

# A Maker Tour to Understand the Role of Maker Education in Public Innovation for Social Challenges

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## ABSTRACT

PromPeru Lab is the Creativity and Innovation Lab from PROMPERU, the public non-profit entity of the Peruvian government that promotes exports, tourism and country image. The main goal of the Lab is to strengthen the culture of human centered innovation in, with and for the public servants from PROMPERU through different activities. This document describes the “Maker Tour” experience where co-workers from different backgrounds visit FabLab ESAN in order to understand what the maker movement is, how it can be linked to their work and the impact in citizens, with (1) a first expectation previous to the visit and (2) brand-new ideas of applications in different social topics after the visit.

## Keywords

Maker; Government; Public Servant; Lab; PROMPERU, Fab Lab

## 1. DESCRIPTION

### 1.1 Description of your setting

PROMPERU is an agency of the Ministry of Foreign Trade and Tourism specializing in and responsible for the promotion of tourism, exports and country image. Its mission is to position Peru on the global stage by promoting the nation’s image as a tourist destination and producer of value added products, contributing to local development. Its main offices are located in Lima, and it has more than 400 workers (called collaborators) distributed in different cities of the country. In 2017, the strategy to promote Peru’s image was to implement a laboratory in order to innovate its services to the public.

Initially named Marca Peru Lab, after being ‘adopted’ by General Management of PROMPERU, a public non-profit entity from Peruvian government, its name became PromPeru Lab. The main goal has been to position PROMPERU within the local innovation ecosystem. In PROMPERU’s role as a Creativity and Innovation Lab, the goal is to help everyone from the entity to imagine, explore, co-create, iterate, develop and innovate in generating new and better proposals for organizational culture according to the new challenges and technologies from 21<sup>st</sup> century. A multi-disciplinary team was established, including an industrial designer, a service designer, and a communicator. The Lab team proposed that five kinds of transformations needed to happen across an entire organization and in the mindset of collaborators: tools, spaces, age, origins, and intersectoral.

1. Transformation of tools means to include new methodologies, tools and activities that can help collaborators (public servants from the entity) to be open to new ideas and ways of working, using design thinking, agile, scrum and other techniques that can make their way of working more agile and able to use new technologies, as digital fabrication tools.
2. Transformation of spaces means to change workspaces and learning spaces into more colorful, free, and warm spaces, so that we get a change from a vertical way of working into a more horizontal and collaborative style. Instead of working in separate areas, the new goal has been to mix colleagues from different areas in order to understand common needs or problems and ideate new solutions that might not have happened in isolation.
3. Transformation related to age, where the challenge is to connect status quo thinking of baby boomers to the more risk-tolerant and more digital mindset of millennials. This also includes finding a middle way between the classic, understated way of speaking and dressing of a public servant vs the more informal and trend-driven attire and slangy way of talking of millennials.
4. Transformation of origin, meaning that the Lab is promoting more collaborative work with better representation of our citizens, not only from the capital but from all regions, backgrounds, and ages.
5. Transformation to become more intersectoral, meaning that PROMPERU has to develop projects with other public servants from all ministries, more institutes, universities and also the local innovation actors, start-ups, incubators, accelerators, coworking centers, makerspaces, and Fab Labs from Peru and the entire world.

In order to support all five transformations in an organization, there were four important strategies that were undertaken. There was no expectation that these strategies would produce an immediate transformation, but that they would create a positive evolution within the public servants and their interaction with the local innovation ecosystem. Those strategies were (1) perform an organizational and a service diagnosis in order to understand how innovation was perceived inside PROMPERU, (2) encourage the integration of internal and external actors and allies from public and private sectors and academics, (3) organize workshops for co-creation between public servants from PROMPERU including the participation of final users, mainly exporters, tour operators and tourists from different countries and ages, and (4) promote the good practices developed by the Laboratory within the organization.

Since its creation, PromPeru Lab has developed 17 workshops with 323 participants who are public servants from the entity, 6 external workshops with and for other public entities as the General Direction of Handicrafts from MINCETUR (Ministry of External Commerce and Tourism) or PCM (Presidency of the Council of Ministers), 2 international workshops including one during Fab14 Conference in France named “Public Innovation Labs: How to innovate inside, with, by and for the Government” with the collaboration of May El-Dardiry from Egypt, 5 videos about Lab projects, 8 important events/conferences such as the Bootcamp for our 1<sup>st</sup> Startup Weekend Travel in Peru, and 8 “Innovation Tours” to innovation offices, unities and labs from public and private entities, including coworkings, crowdworking (Telefonica) and Fab Labs. All activities described have represented an important change in PROMPERU goals and working methodologies, causing a positive interest in learning more about technologies, spaces, new concepts, and exploring new ways of working in order to strengthen their skills.

## 1.2 Description of the educational experience

In 2017 SwissContact, a foundation for international development cooperation, together with PROMPERU and other public entities organized a Hackathon where the goal was to think about new ways to promote innovation and local technologies. Attendees were from different backgrounds including journalism, communications, UX design, and coding. As part of the activity, PromPeru Lab organized a “Maker Tour”, an activity that allowed journalists, bloggers, and communicators to understand how local FabLabs worked, who works there, what technologies can be found, the products that can be made, and the impact FabLabs can have on education and manufacturing. Three spaces were chosen for the tours: FabLab UTEC, FabLab ESAN, and SalaVeo 3D from PUCP. Participation was limited to 30 people who went to all the labs. The experience was positive and reciprocal: communication professionals learned about these spaces, while the makers from the labs learned how important it is to communicate what they are doing and be able to articulate the advantages of those spaces to the general public. Makers from Peru don’t tend to communicate what they do. There are several possible reasons for this: (1) Most of the makers focus on making only, (2) Makerspaces and FabLabs don’t have access to communication professionals found in many businesses, (3) Makers lack experience communicating with a non-technical audience, (4) There is often little thought given to developing a media strategy to share what they are doing, or (5) Even if they are communicating, they only communicate with other makers and other FabLabs.

Thanks to the “Maker Tour,” a new atmosphere was created where both sides understood the importance of being complementary, meaning that the maker should use new media and help from communicators to share what happens inside a FabLab, and the communicator/journalist/blogger learned how technologies work, what their applications can be, and what the impact might be between citizens who are not necessarily makers or part of the maker education movement. Therefore, after that activity, everyone understood how powerful it was to create those moments where different actors in the ecosystem should gather to share information and experiences. “Tour Maker” became a basic, but important action in order to understand what a maker education is and how it can help solve different social challenges.

Since the experience was good, “Maker Tour” was replicated with a different name: “Innovation Tour”. This time the attendees were collaborators, all public servants from different areas of PROMPERU. Because of the lack of time, the activity was based on visiting only one lab: Fab Lab ESAN. Before the tour, all collaborators were surveyed about the topics and technologies they were interested in. The choices were: 3D design for products/spaces, laser cutting, 3d printing, CNC milling machining, electronics design and production, embedded programming, 3D molding, ICT for documentation, 3d scanning, innovation spaces, composites.

As seen in figure 1, of the 23 people responding, the most interesting topics to see/learn were: 3D design for products/spaces (20 people), innovation spaces (19 people), 3d printing (17 people), and electronics design and production (12 people). The least interesting topics for collaborators from PROMPERU were: laser cutting (4 people), CNC milling machining (4 people), embedded programming (5 people) and composites (6 people).

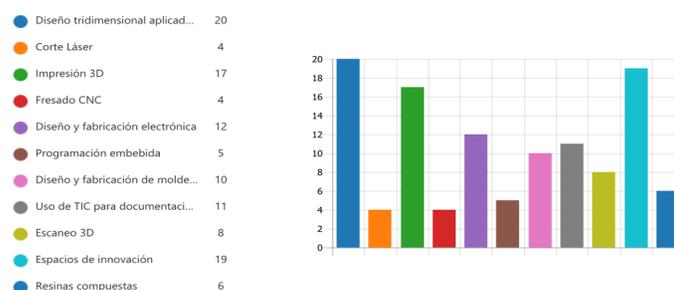


Figure 1. Survey of interest for topics

Although some topics showed low interest, it doesn't mean they are not important. Some possible reasons could be (1) a lack of understanding of what the words mean, (2) thinking those topics would not improve their work, or (3) thinking that a particular topic would be difficult to learn.

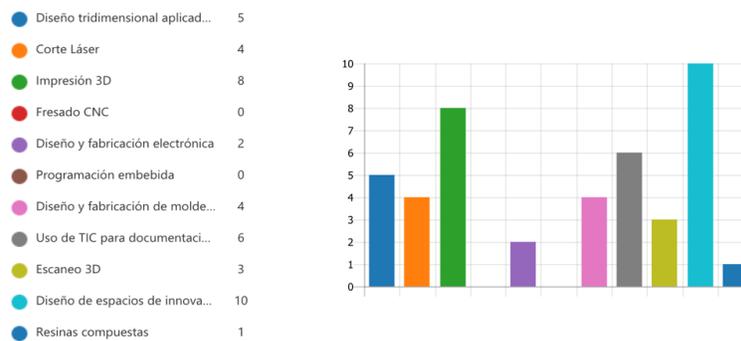
During the experience, 30 collaborators (Fig. 2) learned how the activities of Fab Lab ESAN could be related to their work at PROMPERU, for example 3D molding and casting for food, the creation of tools for handicraft, 3D design and printing of textiles, and the use of new ways to communicate with global Fab Labs using ICT. The knowledge was shared thanks to the extensive documentation of the Fab Lab team. Every project shared included artifacts, plans, lessons learned, and even failures. The team exemplified 21<sup>st</sup> century skills: creativity, communication, collaboration, and critical thinking.



**Figure 2. PROMPERU collaborators in Fab Lab ESAN playing with food and 3d printed products**

The three-hour Innovation Tour was a success. The PROMPERU collaborators learned some basic concepts of maker education, saw some machines working in the moment (laser cutting MDF), and had a hands-on experience assembling a laser cut animal. It is clear that this activity goal was not to turn collaborators into makers but to help them discover the potential of the space, tools, people and new mindset to improve their way of working inside the public entity.

After the activity, there was another survey asking about their experience and comments. This time, there were three questions: “After seeing how Fab Lab ESAN works, its tools, and equipment for digital design and fabrication, which do you think would contribute to your work?”, “What kind of activities would be interested in doing with a Fab Lab/makerspace?”, and a space for additional comments. There were 14 responses, and although this is small number, the interest in topics shifted as a result of the tour. As seen in Figure 3, the most interesting topic is innovation spaces (10 people), 3d printing (8 people) and ICT for documentation (6 people). The least voted topics were laser cutting and CNC milling machining with 0 votes and composites (1 person).



**Figure 3. Answers to the survey after the tour**

## 2. CONCLUSION

### 2.1 Results

- There is a huge interest in innovative spaces for collaborative working, which reflects the lack of design in their actual working spaces.
- 3D printing is an interesting and very important topic; however, not all attendees knew how to use 3D design software, which is crucial for making a product.
- The use of ICT is important and the interest increased after explaining how all Fab Labs can be connected through videoconference, and that it doesn't have to represent a high investment since there are economical cameras and speakers.

- The amount of time to understand how this space works was not enough, so a “Maker Tour” should take more than 3 hours and more days.
- A possible way to increase the interest in Maker Education is getting together all actors, especially public servants. The public sector is key for spread in the country what a Fab Lab/makerspace is and how it can help to design possible solutions to different needs.
- Curiosity is a skill that needs to be strengthened not only in kids, but also in adults. It was observed that most of attendees were not confident enough to ask questions. It is necessary to design a strategy so they can feel comfortable asking basic things about materials, machines, tools, people, spaces, and applications without feeling embarrassed. Otherwise they will have doubts and questions that remain unanswered, decreasing their ability to absorb the intended lessons of tours.

The PromPeru Lab team understood how important it is to replicate the activity not only for all the entity (who were not able to attend) but also to public servants from other public organizations, start-ups, communicators, journalists, and citizens from all kind of backgrounds.

It is planned that for 2019 there will be 4 more “Maker Tours” but to different Labs so that everyone understands the “identity” of each space and what kind of projects can be made.

The impact was huge and generated new projects: there is an upcoming “maker section” in a local digital media that will share short videos of products made by students and researchers inside Fab Labs or makerspaces, there is a TV show named “La Gran Idea” (The Big Idea) where they are mixing innovative tridimensional products with popular culture (dancers, singers, social aid, and competitions between participants), universities are investing in communicating what they are doing hiring new people to create high quality and original videos of projects/products.

## 2.2 Broader Value

It is important to create activities between public entities, private sector, academics, and citizens not once, but many times in order to sensitize everyone about the importance of maker education and its effect on local production.

Most of makers don’t feel interested in communicating what they are doing, and many journalists/bloggers don’t understand what a maker mindset is. Therefore, it is important to create more spaces and moments where both actors share their knowledge and experiences, so that citizens (not necessarily makers) can join the movement.

It is suggested that the FabLearn community support the creation of Labs inside public entities of their countries, including people from different backgrounds and with experience in Fab Labs, makerspaces or all maker-centered/hands-on/digital fabrication learning communities. Innovation and Creativity Labs inside public entities from local government can help the internal transformation, helping the connection between actors of your local ecosystems.

Curiosity decreases when people get older since they are more worried about their work and there is not much time left for other activities. It is important to replicate the concept of 21<sup>st</sup> century skills, but in adults. It means that despite the age of the person, it is good to imagine that everyone is a “young kid at school hungry to learn more”. Maker education is a complementary activity for an adult public servant and can be helpful to strengthen creativity, collaboration with co-workers, communication within different areas and critical thinking questioning why everything should keep similar instead of changing into something else.

Maker Education should be seen not only with the perspective of education. For example, in Peru we have Ministry of Education, Production, Health, Work, External Commerce and Tourism, Women, and more; however, what has to be avoided it to consider that “Maker education is only for Education”; so, the strategy is to share information with all public entities. If more public servants know about it, the easier and clearer it will be to consider the maker education as a solution to social and environmental challenges.

## 2.3 Relevance to Theme

Relevance is based on how simple actions with public servants are necessary to create a change in maker education. Once the public servant feels included in these initiatives, they will be able to see, understand and replicate the experience in their work, share it with their co-workers, family and surrounding.

## 3. BIOS

Victor Freundt, industrial designer from Pontificia Universidad Católica del Perú (PUCP), FabLearn Fellow, Fab Lab Peru Association vice-president, PromPeru Lab coordinator, MIT TR35 Innovator Under 35 Peru, member of the panel for FabLearn2019.

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