



Maker Initiative Strategy

The project “Maker Movement Establishing in Bosnia and Herzegovina and Strengthening in the Visegrad Region” is co-financed by the Governments of Czechia, Hungary, Poland and Slovakia through Visegrad Grants from International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe. The Project has been implemented by the Association FabLab Bosnia and Herzegovina in cooperation with partner organizations: Association Robisz.To (Poland), FabLab Budapest (Hungary), AGNICOLI (Slovakia), Make more (Czech Republic).



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1. Formal Education

Scope of activities:

Maker spirit as a value could be cultivated from an early age - primary and secondary/high schools. Especially because of the target-oriented projects which making and tinkering leads to strengthening curiosity, responsibility, purposefulness, diligence and team work.

Nonetheless, an important environment is the university field, where much stronger emphasis is given to the students' independent choice because many of the students' projects are aspiring to the spin-off or startup idea in the end. So, there is potential to convert makers to the market in a sense of new business development and the creation of job positions.

Opportunities

In general, BiH could see the lack of enthusiasm and ambition among young people. There is a low level of entrepreneurial culture, and the country is suffering from brain drain.

There is a need for teacher support in terms of professional development, new teaching process, teaching materials and handouts in order to get STEM education present in their teaching methods.

According to the trend of investment in high-tech equipment in high school there is a great opportunity for development of new courses which could be part of formal educational plans. Prototyping technologies (3D print and so on) could be a powerful tool not only in the subjects related to IT, but also could be used for better data visualization and presentation, project-based learning, team collaboration especial in higher education. All together those technologies could be used as a support for teaching and learning methods.

Universities are lacking spaces for inventing, testing, and prototyping which could be open to all students. Usually, those laboratories are dedicated to PhD students of some certain program or department, but the power of such labs is in the sharing among the others. Key activities are those which are connected to collaboration with university professors as they have direct contact with students and are able to motivate them. Thanks to the technological background which could be given by such a lab, the transfer of knowledge from the industry could be smoothly applicable.

Specific activities

Special training for lecturers and updated support materials with specific projects and other related content that can be used as an exemplar project database could be delivered by professionals from fablabs or makers community. Also, special events could be organized as regular gatherings for teachers following this focus with the aim of sharing the best practices.

Even before sharing good practice and inspiration there might be a need for some kind of FAQ on maker movement which could easily answer basic questions teachers can have in the beginning.

One of the best ways of promoting the maker movement phenomenon is the popularization events. Mainly school maker faire organized as a selection of student works could be an interesting event to begin with. Also, other events like pop-up fablab for example could be for many students first contacts with prototyping technologies.

There is also the possibility to open the accredited university class/course that leads to ECTS.

Formal education working group could be set up as a platform connecting active stakeholders among universities (maybe also among high schools) in order to develop the process of innovation and implementation of changes in curriculums. This working group will be a relevant partner in a discussion on policy level (communication towards ministries, companies, and other authorities.)

Questions and call to actions:

- Are there any funding schemes for schools to get the new equipment?
- How to address current lecturers on higher education and deliver the sufficient knowledge?
- How to promote the example of good collaboration between companies and universities to stimulate the others to raise awareness about that? Promotion of impacts.

2. Informal Education

Scope of activities:

The greatest role in this area is played by activities developed in the field of workshops, professional clubs, and educational leisure institutions. It is necessary for these activities to be able to ensure a continuous contribution to individual events or to the operation itself, so that they can be educated and professionalize their educational activities. Although they do not seem to be, they are the focal points of the infrastructure, as they stand on the border between official educational institutions and individuals who pass on their knowledge.

Therefore, it makes great sense to provide systemic support for the creation of open workshops, makerspaces and fablabs, which democratize access to technologies, provide them with the necessary training. Natural in its way of functioning, it creates an informal community of people around them who perceive knowledge sharing as the basis of their culture.

Opportunities:

One great opportunity is addressing existing training centers and helping them understand the new opportunities associated with the development of the maker movement. Explain that innovation in education towards STEM can bring new applicants and interesting representative outputs. These can be shared and form a knowledge base accessible to all. These traditional places should be able to expand their offer with just such types of courses and activities.

However, this opportunity is necessarily associated with the need for retraining and education of existing lecturers working in this sector of non-formal education, especially in these areas - 3D printing, 3D modeling, 2D graphics, basic programming, working with development kits, working with CNC, etc. relevant soft skills. There can be many ways, such as online using Youtube webinar tutorials and articles, or trying to educate offline. For example, create a training center that will be able to handle these activities. An interesting way can be the use of existing fablab (e.g. Fablab BiH), which has the technology, or other similar workshops in the country.

There are also internationally certified programs (such as FabAcademy) that can be adopted and offered as a comprehensive educational tool run by the worldwide recognized research institution. (In this case MIT.)

Specific activities:

Targeted construction and the creation of robust content with the theme of maker movement can lead to an easier understanding of the wonderful world of creativity, invention and forging, to greater motivation to start and to the sharing of patterns and typical procedures. This includes content in the sense of video tutorials, tutorials and workshops, as well as sharing tutorials both among professionals and in an attractive way between complete beginners and the general public. (PrusaPrinters, Instructables, Thingiverse, Postavte.si apod.)

Practical connection between leisure time and learning could be realized in the summer city camps happening during the holidays. It is an attractive way to catch kids' awareness and at the same time be able to teach them complex knowledge of prototyping and tinkering. In one or two weeks, kids are able to give a try to all important technologies and handle basic principles applicable to other spheres of life.

For alliances we strongly recommend connecting with other informal education agencies and networking to be able to gather and articulate common needs on a national level. There are many youth organizations, but not only the young people could be the target group for such activities. Seniors, ethnic minorities, excluded communities... all those cultures are potential receivers of informal education.

Questions and calls to actions:

- Who will be able to sponsor such activities? In which form there is a possible collaboration?
- What kind of informal education activities do we have now on the table? How do they cluster? Who is delivering them? Is it possible to connect with maker activities?
- Is there any grant scheme on national/regional/local level to support these topics?
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3. External Cooperation

Scope of the activities:

The chapter external cooperation is meant to be mainly the listing of possible crucial partners that could help to build up a solid background of maker movement development in BiH. It is needed because such partners as industry leaders, public organizations, policy bodies or governmental departments are able to declare the importance, impacts and give great examples of collaboration to be followed by others. Thus, the understanding of support importance will be easily spread and new potential collaborations emerge.

Opportunities:

From the perspective of public support, the make movement is usually difficult to classify as it is something between education, entrepreneurship, innovation and creative industries or traditional culture. It also contains the features of democratization and social inclusion activities. In other words, there are hardly any categories in public support to fit in. So, the great opportunity is to start to do advocacy toward opinion makers in public administration in order to create their understanding of why it is so important. Once the first examples of support will be successfully implemented it could be taken as a precedent - referential use case to follow in other situations (other cities, regions etc.)

Similar opportunities with advocacy and promotion could be seen in the relationship with private sponsors. There are many companies which could benefit from the collaboration with makers, maker events such as maker fairs or directly with fablabs or makerspace.

Specific activities:

Maker Faires and similar events are the great example of gathering of enthusiastic and curious people with passion to learn, experiment, innovate and share. It becomes naturally attractive for these kinds of people. Those categories are relevant for the HR department seeking new employees, so it is a pretty good environment for headhunting or offering job opportunities. And it contributes to job creation.

Also, the brand activation possibilities for companies that are looking for a wide target group of families, middle aged professionals or students and youngsters are represented by those events. From an outside perspective - the connection with maker movement activities creates interesting and credible positioning of the company brand.

In the collaboration with private sector and tech companies could be seen also a business aspect - for example the fablabs (by their focus, knowledge and equipment) as a partner for outsourcing innovation and prototyping activities that could be difficult to get within the companies in the stage of ideation of new product or service. Or also in the stage of launching the series production when the product needs to be optimized for such a step.

If the government is looking for a way to support the entrepreneurial spirit, STEM education and competitiveness, the fab labs could play the role of an arm's length organization for such a purpose. This innovative environment leads to capacity building naturally. Great example could be pop-up fablab touring around the high schools, where the first touch with technologies could be offered in an extraordinarily attractive way. To pay for such a tour is an effective STEM promotion campaign.

In general, the structural support of emerging creative spaces, labs and all these kinds of innovative infrastructures is really helpful especially in the early stage when the initial investment is needed. But crucial is to understand if there is an assumption of equal accessibility that this kind of services should be for everyone, the ongoing support with covering operation cost is absolutely essential. In

this model it is almost impossible to generate enough revenue to stay independent on external subsidies.

Private resources are not always the solution as private tech companies as active supporters of the maker movement might be also affected by political instability. Cooperation with traditional institutions (partners from different fields like museums, galleries, theaters, or libraries) could also bring stable recognition of maker activities.

Questions and call to actions:

- What are possible activities that could be done to promote STEM education?
- How the maker movement and labs collaborate with traditional institutions?
- In which collaboration could actively develop positive lobbying activities towards politicians?
- By which activities could we influence the headhunting and HR processes in the private sector?

4. Presentation and Communication

Scope of the activities:

Under presentation and communication, we understand mainly advocacy and marketing and PR. These activities have different forms and are realized on different platforms. The recipients of the various types of communication differ and so need the form and content.

Opportunities:

FabLab is present and active on many of the already existing platforms and with launching the maker page the communication will be even more intense. It is recommended to cover all the social media platforms that are available, as this is where the target group (youth, young adults) are gathered. The content connected to maker projects and makerspaces is visually interesting in itself and when processed correctly, it can be also very successful on social media profiles. FabLab B&H has already established connections with traditional media and it is therefore advisable to build the strategy also on these. Also incorporating modern ways of communication such as augmented reality could help to highlight the specifics of the maker environment.

Specific activities:

The most traditional way of communication in the digital space is through the website, which provides space for general information as well as blogs and longer articles. This format seems particularly useful for the promotion of maker community, as personal stories and project descriptions can be shared there. As the website maker.ba already exists, some of the initial content might be generated from the community. The web platform is also very useful for the retention of the visitors and potential makers as well as partner presentation.

Social media presence is an important component of the marketing mix. Visuals, that can be very powerful in the case of maker environments, are the key to success here. So, investing into nice photography and video material is worth it. For sharing stories of makers, social media seems to be suitable as well. This can be particularly helpful for the initial introduction of the term “maker”. Partnerships with influencers and companies such as e.g. RedBull might be helpful in this regard as well.

Once a (social) media presence is established advocacy towards public representatives as well as representatives among companies should be approached. To raise awareness about the maker community and the topics related to it among decision makers, organizing a conference seems to be a very good step. Potential partners, politicians, representatives of educational institutions, partnering organisations and members of the international maker community should participate.

Advocacy can be also done towards the general public in the form of conferences or through PR activities. Presence in the classical media such as newspaper or TV can be aimed at introducing the term maker to the general public and highlighting the benefits of belonging to such a community. Cooperating with media partners on a long-term basis enables to introduce topics in a more structured and enhanced form.

Questions and calls to actions:

- Which of the platforms should be used to recruit makers for the emerging platform?
- Can you identify role model-makers, that would serve as an example?
- How can partners be involved?

- As a partner, can you identify your role/the role of your organization in this field?

5. Early Stage Support

Scope of the activities:

In the early stage support several groups and topics can be subordinated. We consider the activities aimed and conducted in cooperation with makers as the most important ones followed by the possibly emerging makerspaces. Also due to the fact that defining a maker can be hard and a broader definition tends to be applied, we also suggest involving the startup community among activities. Some of the activities might also be focused on the public.

Opportunities:

It is crucial for makers to have at least some kind of support in the initial phases of their projects, businesses as well as education and self-development. Given the fact that the makerspace environment in B&H is not developed sufficiently yet, there is a lack of services providing the support needed for the makers. Two main areas can be identified, and plans developed for its development. A program supporting makers who are building a business and aim to introduce a product or service on the market should be prototyped. Focus should be put on the development of makerspaces, as they are the key structure for further development and education of (young) makers. Specific groups such as women in the maker movement might be supported through special programs.

Specific activities:

Providing programs and activities that support makers signalizes for the maker community an important step. By having infrastructure for education, schooling and also other types of support, more people might decide to participate in the movement. Therefore, a country-wide network of makerspaces might be very helpful, as these serve as hubs equipped with knowledge and skills as well as the hardware needed.

Starting by developing the infrastructure for emerging makerspaces seems to be a reasonable step. This can be done in many forms. Establishing a country-wide network of makerspaces might be helpful in the communication with public representatives and commercial partners and thus help with financing the conducted activities. Those should involve consultancies aimed at all the aspects of creating as well as running a makerspace – concept, equipment, financing, staffing, program etc. There are international projects and networks where many case studies and experience can be drawn from. Moreover, FabLab B&H has rich experience from the local environment. Summarizing them in a booklet or structured steps might be helpful for many of the emerging projects. The consultations should be started rather earlier than later to avoid possible failures and misconceptions that might result in more severe problems in the future. On the example of the already emerging makerspaces in Zenica and Mostar, this could be prototyped.

Further specific steps might be taken in order to directly support the development of makerspaces. Advocacy on the national level with the aim of incorporating makerspaces into national (innovation, educational) strategies as well as advocacy on the level of municipalities might be helpful. Organizing a special event (conference) could motivate institutions to support makerspaces.

For the makers an academy might be started, that would develop their professional hard skills as well as soft skills, that would be useful for a successful launch of the “garage” project to the market. This can take place in makerspaces or using digital tools. Networking with partners and sponsors/investors might be provided by FL and its partners. Creating opportunities for public presentation will help the starting project to establish new contacts and at the same time to get feedback on their prototypes. It

is also advisable to create further platforms such as e-shop or a virtual job platform, from which makers could be hired or where they could place their ads.

Supporting special groups such as women in tech, although it is highly recommended, might be considered as a next step once the maker community is well established.

Questions and calls to actions:

- Where to find resources for supporting early-stage projects?
- Is the demand for early-stage support significant?
- How can partners be involved?
- As a partner, can you identify your role/the role of your organization in this field?

6. Mapping and Community Building

Scope of the activities:

In this area, mainly activities connected to organizing and supporting community events, cataloging, and listing (mapping) of the maker and maker-related projects, initiatives, organizations and emerging efforts in the field of FabLabs and Makerspaces are meant. We also consider networking a crucial part of the development of Bosnian maker movement and that especially in regard to the young generations, as the sustainability, creativity and competitiveness of projects is multiplied in a multidisciplinary environment.

Opportunities:

Mapping the maker community is an essential step in the endeavor of building up a community. By listing and cataloging makers and maker (space)-related projects around the country, special effort should be made to also come in contact with the researched makers. This can both help them to understand the advantages and opportunities arising from becoming part of the community and at the same time FabLab B&H and/or its partners can establish themselves as representatives and spokesman of the community. As there has been zero research done about the maker community and creative business in B&H so far, this can be a valuable asset. An early identification of strong makers in the community can be beneficial for marketing purposes as well as for further communication and establishing of strategic partnerships.

Specific activities:

Maker will be a term unknown to many, creating a robust definition is thus an essential initial step. This definition should encompass all the important aspects of the maker movement such as the passion for creation and sharing, motivation to contribute to solving problems by creating or the open-source nature of the projects and in an enhanced form maybe even a list of embraced activities. Yet it should be put in an easily understandable and embraceable form. Distinguishing between the “old” type of handy men and the “new” makers should be considered. For this purpose, flagship makers, based on whose stories and projects the term maker might be defined.

A (continuous) mapping of the maker movement should be done in a partnership with several organizations and institutions. This is both to provide them with the ownership on the emerging projects as well as to ensure a bigger reach of the mapping activities. Universities, municipalities, and other formal institutions can be a source of contacts, more importantly it is, however, the informal structures – freetime clubs, interest groups, youth organizations etc. Small locally run community events so called *meet-the-makers* events are a key to gather makers and soon-to-be-makers, introduce them to the ideas of the community and ask them to provide contacts to other makers. This snowball effect has proven to be particularly effective. The events should also be focused on the needs of the makers – inspiration, contacts, knowledge sharing.

A variety of information about makers should be gathered. Some of it can be published publicly to foster inspiration, cooperation, and awareness among the community. Some more detailed information such as state of the project, funding, experience, equipment, international dimension etc.. can be kept privately for FL and its partnering organizations and be further used internally for development of further products and services. The database should be frequently updated, which can either be automated or conducted on an in-person basis. Mapping is antecedent to the networking phase.

Online tools are very helpful in the mapping as well as networking process. An already existing website maker.ba provides in virtual form multiple opportunities for the above-described needs. Social media might be a powerful tool in this endeavor as well – groups or closed chat channels serve as a prompt form of communication among the makers as well as from FL to the makers.

Questions and calls to actions:

- Where to find resources for a continuous financing of the mapping?
- How to maximize the benefits of the mapping?
- Can local and regional community “managers” be identified?
 - How to involve them meaningfully and sustainably?
- How can partners be involved?
- As a partner, can you identify your role/the role of your organization in this field?