menoufiya	Total	KPIs	Achieved % to date
Total Number Of Participants	1186	559	600	807		20	3,172	2,500	126.68%
Kids	300	31	0	645			976	1,000	97.60%
Adults:	886	528	600	162		20	2196	1,500	146.40%
Engineering Students	600	524	0	36			1,019	1160	128.90%
Non-Technical Students	286	4	600	126			1,944	1,016	169.30%
Management	N/A	N/A	N/A	N/A		20			
Total Number of Bus tours	255	20	100	96			471	-	471
Total Number of Workshops	19	22	30	120			191	40	478%
Total Number of Projects Mentored / Developed	25	24	3	5			57	100	57%
Fixed Fab Lab	N/A	Yes	Yes	Yes	Yes	No	4	5	80%
Fixed Fab Lab Equipment	N/A	Yes	Yes	Yes	Yes	Yes	100%	100%	100%
Fixed Fab Lab Team (4 members each)	N/A	4	4	4	4	1	21	25	84%
Supported Startups through Bus and Fixed Fab Labs		2					2	5	40%
Hackathons		1	1	1			3	-	3

Qualitative Achievements YTD

In addition to the KPIs, the FLoW initiative has managed to achieve a number of milestones, affecting the qualitative impact of the model. It has developed key guidelines to ensure continuity of the framework and processes, and the possibility of replication.

Major Achievements

1) Theory of Change and Stakeholders Analysis
2) Curriculum and Education Component Development
3) Operations Structure and Management to include processes for the following:
   - Consultancy costing guidelines
   - Maintenance (preventive and corrective)
   - Financial follow-up system
   - Inventory and Inventory control.
   - Purchasing
   - Training
   - Daily operations
4) Capacity Building enhancing team through the various trainings (TOC and ToT)
5) Development of KPIs, organizational chart and team plans (Cairo and remote-based teams)

Testimony to these achievements and their impact can be found in the Success Story[3].

[3] Appendix (3)

Still to complete

YTD – May 2018 (current end of project)

- Complete FLoW visits to Beni Suef and Menoufiya
- Hold hackathons in Beni Suef and Menoufiya
- Hold final competition for all governorates
- Locate and establish makerspace in Menoufya
- Finalize hiring of remaining team members in Beni Suef and Menoufiya
- Work on mentoring projects
- Maker Diploma: will be offered only in 4 governorates (Al Minya, Sohag, Fayoum, Beni Suef) and will run in parallel throughout the month of March

Financials

The project officially started in December 2016 with an initial duration plan of 18 months. The project is set to end in May 2018. According to previous analysis, both parties agreed on starting with a budget 4,005,000 EGP, divided between OPEX and CAPEX expenses.

OPEX Expenses distributed among:

- Payroll
- Travel and Transportation
- Other Costs and Services

CAPEX Expenses distributed among:

- Bus Equipment
- Makerspace (Fixed Fab Labs) Equipment
- Office Equipment

Conclusion - Moving Ahead - One-Year Program Extension

To achieve the ambitious goals of impacting the community and economy, and with the momentum we have managed to achieve so far with this project, we firmly believe that we should extend the project for at least one additional year.

Our objectives for the extension would be to reach 6000 participants who are aware of digital fabrication technology in marginalized areas.

Breakdown of Objective

- Increase awareness of 75% of participants about DF technology (4500 participants)
- 25% of participants experience DF hands-on activities (1500 participants)
- 50 case study projects / products are implemented utilizing DF technology
- Building community, awareness and readiness for International Fab 15 Conference (summer 2019)

Giza Systems is hoping to extend the project to achieve the desired future outreach to ensure sustainability of the FLoW project. By collaborating with various partners, Giza Systems hopes to impact the community and economy by creating a model that is sustainable and can be replicated.

Appendices

Appendix (1): Revisited Objectives and KPIs

Targeted Governorates

Cairo, El Minya, Sohag, Fayoum, Beni Suef, and Menoufiya

Targeted Participants

- Number of Engaging Participants (including bus visits in Cairo):
  - **1000** kids (8 – 14 years old).
  - **1500** adults
- Percentage of Engaging Participants:
  - **60%** of Engineering and Computer Science colleges' students.
  - **40%** of Non-Technical background.
- Age Group of targeted participants:
  - **80%**: 8 - 25 years old.
  - **20%**: More than 25.

- Types of makers: Pre-makers and makers

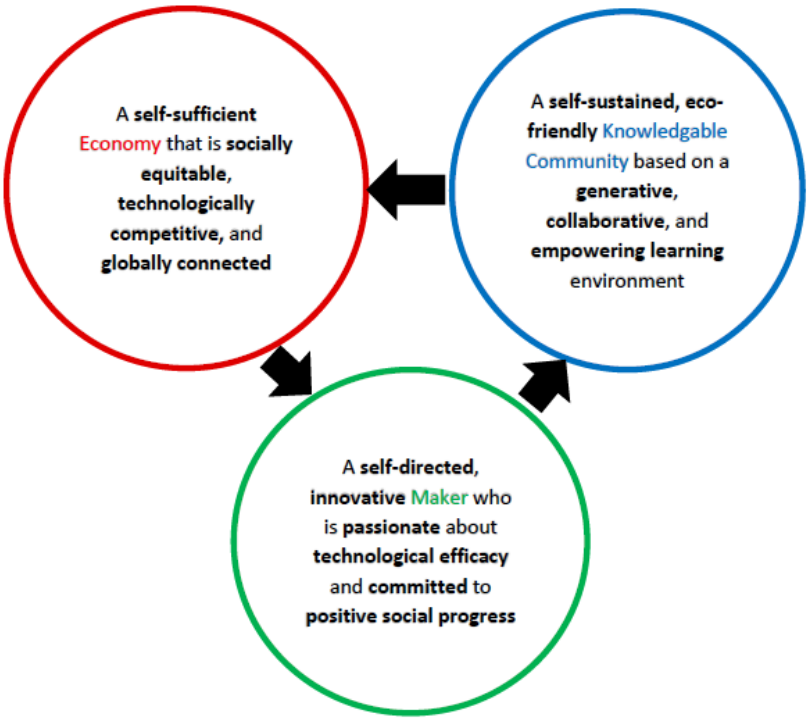
Educational Output

- **40** total workshops provided.
- Projects/Products Developed:
  - **100** projects/products developed (Bus and Fixed Fab Labs
  - Projects/products in 3 major fields: Engineering, Arts and Medical.
- Maker Diploma
  - 70% of the total number of Maker Diploma's applicants should successfully get enrolled and graduate.
  - **40** overall graduates will be selected to be trained on different digital fabrication techniques and business.
  - Successful delivery of final project.

Appendix (2): Logical Theory of Change (ToC) Framework

One of the many reasons that the ToC was adopted is that it is flexible and does not have a particular format—it can include cyclical processes, feedback loops, etc. This method is a clear match for the dynamic Fab Lab environment since FLoW aims to be a moving catalyst of change within the different communities.

Acknowledging that one project cannot realistically address all of Egypt's educational, social and economic challenges, the team identified 3 main domains (impact areas) that it aims to impact through its intervention: individual, community, and economy.



Arising from the challenges within each domain and based on the broader vision for the Fab Lab movement to empower and enrich individuals and societies, the vision of the FLoW project is to foster a self-sufficient economy by using self-directed innovative makers that are committed to positive social progress in order to create a self-sustained, eco-friendly knowledgeable community.

Due to the uniqueness of the Fab Lab on Wheels project and the fact that it is the first of its kind in Egypt, developing a Monitoring & Evaluation (M&E) framework was essential for assessing the progress being achieved against the objectives of the project as well as the outcomes of the project. It is only through such a framework that actual indicators can be assessed to inform any needed adaptations or changes to the program to ensure the realization of the outcomes.

To develop the framework, RISE Egypt adopted the theory of change (ToC) methodology to frame the process in terms of causal chains in the FLoW initiative. The ToC methodology is dynamic, allowing the opportunity to make changes based on experiences and findings, which helps to guide future decisions since relationships between outcomes can be readily seen.

By gauging the progress of the project, the M&E framework allows the FLoW team to actually involve the stakeholders in the process, as well as make changes in the design or implementation of the project based on the findings. Conducting a stakeholders' analysis and involving the stakeholders early in the process leads to increased support and awareness, which translates into jumpstarting the progress of the project.

The ToC utilizes a backwards-mapping process, wherein long-term outcomes that are necessary for the realization of each impact area are delineated and broken down into short-term outcomes that are key to its attainments. Pathways are specific sectors within which Fab Lab will develop activities to affect change purposely and directly.

The three pathways that Fab Lab will use are:

1. Education (core pathway),
2. Operations & Process (supportive pathway),
3. Workforce Development (core pathway).

These pathways were chosen based on their cross-cutting potential to generate change across all 3 impact areas (i.e. individual, community, and economy).

<table>
<tr><th>Pathway 1: Education (core)</th><th>Pathway 2: Operations & Process (supportive)</th><th>Pathway 3: Workforce Development (core)</th></tr>
<tr><td>1. Mentoring program for educational projects</td><td>1. Recruit and hire high-quality teams</td><td rowspan="2">1. Access to Fab Lab facilities for unstructured learning and development experiences</td></tr>
<tr><td>2. Comprehensive, contextualized Digital Fabrication curricula</td><td>2. Professional development for all team members</td></tr>
<tr><td>3. Digital Fabrication training programs for Educators</td><td>3. Up-to-date facilities, equipment and furnishings</td><td rowspan="2">2. Technical mentoring (product design) for Entrepreneurial projects</td></tr>
<tr><td rowspan="2">4. Community Engagement:
i) FLOW (Fab Lab on Wheels)
ii) Engagement Workshops for pre-makers
iii) Competitions
iv) Conferences
v) Recognition/ Celebration Events</td><td>4. Democratic, inclusive and empowering policies and procedures</td></tr>
<tr><td>5. Ongoing Research & Development (R&D)</td><td>3. Partnerships with local and international stakeholders</td></tr>
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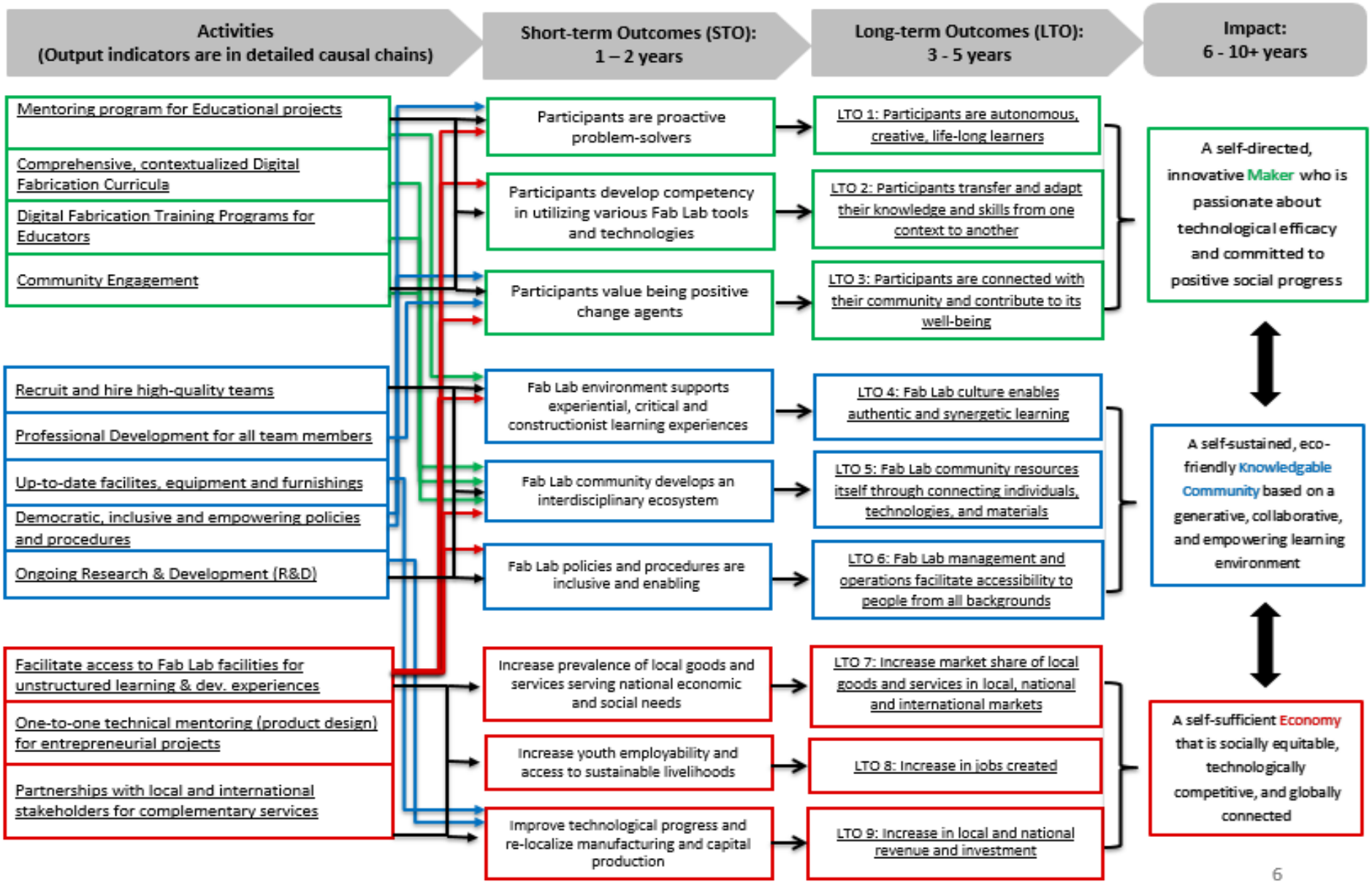
Activities
(Output indicators are in detailed causal chains)
Short-term Outcomes (STO):
1 – 2 years
Long-term Outcomes (LTO):
3 - 5 years
Impact:
6 - 10+ years
Mentoring program for Educational projects
Comprehensive, contextualized Digital Fabrication Curricula
Digital Fabrication Training Programs for Educators
Community Engagement
Recruit and hire high-quality teams
Professional Development for all team members
Up-to-date facilites, equipment and furnishings
Democratic, inclusive and empowering policies and procedures
Ongoing Research & Development (R&D)
Facilitate access to Fab Lab facilities for unstructured learning & dev. experiences
One-to-one technical mentoring (product design) for entrepreneurial projects
Partnerships with local and international stakeholders for complementary services
Participants are proactive problem-solvers
Participants develop competency in utilizing various Fab Lab tools and technologies
Participants value being positive change agents
Fab Lab environment supports experiential, critical and constructionist learning experiences
Fab Lab community develops an interdisciplinary ecosystem
Fab Lab policies and procedures are inclusive and enabling
Increase prevalence of local goods and services serving national economic and social needs
Increase youth employability and access to sustainable livelihoods
Improve technological progress and re-localize manufacturing and capital production
LTO 1: Participants are autonomous, creative, life-long learners
LTO 2: Participants transfer and adapt their knowledge and skills from one context to another
LTO 3: Participants are connected with their community and contribute to its well-being
LTO 4: Fab Lab culture enables authentic and synergetic learning
LTO 5: Fab Lab community resources itself through connecting individuals, technologies, and materials
LTO 6: Fab Lab management and operations facilitate accessibility to people from all backgrounds
LTO 7: Increase market share of local goods and services in local, national and international markets
LTO 8: Increase in jobs created
LTO 9: Increase in local and national revenue and investment
A self-directed, innovative Maker who is passionate about technological efficacy and committed to positive social progress
A self-sustained, eco-friendly Knowledgable Community based on a generative, collaborative, and empowering learning environment
A self-sufficient Economy that is socially equitable, technologically competitive, and globally connected

Appendix (3): Success Story

FLoW one of the main contributing factors to Egypt Winning the Fab 15 International Conference (summer of 2019) in Chile, Santiago

The 13th annual Fab Lab Conference held in Santiago was marked by the triumphal win of Fab Lab Egypt and Fab lab New Cairo; granting Egypt the chance to host Fab 15, the International Fab Lab Conference in 2019. For the first time since the beginning of the Fab Conference, Egypt becomes the first country in the Middle East region to host the Fab event.

The Fab Lab International Conference gathers members of **over 1,000 Fab Labs** worldwide to share and discuss innovative approaches and experiences related to digital fabrication, in addition to presenting successful projects and latest global initiatives. The myriad of initiatives and projects showcased during the Fab Conference are designed and developed to have significant impact on the economy, education, and community at large. The Fab Conference is considered the most important digital manufacturing gathering where participants attend world-class panels, demos, workshops, discussions and lab presentations with representatives from all over the globe.

This year, Fab Lab Egypt (FLE) and Fab Lab in New Cairo (FLiNC), representing Egypt, competed against other Fab Labs from Dubai, United Arab Emirates; Montreal, Canada; Taiwan, China; and Kigali, Rwanda. Each team made their case to host the Fab 15 in their respective countries by presenting their capabilities, workshops, achievements, community, and what the country has to offer.

One of the key factors for Egypt winning was the Fab Lab on Wheels initiative. The model was presented to the international maker community, which was fascinated with the mobile fab lab initiative. The international maker community was extremely intrigued with what the team had managed to accomplish. No other initiative of its type had reached out to talents with zero access to digital fabrication technology with a full-fledged lab, while establishing various processes and monitoring and evaluation tools from which they could truly measure the impact of the initiative.

Various international fab labs approached the team to obtain from them the model and processes, so they could replicate them in their respective countries. Moreover, a global initiative was recommended to be set in motion to start creating a network of mobile fab labs. The team was requested to head the network in Africa and the Middle East.

Fab 15 pitch video, here https://www.youtube.com/watch?v=pbl6e9KAhSc