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# Research for educational making activities

An overview from Europe

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**M**akerspace  
for **I**nclusion



# Makerspaces4Inclusion project over a period of two years we will produce one set of open educational resources which are based around the maker field and digital fabrication.

Who made this research?

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This research has been made by the consortium of the European Project, Makerspace for Inclusion N° 2018-I-BE0S-KA205-002425, with the participation of the following associations:

Digijeunes (France), Timelab (Belgium), Horizonlab (Italy), Nod Makerspace (Romania), MakerConvent-Trànsit Projectes (Spain).

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Digital Edition

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# INTRODUCTION

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Research for educational making activities

*“The maker movement itself is founded on a philosophy that values the sharing of diverse knowledges. It is an extension of the do it yourself (or DIY) movement and places great emphasis on learning-by-doing, conscious and critical consumerism, the democratisation of knowledge and technology, and experimentation and innovation through the use of shared resources.”*

Dale Dougherty

# Overview about making in education?

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## Research for educational making activities

### Why this research?

Over the last decade, we witnessed an unprecedented boom of communities engaged in do-it-yourself (DIY) activities worldwide. These hobbyists, engineers, artists, designers, hackers, and craftsmen are exploring new ways for personal and social expression by hacking and remaking their physical world as they see appropriate. Events such as the Maker Faire or the European Maker Week, supported by the European Commission, are having an important role in promoting the so-called “maker culture”. Additionally, more and more specialized magazines and blogs, as well as, scholarly publications emerge addressing “making” from a range of perspectives, also spaces and activities around Europe.

The Maker Movement is a community of hobbyists, tinkerers, engineers, hackers, and artists who creatively design and build projects for both playful and useful ends. There is growing interest among educators in bringing making into education to enhance opportunities to engage in the practices of engineering, specifically, and STEAM more broadly.

FabLabs, Hackerspaces and Makerspaces can be seen as the physical representations of the maker movement. These unique spaces seek to provide communities, businesses and entrepreneurs the infrastructures and manufacturing equipment indispensable to turn their ideas and concepts into reality. For example, these spaces make designing

new, highly customizable, devices risk-free and low-cost. Equally important, these open spaces serve as a physical place where individuals can freely gather and share their experience and expertise.

This research work follows an overview from the making education ecosystem around the countries of the consortium involved in this project. We found some elements of the Making Education necessary to a better inclusion of the young in this movement:

- 1) digital tools, including rapid prototyping tools and low-cost microcontroller platforms, that characterize many making projects;
- 2) community infrastructure, including online resources and in-person spaces and events; and
- 3) the maker mindset, aesthetic principles, and habits of mind that are commonplace within the community. It further outlines how the practices of making align with research on beneficial learning environments.

# Makerspaces 4 inclusion IO-1 Research

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Research for educational making activities

**This research work follows a overview from the making education ecosystem around the countries of the consortium involved in this project.**

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## Research for educational making activities

**This analysis will be divided into two parts.**

Firstly, a deep analysis of respondent's organisations. This first chapter will answer questions such as: which are the organisations that took part in the google form? where are they from? their scope, etc.

Meanwhile, the second section will be focused on the subject of making education and digital fabrication with more qualitative data such as the involvement in the creation of contents in Making Education and Digital Fabrication and its kind of activity, the thought of the respondents about this theme, their perceptions and their environment as well as their motivations.

### **Analysis of the organisation Type of respondents**

There are two types of respondents in this questionnaire: representative of an organisation/ institution/ collective, and representative/ member of a project. The latter gathered only 3 votes out of the 23 possible, representing therefore only 13% of the respondents. While representatives of an organisation/ institution/ collective are the majority with 87% of the votes (20 votes out of 23).

### **Organisations and country/area**

On the 23 respondents four shared the same institutions. Therefore, there is only 21 organisations from four different countries, all European.

Those organisations are:

- Digijeune from France with two respondents
- Timelab from Gent, Belgium
- De creatieve Stem VZW from Belgium
- Eematico form Bucarest, Romania
- Budalab form Kortrijk, Belgium
- Makerspace pxl UHasselt for Hasselt, Belgium
- Castii for Fabla iMAL form molenbeek, Belgium
- Fablab from Belgium
- Makerconvent from Barcelona, Spain
- Colectic form Barcelona, Spain
- Fundació privada Pare Manel from Barcelona, Spain
- Soko Tech from Barcelona, Spain
- Ateneu de fabricació de la Fabrica del sol from Barcelona, Spain
- Ateneu de fabricació de Ciutat Meridiana with two respondents from Barcelona, Spain.
- Espai jove casa Sagnier from Barcelona, Spain
- Centre Civic Guinardo from Barcelona, Spain
- Centre Civic Vil·la Urània from Barcelona, Spain
- Fab casa del Mig Punt multimedia from Barcelona, Spain
- Bits& Books from Barcelona, Spain
- Ateneu Fabricació les corts form Barcelona, Spain
- Barcelona activa from Barcelona Spain.

In conclusion, we can see that there is a growth of activities regarding educational making.



# On-line research

Research for educational making activities

## On-Line Form

24/3/2020

Making education research



**MAKERSPACES4INCLUSION**

RESEARCH FORM

## Making education research

This form is part of the research process of the European project "Makerspaces4inclusion" 2018-1-BE05-KA205-002425. We believe that the maker movement can also play an important role in fostering inclusion of disadvantaged youth. Through making and tinkering, as well as engaging with communities of makers, young people may in fact be able to develop the necessary resources to tackle their disadvantage.

This project is managed under the consortium of Timelab, Digijeunes, NOD Makerspace, HorizonLab and MakerConvent.

If you need to contact us please write to : [makerspaces4inclusion@gmail.com](mailto:makerspaces4inclusion@gmail.com)

**\*Obligatorio**

### I Accept Personal Data Protection \*

This form involves the collection and processing of personal data. In compliance with The General Data Protection Regulation, in effect on May 25. This consortium has established a clear and precise policy for the protection of personal data. Any collection of personal data, especially as a result of any registration is done with your explicit consent to such collection and processing by this consortium of the disclosed data. Your personal data shall be kept for no longer than is necessary for the research and project purposes for which it is being processed. Your data will be deleted after the end of the project in 2020. You also accept to subscribe to the newsletter. At any time you can unsubscribe to the newsletter or modify your data. This consortium does not transfer your personal data to third parties.

Yes

No

Name and surname \*

Tu respuesta



# Scope

## Research for educational making activities

### What scope of work does it cover?

The question was “What scope of work does it cover?” and almost each participant gave more than one answer to this question. Indeed, the 23 respondents have chosen 61 answers, which means approximately 2 or 3 answers for each participant.

Answer for scope	Number of time chosen	% for number of choice	% for participant
Cultural	11	18,03	47,23
non-formal education	17	27,87	73,91
Socio cultural	15	24,59	65,22
Informal education	7	11,47	30,43
formal education	7	11,47	30,43
Community education	1	1,64	4,35
consultancy services and technological advice for entities of the third sector	1	1,64	4,35
Devolepment of project	1	1,64	4,35
Project of social innovation	1	1,64	4,35

# Analysis on the subject of Making Education and Digital Fabrication

## Research for educational making activities

### Aim(s) of activities in relation to Making Education or Digital Fabrication

Answer for aims of the activities	Number of time chosen	% for number of choice	% for participant
Design and creation of activities	17	26,56	73,91
Public promotion	7	10,94	30,43
Professional training	6	9,37	26,09
Workshops by age and difficulty	14	21,87	60,87
Host activities	12	18,75	52,17
Co- creation	1	1,56	4,35
Collaboration in cross over teams	1	1,56	4,35
Design and creation of contents and materials	1	1,56	4,35
Discussion/ debate space and workshops on education maker or digital manufacturing	1	1,56	4,35
In development of a community center maker focuses on (pre) professional training	1	1,56	4,35
Personalized attention	1	1,56	4,35
Technological training of different collective and personal	1	1,56	4,35
We help the development of innovation projects that come from any citizen, entity, university, school... we adapt ourselves to each project. We have no age limit.	1	1,56	4,35

# Analysis on the subject of Making Education and Digital Fabrication

## Research for educational making activities

### Involvement

The question to be answered was whether the organisation is involved in the creation of contents in Making Education and Digital Fabrication. Only three different responses are possible yes, no or in process. The majority of the respondents (78,26%) are involved in such activity. Four participants are not involved, that to say 17,39%. One organisation is in the process to become involved, representing 4,35%.

### Kinds of activity

When asked “what kind of activity do you do?”, the participants answered, most of the time, by multiple responses. Indeed, there is a total of 69 choices for 10 answers possible and 23 respondents.

Kinds of activities	Number of time chosen	% for number of choice	% for participant
Afterschool activities	16	23,19	69,56
Workshops for other entities/ associations/ museums/ administration	14	20,29	60,87
Holiday time activities	10	14,49	43,48
Family activities	10	14,49	43,48
School workshops	12	17,39	52,17
Libraries workshops	3	4,35	13,04
Open lab day for individuals	1	1,45	4,35
Support to makers and entrepreneurs	1	1,45	4,35
We have pedagogic program of social innovation and for family. The activities pedagogics are realized during school time. The innovation ones are in the user's schedule	1	1,45	4,35
Activities for adults	1	1,45	4,35

# Analysis on the subject of Making Education and Digital Fabrication

## Research for educational making activities

### Some comments of the respondents about the educational impact of the maker movement.

- Useful to engage boys and girls, kids can reach a certain level of independence (know how to use tools, etc.) pretty rapidly.
- I believe digital fabrication and making education are important in that they complement formal education and appeal to those who might have a more practical rather than theoretical approach towards sciences
- **important new skills, but also shows the fact that flipped classrooms and informal education are concept we need to embrace.**
- Flashy spaces and shiny toys in makerspaces are enticing, but it takes time and explicit scaffolding to develop a true Innovator/Maker. Building and providing the space for tinkering and making to happen is one thing but nurturing a mindset that gives the mental tools to engage in making is a larger and time-consuming endeavor. I think that we could summarize the power of making education in a couple of very well-known quotes: **“Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results.”- Dewey**; “I hear and I forget. I see and I remember. I do and I understand.” – Confucius
- It’s the best way to help children understand most of the concepts they learn in school, kindergarten and life.
- **The reverse way of teaching children is the base.** It is about learning how to learn. 3D printing, Q&D prototyping, laser cutting, Design Thinking, ... are tools to help you in this other way of teaching!
- The future
- Excellent
- Of course, we think it is the future
- **I think is an opportunity to learn new creative methodologies with lots of linked contents (technical competences, artistic, transversal skills...).**
- **That it is a movement not only at an educational level but also socially, economically, industrially, and technologically, where many currents and trends come from far away, from the movement of free software to the movements of pedagogical renovation or political-social currents that all of them as a whole pose structural paradigm changes in many areas.** It is part of an unstoppable social transformation, necessary and clearly positive for human development.
- **“A discipline to be introduced in all educational spaces.”** Present and technical methods and present in both the social and professional spheres, it would be necessary to work for the accreditation of formations (Certified Professional Formats) for “low-average qualification” maker profiles.
- **As Maria Montessori said: “Hands are the instruments of human intelligence”.** At SokoTech we think that learning by doing and by experience is the most powerful way to learn, intellectually and emotionally!
- There is an increasing interest in taking it to practice from schools and town halls. On the other hand, **culturally a large part of society is not used to thinking about projects, prototyping, making spells and learning from mistakes, so several times the relationship between**

# Analysis on the subject of Making Education and Digital Fabrication

Research for educational making activities

**education and digital manufacturing remains superficial.**

- **It is a way to facilitate the generation of technological vocations**, an opportunity to motivate and empower citizens in general.
- **It is interesting to know how to adapt to new methodologies, participate in this emerging collaborative culture and share / generate content in relation to it.** I think that both digital manufacturing and education maker will go in augment and you have to start acquainting yourself in all areas.
- The world of Maker and DIY is just beginning and endowing people with a capacity for creation that has never been had before.
- **It is important to include it in the curricula.**
- “We have all studied and we have lived boring theoretical classes ... I believe that education maker revolutionizes the learning model in all subjects, and makes learning a fun and practical experience in the first person and working as a team while overcome practical challenges by applying the theory ... **Maker education offers alternative teaching methods based on Learning by Doing thus creating small inventors!**“
- I believe that the values of the maker movement and the process of technological democratization in recent years are an excellent starting point to promote new educational dynamics, both in the curricular and extracurricular fields.
- **Digital manufacturing is a good tool for project development and prototyping.** The maker education is positive so that the students can know these tools and also learn a responsible use of new technologies. Therefore, we

try to carry out projects that are based on real needs, that improve or help in people's lives.

- It is the means of generating and encouraging vocations and concerns, through the motivation and interest of people, cross-curricular and curricular skills that awakens creativity and self-realization through practice.
- **Learning on the basis of experience is necessary for an optimal learning process, on the other hand, stimulates curiosity in areas of study that are very necessary in today's society, submerged in a process of technological transformation.** And on the other hand, it enhances the fact of not only being consumers but also producers.

# Analysis on the subject of Making Education and Digital Fabrication

Research for educational making activities

## Perceptions in environment about making education.

- **it's getting more and more popular, as there are more and more fablabs/makerspaces that run educational workshops.** Activities tend to be limited, and across France maker activities are pretty much the same everywhere.
- **neighborhood: not that active, city: the city has a few initiatives but it remains timid, the region has quite a vibrant maker ecosystem in particular in Nantes,** the country has one of the most developed ecosystems.
- far too rigid, not enough play and creativity.
- It intrigues, motivates. But still not used to its full potential. **There is a lack of experienced and passionate instructors and a chronic lack in willingness to invest in making education by professionals.**
- **In Romania, the public and organizations have opened up and started adopting trends from the outside, but local creators are still looking for their voice.**
- **I think the region of Kortrijk is an example for other regions.**
- Not sure what is meant here?
- yet no answer so far
- **Most of the other Fablabs in Flanders center on higher education students.**
- **I think we have a growing scenario in every city, in all the country.** Fathers and mothers pushing children to learn robotics or 3D printing, but we need very well-prepared professionals (teachers, facilitators, volunteers, educators, technicians). Trained with pedago-

gical assets, technical assets.

- **It is present in many areas, more and more of them, however many people in situations of social exclusion, or at risk of being, continue to have access problems to this and many other resources, for many reasons.** The digital, economic and social divide is still present in the 21st century.
- **"In socially disadvantaged environments (neighborhoods) we are far from FD and MS entering the agendas of sociocultural trainers and facilitators, we are going to try it, the more institutional devices (Athenian Manufacturing Networks), although they work to bring the layers closer together. popular of the population, are not yet perceived as devices that respond to the needs of these groups. At a city level, the evolution is great, but I think it risks increasing the digital divide".**
- **In Barcelona, we are very lucky with a super-rich panorama in this field!** A thousand thanks to the inspiring and precursor work of MakerConvent in digital social innovation in the Maker field in Barcelona: D
- **It costs that the people who are not related to the world of art, design, technology, architecture ... see the useful application of digital manufacturing beyond the anecdotal: "I make a key ring".**
- **A lot is missing so that it really reaches all citizens.**
- **There is growing interest in the subject.**
- **These technologies and ways of acting little by little are becoming known.** The next step is for users to truly create them and give them real use.

# Analysis on the subject of Making Education and Digital Fabrication

Research for educational making activities

- There are several projects.
- **“I understand a maker not as the great computer engineer / expert in new technologies, but as a craftsman who is able to devise, create or improve projects with the resource makers that we have.”** We are fortunate that our equipment is in Sants, a neighborhood with a working tradition, full of factories and cooperatives, in fact, our own space is located in what was the largest textile factory in Spain! The existence of many cooperatives also makes it possible to recover the philosophy of sharing resources, making the spaces makers are no strangers to the citizen, and where the great strength of these, are not the machines or the resources, but the knowledge that we are exchanging among all of them, some contribute needs, others ideas and others the experience! of city, little by little we continue working to create a solid network of people and resources among the spaces makers that we have. and us and sharing projects to carry out more ambitious and spectacular creations / solutions. At the regional level and also at the city level, I believe that these spaces makers should be invested in and implemented in all schools in the country, providing them with one more resource for students. Normalizing the use of these tools and without temporal or displacement limitations, as it happens now.”
- **“There is a growing awareness of this type of activity, and an increase in interest, but often in out-of-school settings it is too much assimilated (especially in the case of parents who want their children to make the wrong call” “Robotica” “) commercial products (LEGO, commercial educational robots, etc.) that are still very interesting tools are used - although it seems contradictory - as creative and limiting elements of creativity at the same time,**

**since they provide a frame of reference (with the LEGO you can do infinite things, but the pieces fit in a concrete way between them, for example) that makes life easier for the teacher / monitor, but at the same time limits creativity to the students. our environment (Barcelona) there are many initiatives both public and private related to the maker education and although you can always do more and better things, there is a very solid community and solvent.“**

- **“Within the territory of Les Corts, which is where we are located, the citizens know the project and the reception is very good, due to the proximity to the Universities we also have regular students from the UB, as well as entities with special needs.“**
- **It is the present and future for all those people who have the necessity and the inquietude, but the territory and the needs of each person make it prioritize other basic needs.** Having resources to bring digital manufacturing closer is important to democratize and facilitate the resource, so that it is available to everyone.
- I think they are being introduced little by little into society and there is still a long way to go. **I consider it necessary to make a change at the level of consciousness in order to realize the social impact that it implies and promote training / education actions that can reach all types of public and social status.**



# Analysis on the subject of Making Education and Digital Fabrication

## Research for educational making activities

### Motivations for development making education activities.

- It stimulates critical thinking with regards technologies, development, and innovation in general.
- My motivations are multiple and include: **teaching youngsters about sciences and maker activities, helping shape the future of education, empowering people, creating opportunities, bringing people together, happiness.**
- “I believe that each person should get possibilities to develop into a critical thinking individual and should train all the possible quality that will allow her or him to be flexible and adaptable to what the future will be. **Making and digital fabrications are tools to a greater mean.**”
- **As creators and purveyors of education it helps us along the lines mentioned above as well as helping with development of practical skills, curiosity, self-confidence, resource management, design thinking, etc.** Skills like those as well as the open mind this method fosters are critical for preparing children for the challenges and constant changes of life in XXI century.
- **To help the design thinking way of working/teaching/...**
  - I the world of tomorrow you cannot go around Making.
  - **Learning from each other.**
  - **Our aim is to bring STEM education to primary and Middle schools.**
  - **I believe in to introduce the digital fabrication like new skills to create new artisans, combining digital competences and craft creativity.**
- **The social transformation.**
- **Dissemination and implementation of a cooperative way, awakening scientific vocations, renew commitments with education, object-oriented training, development of competition for new jobs.**
- Give tools to people in order for them to create and learn.
- Teach people to think about how to develop a Project and be self-sufficient.
- **Facilitate access to citizens to digital technology through knowledge, information and training, facilitate technological tools for creation and transformation.**
- **It is a topic that generates interest in the users of the centre.**
- **From the Center Cívic we believe that making these tools known to the users and neighbours of the neighbourhood is one of our priorities, due to the empowerment that this entails in the users.**
- It is the speciality of the work center.
- “As a child, I was fascinated by people who practically passed on knowledge and taught me new ways of understanding the world.” **The main motivation, totally personal, is the satisfaction that I get to see how students get excited and see how far they can go. I am a teacher for many years and I see the difference of attitude of the students when I do master class-monologue, with boring and disconnected faces ... and how that attitude changes when we pass to the practical part, where they enjoy and motivate themselves! I believe that learning is to find the little inventor that we all have inside, almost like the**

# Analysis on the subject of Making Education and Digital Fabrication

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## Research for educational making activities

Little Prince! And it is a great responsibility to train new generations that will make our world a better place. Another of my great motivations is to normalize the equality between girls and boys in the world of technology and engineering. From my experience ... I think there is still a lot of work to be done! We still have to respect ourselves, listen and show what we are worth ... I hope that with everyone's work this will change soon! And a little secret ... do you know why I love doing maker activities? Well, because it's when I learn the most! Whether it's preparing new challenges for the children, as well as everything they teach me later!"

- Create meeting points to enhance creativity and knowledge, empowering people to have resources to transform their ideas and projects into realities.
- "The Ateneu is dedicated to digital manufacturing within the social sphere, it is an equipment that brings new technologies to the citizen who wants to develop an idea, whether for a business idea and to cover a special need that the serial manufacturing It is not within your reach, we are dedicated to inclusion, in all its aspects."
- **"Community intervention, promote digital manufacturing in women, enhance cooperative, creative and collaborative learning Work for projects the methodology"**.
- Train people in these areas and accompany them in the social transformation we are experiencing.

# ANNEX

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# Participants

## Research for educational making activities

Times-tamp	Name and surname of respondent	Name of organisation	Website
26/02/19	Pep Oliveras Escura	COLECTIC	colectic.coop
27/02/19	Xavier Capdevila Torné	Fundació Privada Pare Manel	www.paremanel.org
08/03/19	Mariona Aloy Ciller	Soko Tech	Soko.tech
08/03/19	Ateneu de Fabricació	Ateneu de Fabricació de la Fàbrica del Sol	<a href="https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/educacio-i-capacitacio-digital/ateneus-de-fabricacio">https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/educacio-i-capacitacio-digital/ateneus-de-fabricacio</a>
11/03/19	Laura Mendoza Diaz	Ateneu de Fabricació de Ciutat Meridiana	<a href="https://www.facebook.com/AteneuFCM/?ref=bookmarks">https://www.facebook.com/AteneuFCM/?ref=bookmarks</a>
11/03/19	Raquel Somavilla	Espai jove Casa Sagnier	<a href="https://ajuntament.barcelona.cat/espai-jove-casa-sagnier/ca">https://ajuntament.barcelona.cat/espai-jove-casa-sagnier/ca</a>
11/03/19	David Ladó	Centre Civic Guinardó	ccguinardo.cat
11/03/19	Marta Campos	CC Vil·la Urània	<a href="http://ajuntament.barcelona.cat/ccivics/vil.laurania">http://ajuntament.barcelona.cat/ccivics/vil.laurania</a>
13/03/19	Belen Fernandez	FAB Casa del Mig Punt Multimèdia	www.puntmultimedia.org
13/03/19	Ferran Fàbregas	Bits & Books	bitsandbooks.tech
13/03/19	Ester Romero	Ateneu Fabricació les Corts	/
14/03/19	Elisa Soriano Rider	Ateneu Fabricació Ciutat Meri	/
29/03/19	Esther Amice	Barcelona Activa	<a href="https://cibernarium.barcelonactiva.cat/">https://cibernarium.barcelonactiva.cat/</a>
14/02/19	Simone Ferrecchia	Digijeunes	digijeunes.com
11/03/19	Paul Conversy	Digijeunes	digijeunes.com
15/03/19	Evi Swinnen	Timelab	timelab.org
15/03/19	Maria Cristina Ciocci	De Creative STEM vzw	decreativestem.be
15/03/19	Ion Neculai	eematico	eematico.org
18/03/19	Stan Dewaele	BUDA::lab	www.budalab.be
19/03/19	Tom De Weyer	Makerspace pxl UHasselt	makerspace.pxl.uhasselt.be
20/03/19	Jurdant Anouk	Castii for Fablab IMAL	castii.be
21/03/19	Rik Coenen	Fablab+	www.fablabplus.be
07/04/19	Oscar Martinez	MakerConvent	<a href="http://conventagusti.com/maker">http://conventagusti.com/maker</a>

# Makerspace for Inclusion

EU Project N° 2018-I-BE0S-KA205-002425



Digijeunes



HorizonLab



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