Autofabricantes

Who are you and what is your relationship with the project Autofabricantes?

I'm Francisco Díaz, coordinator for research of the research project and working group Autofabricantes.

When, where and why did this project come about?

The project Autofabricantes started in October 2015 when there was an open call for proposals by Medialab-Prado in order to select cultural and research projects in different areas of social innovation related to technology, culture, etc. I was selected to develop this project and what I did was open it up to the entire community to start the working group we are today. But Autofabricantes started in 2014 in Seville with a family we knew and shared other projects with. They were going to have a little girl who they knew was going to be born without a hand, and faced with this scenario, not only from a medical perspective but also an orthoprosthetic one, they asked us what other alternatives there were so that Paula would really be autonomous and free in terms of her personal technical support that the system was offering. That was when we started thinking because we had already been working for three years with 3D printing and other technologies in open code and we saw that creating a prosthesis for Paula was really a realistic alternative and that lead to a whole research project.

Now we are in Madrid in Medialab-Prado. It is a public office, a laboratory of the people of the City of Madrid. It's open so that anybody can collaborate in any type of research or in any type of activity as long as it is collective and everything that is produced is given back to the community.

How many years has the project been functioning?

Here in Madrid we have been operating for three years or "three school years" as we like to say, during which many people and collaborators of different types have contributed tools on the level of technology, practicality or for research.

Where did the name Autofabricantes come from?

Well, like all names come about, it was a coincidence. We were defining our project as collective independent manufacturing of prosthesis and in open code. And it is independent manufacturing because we work with 3D printing machines where we provide our own technical support, and from there the idea of "autofabricantes" (literally "self-manufacturers") came about -- people who produce their own resources.

Are you a research group?

We are a working group associated with Medialab like any other group, but in addition, for two years we were a research project that I coordinated, and we're still a research project that I coordinate, not in mediation and research anymore but in another area.

Are you planning on becoming an association or collective?

Yes, we are already an association. After two years working and getting to know one another, and with people joining and leaving the team, we saw that there could be a much more sustainable and stronger future. So we took part in a group participation facilitation process for six months that led to us becoming an association, redefined and reorganized as a collective and not only relying on what I was proposing.

Can anybody join? What is the profile of the people that have joined so far?

In principle, yes. We simply established some minimum requirements for time commitments when collaborating with us, but just like in any other type of place. Most people are pretty technically experienced because in the beginning we developed or created the model with all the collaborators who are technicians in different areas, from health or occupational therapy or in the specific engineering field of 3D printing, 3D design, electronics, mechatronics, etc.

The 15M Movement, for many of the collectives that I've been speaking with, represented a moment of reorganization, reinventing, regrouping. What has this movement represented for the people in your association?

Personally yes, but regarding Autofabricantes or on a professional level no because it was four years after all of this. Autofabricantes didn't exist when the 15M Movement happened, although there are collectives like "En torno a la silla" and others that we collaborate with and they did have a very important relaunching as far as their functional diversity is concerned, for example, and regarding other concepts that are associated with this type of project.

This project came out of Medialab Prado, but how does this project sustain itself institutionally?

During the first two years, there was very important financial support that allowed me to work on research, coordinating the team and the whole project. This ranged from the material costs, which were also covered by Medialab, to the whole infrastructure that we use here which is very valuable. After that, we looked for external funding and now we rely on an outside foundation called The Daniel and Nina Carasso Foundation which also co-finances part of the project in another bigger lab. Besides this, with a certain amount of autonomy within the association, we make small agreements with small associations, foundations or companies to finance small projects.

Would this research process be possible without institutional support?

A project that is so long-term like this one would be very difficult, without minimal institutional support for infrastructure and with a minimum of financial support for materials or for workshops that we pay for. It would be very difficult because, in the first place, everybody gets tired of collaborating on any type of project and afterwards,

you need community support in order to make the projects you are working on known. There needs to be a big community that provides people and knowledge and that then receives feedback about everything that is produced. So Medialab is an ideal community for this type of project. Medialab or other similar places.

How does a project like this sustain itself after the institutional support from Medialab ends?

We're dealing with this now. Right now we're okay because we receive support from the Carasso Foundation and Medialab and this will continue for another year. But it's true that we have to keep looking for support, not only financial but also from a team perspective and for the whole project because when a collaborative team comes together, there are people on the team who have the expectation and time to dedicate three hours a week and this is fine. But there are others on the team who see that this could be a lifetime project and it's important to try to make this possible. When thinking about possibilities for the future, economically we could be an association, a foundation or a company. In my view, it would be better to continue as an association but it must be economically sustainable for the collaborators and continue to follow the principles of open code, as a center for design and development and with all the families, keeping costs low and the knowledge available.

How many people participate on this team? Are any of them salaried?

Currently on the team there are fifteen people as associates, but in addition there are five or six people who are regular collaborators and another five or six who collaborate now and then. Currently we are all volunteers. I'm in the lab coordinating other activities and a small part of my job is to coordinate Autofabricantes. All the workers have other jobs.

How many hours do the people involved in this project work as volunteers?

There are colleagues who work three hours every fifteen days, others who work the three hours during our meeting each Monday, weekly, and there are colleagues who come up to two or three times a week to do their work. Long term, we should be sufficiently stable economically so that anybody can work more hours beyond those that are done as a volunteer.

Thinking of the concept of "work", what has "work" meant in the context of this project in Medialab?

Well it's incredible working here due to all the input that you have from different projects going on in Medialab. It's also very interesting to work with the different installations that are here, with all of the community because there are many events that you can collaborate with or projects that you can't even imagine come through here and they end up generating a very interesting collaboration.

In your web page it says the following: "This project establishes an ethical and political alternative to the current system of patents and high costs for prostheses in a closed-off industry." Can you explain to us what problems come from the current system of prostheses and why it is not ethical? Why is it that your work is ethical?

Well it's a difficult question because that was the first idea behind the beginning of the project. When a family, or any individual, is told that they have to depend, for the rest of their life, on a catalogue system for the body in order to access different means of support, well okay, because it's a system that guarantees that you'll be allowed to access these types of resources to be able to manage your life better and have more autonomy. But when you discover that behind all of it is an industry with extremely high costs due to patents and lack of investment, and then when you realize that all the technology they have is obsolete, when considering the costs, you begin to have doubts and that's how this project started. And it's not the only one in Spain or Europe; with these projects the goal is to establish some alternatives that are accessible as far as knowledge about their existence and the technology involved, but also economically, so that families across income brackets can access this type of technical support and also have the freedom to be able to replicate, create or improve it.

In order for this project to be possible, it seems essential for there to be a combination of "new tools of digital manufacturing, open code, mutual care and the collaboration of a multitude of professionals and citizens." Can you explain how all these elements combine on this project?

Well, combining all these concepts or ways of doing things can seem difficult but the whole process is very nice and yes, it's true that it takes a lot of invisible work, but it's not a problem and we do it gladly. It's very simple. Digital manufacturing inevitably goes hand in hand with the technology of 3D printing, laser cutting or CNC, which are currently very accessible in Europe or the U.S. The part about "open culture" is the DNA of the project. Everything that is produced, whether it be something in progress or completed, it has to be described and published so that anybody can replicate or improve it in another part of the world. And the part about care, there are times when we forget about it, but it's very important for the whole team of volunteers to be comfortable, to trust one another, to believe in the project, and also, considering that not only technicians but also families are involved in the work process from the very beginning, it's important to create a comfortable space for dialogue because this is where the real innovation starts. And then there's learning because we also consider that it's very important for there to be people involved who are not only technicians or users but also anybody who wants to contribute and learn. What does this mean? Well we have various examples, like Paola, and I love to talk about her work because she started collaborating on the project and she knew very little about 2D and 3D design and, through collaborating with us, seeing that she had the opportunity to learn and contribute in the whole project, now she is one of the people who works not only on 2D and 3D but also in Calculus programs with a fairly complex design.

From what I've read you are a working group that has "communication without taboos." What are the taboos that exist in the area of disabilities that you have decided to eliminate?

Well, related to the topic of disabilities there are many taboos, especially among adults, and also regarding how we used to talk with industry people. To talk without taboos is to talk about high costs, which people often seem afraid to point out, and it seems like we're afraid to talk about different bodies that are lacking a hand or a foot

or whatever. It's amazing when two children who are missing a hand meet and they talk about their disability with an incredible openness that even surprises us, and we are very used to the topic. And this is the most interesting part because we see that the adults are the ones who complicate things that should be very natural, like the fact that we have different bodies and we relate to the world in a very different way.

Do you offer some type of workshop to make your activities known?

For now, we're doing very technical workshops, for example, on developing and designing different types of prostheses; but the conceptual methodological part about everything that we do might be an interesting topic too. We do a lot to disseminate information, but workshops to highlight our work would be a good idea.

You've written that, up to know, you have developed an arm-hand prosthesis and that you have been working with Paula (the young protagonist of the project) and her family on a long-term basis. Can you tell us the story about this family?

Of course, Paula is the daughter of Juan and Natalia, the couple from Seville with whom we started this project and continue working with, and if it's possible, soon we'll do a workshop with Paula's participation. She's using one of the projects that we developed here and we'll do a workshop there in order to do it as a group with other children in Seville. That is, we continue to be in touch with them as we're developing projects with them.

How do you work on updating the prostheses for the people you work with?

This is one of the main problems with the industry and with this type of project in general because it's necessary to change the prosthesis every six months or year, depending on the age of the child, and apart from the major wear and tear that playing has on it. So, with this type of technology it is very easy to reprint another prosthesis with updated measurements and this drastically reduces costs. In addition, it allows children to redesign or change the colors and even the structure according to what they need at each stage of their growth.

What difference is there between a 3D prosthesis and a commercial one?

The commercial prosthesis has a different manufacturing system, and these ones in 3D have a customized model in 3D where you can put in the dimensions, change the model and you can download it to print directly in 3D, in a single morning or afternoon.

How much does a prosthesis cost?

Well, the commercial ones can range from 2,000 €, to those that are merely more aesthetic, up to 20,000 €. Then there are those that are covered by social security or by the national healthcare system and have motorized functionality. We can't sell prostheses, but we do have production costs and hours of work and there are some that we are developing that do not have anything electronic but a high functionality that are called Supergiz and one of these can have a cost of 3D printing and development between approximately 300 and 500 €.

Do the families that receive these prostheses have to pay for them?

Currently, since we have public financing, we are not offering any type of commercial service. They can simply use them for free because in addition, we understand that we are in a beta testing phase; that is, even though there are many families using them, there is always a relationship with them that goes beyond a user of a product because they provide input. They invent other types of solutions that we develop and these end up benefiting other children.

What does it mean to apply free license in the realm of prostheses?

Applying free licensing means that with a model that has been developed here or that has been developed in another part of the world, we can download it, improve it and upload it again so that anybody with a similar need can use it.

Do you work with or form a network with other collectives?

Yes, here in Spain we know other collectives that we collaborate with and we develop very similar projects. We're also in an international network called Enabling the Future that was started in the U.S. and has all of the prostheses that we have seen advertised, with a very specific mechanical model that was developed by a father there when he saw that there was a need to think about another way to offer technical assistance for missing arms.

Is Autofabricantes a political project? If so, what kind of politics are involved?

I would say no. It's a project that offers alternatives and that each person can adapt to their needs. I would say that it's a project generating these alternatives and adding innovation or social use to a technology that, up until now, I considered was just for building action figures and didn't make much sense. And this is what gave meaning to 3D printing, which today has spread throughout the world and it provides an alternative to something has been standardized like the industry of prosthetics, whether we like it or not, when bodies are not standard and much less in these cases.

How many families have passed through Autofabricantes?

Currently, in all of all of our projects together there have been about 25 families, either here in Spain or when we've done work in Colombia. We're in contact with other families in Spain that have come to collaborate and we have been developing projects with them, little by little, because the amount of volunteer hours we can count on is limited, and besides, many of the projects start with a conversation with the family because they think that something we have can help them, but once you start looking into it and do a technical assessment to see what the needs are, you realize that you'd have to start the project from zero.

How do you select the families?

Well normally it's by request. A family comes and we study the cases and we see if it's possible technically and if practically we can develop it. Normally regarding technology there aren't problems, but in practical terms we sometimes don't have time and we have to put the project on hold until we're able to work on it.

What have you learned working with these families?

Well it's a daily learning process, especially when we're with the family and it's incredible to see how something that you've been researching and working on for six or seven months has a real application and the children try it out and put it to use right away, and this is the most gratifying and amazing part of the projects. It's nice working attentively and carefully and listening to the families who often are reluctant to tell you about silly things in life that, in the end, aren't that silly after all.

How do you make decisions as a group?

Every Monday we work on development, we assign tasks for the week and on the following Monday, we assess these tasks and assign others. Every 15 days we have a meeting to tell the whole team how each of the seven research projects is going and once per trimester, we have meetings to evaluate how things are working in general (internal and external communication, etc., or with families) and how work is progressing. We don't always stay on schedule but we do try to carry out effective assessment because the success of the project depends on everything functioning as it should.

Have you designed your own protocol for making sure the group performs well?

We haven't designed tools but we do consider it essential to get together for a drink after work or to celebrate an important accomplishment with a glass of wine or something because it is very important to celebrate every small accomplishment in research projects that are so big.

You come from the university environment. What relationship does the group have with universities?

Currently we have 12 students who collaborate with us and they are working on projects for their degree, for completing a Masters or internships, which have allowed them to get involved and they are even developing new avenues of research that we didn't have access to due to lack of machinery or lab materials. So, we signed an agreement with the Polytechnic University of Madrid to have this exchange with students and ideas, as long as everything that is produced stays in open code and the students learn from a multidisciplinary team.

There is a false dichotomy between the sciences and the humanities at universities. How do these two spheres integrate on this project?

I believe that one has to give meaning to science and all technological developments that we have in our hands, especially in developed countries because there are times when fantastic technological developments occur but they don't have any connection with practical objectives or with people who can put them to use. This it the tool of 3D printing. We have micro-electric prostheses with a highly advanced technology and a person might not care about this until they understand that this can help them move an arm. So it is important to teach people about this and bring down to earth scientific or technical advances that are cutting edge.

Why do you believe in open code?

Because it's not necessary to reinvent the wheel twice in the world. If somebody has already invented it, why think about it again? We have to think beyond this.

How did you get introduced to open code?

I started collaborating at the Fablab in Seville, in the Department of Architecture where I studied in 2011, and I was playing around with the 3D printers that were in Spain. Behind this technology there is a huge community that has made this highly advanced technology possible and that is where I understood that with many people thinking together and sharing what they know, they are capable of doing something very important, and it produces a real improvement in our society.

What are, from the perspective of Autofabricantes, the areas where we need to improve regarding functional diversity?

Well, first there is the idea of normalization, and then of full integration and working more on the autonomy of all people, in the different aspects of life, especially in the area we work in: education. This can be complex and it involves many different areas because the educational system, starting from pre-school, should focus more on sharing, working on concrete projects, collaborating more. Then afterwards, in college, we need to get away from thinking in terms of departments and professions in order to do multidisciplinary projects that have practical applications in the community. Also, we must stop being obsessed with patents and publishing everything we do so that we can produce real change and real innovations beyond a publication or a patent that often sits in a drawer somewhere.

What do you think we need to learn as a society to help us collaborate more?

Well we really need to free ourselves from the "professional chains" and from all the mental ties holding us back with regard to our capacities because surely, if we talk with a neighbor, a classmate or a laboratory colleague, we'll be able to do something that is much more interesting. When we go beyond these limits, this is really when the magic appears and where you smile and say, "We're going to forge ahead in this adventure and maybe something lovely will come out of it."

Do you have documents with information about your methodology or materials that explain your accomplishments?

We are currently working on a new web page where we'll describe all of our projects. Another one of our upcoming projects is to carry out a group analysis consisting of systematizing our work methodology and sharing information about everything we're working on. We plan to work on this little by little.

Are there any tools or concepts that you have invented that you would like to share with us?

I think there are two that are part of the same project. On one hand, there is Supergiz which is a project that came about from dialogues with families, and it entails a prosthesis that doesn't look like a hand -- nor does it function like one. It's a type of glove that has some hooks to handle specific gadgets and it has a specific functionality.

This is fairly innovative, not just because I'm saying it is but because it conceptualizes the functionality of a hand in a specific way. It assumes that bodies have to be autonomous throughout the whole day and it helps with a specific part of one's daily activities. In addition, it allows the children to design and develop the gadgets they're really going to use with us, focusing on their interests and hobbies. It's great to see how, after barely three months into a project, you can develop some gadgets and specific tools for challenges that users have never had the opportunity to overcome.

With this project, instead of releasing it and making it public, which we've already done, we've started to develop it in the context of workshops with six or seven children with similar needs who develop and design these types of gadgets together with designers over three months of work. It's enriching to see how the children connect with one another and they have a good team of designers who make it possible for the rough drawings they do one morning to become a reality in 3D printing in a way that really works.

What does growth mean for Autofabricantes?

from my point of view, and Autofabricante's, it's always important to come to agreement in our meetings. However, from my perspective, I think growing means having an idea that's bigger than what we are doing now. Growth is a matter of being more sustainable as a group, which means more confident, to trust one another more. Growing means having an environment of users and families that have a lot of trust, an environment that is well nourished. For me, growing isn't just a bigger number or a greater sum.

Keeping in mind the climate of political discontent and insecurity in different aspects of life, how do you stay motivated and how do you deal with powerlessness?

This is one of the most difficult parts. Currently there is a project that has taken three years of work and then there are shorter research projects that yield positive results in a short amount of time. It's a matter of celebrating the small victories in these longer research projects. It's important to celebrate each of the small steps that we take and to try to sketch out the whole path together until we reach our final objectives. We have to avoid having abstract goals and make sure they are very specific.