

CREACT4MED Mapping: Best Practices

Application Number: BP_51

| 1. Basic info* | |
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| Email Address | omar.essafty@san3atech.com |
| Title of the Best Practice | San3a Tech |
| Name of the Applicant | Omar Essafty |
| Is the BP a registered legal entity? | Yes, I will send the certificate of registration by email |
| Website | https://www.san3atech.com/ https://www.makerdiploma.com/ |
| Country | Egypt; |
| Subsector | Technical Innovation (STEM education, rapid prototyping, DIY, personalized manufacturing, crafts); |
| Category | b) Ecosystem enablement;a) Cultural and creative entrepreneurship;Innovation Democratization; |
| Year of establishment and duration | 2/24/2012 |
| Target group of the BP | We mainly target youth who lack access to technology-related career development opportunities, especially underserved communities and disadvantaged groups. Secondary target groups include entrepreneurs and small business owners in the creative and technical fields. |
| 2. Best Practice Characteristics | |
| Problem Statement | <p>The design of the formal education systems in Egypt does not effectively contribute to students acquiring up-to-date practical and specifically technology-related skills. As a result, graduates are ill-equipped candidates for the job market.</p> <p>Furthermore, after graduation, there is an absence of access to career development opportunities related to technical innovation due to financial constraints and limited resources. This pervasive issue in Egypt impacts the entire country; however, disadvantaged groups such as females and those residing outside the capital, Cairo, encounter even greater hurdles in accessing such opportunities.</p> |
| Mission Statement & Value proposition | <p>San3a Tech is on a mission to democratize technical innovation, ensuring that it is accessible to all.</p> <p>To address the problem (<i>mentioned in the problem statement</i>), we launched the Maker Diploma, among other programs, aimed at empowering professionals and career starters. Our goal is to bridge the gap between them and 21st-century skills, including technology-related skills, which we refer to as Maker skills.</p> <p>Our 11-week program is designed to empower participants with skills that set them apart in the STEM job market. Throughout the program, they learn how to transform ideas and concepts into prototypes. Upon completion, participants will be able to conceptualize, model, and create a</p> |

medium-fidelity prototype of a smart device or solution that addresses a personal demand or solves a local challenge.

Utilizing a hybrid, distributed, and horizontal learning approach, our program accommodates anyone eager to learn, regardless of their technical background. We cover the basics and fundamentals of various tracks, such as design, digital fabrication, additive manufacturing, programming, and documentation, without diving too deeply into a single topic.

Collaborating with educators, engineers, creatives, researchers, and hobbyists, we focus on sharpening 21st-century skills, including critical and design thinking, collaboration, citizenship, creativity, and, of course, technology-maker skills. This fast-paced, hands-on learning experience consists of six modules, complementing participants' existing domain-specific knowledge with cutting-edge skills to stand out in the STEM job market and broaden their horizons on new domains and opportunities.

Finally, participants are required to document their experience and technical work online on a dedicated website, which serves as a portfolio, reference, or open-source platform for other learners.

To give some examples on how these skills can help the different professional addressed by the program:

1. Educators can utilize the learned skills to enhance their teaching experience by incorporating hands-on and STEM components into the curriculum. STEM-experienced teachers are now being sought after in all schools.
2. Many engineers and creatives often miss the chance to gain hands-on experience during their university years. While they may be familiar with the concepts and names of technologies (e.g., 3D Printing), they rarely have the opportunity to learn how to use them. Some industries have already integrated additive manufacturing technologies and are actively seeking candidates with basic knowledge in this area.

Maker Diploma Program is not only a learning experience, but also a platform for social change. By empowering students to become makers, the program enables them to become agents of innovation and impact in their communities and beyond. In Maker Diploma, we tackle the SDGs 4,5, and 9.



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| <p>Results and growth</p> | <p>Since 2014, and thanks to a strategic partnership with the American Center, U.S. Embassy, Cairo, we have successfully launched the program and offered fully-funded scholarships every year. Initially, the program was exclusively on-campus, with a limited enrollment of 24 students per year due to various factors, including funding constraints and methodologies employed at that time.</p> <p>By 2019, we transitioned to a hybrid distributed model, integrating both on-campus and online experiences. Additionally, we expanded our donor base, allowing us to provide more scholarships annually.</p> <p>Currently, we have the capacity to enroll 120-160 participants per year across two rounds, spanning five different governorates (three in a single round), with the support of different donors.</p> <p>To date, we have graduated approximately 2,500 alumni. We continue to nurture and empower this active network by offering diverse opportunities and creating a space for the exchange of expertise and opportunities.</p> |
| <p>Strategy to be financially sustainable</p> | <p>To ensure the long-term financial sustainability of the Maker Diploma, we are pursuing three strategic tracks:</p> <ol style="list-style-type: none"> 1. Partnerships with Developmental Organizations and Companies: Education and job creation remain global priorities, making the Maker Diploma an attractive solution for developmental organizations and companies interested in measurable Corporate Social Responsibility (CSR) activities. Our program's measurable impact positions it as a preferred choice. Through the implementation of a hybrid distributed learning approach, we continually onboard new donors, expanding participant numbers, and reaching more geographical areas annually. 2. Engaging STEM Employers: We are reaching out to employers in STEM fields, encouraging them to allocate budgets to sponsor participants. In return, we promise to provide a pool of well-equipped candidates for internships and jobs. This not only benefits the employers by saving budget in the long run but also contributes to creating a skilled workforce. 3. Offering a Self-Paced Online Version: Recognizing the constraints of a 3-month commitment, we are introducing a self-paced online version of the diploma for individuals capable of paying and seeking flexibility. The e-learning approach not only offers financial rewards in the long term but also provides opportunities for regional expansion. <p>By diversifying our funding sources and addressing the needs of various stakeholders, we aim to ensure the sustained success and impact of the Maker Diploma.</p> |

3. Impact (please complete at least 3 of the 6 sub-sections)

Economic significance

Replicability and upscaling

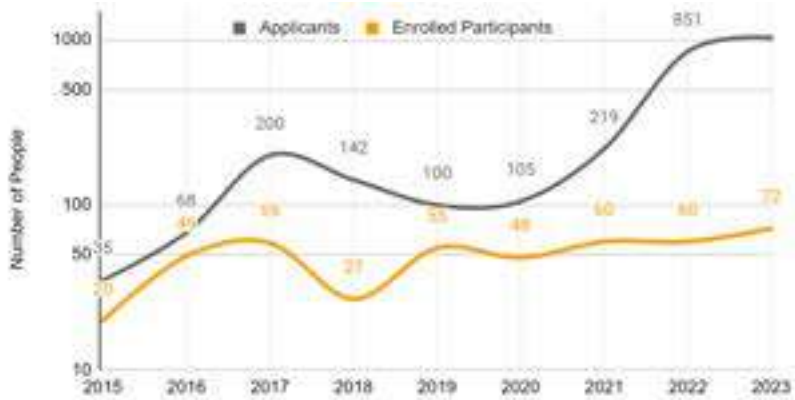
By employing the hybrid-distributed learning experience crafted by our team, it becomes more feasible to replicate the Maker Diploma and scale it without depleting or overusing resources. Participants have access to a comprehensive set of learning resources throughout the program on an online platform, which also serves as a communication hub for tasks, assignments, and required work.

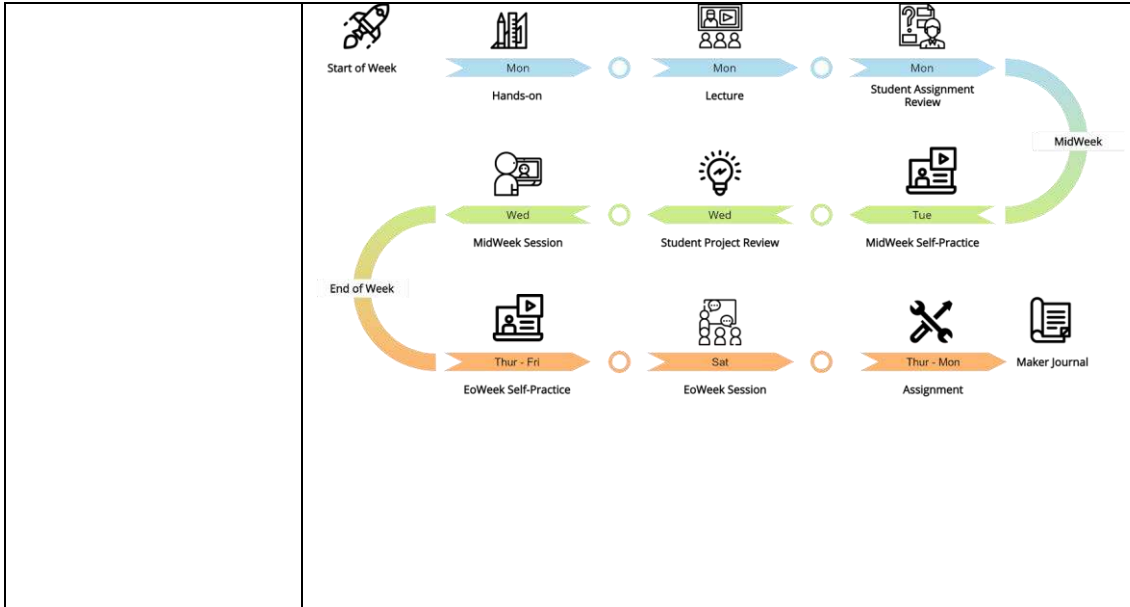
However, participants require access to a fablab/makerspace to apply the learned skills and complete assignments. To facilitate this, we leverage our network of fablabs and partners across Egypt to provide such access.

Additionally, the extensive network of alumni further grants us access to a regenerative pool of instructors and facilitators.

As previously mentioned, the initial enrollment capacity for the diploma was limited to 24 students per year. Presently, we can accommodate up to 120-160 fully-funded students annually.

Moreover, as evidence of the diploma's increasing popularity, the number of applicants per cycle has surged from an average of 35 applicants in 2014 to over 850 in 2023.





Employment generation

The program's main objective is to equip career starters and professionals with a comprehensive set of skills and knowledge, preparing them to stand out in the STEM job market.

Fundamentally, Maker Diploma provides an opportunity for career starters and professionals to explore new and niche job profiles that may align with future global trends but are not widely recognized in Egypt. This includes roles such as engineers and creatives with additive manufacturing experience, product designers with design-for-manufacturing expertise, medical professionals and researchers with prototyping skills, and more.

Alumni, using dedicated websites as portfolios to document their program experiences, significantly increase their chances of being accepted for jobs. Examples of such websites include:

- [Farida El Kabbany](#)
- [Menna Safwat](#)
- [Mina Magdy](#)
- [Doaa El-Bess](#)

Over the past few years, we have cultivated an active network of more than 2,500 alumni, including graduates of our programs and success partners. Within this network, we provide diverse opportunities and create a space for the exchange of expertise.

In the last two years alone, we have facilitated over 150 job opportunities, spanning full-time, part-time, and freelance positions. A noteworthy achievement is that 100% of the staff delivering our flagship program, the "Maker Diploma," are alumni of the same program.

Currently, we offer more than 200 job opportunities annually for our alumni network, achieving a successful hiring rate of 40%. These opportunities include internal positions at San3a Tech or through our

network of partners. Additionally, we leverage our networks to provide freelance job opportunities, with 60% of technical service jobs outsourced to our community.

Internally, over 50% of our technical team comprises Maker Diploma graduates, a testament to the program's effectiveness and the quality of its participants.

Externally, many of our alumni have secured positions in other makerspaces and Fab Labs. Examples include:

- Mahmoud Abo Elnaga (Advanced Round 2018): Workshop Instructor at the German International University.
- Mohammed El-Sayed (Summer Round 2020): Fab Lab Technician at The Knowledge Hub Universities.
- Eman Elkfrawy and Eyad Hossam (Winter Round 2022): Fab Lab Specialists at Fab Lab Mansoura.
- Mayar Wael (Winter Round 2023): Fab Lab Facilitator at Creativa Hub Menofia.

Stories of Success:

Hassan Khaled: Renovating Art and Crafts

- Maker Diploma Round: 27
- Current Position/Activity: Artisan and Business Owner of "Khashaba"
- Story: Hassan blends traditional woodworking with digital fabrication techniques, creating sophisticated artistic pieces efficiently.

Dalia Niazy: Researching Smart Architecture

- Maker Diploma Round: 20
- Current Position/Activity: PhD researcher at Deakin University, Australia
- Story: Dalia utilized digital fabrication tools, programming, and electronics in her Master's thesis, winning the Best Thesis Award at Ain Shams University. She now focuses on 4D printing for advanced built environments.

Mohamed Elsayed: From Non-Technical Background to Technical Job

- Maker Diploma Round: 20
- Current Position/Activity: Fab Lab Technician at The Knowledge Hub
- Story: Mohamed, with a non-technical background, explored his passion for software development and digital fabrication through Maker Diploma, leading to a successful career shift to a Fab Lab Technician in GUI.

Lamiaa Nail: Shaping the Maker Education in Egypt

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| | <ul style="list-style-type: none"> ● Maker Diploma Round: 14 ● Current Position/Activity: Education Manager at San3a Tech ● Story: Lamiaa, an engineer turned learning designer, implemented a Maker Education program for youth. In her current role, she contributes to impactful programs like Girls Make and the Maker Diploma, giving back to the community she once joined as a participant. |
| <p>Inclusiveness</p> | <p>Maker Diploma, among the other programs developed by San3a Tech, inherits the mission of democratizing technical innovation, making it accessible and "inclusive" for everyone.</p> <p>The program addresses inclusivity on different levels:</p> <ol style="list-style-type: none"> a. Background and Age Barriers: For a long time, formal educational systems excluded numerous groups from accessing technology-related skills, and STEM skills were typically associated with individuals with a technical background. Similarly, age limits often hindered a broad range of individuals from participating in the learning process. Maker Diploma provides an opportunity for anyone who wishes to acquire STEM and 21st-century skills, regardless of their age (above 20) or technical background. b. Gender Diversity: Noteworthy positive shifts have been observed in gender diversity. Despite the traditional male dominance in technology-related fields, our proactive push for inclusivity has yielded encouraging results. We have witnessed an increase in female applicants and participants over time. On average, our female representation among participants and alumni profiles is 45%. c. Demographic Barriers: Individuals residing outside Cairo often face challenges due to centralization, limiting their access to various services and opportunities, including career development. Maker Diploma is designed to be easily implemented in different governorates simultaneously. Access to technical facilities is facilitated through our network of partners, eliminating the need for participants from outside Cairo to relocate or travel regularly to the capital to benefit from the opportunity. d. Affordability: Through strategic partnerships and sponsorships, we ensure that the program is available in the form of scholarships, ranging from partially-funded to fully-funded. This approach aims to empower marginalized groups who may not be able to afford such opportunities. |

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| Social impact | <p>Programs like Maker Diploma, with their tangible outcomes and the transformative shift experienced by participants, exert a lasting influence on the community and society in various ways.</p> <p>Innovation & Shifting Consumer Behavior: By exposing participants to innovative learning methodologies that foster creativity, critical thinking, and design skills, society gains more creative individuals. Learning maker skills and adopting a producer perspective, along with engagement in communities related to personalized manufacturing and DIY concepts, prompts a shift from a consumer to a maker behavior. This change initiates a ripple effect, as individuals with this mindset impact their immediate circles, setting off a chain reaction that extends to larger spheres.</p> <p>Technology and Industrial Advancement: Equipping professionals and career starters with 21st-century skills and advanced technology expertise, including rapid prototyping and design skills, results in more capable and creative employees. These individuals can seamlessly integrate innovative thinking and technological skills into their daily work. Employers gain confidence in adopting new technologies and techniques when presented with a pool of skilled and creative candidates.</p> <p>Economic Prosperity & Career Advancement: Program alumni possess skills that distinguish them in the job market, facilitating easier employment. Furthermore, these acquired skills create avenues for earning a livelihood and improving living conditions through freelance opportunities. The documented learning experiences of the program enhance the acceptance rates of alumni for educational scholarships, international internships, and job opportunities.</p> <p>Investing in New Generations: Alumni with an education background have a significant impact on the lives of hundreds and thousands of students across various educational institutions.</p> <p>Giving Back to the Community: A core value of the program is giving back to the community. Participants, once given the opportunity, recognize the duty to share knowledge and create opportunities within their communities. Remarkably, 70% of new participants are introduced to the program through the recommendations of previous participants.</p> |
| Innovation | |
| Environmental sustainability | |
| 4. Challenges and lessons learned | |
| Challenges | <p>Localization and Adaptation to Local Needs A one-size-fits-all approach is not effective in a diverse global environment. In the beginning, and especially since the Fablabs and</p> |

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| | <p>makerspaces concepts were started in Europe and the U.S., we thought we could copy and paste one of the successful learning programs out there, but we figured that this is not going to work. We learned that we must tailor our strategies and solutions to local needs. We've conducted a thorough assessment of the local context and tweaked the whole program model accordingly. While it's a continued learning journey, we're still regularly developing the program to make it more fitting to the local needs and even the needs of each segment interested in the program.</p> <p>Financial Sustainability While the program managed to get enough fundings to provide fully-funded scholarships for all students in the past 7 years, we're in urgent need to shift to a more financially stable model where as mentioned before employers pays for their employees or potential candidates, or individuals paying for themselves to attend self-paced version of the program. We're taking steady steps, but the situation is still challenging.</p> |
| Lessons learned | <p>Impact-Driven Work: Resilience & Prioritizing Impact Over Quick Profits While quick expansion or immediate solutions for revenues might be tempting, it's essential to maintain a focus on long-term impact and building resilient communities. Our work should be driven by the positive change we aim to create rather than short-term gains.</p> <p>Balancing Two-Way Value: Quality vs Quantity In our pursuit of expanding reach, we must not compromise on the quality of the program. The value derived should be two-way – providing high-quality educational experience while reaching more individuals.</p> <p>The Importance of Building Networks Networking is crucial for learning new ideas, expanding reach, and enabling others to do the same. By fostering strong networks, we can collectively enhance our capabilities and extend our influence.</p> |
| 5. Demographic Information | |
| Is the organization led by a woman? | The founding board and the executive team are diverse. 43% of which are females. |
| What age is the lead of the organization? | Between 16 and 35 years old |
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