Breakers

Make a new world

Fundación
Discover what has happened during the first two years of the Breakers program.

Together we have built the foundations of a Breakers world full of fresh and ground breaking ideas for connecting young people with new opportunities.

“Not only makers, we are Breakers”
Dimensions

1. Breakers World
2. Young people and their journey in Breakers
3. Other agents involved in Breakers
4. The platform for the diffusion of the knowledge generated
5. Dissemination of the program
Breakers World

Introduction
Objetives
Indicators
Training
FabLabs
Skills
Methodology
Journey
Breakers, a training program that brings FabLabs and the Maker world closer to young people with diverse realities.

Combine:

- Young people in vulnerability
- Creative technologies and digital tools from FabLabs
- Methodology inspired by the maker philosophy
Breakers World

Program objectives

→ To bring digital tools and creative technologies closer to young people in situations of risk.

→ To develop both social and personal skills in young people in order to improve their process of autonomy and emancipation.

→ To improve young people’s attitudes to their learning process.

The word

Breakers comes from the combination of "Break", that means to separate into parts, fracture; and "Maker", a word within the maker movement refers to the person who is curious and who likes to create, invent and make things.
Breakers World

2016-2017 Indicators

More than 1775 Hours of training given
More than 415 Young people trained
More than 75 Entities of origen for young people
More than 8/6 8 spaces offering regular training in 6 cities
More than 260 Open code resources published

More than 60 Facilitators have participated in Breakers
4 National meetings for facilitators
1 Meeting for young Breakers
1 Conference Learn 2 Teach, Teach 2 Learn
1 International IMake4MyCity award
Training

The Breakers program offers to young people a 40 hours training to introduce them to the world of creation and digital manufacturing. Combining the learning of technical skills in 2D/3D technologies such as 3D printing, laser cutting machines and prototyped electronics along with other transversal and social skills like team work, bettering communication, negotiating in business and motivation.

Structure:

Kick off
First contact with the space and the digital environment.

Initiation module
Activities to overcome fear, discover the potential of the machinery and acquire basic skills.

Project development
Carrying out unrestricted themed projects according to individual interests or within a concrete framework which integrates different techniques.

Inspirational talks and outings
Theme activities with the objective of discovering new surroundings and get to know people in the sector.

Innovation apprenticeship

A flexible and adaptable format

Breakers training model is planned to ensure flexibility and adaptability to each space reality with the objective of optimising the resources, knowledge and experience acquired during their trajectory.
Breakers World

FabLabs y Maker Spaces collaborators

Training takes place on a regular basis in Madrid, Seville, Bilbao, Valencia, Barcelona and Castelldefels, in the FabLabs and maker spaces collaborating in the program:

- Madrid
- Sevilla
- Bilbao
- Barcelona
- Valencia

What is a FabLab space?

Fab Labs (LABoratorios de FABricación o LABoratorios FABulosos) are a global network of local laboratories which make creativity and invention possible through the use of digital manufacturing tools.
Breakers World

Skills Development

Breakers takes advantage of the opportunities the Maker philosophy offers to learn not only technical abilities but also social and personal skills which could result in significatively better social and labour inclusion for the young people in training.

Personal and social skills

- Cooperation and working in teams
- Decision making in a changing and complex context
- Resilience
- Communication
- Investigation and autonomy
- Managing information
- Autonomous search for resources
Breakers World

**Technical skills**

**Fabrication**
- 3D printing
- Laser cutting and engraving
- Vinyl cutting
- CNC milling

**Design**
- Vector design 2D
- Modelling 3D
- Scanning 3D
- Circuits

**Rapid electronic phototyping**
- Arduino
- Programming
- Educational robotics

**Documentation**
- Recording and editing images and videos
- Preparation of processes and tutorials
- Production of portfolios
- Use of online platforms
Breakers World

Methodology

Breakers takes advantage of digital manufacture and rapid prototyping to generate learning environments, which offer emancipating opportunities for young people.

Making, as a combination of physical and formative tools, have the potential to transform educative practices with the creative use of technology, but its potential is nullified if its implementation does not come with an educative action.

The MakerED methodology is based, on one hand, on the Design Based Research (DBR) paradigm, and on the other hand, on skills-based training:

**Design-Based Research (DBR)**
A systematic and flexible focus which has as an objective to improve education practices through the repetitive analysis of programs and their implementation.

**Skills based training**
The development of skills in the sense of complex knowledge, integration, multi and transdisciplinary training is normally taught in Making practices and in Making education.

MakerED
Over and above the technical capacity of the machines of the FabLabs, the facilitator or MakerED offers understanding on how the new work methodology may be exported to different fields, adapting to the needs in each context.
During this period, a formative model has been implemented offering three Breakers editions annually. Additionally, different formats of training have been carried out such as TecnoLab la Rueca and Yamakers, and national meetings have been held for both young people and facilitators.
2 Young people and their journey in Breakers
Many young people at risk have not connected with conventional learning methods. That is why the need exists to show them that there are different options to develop personally and professionally.

For many participants, Breakers is a first approach in the world of technology from a completely new and unknown perspective.
Young people

Profile of participants

Young people at risk, mainly wards or ex-wards of the court.

Breakers participants are mainly young people without family support who are or have been wards of the court and in most cases find themselves under pressure to emancipate urgently.

The majority find themselves in other personal and educational itineraries and have a reference educator.

The process of autonomy and emancipation of these young people, in the current context of youth unemployment, temporary contracts and uncertainty, is very complex.

Average of young Breakers:

60% Wards and ex-wards
40% Other

From program of infants and youths at risk, European Youth Guarantee initiatives

The majority of young Breakers come from entities linked to FEPA.

FEPA is a state foundation which brings together entities which develop projects aimed at young people without the support of a family, especially wards or ex wards between 16 and 21.

In Spain:

More than 3,500 Young wards close to emancipation.

More than 5,000 Young wards in process of emancipation.

Around 750 Young foreigners without work permits.

Around 50% Have not passed secondary school.
Young people

Other profiles

Breakers also offers specific training to other collectives:

**RUEKERS:**
Young people in vulnerable situations who come to TecnoLab La Rueca

Young people between 12 and 25 who live and study in the Madrid area come to TecnoLab La Rueda Association, specifically in the districts of Cuidad lineanr, SanBlas, Canillejas and Arganzuela.

The Breakers group includes both young people with cyclic ESO studies, cycles of vocational training or school workshops, as young people who have abandoned their studies and are in the process of improving their employability.

**YAMAKERS:**
Young people with high-functioning Autism

Young people who participate in Yamakers come from the Fundación Friends. The Yamakers project offers training to young people with high functioning Autism for the development of social projects.

High functioning autism is a serious development disorder, considered as a disorder which manifests itself differently in each individual. It is a disorder that affects approx. 7 out of every 10,000 people, with more emphasis on boys than on girls. Its cognitive social and personal peculiarities, in addition to the lack of widespread general information among the population, often translates to a high level abandonment of school and a poor social or community integration, and especially in the labour environment.

Fundació Friends purpose is to provide care and follow-up to young people diagnosed with the Asperger's syndrome and to improve their education, quality of life and inclusion in the labour market.
Young people

Indicators

80% of young people finished the training

More than 70% have an attendance rate of over 75%

8.6 Recommendation for the course

What the young people evaluate highest is:
- Get to know new people
- Variation in activities
- The developing projects

What the educators evaluate highest is:
- The possibility of getting the most out of the acquisition of tools
- Personal and social skills
- Acquiring job training

Situation of the young people surveyed:
- 81% study
- 25% work

After going through Breakers:
- 56% Keep contact with other colleagues who they didn’t know before
- 2% Go regularly to the FabLab
Young people

Skills evaluation from the youths themselves

After the training course the young people evaluate the skills acquired during the program:

**Adoption of technologies for personal or professional improvement**

“I understand and accept ideas different to mine”
“I have worked in a team and give more importance to mutual collaboration”
“I see that making mistakes because you don’t know something doesn’t mean you can’t learn it”
“I think the things I learnt will be useful in other areas in life”
“I feel able to get what I propose”

**Commitment**

“I give more importance to the fact that I finished what I started”
“I give more importance to regular attendance and punctuality in the classes”

**Global evaluation above 8**

**Reducing the digital gap**

“I am more curious about other things I don’t know about”
“I consider that there may be other areas which I don’t know about and which could be interesting”

**Creating community**

“I have met people very committed in their area of work”
“I’ve met people who have given me a feeling of well-being”
“I would like to stay in touch with colleagues and teachers from the course”
Young people

Experiences

**Jokin, participant in Espacio Open Bilbao**

“I liked the course and they said I could keep coming. And I was over the moon, above all about my colleagues and this energy to learn something.”

**Manuel, participant in FabLab VLC**

"After Breakers my situation has not changed much. Hopefully! I am making important strides before, during and after the course and I hope this road finishes in something beneficial.”

**Lisette, participant in Tinkerers FabLab**

"At first I thought I wasn’t going to fit in because I’m not in the least bit technical. I was really nervous when I arrived on the first day, I didn’t know what to do. But as time went by I began to realise that I could do it and I didn’t feel useless."
3 Other agents involved

Facilitators

Members of the Alumni Community

Volunteers
Facilitators

The facilitators are the people who accompany the young Breakers during their training.

The facilitators’ teams count on members from very diverse disciplines and combine a technical profile with teacher figure with didactic-pedagogical-social training.
Facilitators

Profile and skills:

- Use of personal experience on learning styles
- Is aware of the learning processes
- Has multi-disciplinary training
- Gives a lot of importance to documentation of processes

- Is a vocational educator
- Want to be a generator of change
- Has an active role in proposing projects
- Builds knowledge and habitually shares it

- Acknowledged as the teacher figure, as a facilitator of the learning processes
- Uses methodologies that advocate problem-based learning
- Structures the work for projects

- Develops strategies for pedagogical evaluation in progress
- Puts skills development before the acquisition of content
- Autonomously searches for resources and solutions
- Gives importance to the educational function of the space
Facilitators

Facilitator meetings

One or twice a year, an event is organized aimed at designing learning environments together.

The objectives of the meeting are:

- Acquire the work methodology
- Design activities and environments
- Develop instruments for data collection and pedagogical evaluation
- Share experiences

Facilitators have participated in the training meetings more than 45.

TecnoLab La Rueca promotes the integration of young people in vulnerable situations and guarantees an inclusive space of interaction and socialization on equal opportunities.
Facilitators

Experiencias

Milena, facilitator in Tinkerers FabLab

“One day we connected to the International Space Station transmission to appreciate direct images of the earth from space. Right at that moment it passed by the area of their village in Uarzazate, in the pre-Sahara of Morocco. The emotion of one of the youngster originally from there was so strong that we were all moved. It was an unforgettable moment.”

Nerea, facilitator in Espacio Open Bilbao

“It’s a motivational project, group dynamic and collaborative, with very diverse synergies among agents.”

Iris, educator in Tinkerers FabLab

“A new world, which for me never ceases to surprise. It’s a wonderful opportunity to be in touch with 3D and digital manufacture, I feel it’s useful and has many opportunities. It can be applied to an infinite number of things.”

Juan Carlos, facilitator in FabLab Sevilla

“A tough experience, it demands that you have a double measurement with your habitual way of seeing workshops, and with what you want to create so that they have fun.”

Breaker moment

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Members of the Alumni Community

The creation of an alumni community is the natural response to the wish to turn what starts as an educational project into a project with greater impact which happens in the itineraries and processes vital to the young people who participate.
Members of the Alumni Community

There are different options linked to Breakers for the young participants to continue connected to Breakers and FabLabs once the training has finished:

- **Training itinerary fulfilment**
- **Participating in concrete activities**
- **Volunteering in carrying out the courses**
- **Association in Maker spaces**

Experiences

Ana, participant in MakeSpace Madrid

“We would like to go back to MakeSpace. We are trying to get together all the time to go, see each other and meet up again.”
Members of the Alumni Community

1st National convention of young Breakers

The 1st young Breakers convention took place on the 3rd and 4th of November in MediaLab Prado Madrid.

30 young people who had previously participated in the Breakers program took part in the event. From cities such as Sevilla, Valencia, Bilbao, Madrid, Barcelona and Castelldefels.

Over the two days the young people were protagonists in various workshops and activities, they also took part in the Mini Maker Faire in Madrid where they had the opportunity to show their projects.

Experiences

During the meeting the young people had the opportunity to strengthen links with other Breakers and continue acquiring new tools to be more fluid in the digital environment.
Volunteering

The Breakers voluntary work program offers the whole world the opportunity to live a Breaker experience by getting immersed in the workshops and accompanying the young people in their apprenticeship.
Volunteering

The Breakers voluntary program was created with the purpose of offering support to the spaces and facilitators who participated in the training.

Volunteer roles:

**General support**
Help with the documentation of processes, projects and activities.

**Pedagogical Support**
Help in the creation of content and accompanying the young people.

**TIC Support**
Help with tasks such as machine maintenance, TIC assistance and dynamics.

**Translation Support**
Facilitate the communication between teachers and the young people.

Ana, volunteer in FabLab VLC
“It is strange to see the reaction of each of the youngsters when experimenting with new things, they come to classes happy and wanting to do the courses and that is enormously encouraging.”
Platform and diffusion of knowledge generated

Platform breakerslab.org

Educational activities

Breaker protagonists

Resources

Breaker projects

FabLabs & makerspaces
Breakerslab.org, an online platform to share general knowledge generated in Breakers.
Breakers platform offers resources and activities related to digital creation and manufacturing for educational contexts.

Their objective is to bring resources to facilitate access to innovative digital tools and technology to the young people and people around them.

Through the platform you can also get to know the protagonists of the program and their projects.
How do we design and test activities?

Before
Define and foresee
Educational objectives.
Strategies for dynamics. Skills.
Indicators for evaluation.
Integration of different techniques.
Tools and materials.
Times and organisation of spaces.

During
Testing and evaluating
Processes.
Cooperation dynamics.
Self-learning Mechanisms.
Skills.

Afterwards
Technical and pedagogical documentation
Steps and reflection about approach, dynamics, and processes.
Files, designs, photos or videos.

Educative Activities
Proposals and design of activities tested during Breakers courses and shared on the platform.

Activity themes:
- 2D, vectorial design, cutting and engraving
- 3D, modelling and 3D printing
- Electricity, electronics and programming
- Dynamics and challenges
- Over 50 activities
It is also possible to come across all types of initiatives and resources which serve as inspiration to introduce in the world of creation and digital manufacture in educational areas:

- **Software**: MakerEd
- **Online platforms**: hackster.io
- **Inspiration and projects**: more than 35 activities
- **Introduction to the maker world**: Publications
- **Classes and tutorials**:
Platform

Projects

The platform shows the creations, prototypes and solutions developed by the young Breakers during their training.

more than 20 projects carried out
more than 10 Entities participated / benefitted from them

Javi
TinkerYak project group

“We are thinking about continuing with more prototypes because it’s a very interesting subject. In addition, it is open to everybody, whoever wants to contribute something and help us continue.”
Dissemination of the program

Dissemination

Events and fairs

Conventions

Awards

Pasos y reflexiones sobre planteamiento, dinámicas, procesos, motivación

Incluir archivos, diseños, fotos o vídeos
Dissemination of the program

Events and fairs

Breakers participants has shown some of their creations in events like Maker Faire in Bilbao, Maker Faire Barcelona and Mini Maker Faire Madrid:

A Maker Faire is an open display of skill and creativity, a showcase of inventions and ingenuity designed for all audiences, as well as a celebration of the Maker movement.

These fairs are meeting points for people from the world of creation and digital manufacturing and they concentrate all kinds of curious people who come from the most diverse disciplines and who enjoy learning and sharing what they do.
Dissemination of the program

Conventions

On September the 16th Breakers celebrated its 2nd year by participating in the “Learn 2 Teach. Teach 2 Learn” convention organised by the Fundación Orange.

The event, took place in La Casa Encendida in Madrid and was dedicated to new educational proposals which use digital tools in order to favour the learning process, autonomy and emancipation of young people.

Master Class

Two experts in STEAM education presented a master class and offered several workshops: Susan Klimczak, Education Director of the South East Technology Center de Boston, and David Cuartielles, Co-founder of Arduino.
Dissemination of the program

Awards

The Breakers program was awarded by the jury prize in the ‘International Challenge’ ‘I make 4 my city - Sport for all’ contest, organised by the Fondation Orange from among more than 60 fablabs in 11 countries.

The competition selected the digital creations designed and created by the young people in the FabLabs, offering the possibility of creating digital solutions to be adopted by cities of the future. On this occasion the purpose was to create a solution to develop the practice of “sport for all”.
Next steps

Looking towards 2018

This coming year, Breakers will continue developing the following lines of action:

- Continue to train new young people through Breakers and give continuity to the previous ones with OpenBreakers.
- Promote and extend the Breakers alumni community.
- Expand the open source repository with new activities.
- Support the creation of new training itineraries around digital manufacturing.
- Offer Open Days format or open days to have a first contact with the FabLab world before starting the course.
- Consolidate the training program in current spaces and gradually expand to new spaces.
- Strengthen the communication of the program
For me, Breakers, make a new world means...

discover new things, discover other worlds

Kahlid, young Breakers participant
Breakers is...

Ingenuity, craftsmanship and unity. Ana

Learning, collaborating and teaching. Leo

Innovation, education, disruption. Borja

People, creativity and future. Manuel

A project by:

Fundación

Collaborators:

Fablabs and Makerspaces: