D3.2 Participatory Gender Actions

About this document

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List of Acronyms and Abbreviations

CA	Consortium Agreement
CCC	Chaos Computer Club
CO	Confidential
DoA	Description of Action
DIY	Do it yourself
DIT	Do it together
DIWO	Do it with others
DOI	Digital Object Identifier
DMP	Data Management Plan
DPO	Data Protection Officer
EC	European Commission
EGE	The European Group on Ethics in Science and New Technologies
FAIR	Findable, Accessible, Interoperable, Re-usable
GA	Grant Agreement
GDPR	General Data Protection Regulation
GIG	Global Innovation Gathering e.V., Germany
GIM	Grassroots Innovation Movements
IPR	Intellectual Property Rights
LGBTQIA+	Lesbian, Gay, Bi, Trans*, Queer or Questioning, Inter*, Asexual +
R&I	Research & Innovation

RRI	Responsible Research and Innovation
STEM	Science Technology, Engineering, and Mathematics
TUB	Technische Universität Berlin, Germany
VTT	Teknologian Tutkimuskeskus VTT OY, Finland
WIF	Wikifactory Europe SL, Spain
WP	Work Package
WP1	Project Management
WP2	Building the critical making knowledge-base: concept & methods
WP3	Case Action: GENDER
WP4	Case Action: YOUNG TALENTS
WP5	Case Action: OPENNESS
WP6	Evaluation, Impact, Future Implications
WP7	Dissemination, Exploitation and Communication
ZSI	Zentrum für Soziale Innovation, Austria

Executive summary

In Critical Making we study grassroots innovations in the maker movement with regards to RRI aspects. Gender - as one of the core dimensions of RRI - is examined more closely in WP3. In this work package we aim to explore the unequal gender relations in the maker movement and identify strategies on how to address the currently perceived gender bias in maker spaces.

We started our work with a collection and review of existing initiatives and programmes, on- and offline, that are aimed to engage and accept female, inter*, trans, and non-binary persons in the community of responsible innovators and makers. This work is documented in D3.1 Critical Review of Gender Aspects.

Based on these first insights we started to co-design gender-inclusive measures with representatives of the world-wide maker community in spring 2021. 12 makers participated in a series of 3 online workshops where they created a vision of gender-inclusive making and deduced potential gender-specific measures from this vision that could be realised in the Critical Making project. As a result of these ideation workshops and final co-budgeting activities the participants agreed to join forces in order to:

- Create new workshop formats for caretaker-inclusive making
- Create material that fosters the dissemination of gender diversity in making
- Elaborate workshops that support women in local communities to engage in making

Throughout the whole year 2023 these formats and materials were co-created and implemented:

- **Caretaker-inclusive making:** Format owners in Austria, Indonesia and Poland realised their ideas of events, trainings and workshops that included caretakers and their kids in making - all with a different focus but rich in experiences and inspiration for the further maker community
- **Support of women in local communities to get involved in making:** Workshops in Cameroon and South-Sudan addressed the needs of women in a

local context - either via training in making skills or via support of local female brewers in the production of hand-sanitizers.

- **Rising awareness for gender-inclusive making:** A rich set of online stories of gender-inclusive making give a voice to makers outside of the mainstream maker community and guidelines for inclusive making trigger maker space owners and individual members to reflect how making can become more inclusive in their direct environment.

- **Adaptation of the wikifactory platform:** The adaptation of the wikifactory platform to be more gender-inclusive was a planned activity right from the beginning of the project. Several adaptations have been undertaken to encourage visibility of diversity and strengthen the supporting community guidelines.

The gender-inclusive measures are analysed according to the **6 core values of Critical Making**. This was highly interesting, as this analytical lens helped us to identify the commonalities and differences between the manifold approaches and also to critically reflect how these core values can guide activities in practical terms.

In the final six project months the project team will focus on sharing the created gender-inclusive measures with the worldwide make community, collect new inputs and experiences related to the shared formats and materials and think about measures on how to maintain and scale gender-inclusive making after the end of the project. We will contribute to the scientific discourse on responsible research and innovation with a scientific publication that presents the insights from our work on gender-inclusiveness in making and technology.

Introduction

Gender aspects have been investigated in the maker movement for some years now and studies confirm a cis[1] male gender bias in maker settings across the globe (Maric, 2018; Wittemyer et al., 2014).

There are many ways to approach this topic and with many adjacent socio-cultural practices it is important to define the borders for our work. Thus, we started with an internal definition and delineation of the term "Making" or "makers" and a definition of what we as a consortium understand as Critical Making[2]:

What we mean by Critical Making

Critical Making has two aspects: the Making and the Criticality. The ***maker*** culture is a contemporary subculture representing a technology-based extension of DIY culture that intersects with hacker culture (which is less concerned with physical objects as it focuses on software) and revels in the creation of new devices as well as tinkering with existing ones (Doyle 2013; Richterich & Wenz 2017).

In our project, we define **Critical Making** along the following six core values:

- **Open:** Critical Making promotes open collaboration, including the sharing of skills and knowledge. It boosts creativity in the ecosystem of makers by making processes and results accessible.
- **Local & connected:** Critical Making is happening locally, working on the ground and adapted to a particular socio-cultural context. Thereby, critical making implies an engagement with local communities as well as global networks – thinking globally and making locally.
- **Social & diverse:** Critical Making reflects on the social dimensions of making, the living realities of those persons involved and concerned, as well as the

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[1] The word 'cis' refers to persons who identify with the gender they have been assigned at birth, whereas 'trans' refers to persons, who do not (solely) identify with the gender they have been assigned at birth.

[2] see also Deliverable D2.1. Critical Making Baseline on more information regarding the concept and theoretical embedding of Critical Making

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ethical implications of their work. Critical Making thereby addresses societal challenges and needs. This is why it is so important to strive for diversity and inclusiveness.

- **Reflexive:** Critical Making re-thinks and re-constructs the dominant mainstream maker culture from a critical stance, reflecting on underlying power structures and their implications.
- **Impactful:** Critical Making aspires to really make a difference. It seeks to improve life and build a sustainable future.
- **Joyful & meaningful:** Critical Making is still about the joy of and in making, but adds meaning to it. What is made critically is made with a specific purpose of individual or social kind.

What we mean by "gender"

The following aspects of gender are considered important for our work as a project team (see D3.1 for a longer elaboration):

- We define gender as a relational, fluent category of social structuring and relevance, which is inherently tied to power differentials and inequalities.
- We do not consider gender as binary, but as a category offering space to cis and trans men and women, inter* and nonbinary persons and those not only attributing themselves to one of these categories.
- In relation to the concept of intersectionality (Crenshaw, 1989), gender cannot be deduced as single category of interest, as at the level of individuals gender intersects with other categories of discrimination such as race, class, disability or sexual orientation.

Structure of this document

Chapter 1: We start this document with an introduction into the co-design process of the measures addressing gender-inclusiveness in making.

Chapter 2: Then we guide the reader through the variety of co-designed measures and introduce the lessons learned from each of these measures.

Chapter3: Finally we elaborate the core lessons learned related to gender-inclusiveness in making and provide a future outlook into the planned activities.

1. Co-designing gender-specific measures

The co-design process with 12 representatives of the maker community was conducted via three online workshop sessions happening in October and November 2021 (See *Fig. 1*).

Workshop 1 25/10/2021	Workshop 2 08/11/2021	Workshop 3 22/11/2021
12 participants	12 participants	11 participants
Focus: Creating a vision for gender-specific making and first ideas to support this vision	Focus: Detailing and prioritising the ideas to become concrete gender-specific measures	Focus: Co-Budgeting and planning of next steps

Fig 1. Structure of the Co-Design Process

The design of these workshops and the outcomes from the co-design process are described in the following chapter.

CORE DECISION FOR THE DESIGN OF THE WORKSHOP SERIES

First, we aimed at the participation of makers from around the world and had to consider different time zones when planning the workshops. Thus, we split the participants into two groups according to their time-zones and organised the same workshop format twice, for each of the groups. Only for the last workshop, when we co-designed the budget, we brought all participants together in one online meeting.

Second, we aimed for an open co-creation process where participants decided on their own which gender-specific measures should be implemented as part of the Critical Making project. At the same time, we had restrictions with regard to the available budget and timing that was predefined in the DoW. Thus we decided to plan every workshop session spontaneously, according to the outcomes of the previous one. And we tried to keep an eye on the realisability of the co-created gender-specific measures as facilitators of the co-design process.

1.1. WORKSHOP 1: CREATING A VISION FOR GENDER-SPECIFIC MAKING AND FIRST IDEAS TO SUPPORT THIS VISION

The starting workshop was organised on the 25th of October 2021. The participants in the workshops all had a strong stake in turning Making more gender-inclusive: either they were representatives from the case actions described in D3.1, or they represented related projects that dealt with gender and making.

There were 6 participants in the morning workshop slot, coming from Austria, India, Indonesia, Poland and South Sudan. There were 6 participants in the afternoon workshop slot, coming from Austria, Cameroon and Germany. 2 participants, who wanted to join from Brazil were excused due to illness. To avoid losing their valuable input, they were invited to reflect about the outcomes of the whole co-design workshop series and thus bring in their specific experiences.

Visions of Gender and Making

The main activity of this starting workshop was to create a vision for gender-inclusive making and deduce from this vision potential gender-specific measures that could be realised in the project.

The online meeting was facilitated by 4 members of the critical making team and used Jamboard as a collaborative working space (see Figure 2).
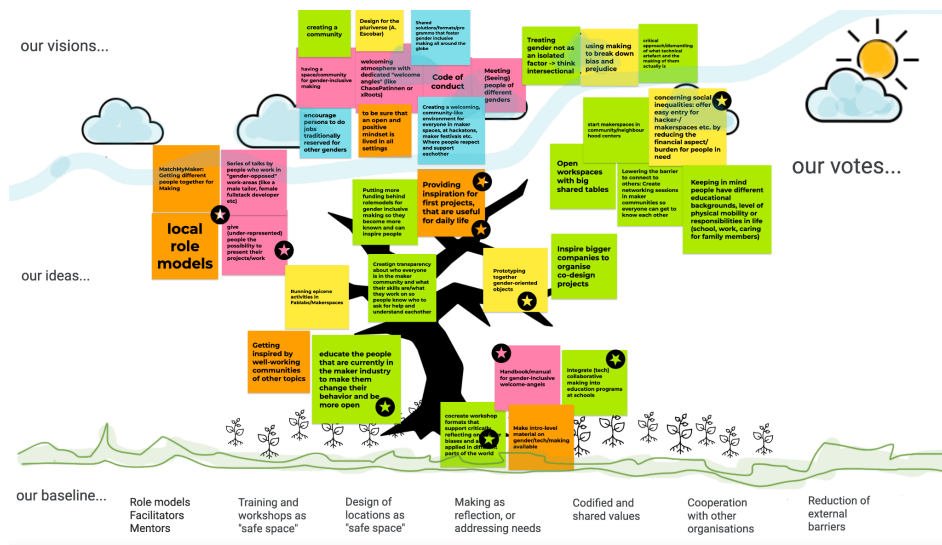
Fig 2. Vision tree of the co-design workshop

The workshop design was organised around the methodology of backcasting (Robinson 2003), creating a vision about a future ideal first to then delineate currently necessary steps to aspirate towards this ideal. In the first co-design exercise the participants were asked to open up their minds and think about the ideal future of gender-inclusive making, without restricting their ideas by potential limitations.

The question, participants elaborated their ideal future with, was: **In an ideal future, what does gender-inclusive making look like?**

In the following we have summarised the main issues that were discussed from both workshop slots.

According to the participants, in an ideal future there would be specific maker spaces which focus their work on gender-inclusive making and collaborate with each other. They would share solutions, formats and programmes that foster gender-inclusive making and thus create a community around this topic.

There would be a startup fund to support these gender-inclusive maker spaces across the globe to avoid leaving groups that are not mainstream in making, like women and girls, behind.

All mainstream maker spaces would aim for creating an open and welcoming atmosphere to people of all genders. These spaces would be open access and their

members would respect and support each other and ensure that an open and positive mindset is lived in all settings. There would be dedicated "welcome angels" to introduce new people to the maker space and members would agree on a Code of Conduct.

In the spaces making is untangled from gender identities. Everyone creates and uses tools based on their own needs and interests. The tools become gender-neutral and there are no stereotypes applied. Categorizations are overcome and thought in fluid, dynamic ways, allowing less rigid but more generous and sustainable forms of behaviour and living. Gender is not treated as an isolated factor but understood as being intersectional.

Making is used as an approach to reflect upon and break down (gender) bias. It is understood as a critical approach that allows dismantling of what technical artefact and the making of them actually is.

Making is a tool for self-articulation, self-development and empowerment. It fosters finding urgently needed solutions for issues around health, nutrition, prevention of violence and poverty. The makers are in open relation with local communities to address their needs. It is ensured that people who belong to underrepresented or marginalised groups, like young cis women, have confidence in their ideas and solutions. Young people create in peaceful co-existence and insulation, depression and exploitation is overcome through voicing critique and channelling it into amazing projects.

Concrete Ideas for Actions

In the next co-design exercise participants were invited to suggest concrete ideas, which would support the realisation of the vision on gender and making elaborated in the exercise before. After having collected all ideas, the participants were provided with the option to select three of the actions which they would like to see being supported by the Critical Making project.

The question was: **Concrete Ideas for Actions - What can be done?**

Again we provide a summary of the main ideas for action in this chapter, where the ideas come from both workshop groups. In this summary we focus on the ideas that

were selected by participants to be further discussed and supported in the co-design process. The complete list of collected ideas can be found in the Annex of this document. The ideas can be grouped as follows:

1. Let's get active together

The workshop participants suggested concrete actions that either support the ideation, prototyping and making of gender-oriented objects or specifically engage people in making who are not part of the mainstream cis male group.

It was suggested to organise workshops around the globe that support critically reflecting on gender biases, where gender-oriented objects are prototyped together. Another idea was to organise ideation workshops for young women and also offer mentoring on how to realise these ideas, as well as seed funding for innovative ideas. As a starting point of these workshops a collection of projects that can be useful for the daily life of the participating women was suggested.

II. Foster outreach and talking about it

Participants suggested many concrete actions that related to raising awareness for gender-inclusive making and increasing the knowledge on how to best support makerspaces to become more gender-inclusive. It was proposed to share stories about gender-inclusive making, create an open guide of different approaches and frameworks for gender-inclusive making, prepare a handbook for gender-inclusive welcome angels, publish a manual on how to get started if you want to make a new space. Also different event formats were suggested, like organise a conference on this topic to bring different ideas together, organise open seminars where makers share their stories and under-represented people have the possibility to present their work. Finally collaborative, gender-inclusive making should be integrated into education programs at schools.

III. Adapt a maker space to be more inclusive

Participants suggested two actions that would help to turn a maker space more inclusive. With regard to social inequalities they suggested offering easy entry for

hacker-/ makerspaces etc. by reducing the financial burdens for people in need. With regard to a more inclusive approach it was proposed to organise design thinking workshops for the local community, to get to know their opinion of how to make our local lab more inclusive.

IV. Innovate the supportive structures/processes to foster feminist, autonomous makers

Finally participants came up with supportive ideas for gender-inclusive making, like introducing a new currency is valid within feminist makerspaces only or to build a label similar to "fair trade" or "organic" that is only for autonomous makers/designers/artists in similar collectives to support each others approach and let people know about why it is different.

Fig 3 represents a screenshot from the Jamboard, which was used to detail the concrete actions.
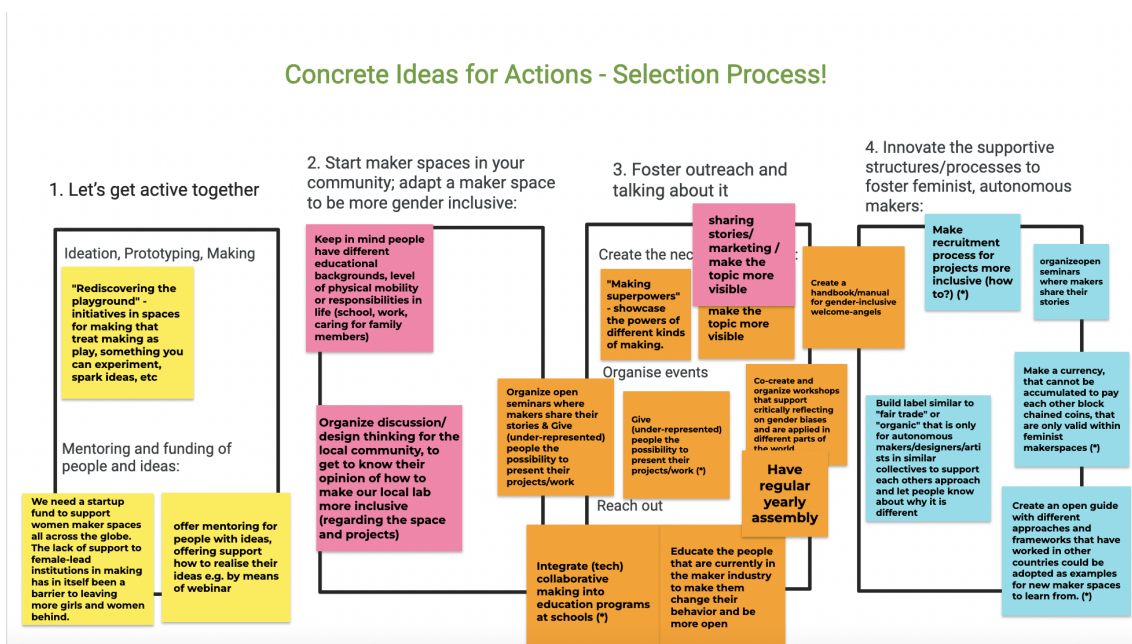

Fig 3. Ideas elaborated in the co-design process

1.2. WORKSHOP 2: DETAILING AND PRIORITISING THE IDEAS TO BECOME CONCRETE GENDER-SPECIFIC MEASURES

The second workshop was organised on the 8th of November 2021. In the morning workshop slot, we gathered the same six participants as in Workshop 1. There were six participants in the morning workshop session and six participants in the afternoon session. The main aim of this second workshop was to make another selection of actions from workshop one, by asking the participants which of these actions they themselves would like to implement in the upcoming project months. In addition, the workshop aimed at collecting first experiences and good practice that relate to these selected actions. The whole workshop documentation can be found in the Annex of this document. In the following chapter we will summarise the main selected ideas and related experiences.

1.2.1. Create workshops and events that are inclusive for children and caretakers

This gender-inclusive action aims at developing formats that allow caretakers and their children to make together. It is motivated by the difficulty to get caretakers active in making, or to allow them to stay active in making when they have children. Also, it aims at getting children interested in making early to counteract existing gender stereotypes.

Good practices shared were:

- Adapt the maker space policy to having kids in the space, like Stratum0 in Germany, who have a "No complaining policy" and allows children to move and play freely in the make space
- Adapt the make space to be welcoming for children: e.g. Have a diaper change station and a kids corner with toys like lego etc.
- Rent the maker space for childrens' birthday parties and offer make activities for the guests of the birthday party (Happylab Vienna)
- Organise electric girls workshop for mothers and daughters (Happylab Vienna)

- Organise babysitters if you have an event (Mz. Balthazar's Lab)

There were three participants who wanted to collaborate and shape this idea.

1.2.2. Create Material & Outreach Activities that raise awareness on Gender-inclusive making

This gender-inclusive action aimed at creating information material and events that help to raise awareness for gender and making. It counteracts the problem that gender-inclusive making is not visible enough, insights about its potential and facilitation are not well communicated in the make community and to other stakeholders like schools. The group aimed at sharing stories, giving underrepresented people a voice to share their experiences and work; and by creating guidance for gender-inclusive making and facilitation.

Best practices shared were:

- The Prusa Manual for 3D printers as a good practice for manuals (https://help.prusa3d.com/de/tag/mk3s-2/)
- The Female Maker Month organised by the HappyLab in Vienna
- Mz. Baltazar's approach to organise workshops which are exclusively for people who identify as female, trans, non-binary and also hosted by people who identify as female, trans, non-binary.
- The stories shared by the Maker Women project, e.g. https://www.youtube.com/watch?v=ud_q7p5Oy2w&ab_channel=Robiszto
- A symposium related to gender and hacking organised in in Berlin: https://www.digital-future.berlin/fileadmin/Digital-Future/Dateien/Trans_Feminst _Hacking_programm.pdf

There were five participants who wanted to collaborate and shape this idea. Three aimed at organising a series of speaker-events in makerspaces, where the speakers represent groups that are not mainstream to making. One aimed at collecting stories for gender-inclusive making and sharing them online. One aimed at creating guidelines for inclusive making to be disseminated to maker spaces.

1.2.3. Supporting existing maker spaces to organise gender-inclusive activities

This action aims at supporting existing maker spaces in their outreach to underrepresented people, to develop new formats of engaging them, providing funding for these events and the facilitation of these people.

Best practices:

- Yearly International conference for women entrepreneurs with female speakers, sponsors, and an award; gives women the feeling to belong, http://www.emergindia.org/activities.php (eMerg)
- Production of hand-sanitizers as a business opportunity for women (GoGirlsICT, https://gogirlsict.org/gosanitize/)
- Soya C(o)u(l)ture Initiative by Honf: https://www.youtube.com/watch?v=2xMY2o6NQ0k

There were two participants who wanted to collaborate and shape this idea.

1.3. Workshop 3: Co-Budgeting and planning of next steps

The third co-design workshop was organised on the 22nd of November 2022, with 11 participants - thus gathering participants from both workshop groups in one common meeting.

The main objective of this workshop was to co-design the distribution of budget amongst all participants and suggested ideas. In addition we aimed at defining next steps and clarifying how the Critical Making project team could be of support during the implementation phase.

The co-design of the budget was certainly the most sensible agenda point of this 3rd workshop, as we had involved the participants in the whole process of co-creating their ideas and now the question was, if a budget of 9,000 Euro would be sufficient to support implementing those ideas.

We started this co-design process with a first wrap-up of the previous workshops, presenting the four main ideas of gender-inclusive actions and the available budget of 9,000 Euro. Then we invited participants to a group work, where those participants who showed interest to implement one of the 4 presented ideas above grouped together and defined:

1. the objectives to reach with the implemented gender-inclusive measure,
2. the actions to be taken during the implementation process,
3. the roles and responsibilities of participants in the implementation process,
4. the required support of the project team and
5. finally the budget needed for the implementation.

The next figure (Figure 4) shows the Jamboard for one of the groups from this first exercise:
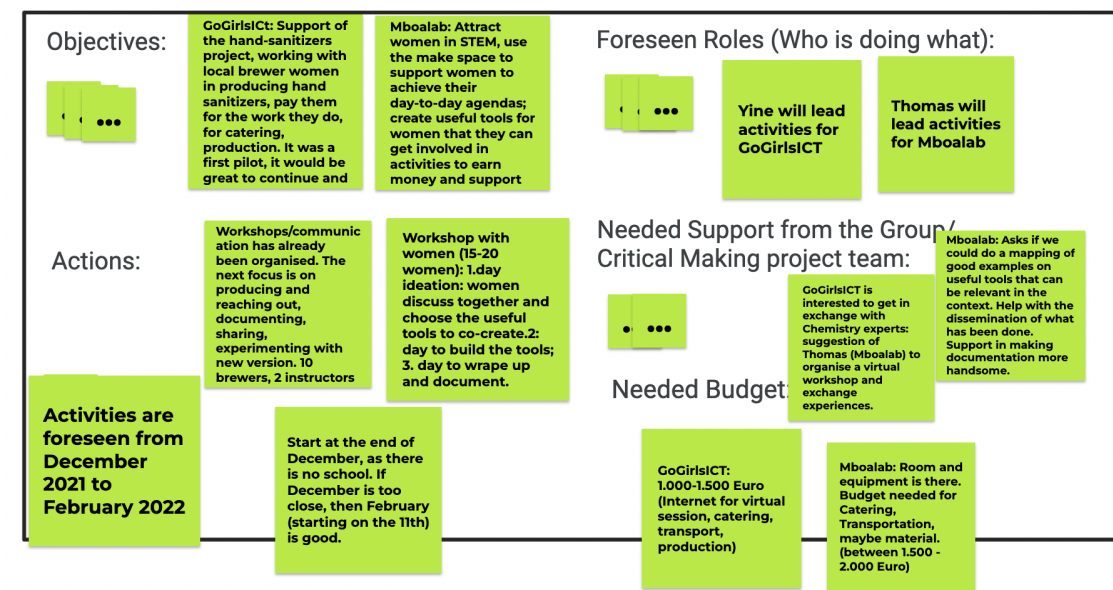

Fig 4. Definition of the gender-inclusive measures

After bringing the results of the group-work back to the whole group of participants we took a look at the requested budget per group and invited participants to negotiate between them how to best split the 9,000 Euro.

This negotiation process was a very fruitful and respectful one. All groups received the budget they needed to start implementing their gender-inclusive measures and we concluded the workshop with a summary of next steps and planned actions.

2. Implementing gender-inclusive measures

In the following chapter we want to introduce the implemented gender-inclusive measures that can be seen in the overview chart in Figure 5.
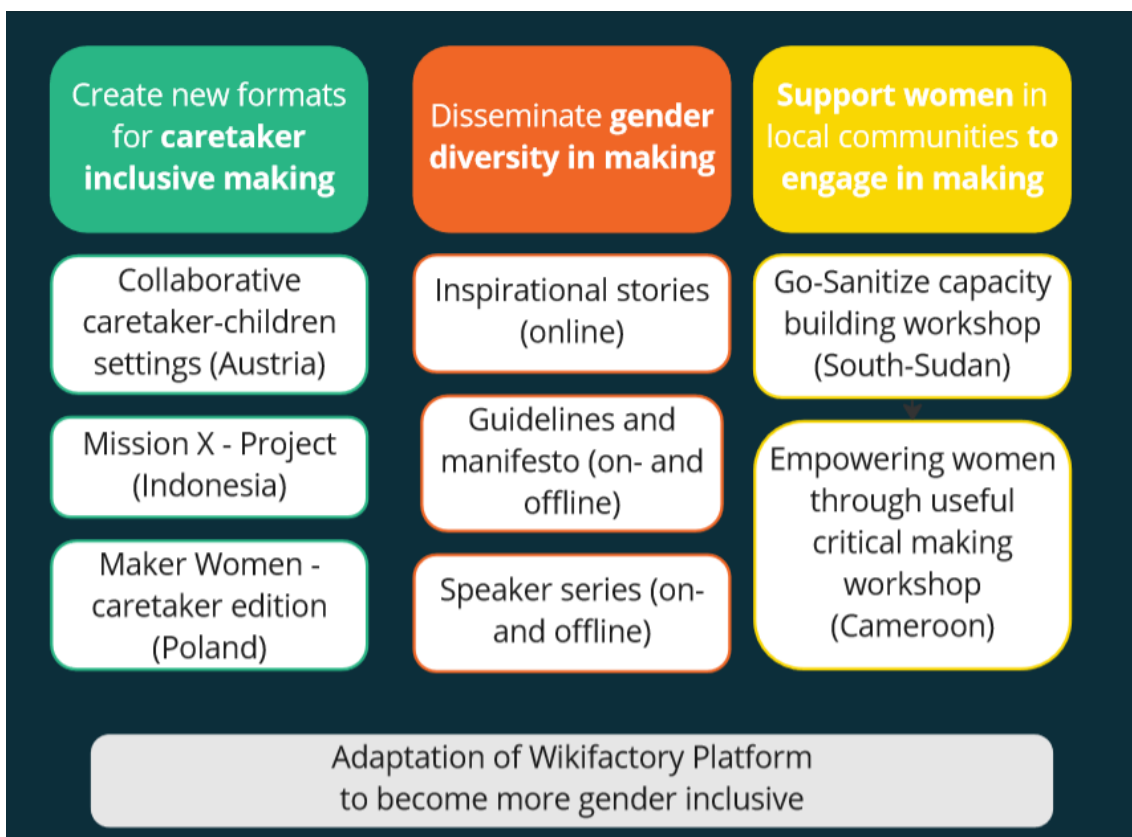

Fig. 5 - Overview: Gender-inclusive activities resulting from the co-design process

2.1. CREATE NEW FORMATS FOR CARETAKER INCLUSIVE MAKING

In this group we had three different formats developed by our co-researchers from the maker community. The implementation process was accompanied by the Critical Making team through regular online meetings with all members of this group.

Format 1: Collaborative Caretaker-Children Settings

Owner of this Format	Stefanie Wuschitz, Mz* Balthazar's Laboratory (Vienna, Austria)
Responsible Persons involved in carrying out related activities	Stefanie Wuschitz, Olivia Jaques, Patricia J. Reis, Lale Rodgarkia-Dara, Anna Watzinger, Georg Regal
Number of activities	3
Addressees of activities	Caretakers and their child(ren)
Number of participants	20
Place of activities	Vienna & Hallein, Austria
Timeframe of activities	April 2022 - September 2022

This format was developed and owned by Stefanie Wuschitz from Mz* Baltazar's Lab. Its goal was to provide caretakers and children to collaboratively take part in maker activities. Three different activities were carried out in this regard:

Mud battery workshop

In a public space next to a communal residence in Vienna, children and present caretakers collaboratively created mud batteries out of ceramic vessels to create electricity. All interessees, who passed by, could take part, which resulted in younger children participating with accompanying parents and older children in school age participating on their own. In total, 12 participants were engaged.

The workshop encompassed all steps from cleaning the mud, to filling prepared ceramic vessels and adding graphite, to measuring, wiring, and connecting the batteries in series. The children were eager to engage and discussions about energy supply and electricity evolved. Suggestions for improvement considered limiting group-size based on age to cater more specifically for the different needs of the participating children and whether or not they are in company with a caretaker, as well as having a readymade mud–battery to give children an idea of what they are creating.

Fig 6. Mud-battery workshop in Vienna

Salon of open secrets

A solo exhibition was set up by the collective Mz* Baltazar's Laboratory in Kunstraum pro arte (Hallein). This activity sought to make childcare responsibilities and the work to set up the exhibition compatible. Raspberry Pis, amplifiers, wearables, screens, and self made interfaces were used in the set-up of the exhibition, which was then open to the general public and attracted a lot of attention.

While the exhibition was set up successfully, members of the collective could not bring their children along on the basis of the delicate equipment of the exhibition set-up. Instead, childcare had to be taken over by other family members, or in case this was not possible, other members of the collective had to extend their working hours. Despite this solution, Stefanie holds that within the collective, as well as the broader public in Austria, childcare is still considered to be a private task of the primary caretaker (mostly the mother), rather than a collective task organised by the collective, as it should be.

Better manuals

Eight artists and their children engaged to create zines for describing specific aspects of their art projects (Austrian Institute of Technology (AIT), Vienna). The artists got introduced to a specific and new format of zine documentation to describe how to build a specific aspect of an art project in unorthodox ways, looked at artist manual samples, discussed in the group and were asked to try it out, while the children were equally working with pictures and paper, painting, folding and cutting it, producing their own foldable manual. The children seemed to enjoy their activities and produced a lot of material. The adult artists did not seem as productive,but rather hesitant in producing their own zines, which could both be related to the zine concept, which was new to them, as well as the competitive environment artists are generally faced with. This is why the format owner Stefanie Wuschitz suggests implementing an initial phase for team building and learning to know and trust each other before starting the activity.

Format 2. MISSION X PROJECT

Owner of this Format	Irene Agrivina, HONF & XXLab (Yogyakartha, Indonesia)
Responsible persons involved in carrying out related activities	Irene Agrivina, Yudhianto Asmoro, Gisela Maria
Number of activities	3
Addressees of activities	mothers, nonbinary persons, children, general public

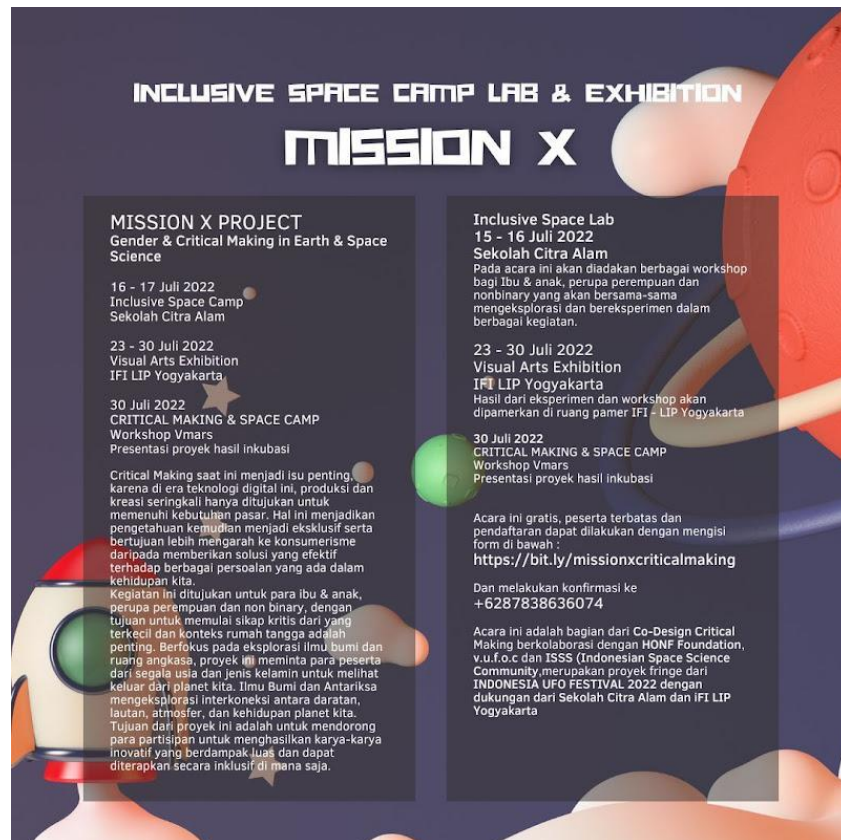| Number of participants	20 mothers & children, 4 nonbinary persons, 65 participants from general public
Place of activities	Yogyakarta, Indonesia
Timeframe of activities	July 2022

Fig 7. Programme flyer of the MISSION X project

MISSION X was developed and owned by Irina Agrivina as an active member of HONF and the XXLab in Yogyakarta, Indonesia. Its goal was to interlink aspects of Critical Making and gender equality. Therefore MISSION X invited mothers, nonbinary persons and children to produce innovative projects out of everyday and domestic objects. The topic for doing so was related to earth and space science exploration.

Inclusive space lab & camp

This incubation and laboratory activity tried to review the process of inclusive creation, by involving mothers (17) and children as well as nonbinary persons (4) in a critical and creative creation process over the timeframe of three days at Sekolah Citra Alam, Yogyakarta, Indonesia. Participants were encouraged to produce innovative works that

have a broad impact and can be applied inclusively anywhere. The related activities took place inside as well as outside in nature to allow for exploration. For implementation of the participants' own projects, electronic components and tools, household tools, used plastic, carbon inks and acrylic paint were available.

The innovative projects based on daily and domestic observations and research worked well for all participants involved. The children enjoyed their time at the workshop, felt safe and relaxed as they were surrounded by their caretakers. The adults were equally curious, wanted to explore and also move beyond their comfort zone. Also the collaboration between adults and kids worked really well, however, as Irene notes, some mothers became quite competitive with regard to their childrens' works, and intervened in their doing, giving guidance and directions, which Irene considered as detrimental to the process of making itself.

Fig 8-10. Impressions from the MISSION X project

Visual arts exhibition:

The second MISSION X activity was a one-week exhibition to showcase the collaborative projects developed by the participants of the inclusive space camp. This exhibition was organised at the Institut Français Indonesia in Yogyakarta and was a cooperation between HONF, v.u.f.o.c, ISSS (Indonesian Space Science Society) and the

Indonesia Ufo Festival 2022, Sekolah Citra Alam and the Institut Français Indonesia.

The exhibition was open to the general public and the audience was excited to see the results. As participants' feedback has shown, participants would have loved to have more time for incubation and development of their projects, which has continued after their time at the inclusive space camp. Despite being part of the first project phase, some participants do not have a clear idea how to develop and make innovative projects using only basic devices. Some children developed complex projects, used a lot of creativity and time and, according to Irene Agrivina, created impressive results.
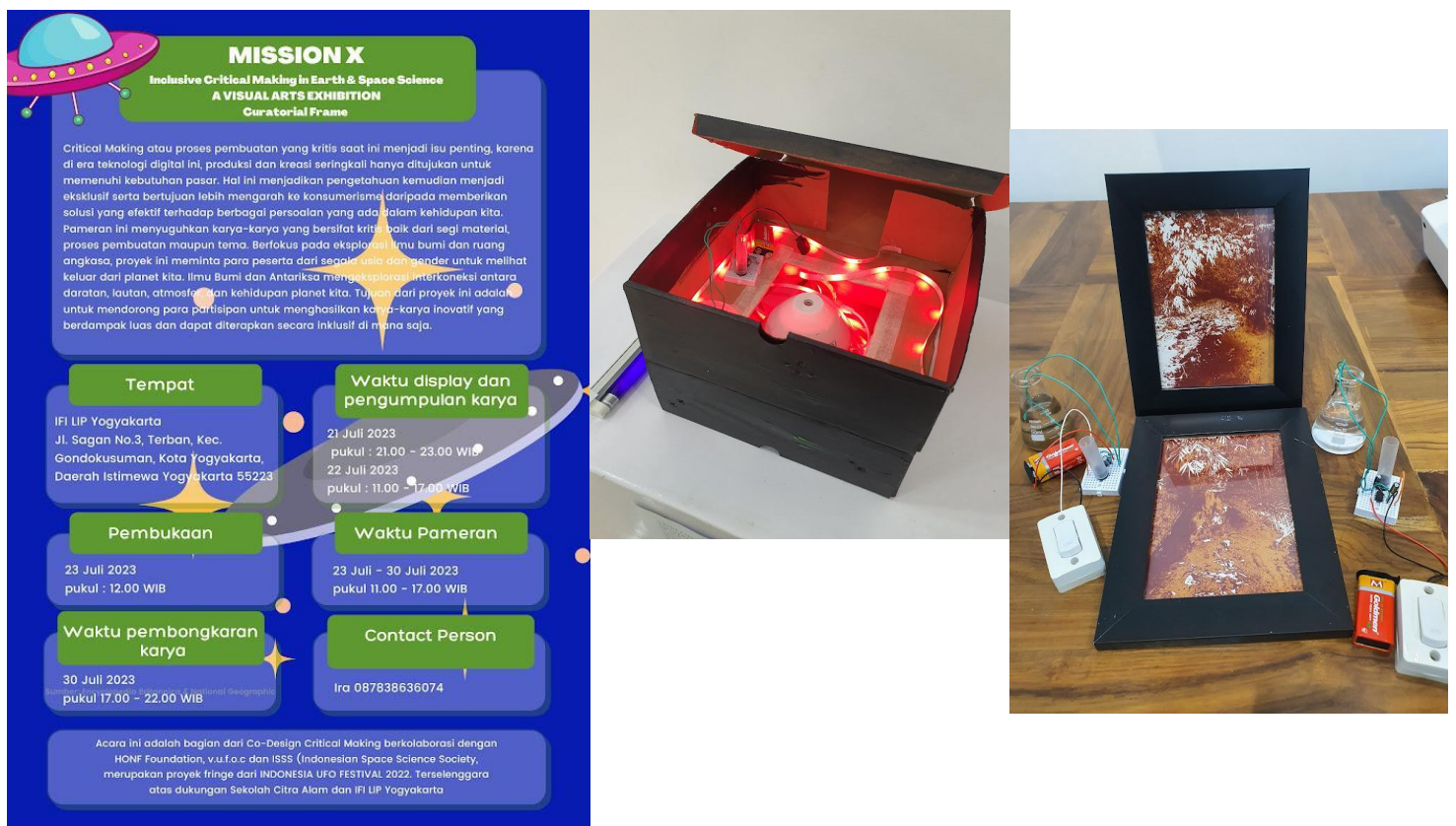
Fig 11-13. Outcomes of the MISSION X project

Space camp workshop & project presentation:
The last activity took place at Sekolah Eksperimental Mangunan, which is a school located in Yogyakarta and was organised as a collaboration between HONF, v.u.f.o.c, ISSS (Indonesian Space Science Society) and the Indonesia Ufo Festival 2022, as well as the Sekolah Experimental Mangunan. Again, mothers and children as well as the general public were invited to take part, with 20 mothers and children as well as 35 participants from the general public participating. The activity started with an

introductory workshop, led over to a session where mothers and children were doing sky observations using telescopes. The last session of the activity equally presented the work done by participants of the inclusive space lab and camp as well as a Q&A to discuss the work done and future work plans. As feedback, children liked the observations in nature, but otherwise opted for more adventurous activities, interests varied age-specifically. In general, the children were very proud of their projects and open for future collaboration. For mothers, working groups were most interesting, as these formats allowed them to share their knowledge and background. Participating mothers, who were in their teenage years, however, had varying interests and would have liked to work more with coding and programming rather than hands-on activities.

Format 3: Maker Women - Caretaker edition

Owner of this Format	Karolina Guzek, Robisz.to (Warsaw, Poland)
Responsible persons involved in carrying out related activities	Nadia Dobrowolska, Michał Burza, Marlena Przychodzka
Number of activities	4
Addressees of activities	Women, mothers and children
Number of participants	8 women, 4 mothers with children
Place of activities	Warsaw, Poland
Timeframe of activities	October 2022

This format was developed and owned by Karolina Guzek from Robisz.to on the basis of their already existing Maker Women programme. Maker Woman is a project for women who want to gain new technical and digital skills and empower themselves in the labour market. The project debuted in 2017 and nearly 2,000 women have been trained in 3 years.

So far, some participants have brought their children along. It has, however not been encouraged, nor have there been any specifically organised child-caretaking offers. The goal of the Maker Women Caretaker Edition was to meet women who want to develop professionally, have pre-school children (4-6 years old) and do not have the

opportunity to leave them in the care of others for the duration of the classes. Therefore, during our Maker Woman workshops, a temporary "FabLab kindergarten" was operating in the room next door. Children were taken care of by a qualified educator who creatively animated their time.

The workshop was rolled out as a series of 4 classes which took place at the [FabLab powered by Orange](#) in Warsaw and attracted a lot of interest. Out of overall 40 applications, amongst them 15 mothers with children, 8 women and 4 mothers with children (aged 4 to 6 years) could participate.

While the adults learned how to use a laser cutter, existing vector graphics and create their own designs, children could choose to engage in activities such as preparing a name tag made of a pad of stiff felt and letters made of different coloured pieces of felt available in the studio, created people and a train out of prepared chestnuts and materials. On their last day they were also able to design their own pre-cut wooden puzzle. The children could also engage in using other games and toys provided.

Fig 14 - Impression from Maker Women - laser cutted objects

Their room (usually the sewing room of the FabLab) has been made child-friendly, with machinery removed, and a carpet being put on the floor. Snacks and breaks were also provided.

In order to evaluate their experience, all participants as well as the organised caretaker were to fill in a prepared survey before the start of the classes and after the classes were finished. The results were overwhelmingly positive, with the mothers considering the possibility to bring their children a key prerequisite for their own participation: "Without the babysitter my participation in several activities would have been impossible!" The organised childcare enabled them to learn attentively.

Fig. 15 - FabLab Kindergarten in action and

Fig. 16 - A participant in front of
a laser cutter

While the mothers would keep the structure the same, they opted for a larger age-group for children to bring along, which would require some changes in the childcare-organisation, with regards to materials provided or even caretakers present. The children enjoyed their time in the Fablab Kindergarten and also got interested in the general activities in the FabLab: "my daughter is very interested in what goes on in the FabLab and already wants to participate more!", "My son was very eager to participate in the activities. He even looked forward to it. At the end he said that he would like to visit you again :)"

From the viewpoint of facilitation, the childcare-option needed more time for room preparation before the event - with removing machinery and providing for flexible structures, which offers space for all materials and also for the children's creations. Also, after the event more time was needed for restoring the room, cleaning included, which needs to be considered when repeating the format. Since the offer was used successfully, future Maker Women series might equally feature childcare possibilities, when budget is available for doing so. Alternatively, future classes might - in contrast to

this trial in the realm of the Critical Making project, not be organised for free, so that a budget for paid childcare is available.

2.2. DISSEMINATE GENDER-DIVERSITY IN MAKING
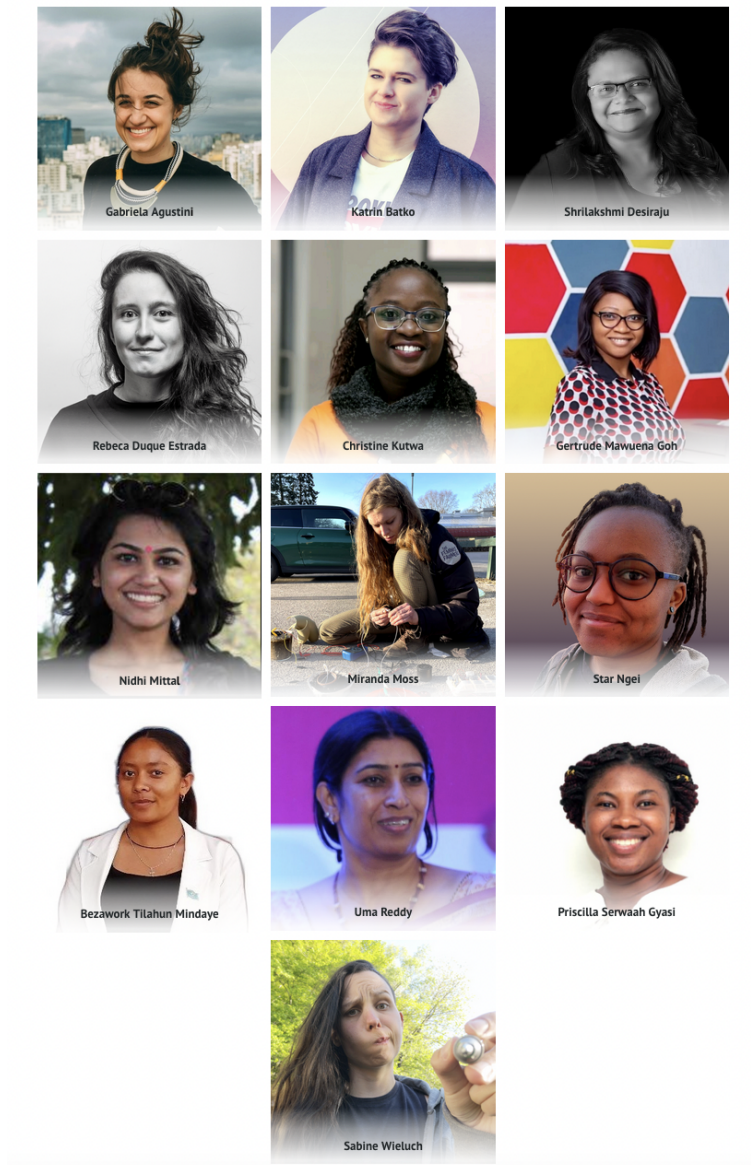
Inspirational Stories

Owner of this Format	Audrey Dzousa, eMERG India (Bangalore, India)
Responsible persons involved in carrying out related activities	Audrey Dzousa (eMERG), Teresa Schaefer and Lisa M. Seebacher (ZSI), Asmaa Guedira (GIG)
Addressees of activities	People who are not yet part of maker spaces and - on the basis of their gender - marginalised in dominant maker space cultures
Number of participants	16 interviewees at the time of writing this deliverable
Place of activities	online - global
Timeframe of activities	May 2022 - ongoing

The main aim of this gender action was to create an attractive online format that shares personal narratives of those people who are still underrepresented in making, giving them a voice to share their experiences how they made it into making and thus raising awareness for gender-inclusiveness in making.

At the time of writing this deliverable we have shared 16 inspirational stories from different parts of the world on our Critical Making website. We looked for inspirational people that were not too well-known in the make community yet and thus easy to relate with. The inspirational stories were collected via personal online interviews (the question guidelines can be found in the Annex of this document). They were organised and conducted by one of the responsible persons mentioned above, summarised and edited to have the same format, and then sent back to the interviewee for final approval.

Fig. 17 - Inspirational Stories Overview

These stories provide manifold insights into the pathways of amazing makers and how they dealt with barriers related to gender and intersecting inequalities in their socio-cultural context. They show that gender-inclusiveness is a topic that is strongly influenced by local gender stereotypes, norms and cultures. Thus each inspirational story provides different insights into the pathways of people being underrepresented in making - a rich base of inspiration for the reader.

Bezawork Tilahun Mindaye
Bahir Dar Institute of Technology, Ethiopia

Bezawork has been a lecturer at the Bahir Dar Institute of Technology for the last five years. She also coordinates two makerspace: the Business Incubation and Techno Entrepreneurship Center-Bitec and the makerspace of Bahir Dar American Corner. She participates in different women empowering programs, is a Google's Women Techmakers Ambassador and volunteer teacher. She holds a Master's degree in Software Engineering from Bahir Dar University.

> "I want to empower women to believe in themselves that they can be engineers and leaders and entrepreneurs. Everything is possible, it doesn't matter which gender you have."

Working as a woman in tech in Ethiopia means being confronted with many barriers.

> *"In Ethiopia girls are not appreciated to study technology and engineering, they are rather forced to join social studies"*, she says.

And if girls get good grades in STEM subjects others would assume that this is due to affirmative actions of the Ethiopian government rather than to the girls skills and talents.

In her work, when Bezawork manages her male team members, some of them would not follow, as their cultural background makes it difficult for them to accept a female superior. Sexual harrasment and unapropriate behaviours also show up from some male colleauges.

> "I will automatically reject lots of job offers, because they come with breaking your privacy, your dignity. Because I have full confidence I can earn the opportunity with my skills and efforts. This is very challenging in the workplace and in the education sector."

Fig. 18 - The first paragraphs of the Inspirational Story of Bezawork Tilahun

Introduction and Guidelines for Inclusive Making

Owner of this Format	Cin Pietschmann <u>xHain</u> & <u>Wikimedia Deutschland e.V.</u> (Berlin, Germany)
Responsible persons involved in carrying out related activities	Cin Pietschmann (xHain), Teresa Schaefer, Barbara Kieslinger (ZSI), Sandra Mamitzsch and Asmaa Guedira (GIG), Regina Sipos (TU Berlin), Hanna Saari (VTT)
Number of activities	2
Addressees of activities	Makers and makerspaces that would like to become more inclusive
Place of activities	online
Timeframe of activities	April 2022 - October 2022

The goal of this action was to share available knowledge and expertise on how to make the making scene more inclusive. While gender is an important dimension, this action, owned and commissioned by Cin Pietschmann, took a broader approach to inclusion and addressed several dimensions of marginalisation. The material produced is based on Cin's own master thesis on this very topic, as well as their own experience as a maker. Further, the collected insights and materials were enriched by the community engaged in the Critical Making project.

The material was collected and systematised alongside two different formats:

- The **Manual for Creating an Inclusive Makerspace** specifically targets maker spaces or communities willing to start a makerspace on their own and strive to organise it in a way that counteracts existing structures of inequalities.

- The **Introduction to Inclusive Making** represents a general introduction to making from a reflexive approach. Taking inclusiveness as a starting point, these elaborations target anyone interested or already engaged in making to reflect their practices.

Both of these materials are shared online on the Critical Making website and remain open documents in the sense that they are open for comments and additions from the

community and openly ask for them. Additionally, it is planned to disseminate both the introduction and the manual as printed versions.

Basic rules on how to create an inclusive Maker Space

There are in general some ground rules to start off from and which should always apply.

- **Be outspoken against any form of discrimination**
  If you want to welcome newcomers to the community and especially those from marginalized populations, it is your responsibility to create a safe environment for them and make them feel safe. Be loud and clear about both your own stance and the Maker Space's stance on discrimination and be ready to take action if they are challenged.
- **Publish a Code of Conduct (CoC) in your Maker Space**
  A Code of Conduct consists of rules, which outline norms, responsibilities and appropriate behavior alongside what to avoid in a specific group or space. Such a Code of Conduct can also be understood as a social agreement. A CoC should take a stance against all forms of discrimination and what will be the consequences if rules are broken. A proper CoC should not only address inappropriate behavior, but also actively name and promote appropriate behavior and what the space and community strive to be like. You can find many examples online, like **here (https://makers.tech/code-of-conduct/)** and **here (https://www.mzbaltazarslaboratory.org/code-of-conduct/)**. There is also variation of a CoC called **"Know your rights!"** that focuses on each person's own rights within a community.
- **Co-create your CoC**
  Invite a diverse group of people to collectively work on or give feedback on your CoC. Expect to change some things in the future as we are all growing and evolving not only as people but as a community that never stops learning.
- **Establish an awareness team**
  Have an awareness team (or person) that functions not only as reinforcement of the CoC, but also as a first contact for feedback or for someone who needs help.

In the following part, we want to offer more in-depth tips on inclusivity in a Maker Space. Feel free to pick up what is most important to your space right now or where it might need improvement.

Fig 19: A glimpse into the Manual for Creating an inclusive Maker Space

Speaker Series

Owner of this Format	Felix Just (XHain, Berlin, Germany), Rebecca Husemann (Stratum0, Braunschweig, Germany)
Responsible persons involved in carrying out related activities	open
Number of activities	open
Addressees of activities	People who are not yet part of maker spaces and - on the basis of their gender - marginalised in dominant maker space cultures
Place of activities	Makerspaces in Germany
Timeframe of activities	open

The main aim of this gender action is to create an attractive hybrid format where makers, who are part of an underrepresented group in making, share their personal stories how they made it into making and how they benefit from it.

The original plan was to organise four events as part of this speaker series - two in Stratum0 and two in xHain, and invite in a next step other hacker- and makerspaces in Germany to pick up this format and apply it in their own spaces. Each event should be dedicated to specific topics (e.g. women makers working with textile) to show both the diversity of making activities and the diversity of makers.

This gender measure aimed at giving visibility to the speakers, helping maker spaces to attract new audiences and making the audience better understand which challenges are faced by those who are not part of the mainstream maker group.

By the time of writing this deliverable, the speaker series is the only gender measure that has not been realised yet. The main reason for this delay was dedicated to time constraints by both format owners. This shows how difficult it can be to get involved in

"add-on" activities when time schedules for the normally day-to-day business are already full - even if the activity is perceived as useful and desirable.

There are still negotiations about the speaker series taking place in Spring 2023, maybe as a format that provides a stage for the interviewees of the inspirational stories described above to present themselves and their work.

2.3. SUPPORT WOMEN IN LOCAL COMMUNITIES TO ENGAGE IN MAKING

Go-Sanitize Capacity Building Workshop

Owner of this Format	Yine Yenki Nyika, **GoGirls ICT Initiative** (Juba, South Sudan)
Responsible Persons involved in carrying out related activities	Yine Yenki Nyika and Yine Beatrice (GoGirls ICT), Thomas Hervé Mboa Nkoudou (Mboa Lab Cameroon)
Number of activities	1
Addressees of activities	Female brewers involved in the GoSanitize production
Number of participants	6 female brewers, two chemistry experts, two religious leaders
Place of activities	Juba, South Sudan
Timeframe of activities	26th March 2022

The workshop organised in Juba by the Go Girls ICT team supported the ongoing GoSanitize project. South Sudan is a country that depends entirely on imports from its neighbouring countries and during the Covid-19 pandemic, products such as hand sanitizers became more expensive as their demand was high and not affordable to the common person in the community. This was the starting point of the GoSanitize project, where 10 female brewers were trained to produce highly concentrated alcohol (Ethanol) for use in the hand sanitizers. These local female brewers use locally available resources and produce the alcohol in their homes. These hand sanitizers are then offered at affordable prices to the community.

The Critical Making workshop that supported the GoSanitize project had three main goals:

- Support the experience exchange with MboaLab in Cameroon, which is involved in the local production of hand sanitizers as well.
- Invite religious leaders to counteract slander of women being involved in the production of alcohol
- Increase the safety standards for local brewers producing highly explosive Ethanol for the hand sanitizers in the local homes

The workshop started with the **peer-to-peer virtual mentoring exchange** between the GoGirls ICT team and Bibliothèque-MboaLab, Cameroon on experiences and lessons learned from the local hand sanitizer production methodologies, quality control, and marketing strategies.

After this virtual mentoring exchange, the Gosanitize team hosted a **team of religious leaders to talk to the female brewers about their work.**
In South Sudan the prevalence of alcohol-related illness is unknown, though there is anecdotal information that alcohol-related violence, marital discord, absenteeism from work, and road traffic accidents related to the use of alcohol are common. According to the local female brewers, religious beliefs and the extent to which women who make alcohol are viewed as contributors to the prevalence of hooliganism and illness in the societies could one day limit their continuation in the production of alcohol. Not to be associated with a bad name in their society that taints their religious beliefs, some women have deserted this business to do other socially recognised and valued activities.

In the dialogue with religious leaders, they emphasised alcohol's medicinal properties and symbolism dating back to the ancient Israelites. Reminding female brewers of the nobility of their work provided an opportunity for them to change the narrative about the production of alcohol as a business. The female brewers were therefore assured that making alcohol for sanitizer production was not unethical, since they are contributing to the social good of fighting COVID-19.

The last part of the workshop was dedicated to **training the local brewers in stricter safety regulations**. Alcohol production for local consumption has always

been part of the brewers' normal business. But the kind of alcohol used for making hand sanitizers is highly flammable, thus, an outbreak of fire or accidents could easily happen at their home. To minimise such incidents, together with the local brewers, the GoSanitize team elaborated Standards of Operation and safety precautions that will be shared with the South Sudan Bureau of Standards for validation and implemented by the brewers and the Gosanitize team. These safety precautions will also be illustrated in the form of pictures, and each brewer will be provided with a poster to remind them of the Standards of Operation.

Fig 20. Yine moderating the online peer-to-peer mentoring, Fig 21. A religious leader talking to the female brewers, Fig 22. A lay reader reading a scripture from the Holy Book, Fig 23. Local female brewers.

Training workshop on makerspaces for sustainable development: Empowering women through useful critical making

Owner of this Format	Thomas Hervé Mboa Nkoudou, Mboa Lab (Yaoundé, Cameroon)
Responsible Persons involved in carrying out related activities	Thomas Hervé Mboa Nkoudou, Vanisa Ngumsie, Stephane Fadanka (Mboa Lab Cameroon)
Number of activities	1
Addressees of activities	secondary school girls, women in academia, women in rural areas and lab staff
Number of participants	18
Place of activities	Mboalab in the mefou-Assi village, Cameroon
Timeframe of activities	5th to 8th March 2022

The overall goal of this workshop was to empower women by educating them on the idea of makerspaces, their equipment as well as critical making activities. This workshop was put in place as part of the activities to celebrate the international women's day 2022 under the theme (#breaking the bias) Gender Equality today for a sustainable tomorrow. The workshop included the following topics:

Ideation (Day 1)

After an introduction to the concept of Critical Making and a tour to the different sections of Mboalab and its main equipment, the participants started to brainstorm what can be produced with the different equipment at hand that would support their daily life?

Digital fabrication and home biology for day to day life (Day 2)

Based on the outcomes of the brainstorming session of Day 1, the second day of this workshop was dedicated to training the female participants in:

- how to use 3D printers to print any plastic item of their choice (e.g plastic earrings)
- how to use vinyl cutter to cut writings, drawings and designs of any choice
- how to produce body and household cleaning liquids (e.g. liquid soap/hydroalcoholic gel)
- how to produce bleach

Home biology for all (Day 3)

The third day continued with the training on the:

- production of hand base sanitizer and
- smart microbiology for the production of yoghurt.

The third day ended with a collection of feedback of participants.

Participants were contacted six weeks after the workshop for a second round of feedback collection, where 7 provided us with insights in how far they used the knowledge from the training in their daily lives.

Lessons learned and conclusions from the evaluation of the workshop:

The feedback of participants showed that the workshop was well appreciated by most of the participants as most of them had never attended such type of training. It was described as an "eye opener". Participants were enthusiastic to put what was learnt in practice. The questionnaire sent to participants 6 weeks after the workshop showed that from the 7 respondents 5 have reproduced the products that were taught to them at home (mainly yoghurt and liquid soap), the two remaining were planning to do so and have already organised the needed ingredients. All of them wanted to visit other

workshops organised by Mboalab. So we think that this is a very positive outcome of the workshop. For a next workshop it would be interesting to explore other fields of production, making participants practise more with the machines and ingredients, and motivating them to do practical sessions with their own products.

Fig 24: 3D printer "Anet" printing plastic earrings, Fig 25: Production process of liquid soap, Fig 26: Production process of hand sanitizer, Fig 27. Ingredients for the production of Yoghurt.

2.4. Adapt Wikifactory to be more gender-inclusive

On Wikifactory, there is both a set of collaboration tools and a global community of designers and engineers that use the platform features to host and support their maker projects. To first consider how to adapt Wikifactory to be more gender-inclusive, it was important to identify the different touchpoints on the platform

that could be adapted or revised for greater inclusivity. We therefore first identified the following engagement and interaction types on Wikifactory worth exploring as they create the public resource that the community is built upon: *Public Projects*, *Stories* and *Featured.* For each, we explored the information, resources and activities that emerge in the user experience and engagement with these engagement types to find touchpoints that could be improved from a gender inclusiveness perspective. The following outlines the touchpoints identified, as well as actions and improvements that were considered and implemented to adapt and improve Wikifactory for greater inclusivity.

Projects on Wikifactory

Regarding *Projects*, users can personally or as teams host their product and hardware projects online that can be either private or public, with the latter providing knowledge resources for others to learn from their designs, documentation and experience in making products of all kinds. Users can start a project from scratch, or in the case of a public project can 'fork' or copy an existing project as well. To support its users in using the platform's project features, Wikifactory has developed a series of Help Center articles and resources for makers. Whilst the Help Center articles are quite feature related, the Wikifactory Demo is a template project that is referenced and offered to the community to build upon, fork and get started, which does include questions that touch on questions of identity and purpose. These template projects are also used and forked for the use of challenges, open calls and hackathons as well - such as the [Safe to Play](#) Challenge or [From One to Many](#) Challenge. On review of this community touchpoint, we saw that there were opportunities to improve the Template Documentation to be more inclusive of gender and diversity from the perspective of the 'About Team' and 'Social and Environmental Impact Section'. In the aim of improving this Template Project as a valuable resource from the diversity perspective, the following changes were implemented:
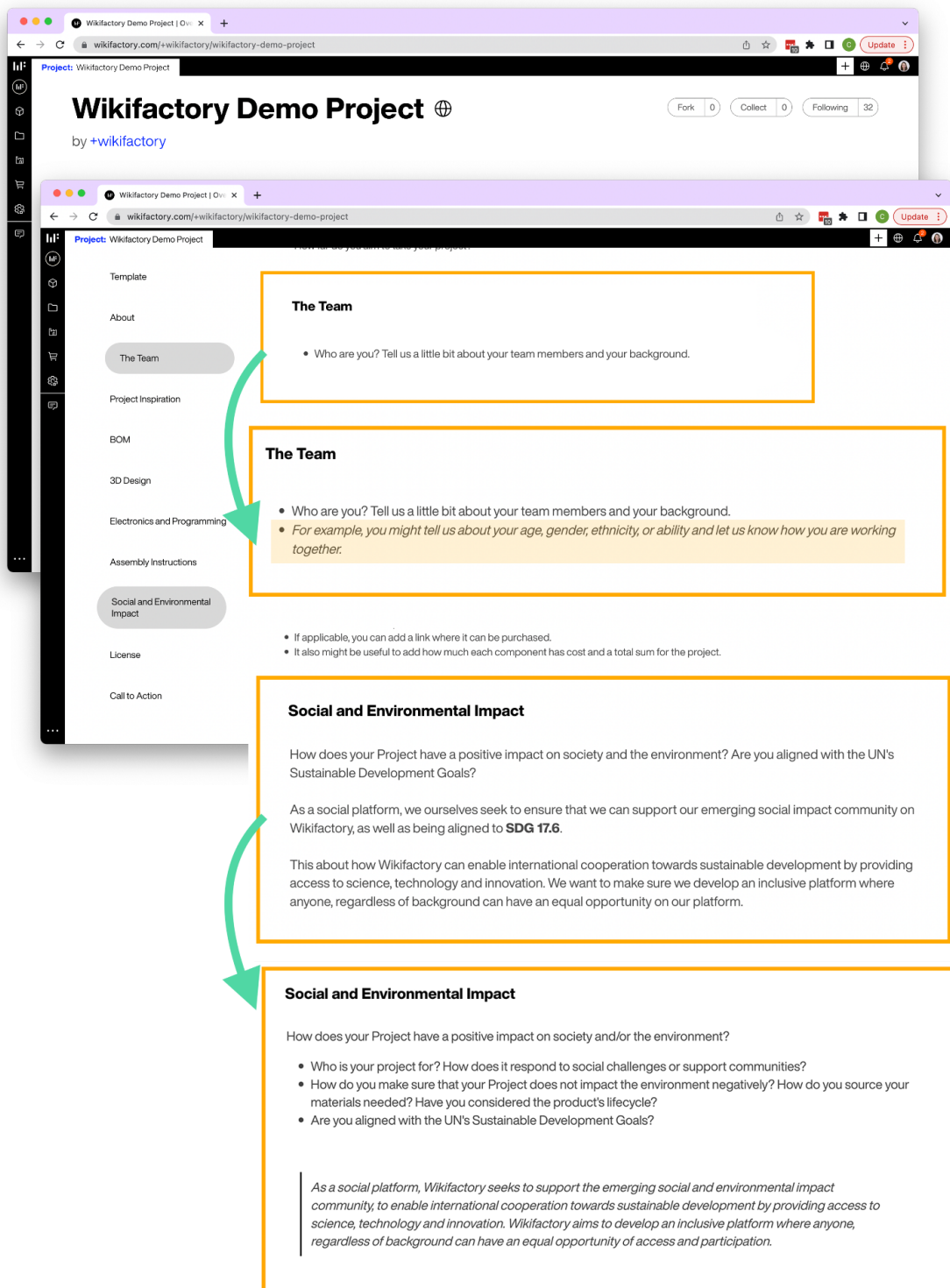
Fig. 29 - Gender-inclusive adaptations of the Wikifactory demo project

The changes were primarily aimed in providing greater opportunity for the user that references the Demo template Project to share more about the team's background and encourage to make diversity on the one hand of The Team section visible, and adapt the Social and Environmental Impact section to include about target beneficiary audience and more precise questions about the specific impact in aims to achieve. An additional vision statement was also included to further emphasise the platform ethos, to encourage equal opportunity of access and participation within the template as well. As a resource released in the public domain, this template project will now be available to users on Wikifactory to build upon, as well as be used in reference for future challenges where template projects are used for project submission.

Stories on Wikifactory

With the use of *Stories* as an engagement interaction type on Wikifactory, users can also publish long form blog posts on the platform in a similar style to other sites like Medium. Whilst the platform does and cannot intervene on the nature of what gets published on Wikifactory, on review we identified the Community Guidelines and its notice banner in place inside the publishing flow of Stories that did give the indication for an appropriate touchpoint to adapt for the purposes of gender inclusiveness and diversity.

Whilst the Community Guidelines already included a No Tolerance section that encompassed hate speech and discriminatory messages on the basis of identity, we wished to improve the initial section on *Building a Strong Community* to more promptly emphasize the global nature of the Wikifactory community and to encourage openness and welcoming of diversity. To this effect, the following changes we made:
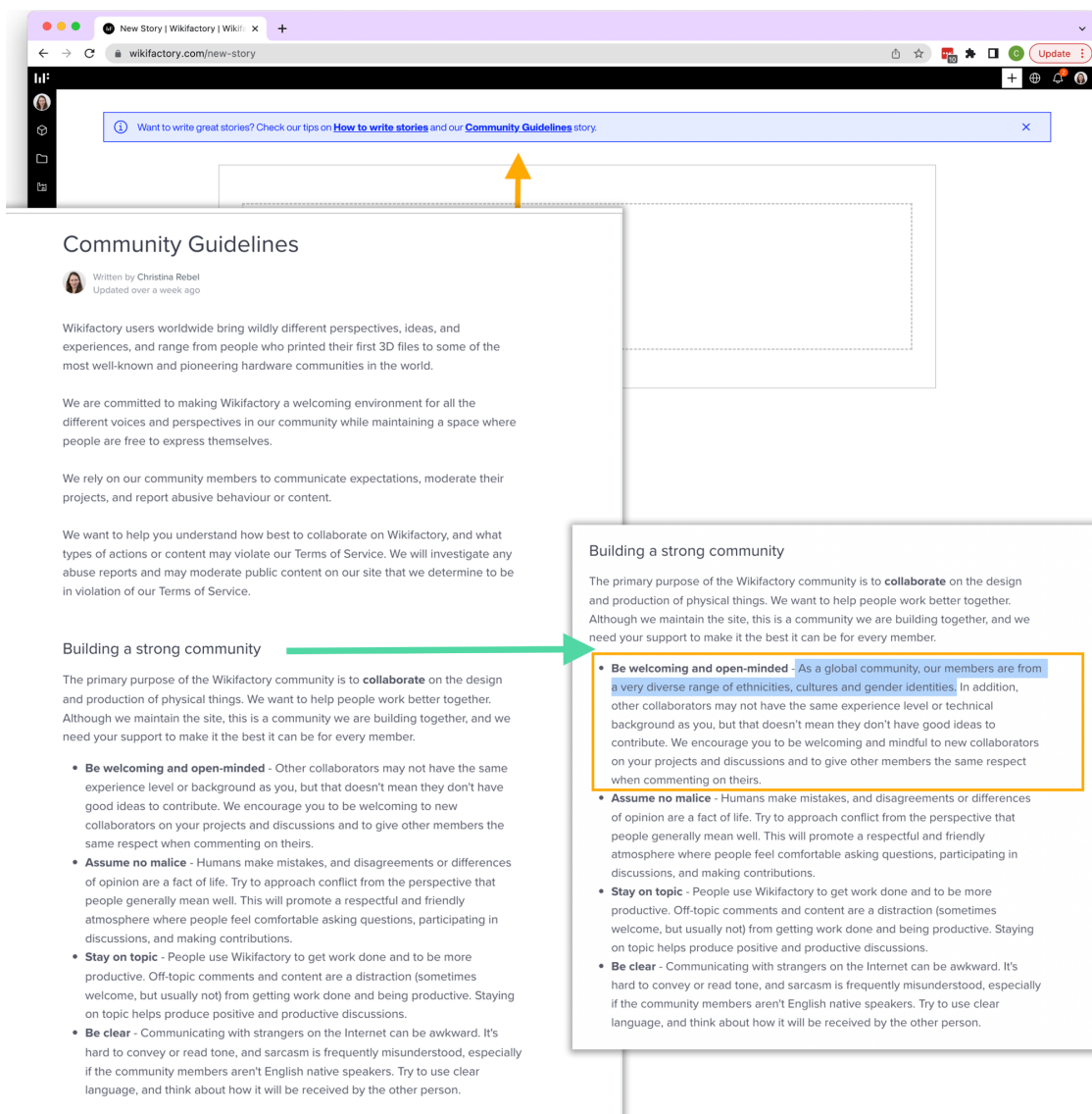
Fig. 29 - Gender-inclusive adaptations of the wikifactory community guidelines

As this section is at the top of the community guidelines, the changes allowed for a greater emphasis on the aspiration of the platform to encourage awareness of the global community of diverse backgrounds and to welcome participation and openness. Whilst the guidelines were mainly focused around building a technical community, the adaptation of **Be welcoming and open-minded** to be inclusive of diversity from an identity perspective was a good position to highlight this. As the first point, it is able to be elevated in emphasis at the start of the Community Guidelines as well. Wikifactory will now be able to use the new version in the community and content moderation

processes moving forward, with an adaptation that more comprehensively emphasizes diversity in positive and aspirational terms as well as our protections against hate speech and discrimination on the basis of identity.

Featured on Wikifactory

In terms of the remaining engagement type we wished to explore for adaptation, the *Featured* section in Wikifactory was a curated promoted space of public projects from the Community that would be selected on a Monthly basis. The selection of these projects was based on technical achievement, but we identified the opportunity to take the celebration of International Women's Day in 2021 by dedicating the featured projects to women-led initiatives during the respective month and launching a survey to Sign Up for Wikifactory support. This led to 42 survey responses and over 2,300 reached on Facebook alone about the campaign.
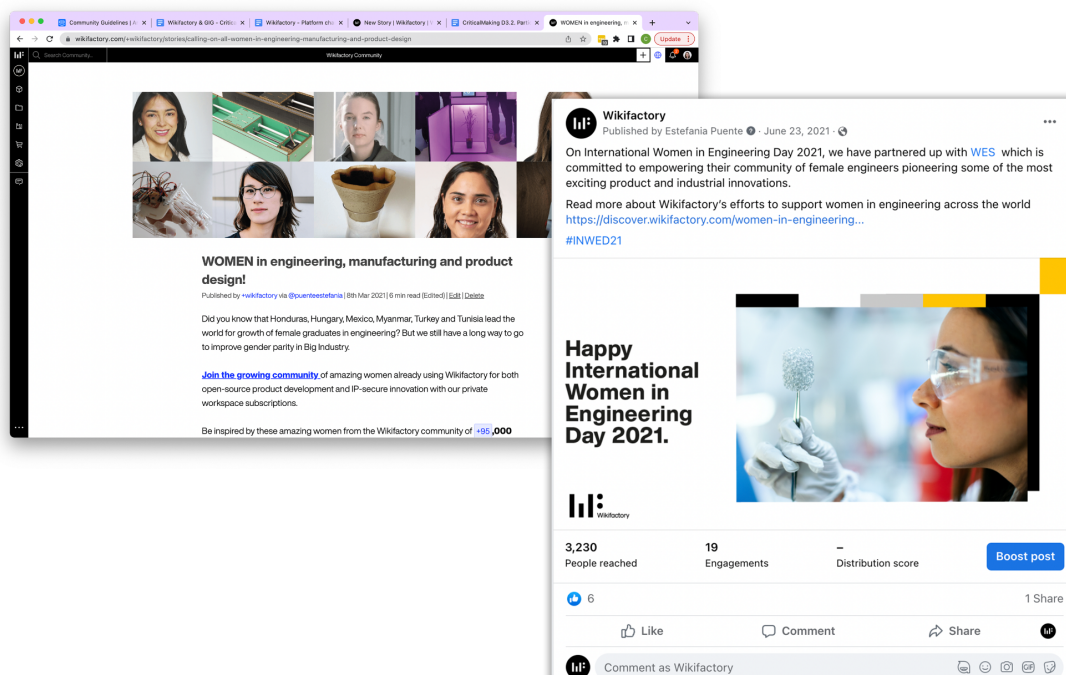

Fig. 31 - Featuring women in engineering, manufacturing and product design

Looking at how Wikifactory promoted its platform on social platforms was also a space of consideration from a gender inclusivity as well. Whilst Wikifactory already had

promotional videos in place, we took the opportunity of a new launch in June 2022 that would include a new video launch to review the asset from a gender inclusivity point of view. Whilst in general the previous main promotional video included people of a diverse range of backgrounds across the 78 seconds, it was in the first 10 seconds that we wanted to particularly ensure that diversity was more present. Providing this advice ensured that the first 10 seconds of the new promotional video included images of diverse genders and backgrounds, and is available for review on [Youtube](#).

Aligning the Wikifactory platform to Critical Making also provided the opportunity to advise their PR strategy to also include gender inclusiveness more centrally to our messaging, by driving greater thought leadership from the female co-founder Christina Rebel. This adaptation to the strategies in 2022 compared to 2021 PR strategies of Wikifactory resulted in 3x more articles in Industry and Trade Press about her experience and advice as a female entrepreneur, in promotion of greater inclusivity and access in manufacturing. (See forth [The Purchaser](#), [EU Startups](#) and [Authority Magazine](#).

In sum, the review of the Wikifactory platform and its engagement touchpoints for its community offered several spaces of adaptation for the purposes of gender inclusivity. Whether Projects, Stories and Featured on platform, or their presence on social media channels and Press - several touch points were improved thanks to the Critical Making programme and will have lasting effects moving forward that will play out incrementally and beyond the duration of the programme. The resulting adaptations were: the *Template Project* that Wikifactory offers community members to reference when starting their own maker project on platform; the *Community Guidelines* that are prompted for notice when publishing Stories on platform; *Featured* as a curated selection now reserves the month of March to celebrate Women makers on platform as a proactive campaign that will continue to run in upcoming years; an improved promotional video across social channels that is more inclusive of diversity in ethnicity and gender in the persons represented; as well as the impact on the PR strategy of Wikifactory that has brought about more press interviews that has highlighted the message for greater access and equal opportunity in making.

3. Discussion, summary and outlook

In our project we have defined 6 core values for Critical Making. Taken as an analytical lens, these core values provide interesting insights into the co-designed activities for gender-inclusive making. The following table (table 1) provides an overview of gender-inclusive activities and their relation to the 6 core values of Critical Making, which will then be discussed in more detail in the following paragraphs.

Table 1: Gender-inclusive activities and Critical Making Core Values

Activities to support gender-inclusive making				Critical Making core values					
Goals	Measures	Location	Addressees (no. participants)	open	local connected	social diverse	reflexive	impactful	joyful meaningful
New formats for caretaker inclusive making	**Collaborative caretaker-children settings**	Vienna & Hallein, Austria	Caretakers and children (20)	Well documented, exhibited to the public	Organised in a local, public space, sharing results globally	Involving marginalised groups: caretakers and children	Questioning resource use	Engaging children and caretakers in making	Children enjoyed it
	Project X	Yogyakarta Indonesia	Mothers & children (20), nonbinary persons (4), general public (65)	Well documented, presented to the public via an exhibition	Supporting a local collective, sharing results globally	Involving marginalised groups: caretakers and children	Questioning resource use	Upskilling of participants, engaging children and caretakers in making	Caretakers and children enjoyed it
	MakerWomen	Warsaw, Poland	4 Mothers & children	Well documented	Addressing local females' needs, sharing results globally	Involving marginalised groups: caretakers and children	Reflecting on the gender care gap	Upskilling of participants, creating new job opportunities	Caretakers and children enjoyed it

	Activities to support gender-inclusive making			Critical Making core values					
Goals	Measures	Location	Addressees (no. participants)	open	local connected	social diverse	reflexive	impactful	joyful meaningful
Share gender diversity in making	**Inspirational stories**	Online - global	People not yet part of maker spaces and marginalised in dominant maker space cultures (16 stories)	Open to anyone with internet connection	Sharing local narratives of marginalised groups globally	Giving marginalised groups a voice	Reflecting gender-related power structures	Putting light on new role models	Interviewees are proud of their stories
	Introduction and guidelines for inclusive making	Online	Makers and makerspaces that would like to become more inclusive	Open to comments for those with internet connection	Organised in collaboration with makers from different contexts	Providing concrete guidelines to trigger inclusive making	Reflecting on means to increase inclusiveness	Turning makerspaces more inclusive	Creators are proud of their guidelines
	Speaker series	Germany	People not yet part of maker spaces and marginalised in dominant maker space cultures	-	-	-	-	-	-
Support women in local communities to engage in making	**Go-Sanitize capacity building workshop**	Juba, South Sudan	Female brewers (6) involved in Go-Sanitize production	Well documented	Addressing female brewers' local needs, sharing results globally	Involving marginalised groups: local female brewers	Reflecting power structures related to religion and gender	Upskilling and empowering participants	Participants enjoyed the workshop
	Training workshop: empowering women through useful critical making	Yaoundé, Cameroon	Secondary school girls, women in academia, women in rural areas	Well documented	Addressing women's local needs with training and making	Involve marginalised groups: women of all educational backgrounds	-	Upskilling of participants, new work opportunities	Participants enjoyed the workshop

	Activities to support gender-inclusive making			Critical Making core values					
Goals	Measures	Location	Addressees (no. participants)	open	local connected	social diverse	reflexive	impactful	joyful meaningful
Wiki-factory	**Changes in the online platform to become more gender-inclusive**	Online	All users of the Wikifactory platform	The resulting changes are open to all users	The changes were aligned to the platform as local place of a global community	Encourage visibility of diversity; strengthen supporting community guidelines	Reflecting power through visibility and and enabling structures	Support diverse makers to find their way on Wikifactory	Changes are supposed to help makers enjoy their work

THE GENDER-INCLUSIVE ACTIVITIES AND THE 6 CORE VALUES OF CRITICAL MAKING

> **Open: Critical Making promotes open collaboration, including the sharing of skills and knowledge. It boosts creativity in the ecosystem of makers by making processes and results accessible.**

Openness and **making processes and results accessible** were a fundamental concern of all format owners during the development, implementation and documentation of the gender-inclusive activities. The main objective of format owners was to make a change and provide better access to making for people of all genders. To reach this aim, sharing the developed event- and workshop-formats, the elaborated guidelines and personal stories, and the lessons learned with the broader maker community was perceived as being essential. This wider dissemination of the gender-inclusive measures is also requested from the Critical Making project by format owners to actively support the openness and accessibility of the results in the last six months of the project duration. More specifically, the **open sharing of skills and knowledge** was the key focus of several gender-inclusive activities: the training workshop for women organised in Cameroon, the maker women training organised in Poland, or the maker camp for caretakers and children organised in Indonesia are some examples. So we see that upskilling of both - technical and soft skills - is one important element for turning the maker community more inclusive.

During the co-design process and the implementation of gender-inclusive activities we realised that openness also entails the **design of inclusive spaces** for collaboration and making. The example of the caretaker inclusive activities of Mz Baltazar shows that in order to make maker processes accessible to persons with caring responsibilities, which are - on the basis of the gendered division of labour and the gender care gap - mostly cis women, the timing as well as space settings and possibilities for bringing children along needs to be considered in the space design.

This is why the guidelines on "how to make maker spaces more inclusive" are an important outcome of our project, which can be regarded as a first input to be more broadly discussed with the make community from different continents, regions and socio-cultural contexts.

This leads to another important lesson from the gender-inclusive measures: When we talk about "openness" we have to carefully consider which target group is addressed. Accessibility to resources, experiences, materials etc. that is mediated only via internet access and topical communication technology risks the exclusion of those who are not provided the necessary technological opportunities (as we have experienced in South Sudan where internet access is granted for 8% of the population only and thus GoGirls ICT becomes also an important mediator in providing the equipment for the online mutual learning activities). Also language might become a barrier to openness if not considered appropriately according to the needs of the target groups. And if we offer training courses to women in different parts of this world (see above) then the limitations in terms of numbers of people who could be trained hinders us in being as open as we would wish to be.

> **Local & connected: Critical Making is happening locally, working on the ground and adapted to a particular socio-cultural context. Thereby, critical making implies an engagement with local communities as well as global networks – thinking globally and making locally.**

We realised that addressing gender inequalities in making and innovation can take many shapes and the successful realisation of gender-inclusive activities is strongly influenced by the social-cultural context and the local needs they are embedded in. While gender is one dimension to be considered, focussing exclusively and solely on gender ignores other dimensions of social discrimination such as race/ethnicity, or disability. On the basis of colonial legacy, processes of marginalisation and discrimination share common structures globally. The specific intersections and resulting living realities, however,

differ socioculturally, which is why the adaptation to local needs and requirements is key.

This is the reason why we can see a strong local connection and adaptation to the particular sociocultural contexts in many of the developed gender-inclusive formats. An example for this core value is the workshop organised with female brewers and religious leaders in South Sudan that aimed specifically to address concerns originating from local beliefs and sociocultural values.

Also the caretaker inclusive workshop in Vienna shows the importance of this core value - when hands-on making activities for children and their caretakers were organised open-air, in a public space surrounded by social housing complexes they succeeded to trigger interest and curiosity within the local community and to reduce physical entry barriers to any closed space.

The format owners of these two gender-inclusive measures are happy to share and exchange on their lessons learned with the worldwide maker community and this is where we see a strong global embedding.

This link between local and global is even more apparent when we think about the Inspirational Stories for gender-inclusive making. These personal narratives of female and nonbinary makers and the challenges they had to overcome are strongly rooted in the specific socio-cultural contexts, while being shared globally and thus serving as role models for a world-wide maker community.

In the same vein, locally-specific adaptations might not suit every other context. For example, the camp organised by HONF in Yogyakarta, Indonesia might have not worked out the same way when organised by Mz Baltazar in Vienna, Austria. An unreflected replication of the local gender-centred activities at a global level in terms of scaling up might therefore not always work out as desired. Instead, these activities could be scaled out, i.e. actively scrutinised for local specificities and adapted to different local needs to allow for a multifaceted multiplication and translation processes. As an interesting outcome of the Critical Making activities the format

owners of HONF in Indonesia and Mz Baltazar in Austria plan to specifically try out this "scaling out" of the Project X camp and learn from the local adaption of the concept to the Central European context.

> **Social & Diverse: Critical Making reflects on the social dimensions of making, the living realities of those persons involved and concerned, as well as the ethical implications of their work. Critical Making thereby addresses societal challenges and needs. That's why it is so important to strive for diversity and inclusiveness.**

This value is at the core of all gender-inclusive measures that we have developed in WP3. All actions were centering on inclusiveness and diversity and the question which social dimensions to address with the gender-inclusive actions was open to the participants to adapt to their community needs. Thus, this value strongly links with the previous values on local adaption and openness.

With the portfolio of formats and materials created via the participatory gender actions we reached to participants of different socioeconomic and -cultural backgrounds, e.g. with regard to gender, race/ethnicity, age, social status, religion, education, occupation, and living environment. Not all these aspects could always be considered by all actions taken, rather their focus depended strongly on the specific goals of the format owners and the given structural conditions. We realised for instance that the Inspirational Stories of Inclusive Making were all stories of makers who are not part of the mainstream maker groups and the stories they tell, the challenges they overcame, the passion they have for making turns them into great role models, although most of them are highly-trained, non-disabled and mobile.

> **Reflexive:** **Critical Making re-thinks and re-constructs the dominant mainstream maker culture from a critical stance, reflecting on underlying power structures and their implications.**

Critically reflecting on the dominant mainstream maker culture was the main aim of the whole co-design process, when the participants identified existing gender inequalities and discussed ideas, approaches and needs to address them. Gender relations are relations of power - therefore, every intervention that aims to re-construct or influence these relations of power can be considered as reflexive.

In the portfolio of gender-inclusive activities we find some formats where the reflexive element was particularly strong. The GoSanitise project, for instance, tried to actively reflect on societal challenges of gendered expectations and unequal acceptance for women by working with alcohol and took a reflexive approach by using locally appreciated authorities to approve and legitimise the women's activities.

During the inclusive base & camp of the Mission X project of HONF in Indonesia, caretakers and children created innovative projects out of everyday and domestic objects, critically experimenting with ways of producing more sustainably with material that is locally available. The results of these innovative making processes were also shared with the wider public during an exhibition.

Also the "Introduction to inclusive making" triggers individual readers to think more critically how they themselves can act more gender-inclusive, and the Inspirational Stories reflect the challenges that makers outside of the mainstream maker community had to face (and still face) to become accepted and equal members of this community.

In other formats, participants were less actively engaged in reflexive processes of power structures and their implications. Some gender-inclusive activities had a strong focus on training women in making skills, without stimulating participants to actively engage in the critical and reflexive processes, or rethink gender-relations beyond binary categories. However, even in these cases an upskilling of people from minority groups

can be seen as a precondition for a transformation to take place as an intermediate outcome.

Further, also the sociocultural and political context structure the criticality and reflexivity of actions taken. In countries which criminalise the existence and support of LBGTQIA+ community members and block any discussions related to change unequal gender relations, workshops solely addressing cis women might already be regarded as reflexive and transformative. In other contexts, where gender-based discrimination discourses have at least reached some societal acceptance, the same focus on cis women might rather be considered as affirmative and not taking for example the specific marginalisation trans women experience on the basis of transmisogyny into account.

> **Impactful: Critical Making aspires to really make a difference. It seeks to improve life and build a sustainable future.**

The feedback that we have received from the format owners shows an impact of their gender-inclusive actions on those participating. The women in Cameroon told us six weeks after the course that they tried to produce yoghurt or liquid soap at home and would love to join another making workshop to further increase their skills. The children in Vienna loved the creation of mud-batteries and always asked for new activities, when they met Stefanie - the format owner - on the street. The caretakers in Indonesia were really proud of their created projects and were interested to engage in further training activities related to programming and coding. The female brewers in South Sudan are not only better trained in safety measures when brewing high-percentage alcohol in their homes; they also safely know that brewing alcohol for the sake of producing hand-sanitizers is a well-accepted activity by their religious leaders. The participants in the training in Poland have gained digital fabrication skills that they can now use to seek for new job opportunities. The interviewees of the Inspirational Stories were thankful for providing a stage for their personal narratives

and enabling them to act as role models of potential future makers outside of the mainstream.

The challenge for the project is now to keep track of the long-term impacts that might be a result of all the small measures we have implemented in the project. Every single gender-inclusive action had a small impact on the format owners, who were involved in the co-design and implementation of their innovative ideas, and the participants who were the target group of the activities. Whether the sum of various small activities will successfully contribute to slowly shifting hegemonic structures and rendering the maker and hacker communities more inclusive still remains to be seen.

> **Joyful & meaningful:** Critical Making is still about the joy of and in making, but adds meaning to it. What is made critically is made with a specific purpose of individual or social kind.

Each of the gender-inclusive measures was co-designed by format owners who perceived their actions as meaningful and important to address the gender-gap in making. As has been discussed for the value of impactful all formats touched on a social dimension, not only for format owners but also participants.

It was amazing to see how much the children involved in caretaker inclusive making in Austria, Poland and Indonesia enjoyed the tinkering and making, alone or in collaboration with their caretakers. We received very positive feedback from the women participating in the making workshop in Cameroon with regard to the usefulness of this training activity also for supporting their daily life activities. The interviewees of the Inspirational Stories about gender-inclusive making shared their appreciation for the Critical Making project, providing the opportunity and platform to make their stories heard and becoming a role model for others outside of the mainstream to follow into the maker movement.

In all of the cases implemented, making was not done for the sole purpose of making itself, but always served a broader vision to render making more gender-inclusive.

Nevertheless, the enjoyment of being involved in the activities was certainly an important element to motivate participation and create positive impacts for the participants as well as the format owners themselves.

OUTLOOK

As has been mentioned several times throughout this document the focus of the last six project months will be related to the dissemination and sharing of the co-designed gender-inclusive activities and collecting feedback from the maker community of different parts of this world. Thus dissemination is not seen as a one-directional activity that pushes information towards the maker community, but as a bi-directional process of discussing the created formats and materials, enriching them with new insights and experiences and thereby supporting the practical implementation of gender-inclusive measures. This work will be done in close collaboration with the communication team of the Critical Making project, making use of the partners' connections to the maker community (e.g. the global network of GIG partners and the Wikifactory platform users).

The second stream of activities in this work package is dedicated to the sustainability of the gender-inclusive measures and thus links closely to the dissemination work in the make community. We will organise workshops that not only introduce the gender-inclusive measures to makers in different partner locations but also stimulate reflection on how to further sustain and scale the gender-inclusive activities of the Critical Making project. One objective will be to elaborate how the specific online formats and the moderation of the gained insights can continue after the end of the project.

An important final outcome of our work will be a publication targeting the scientific community and thus contributing to the scientific discourse on responsible research and innovation specifically focusing on gender-aspects.

4. References

Crenshaw, K. (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. *University of Chicago Legal Forum*, 1, 31.

Doyle, C. (2013). Making Makers. In: *6th Annual Learning Innovation Network Conference – Sustainable Models of Student Engagement – Rhetoric or Achievable?* 17th October 2013 in the Ashling Hotel, Dublin, Dublin, Ireland.

Richterich, A., & Wenz, K. (2017). 'Introduction. Making and Hacking'. *Digital Culture & Society*, 3, 1. https://doi.org/10.14361/dcs-2017-0102.

Robinson, J. (2003). 'Future Subjunctive: Backcasting as Social Learning'. *Futures* 35 (8): 839–56. https://doi.org/10.1016/S0016-3287(03)00039-9.

Schaefer, T., Fabian, C.M., Seebacher, L.M., Guedira, A., Kieslinger, B., and C. Christiansen (2021). D3.2. Critical Review of Gender Aspects and Activities. *Critical Making Consortium.*

Sipos, R., Kieslinger, B., Schaefer, T., Seebacher, L. M., Akerman, M., & Mamitzsch, S. (2022). Critical Making Case Actions and Methodologies: A Methodological Toolbox. Zenodo. https://doi.org/10.5281/zenodo.5948298

5. Annex

Co-Design Workshop 1

The following list shows concrete Ideas for Action that were elaborated in the Co-Design Workshop 1.

Change the wording to "make spaces", because it makes the spaces more open, you don't have to call yourself a hacker or maker

Let's get active together:

Ideation, Prototyping, Making

- Provide inspiration for first projects, that are useful for daily life (**)

- Prototype together gender-oriented objects (*)

- Have ideation workshops for young women (*)

- Co-create and organise workshops that support critically reflecting on gender biases and are applied in different parts of the world (*)

- Based on the observations on daily and local issues, start with brainstorming and basic ideas to find affordable solutions

- Get inspired by well-working communities of other topics

- Run epicene activities in Fablabs/Makerspaces

- "Rediscovering the playground" - initiatives in spaces for making that treat making as play, something you can experiment, spark ideas, etc

- MatchMyMaker: Getting different people together for Making

Mentoring and funding of people and ideas:

- Offer mentoring for people with ideas, offering support how to realise their ideas e.g. by means of webinar (**)

- Choose a cohort and have webinars mentoring sessions

- Give out scholarship to very young feminist makers/hackers/designers/artists (*)

- Give some seed fundings for innovative ideas for young female makers/hackers/artist/designers or collectives (*)

- Put more funding behind role models for gender inclusive making so they become more known and can inspire people

Start maker spaces in your community; adapt a maker space to be more gender inclusive:

- Concerning social inequalities: offer easy entry for hacker-/ makerspaces etc. by reducing the financial aspect/ burden for people in need (*)

- Organise discussion/ design thinking for the local community, to get to know their opinion of how to make our local lab more inclusive (regarding the space and projects) (*)

- Start makerspaces in community/neighbourhood centres

- Lower the barrier to connect to others: Create networking sessions in maker communities so everyone can get to know each other

- Create transparency about who everyone is in the maker community and what their skills are/what they work on so people know who to ask for help and understand each other

- Keep in mind people have different educational backgrounds, level of physical mobility or responsibilities in life (school, work, caring for family members)

- Open workspaces with big shared tables

- Invite local role models

Foster outreach and talking about it

Create the necessary material:

- Create an open guide with different approaches and frameworks that have worked in other countries could be adopted as examples for new maker spaces to learn from. (*)

- Create a handbook/manual for gender-inclusive welcome-angels (*)

- Publish an ebook in different languages on how to get started if you want to make a new space (*)

- Share stories/ marketing / make the topic more visible (**)

- "Making superpowers" - showcase the powers of different kinds of making. Maybe start from how spaces for making advertise themselves (online or physical spaces) to promote something out of the standard tech making

- Make intro-level material on gender/tech/making available

- Make a really well done film about this movement

- Make some online methods for making protocols

- Invest money in translations

Organise events:

- Organise a really big conference online where we can come up with common ideas and formulate them (*)

- Organise a series of talks by people who work in "gender-opposed" work-areas (like a male tailor, a female full stack developer etc.)

- Give (under-represented) people the possibility to present their projects/work (*)

- Organise open seminars where makers share their stories (*)

- Have regular yearly assembly

Reach out:

- Help new leaders (*)

- Educate the people that are currently in the maker industry to make them change their behaviour and be more open (*)

- Integrate (tech) collaborative making into education programs at schools (*)

- Inspire bigger companies to organise co-design projects

Innovate the supportive structures/processes to foster feminist, autonomous makers:

- Make a currency, that cannot be accumulated to pay each other block chained coins, that are only valid within feminist makerspaces (*)

- Build label similar to "fair trade" or "organic" that is only for autonomous makers/designers/artists in similar collectives to support each others approach and let people know about why it is different (*)

- Make recruitment process for projects more inclusive (how to?) (*)

CO-DESIGN WORKSHOP 2

The following section shows the selected ideas to be further co-designed from Co-Design Workshop 2.

How to create workshops and events that are inclusive for children?

Motivation:

- It is difficult to make people understand why they should become makers, to get people involved in making. It is easier to get children engaged in making, so it's great to engage with the younger generations.
- If mothers want to become (and stay) active in making, then often they struggle with the question of who takes care of their children. So could we develop workshop formats that allow both - parents and kids - to make together.

Good practices:

- Adapt the policy to having kids in the space: e.g. No complaining policy in Stratum0: kids can freely move and play in the make space and nobody complains
- Adapt the make space: e.g. Have a diaper change station, a kids corner with toys like lego etc. (Stratum0)
- Rent the space for childrens' birthday parties and offer make activities for the kids of the birthday party (Happylab Vienna)

- Electric girls workshop for mothers and daughters (Happylab Vienna) - but these workshops should be more interactive as they are currently organised in the Happylab
- Organise babysitters if you have an event (Mz. Balthazar's Lab)
- Do not try to fit children into adults' programs, but adapt the workshop programme to the pace and needs of children
- ClassroomOnPhone-project of GoGirlsICT (https://gogirlsict.org/classroomonphone-series-gogirls-learning-podcast/): explains science to girls with small experiments that they can do with everything they find in their kitchen.

Material Creation & Outreach

Motivation:

- Gender inclusive-making is not visible enough, insights about its potential and facilitation are not well communicated in the make community and to other stakeholders like schools. So we need to foster outreach and communication: by sharing stories, giving underrepresented people a voice to share their experiences and work; and by creating guidance for gender-inclusive making and facilitation (e.g. for gender-inclusive welcome angels).
- The format of these materials still needs to be defined (it can be online/offline seminars, workshops, written manuals and handbooks etc.)

Best practices:

Manuals and written material:

- Create an open guide with different approaches and frameworks that have worked in other countries and could be adopted as examples for new make spaces to learn from. (like the hackspace-design-patterns: https://wiki.hackerspaces.org/Design_Patterns)

- Prusa Manual for 3D printers as a best practice for manuals (https://help.prusa3d.com/de/tag/mk3s-2/)

Workshops/conferences etc.:

- This is the symposium I co-organized in Berlin, which I think was a good way to learn more about each others concerns: https://www.digital-future.berlin/fileadmin/Digital-Future/Dateien/Trans_Feminst_Hacking_programm.pdf
- Regular festivals where people meet and give workshops to each other like THF and etc
- All our workshops are exclusively for people who identify as female, trans, non-binary and also hosted by people who identify as female, trans, non-binary. Mostly artists showing their work and then explaining the technology behind it. (Mz. Baltazar's Lab)
- Starting the workshop with feminist critical theory input to counter act hesitation
- Happy Lab in Vienna - Female maker month

Stories:

https://www.youtube.com/watch?v=ud_q7p5Oy2w&ab_channel=Robiszto

https://www.youtube.com/watch?v=-SrRexK-H4s

https://www.youtube.com/watch?v=fVvdxvq77vE&ab_channel=Robiszto

https://www.youtube.com/watch?v=0Dsh_8OQa_8&ab_channel=FundacjaOrang

Supporting existing make spaces with their activities

Motivation:

- We want to support female-identifying persons in the ideation phase, provide them with support and mentoring to implement ideas and maybe even get into business with their ideas.

- We want to support existing make spaces in their outreach to underrepresented people in making, to develop new formats of engaging them, providing funding for these events and the facilitation of these people.

Best practices:

- Memberships, friends support through platforms like patreon
- Yearly International conference for women entrepreneurs with female speakers, sponsors, and an award; gives women the feeling to belong, http://www.emergindia.org/activities.php (eMerg)
- Production of hand-sanitizers as a business opportunity for women (GoGirlsICT, https://gogirlsict.org/gosanitize/)
- https://www.youtube.com/watch?v=2xMY2o6NQ0k
- Happy Lab in Vienna - Female maker month
- Offering make activities in a public library (e.g. in Boulder USA)

INSPIRATIONAL STORY - INTERVIEW GUIDELINES

The interviews with makers from around the world who shared their inspirational stories on gender-inclusive making were based on four main questions:

- Can you shortly tell me about your background and what you are currently working on?
- Did you face barriers - and specifically related to gender & intersectionality - on your way? And if so, how did you overcome them?
- What supported you in your work? And how can we increase the number of female representatives in innovation and making?
- Is there a message you would tell to your younger self?