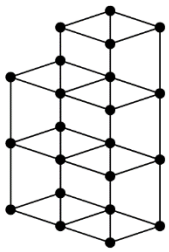

doing it together science

Grant agreement no. 709443

DITOs

Doing It Together science

Coordination & Support Action

D1.1 Outreach Plan for Biodesign

Work Package: 1

Due date of deliverable: Month 6

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Reviewer: Bruno Strasser (UNIGE)

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PU	Public	**X**
CO	Confidential, only for members of the consortium (including the Commission Services)	
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)	
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)	
EU-SEC	EU-SEC Classified Information: SECRET UE (Commission Decision 2005/444/EC)	

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Abstract	This deliverable is a compilation of initial plans for the implementation of public engagement activities in the area of biodesign including good practices, methods and approaches.
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Table of Contents

1 Version Log

Version	Date	Released by	Nature of Change
DRAFT	19.10.2016	Imane Baïz, Lena Asai (UPD)	Consortium review
Review	19.11.16	Bruno Strasser (UNIGE)	Internal review
Review	14.11.16	Norbert Steinhaus (Bonn Science Shop, Living Knowledge Network)	External review
Review	29.11.2016	Artemis Skarlatidou	Internal Review
1.0	30.11.2016	Consortium	Formal release

2 Definitions and acronyms

Acronyms	Definitions
Biodesign	A cross-disciplinary combination of bioart, DIY science, and synthetic biology (further explored in Appendix A)
CRI	Center for Research and Interdisciplinarity
CS	Citizen Science
CSA	Coordination and Support Action
CwB	Citizens without Borders
DITOs	Doing It Together science
DIY	Do It Yourself
DIYBio	Do It Yourself Biology
DIT	Do It Together
DoA	Description of Action as defined in the Grant Agreement
EC	European Commission
ECSA	European Citizen Science Association / Verein der Europäischen Bürgerwissenschaften
ESRT	European Stakeholder Round Table
H2020	Horizon 2020 Programme
ICT	Information and Communication Technologies
Ideation	The creative process of generating, developing, and communicating new ideas
KI	Kersnikova Institute
Meritum	Centrum Szkolen I Rozwoju Osobistego Meritum
MOOC	Massive Open Online Course
MP	Medialab Prado, Madrid
RRI	Responsible Research and Innovation
Tekiu	Tekiu Limited
UCL	University College London
UNIGE	Université de Genève
UPD	Université Paris Descartes
WP	Work Package
WS	Waag Society

3 Executive Summary

This report presents an initial plan and compilation of public engagement activities in the area of biodesign. It outlines the methodology used to formulate the outreach plan for biodesign, namely consultation of partners and feedback via forms and online conversations. It covers around 50 events from 7 partners. The report outlines good practices, analysis and initial set of guidelines regarding issues and lessons learnt from events organised in phase 1. In phase 2, partners aim to run a hundred events and WP1 will support and promote collaborative practices and public activities.

UPD leads WP1 biodesign. During phase 1 of DITOs it became evident that the term biodesign is used to describe a wide range of activities in bioart, DIY science, and synthetic biology. It is a term used within many disciplines hence there are different interpretations and some confusion about how the term is used within various communities. WP1 is undertaking an investigation for a working definition for biodesign.

The outreach plan for biodesign is deliverable 1.1 (D1.1) from the coordination and support action (CSA) Doing It Together science (DITOs), grant agreement 709443.

4 Introduction

The project ‘Doing-It-Together Science’, DITOs, represents a step change in European public engagement with science and innovation. The aim is to elevate public engagement with science across Europe from passive engagement into an active one. The project will support and build upon DIY, grassroots, and frugal innovation initiatives so that in the short and medium term we sustain, build and promote and in the long term increase the effects of these grassroots efforts channels to policy makers at different levels.[1]

[1] Doing It Together science (DITOs), grant agreement 709443.

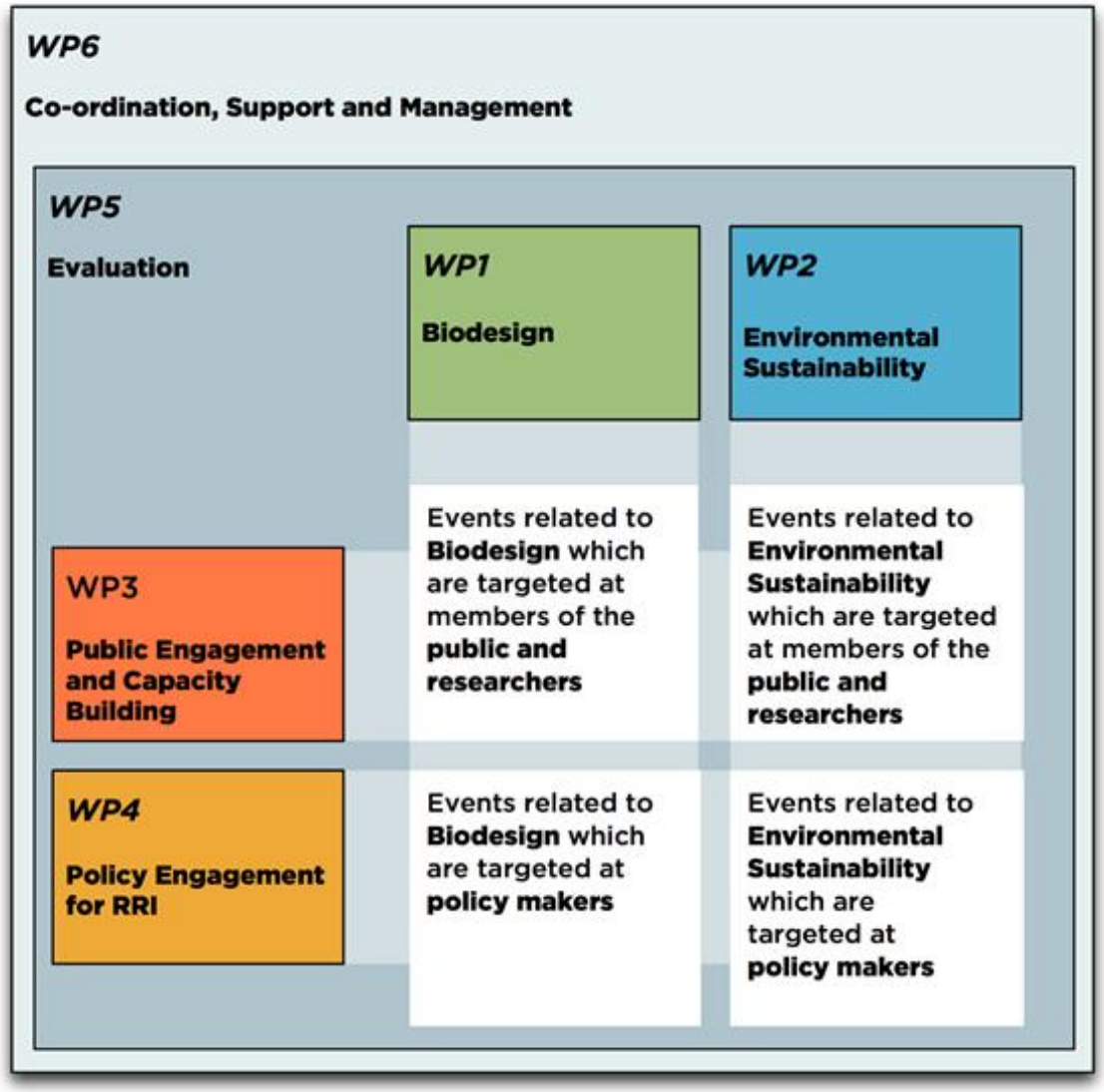


Figure 1: Relationships between work packages

UPD leads WP1 biodesign. Within DITOs, the title 'Biodesign' is initially used to describe a wide range of activities including bioart, DIY science, and synthetic biology. We investigate how different communities conceptualise the term and work towards providing a working definition (see Appendix A). This WP attempts to cover a wide range of biodesign citizen science activities to engage citizens, scientists and policy makers in shaping and conducting research in biodesign and technology, addressing personal health and global issues.

BOX 1.1

O1 To engage citizens, scientists and policy makers in shaping and conducting research in biodesign and technology, addressing personal health and global issues by

O1.1 Methodologies and Practices. Developing methods for supporting the active and collaborative involvement of citizens and scientists in biodesign, including the engagement of citizens in the research process with methods such as teaching through research, collective design of creative prototypes, prospective approach of critical design, crossdisciplinary issues (biology, ethics, forecasting, biology, design, history);

O1.2 Networking. Establishment and bolstering of networked hubs as permanent biodesign and technology research and exhibition spaces to strengthen, support and make more visible the work done by public engagement organisations, including DIY science initiatives by promoting mutual learning between experts, policy makers and other stakeholders;

O1.3 Activities. Implementing a programme of activities covering a range of biotech, biodesign and social challenges, biodesign cafés, exhibitions, events, workshops, collective creation.

Figure 2: WP1 Objectives

UPD: will organise a set of hands-on activities in biodesign and also will lead WP1 with the main objectives of introducing the basic processes in biodesign, to develop participative science in tangible and creative ways, and to bring to life a long-term and cross-disciplinary network of biodesign.

UCL: will lead hands-on workshops and publish materials addressing broad audiences.

WS: will lead hands-on workshops.

ECSA: contributes to this WP ensuring the necessary links with appropriate policy and decision makers.

MP: will organise workshops targeting at youngsters between 8 to 16 years old.

KI: offers to combine art and science with hands-on involvement in biodesign activities.

Meritum: will carry out training science cafés and workshops on biodesign.

UNIGE: will work on participatory DIY science postcard-making which will feature tested DIY science experiments and help as a dissemination tool to promote partner events

Tekiu: contributes to this WP ensuring the necessary links with appropriate policy and decision makers.

The whole list of events can be found in the grant agreement.[1]

4.1 Deliverable Goals

WP1T1 seeks to share methods, approaches and lessons learnt by DITOs partners in their current praxis. Thus, the first purpose of this deliverable is to **describe an initial set of implementations of CS and DIY science activities** that DITOs' partners have planned with a focus on biodesign.

Second, this deliverable aims to **become a working tool for partners to share and exchange their preliminary practices and insights for organising successful public engagement in citizen science and DIY science events** in the thematic area of biodesign. This exchange is facilitated through formative evaluation (section 5.5.4 in D5.1).

Third, this deliverable discusses the **self-assessment approach taken in order to improve the methodologies** used to gather, describe and analyse the information on activities developed by partners.

4.2 Deliverable Structure

The deliverable begins with a description of the methodology used to gather information about activities organised by the partners. A brief description of partner activities is presented followed by the analysis and summary of the gathered information. This serves to give an overview of the organisational details and approaches practiced by partners. Experiences from WP1 event organising are also included to give a more in depth perspective. The results not only highlight the most important details of the events and the diversity of approaches but also raise questions about our collective and individual practices in science event planning and facilitation. These questions and insights will be explored further througout phase 2 of the project.

Next, a discussion of the analysis findings is presented focusing on three aspects: good practice for public engagement in biodesign, questions that arose during the analysis of each factor, and suggestions to improve the information gathering approach. A tentative template for organising specific types of events based on an information sheet proposed in this deliverable is also presented.

Finally, this methodology is discussed in relation to previous results. The report reflects on the pros and cons of this approach in relation to the work package goals and provides suggestions for future improvements.

4.3 Escalator Model

The overall objective of WP1 is to engage citizens, scientists and policy makers in shaping and conducting research in biodesign. The challenge of public engagement will be addressed by using a virtual *escalator model*. This enables people to decide which level of contribution is suitable for them, while gently exposing them and encouraging them to move to the next level.

They may choose just to install software on their computer or phone and use its sensors with very little intervention (Intensity **Level 1 - Crowdsourcing**) in

applications such as monitoring air pollution, where the phone is setup to report the measurements. At the next level (**Level 2 - Distributed intelligence**), participants use their cognitive capacity – e.g. engaging in serious games and citizen science activities at Medialab Prado (MP). At the next level (**Level 3 - Participatory science**) participants are engaged in defining the problem that will be explored, in collaboration with scientists, by collecting and analysing data for example. Examples include ecological observations conducted within the ECSA network in which participants work with scientists in activities such as BioBlitz, where community members concentrate on a small area and record biodiversity in minute details. DIY science operates at **Level 4 – DIY Science**, the level that can potentially most empower participants and increase their capabilities.[2]

Level 1 'Crowdsourcing"	Citizens as sensors or contributing computing computer resources
Level 2 'Distributed intelligence'	Citizens as basic interpreters
Level 3 'Participatory science"	Participation in problem definition and data collection
Level 4 'DIY Science'	Collaborative science - problem definition, experiment design and/or execution, data analysis

The range of ways citizens participate in science.

We stress the point that we encourage people to become actively involved in scientific practices. There is no value judgment that Level 4 is necessarily better than Level 1, nor do we believe that all participants should operate at a DIY science level. Different issues, scientific problems, personal interests, socio-economic conditions, time constraints, and social circumstances all influence the level at which each participant chooses to operate. The aim of facilitators, scientists and policy makers should be to enable people to move smoothly to the level that suits their needs. The *escalator model* is described in the grant agreement [1].

4.4 Dissemination through Events to develop Public Engagement and Capacity Building

DITOs' engagement approach emphasises the need for flexibility and adaptation to circumstances. This means ensuring the relevance of the events to the lives of participants by **adapting activities to context and particular situation, co-designing activities, and iterative learning from continuous evaluation.** We will draw from local and expert knowledge, and use a variety of media (online, face-to-face, outdoors, etc.) and methods (publishing information, exhibitions, dialogue and deliberations, hands-on workshops, etc.) to build knowledge, skills and confidence as well as mutual trust and respect between participants and institutions.

[2] Grant Agreement http://cordis.europa.eu/project/rcn/203160_en.html CSA Doing It Together science (DITOs), grant agreement 709443.

Public engagement and capacity building are complementary to the biodesign and environmental sustainability activities, and are a major mechanism for the 'escalator' described above. Here the **events** – online activities, travelling exhibitions and labs, science cafés and workshops **are designed to increase capacity, raise interest** and develop better awareness of science and technology issues and practices including citizen science.

5 Plan for Public Engagement Activities

5.1 Methodology to determine Public Engagement Plans

The methodology applied in this deliverable was designed together with the WP2 leader (MP) and with input from WP5 and in consultation with consortium partners. This means that D1.1 and D2.1 have a very similar structure and both deliverables have been written collaboratively between the leaders of the two work packages. Similar approaches have been taken and therefore sections can be found in both deliverables for the sake of clarity. Similarly, other parts have been removed from one or the other deliverable to avoid some duplication and repetitions. Noticeably discussions and conclusions might differ since data and topics between both are different. In addition, because in most partner organisations event facilitators are the same for both thematic areas, strategies for event planning and design, practices, and context will also appear the same for both.

This deliverable aims to compile the different practices carried out by the partners when organising public engagement activities in relation to biodesign. In order to do that, every partner organising events in WP1 **selected two or three activities** that they considered as **representative of their usual practice** and which are different or complementary between each other.

The WP1 and WP2 leaders developed a questionnaire with input from WP5. The aim is to create a baseline of methodologies **currently used by partners to plan and deliver activities** that can be used to build upon, share, and compare to as the project progresses. The questionnaire focused not only on the content and format of each event, but also in the less visible organisational details that are crucial for the success of such events. The questionnaire template can be found in Appendix B.

All partners filled out the questionnaire online. This facilitated sharing answers and insights between partners.

However, while not all the questionnaires were filled out in full, identification of some key aspects of the activities was possible. This enabled the extraction of relevant data to characterise qualitatively the group of the activities that were proposed. The data from the questionnaires was used to populate an Excel file that could be analysed. Many of the questions were open-ended so an effort was made to cluster related ideas.

After this analysis and while considering the results discussed the information sheet that it was proposed in this deliverable (D1.1). This discussion led to a second iteration of the information sheet that will be a double-sided card that sums up each activity in an easy readable and attractive way. This design fulfils two goals. It aims to be informative for the general public, so the front side covers show practical

information of the activity to attract and engage participation. Secondly the document is also intended to be useful for event organisers by showing 'behind-the-scenes' information such as tips from experienced organisers on the back of the document.

5.2 Detailed Activity Plan

Seven partners out of eleven have citizen science activities related to biodesign(UPD, UCL, WS, MP, KI, Meritum, UNIGE). Data from those seven partners have been gathered covering a total of **27 activities and 211 events**. There was a clear difference between some of them, which allowed us to make a preliminary classification in 5 different categories: **interactive and travelling exhibitions** (A), **conferences / seminars** (B), **gaming competitions / online engagement** (C), **discussions / debates at science cafés and public screenings** (D), **DIY and DIT workshops** (E).

Below can be found a comprehensive list:

UPD:

- **Biodesign NightScience.** A series of lectures and workshops on biodesign that gather researchers, hackers and education innovators to share their approaches and experience on building new ways to achieve better knowledge construction and transmission. Citizens and scientists are invited to reflect on biodesign in the light of DIY, open, frugal, responsible science and research to increase science literacy and provide citizens with tools to make sense of the world around them. (A)
- **iGAMER.** International Game competition for Education and Research which invites undergraduate and graduate students to develop innovative games that engage the largest community into learning through research and questioning. (C)
- **Gamelier events.** Club dedicated to educational and scientific games that organises monthly lectures, workshops and game-jams on biodesign. (C)
- **MOOC.** Massive Open Online Courses on Synthetic Biology. (C)
- **CRI Journal.** Reports on DITOs events shared on the CRI website. (C)
- **Biodesign Workshops**. Interdisciplinary workshops dealing with different topics related to biodesign (e.g. synthetic biology, biomaterials, bioremediation) and different methods of design (design fiction, design thinking). They are co-organised by the participants and the mentors together. (E)
- **High school biodesign workshops.** Workshops that are organised in high schools in collaboration with biology and biotechnology teachers. By participating in brainstorming sessions, collecting data or samples from their immediate environment and conducting hands-on experiments with DIY kits (e.g. making bioremediation by encapsulating microalgae with alginate, producing vegan leather with kombucha), students experience how to contribute to citizen science. (E)

- **Leadership Programme.** “Teaching Through Research” programme addressed to young teachers and researchers in life sciences and biotechnology to help them develop and implement innovative educational projects. (E)

UCL:

- **CwB (Citizens without Borders) Biocafés.** The event is an opportunity for citizens to meet with practitioners/makers in a relaxed environment to discuss topics related to design thinking in Biology. The public selects themes and guest scientists on a monthly basis. (D)
- **Science Film Night.** An opportunity for citizens to get together and watch a film or documentary on a topic related to biodesign, including specific issues of interests at the EU level. A discussion is moderated and a guest expert will be invited to give their opinion and answer questions about the themes of the film. The discussion will continue on the event website and a summary of the discussion will be posted as a blog. (D)
- **CwB (Citizens without Borders) BioPlayshops.** A series of workshops that take participants on a journey to explore, ‘calibrate’, and fine-tune their senses and investigative skills. It aims at redefining the participants’ relationship to errors by employing a playful approach to exploration that ‘awakens the inner child’, who is not afraid to explore, ask, and try things out. The playshops also open up different avenues to explore and express investigative journeys including artistic expression through sculpture and performance arts. (E)

WS:

- **The Science Bus.** A traveling interactive exhibition and workshop program of citizen science projects, facilitated by a bus equipped with scientific instruments. Workshop prototypes and results will be added to the exhibition from all DITOs partners and hubs facilitating the physical exchange of good practices in citizen science throughout Europe. (A)
- **Reddit Ask Me Anythings.** Interactive sessions with scientist and DITOs practitioners. (C)
- **Open Evenings.** Open innovation evenings for grass-roots self-initiated bio research / design taking place in the WS fablab and wetlab, during which they present and discuss their own work and have the lab available for their projects while being supported by lab staff. (D)
- **Do-It-Together Bio.** Workshops guided by an artist on a specifically 'hot topic' or new related item in biodesign news. (E)

MP:

- **OpenBio workshop.** A workshop for 20 youngsters (age 8 - 16) aiming at providing an introduction to concepts, tools and methods for DIY Biology. The topic is decided by MP and an expert is selected to guide the hands-on experiment. (E)

KI:

- **BioArt.** A series of BioArt (widely addressed to as "hybrid art") exhibitions as the final result of a long-term incubation process including an artist, scientist(s), technician and interested members of the general public addressing the field of biotechnology, biology and life systems through a humanistic viewpoint. (A)
- **Workshop Lab Books.** A learning tool for anyone entering the DIT / DIY science field. It will encompass the guidelines and basic knowledge required for people to run their own activities, the presentations of individual workshops carried out at Kersnikova based on the DITOs framework, and instructions on how to repeat those activities. The LabBooks will be published online via the DITOs and other websites. (C)
- **BioTalks.** Science café-style events, where community members and leaders engaged through BioTehna (biotech - oriented) and ČIPke (women in science-oriented) will discuss selected arts & science projects in the field of bioart / hybrid art in an informal way at RAMPA Laboratory or Kapelica Gallery. (D)
- **Bio Friday Academy.** A series of workshops addressing the field of biotechnology, biology, biodesign, for youth (age 8 - 16) where they will explore and experiment with life systems under the mentorship of professionals proficient in the field. (E)
- **Bio Citizen Science.** A series of workshops addressing the field of biotechnology, Biodesign, for students and adults (age 17 - 99) where they will explore and experiment with life systems. (E)

Meritum:

- **CityHacking.** Production and promotion of “City hacking” app for Android mobile phones. The application tries to enrich urban experience by creating game environment which helps to understand flow of data produced by cities (e.g. noise/air quality monitoring, biodiversity, use of streets/plazas). (C)
- **Biodesign Café.** BioScience Cafés are regularly organised events for members and leaders of communities interested in biodesign in Silesia region. The discussions will be devoted to subjects of art & science projects. (D)
- **Bio Hack the City.** “Hack the City” hackathon are two events planned to gather professionals and city activists as well as young scientists, and invite them to hack provided data sets (data mining) in European cities and environment to demonstrate new ideas or patterns of development and promote them with usage ICT tools. (E)

UNIGE:

- **Perspectives on DIYBio.** A public conference on the significance of the Do-It-Yourself Biology movement for science practice and policy, and an associated DIY interactive workshop in six European countries. (B)
- **DIY Science Postcards.** A series of visually attractive postcards with instructions on how to perform DIY biotechnology experiments at home and encouraging participants to connect to the wider European DIY community. (C)

- **BioNights.** Monthly public events (40 people) with hands-on activities on a scientific theme (e.g. "Discover your DNA", "Discover Microbes", etc.)

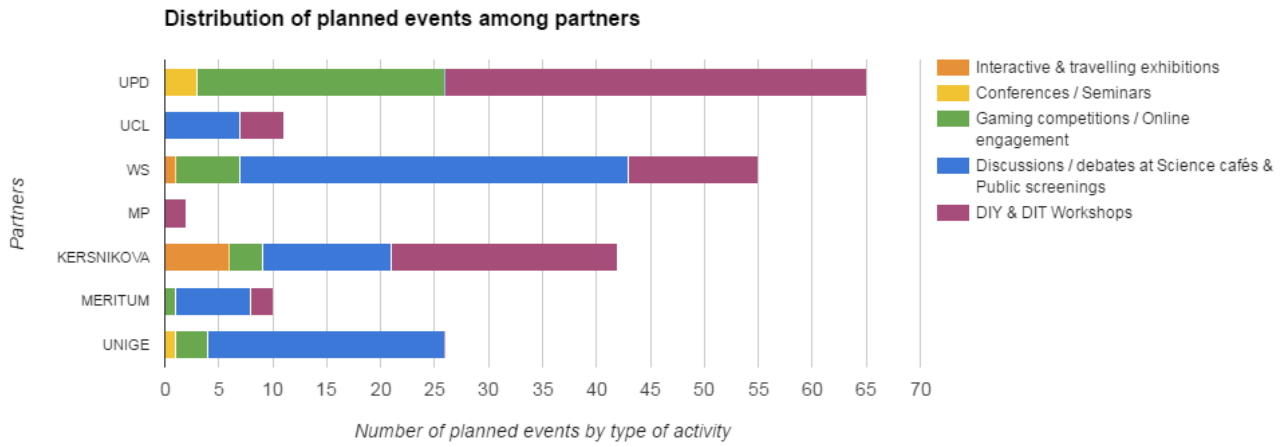
The first question that arose is whether these types can be mapped to the categories of the *escalator model*. The consensus was that this mapping might not work properly because a workshop could be designed as level 2 (distributed intelligence) while another might be designed for level 4 (DIY Science).

The next question was whether the questionnaire tackles this issue. While some questions focus on the same topics as the *escalator model*, none use the same categories as the escalator. This specific lack must be corrected in future questionnaires to create a better mapping between the DITOs activities and the escalator model.

The table shows the number of activity per partner and per activity category:

Partner	**Type of activity** *(number of planned events M1-M36)*					**Total number of activities by partner** *(total number of planned events)*
	Interactive & travelling exhibitions	**Conferences / Seminars**	**Gaming competitions / Online engagement**	**Discussions / debates at Science public cafés and public screenings**	**DIY & DIT Workshops**	
UPD	n/a	Biodesign NightScience *(3)*	iGAMER *(3)* Gamelier events *(14)* MOOC *(3)* CRI Journal *(3)*	n/a	Biodesign Workshops *(6)* High school Biodesign Workshops *(30)* Leadership Programme *(3)*	**8** *(65)*
UCL	n/a	n/a	n/a	CwB Biocafés *(3)* Science Film Night *(4)*	CwB BioPlayshops *(4)*	**3** *(11)*
WS	The Science Bus *(1)*	n/a	Reddit ask me anything *(6)*	Open Evenings*(36)*	Do-It-Together Bio *(12)*	**4** *(55)*
MP	n/a	n/a	n/a	n/a	OpenBio workshop *(2)*	**1** *(2)*
KI	BioArt *(6)*	n/a	Workshop Lab Books *(3)*	BioTalks *(12)*	Bio Friday Academy *(16)* Bio Citizen Science *(5)*	**5** *(42)*
Meritum	n/a	n/a	CityHacking *(1)*	Biodesign Café *(7)*	Bio Hack The City *(2)*	**3** *(10)*
UNIGE	n/a	Perspectives on DIYBio *(1)*	DIY Science Postcards *(3)*	BioNights *(22)*	n/a	**3** *(26)*
Total number of activities by type of activity	**2** *(7)*	**2** *(4)*	**8** *(36)*	**6** *(84)*	**9** *(80)*	**27** *(211)*

(total number of planned events)						



In addition to the table, the answers to the questionnaire display the diversity of activities when organizing the events not only between type of activities but also partners. The point is that for example two seminars from two different partners are also quite different in the way of how they are organised.

5.2.1 Thematic Topics

The partners identified the topics they were going to address during their activities. This was an open-ended question so resulted in a large variety of answers that extended beyond biodesign but also addressed notions of citizen science and political issues. We have made an effort to merge and categorise these answers to provide a coherent list of topics addressed by the activities:

Specific biodesign topics:

In the first group we identified topics that are considered by partners to be the ones that fall into the broad category of their biodesign definitions. It is clear that the range of answers / topics is quite wide and one of the key tasks for Phase 2 would be to somewhat consolidate the topics.

The current state shows that partners are presenting topics that address mostly the fields within natural sciences (synthetic biology, DNA & molecular biology, (bio)chemistry pharmaceutics, biotechnology, GMOs, hybrid species, stem-cell research, botany). Some partners are focusing more on the methodology of running biodesign activities, while others are focusing more on the impacts and ethical issues of these activities.

Topics about CS itself:

- Participation and engagement:
    - What is needed to engage publics in CS activities
    - How to increase youth participation and engagement in CS
    - What can citizens do to get involved in CS?
    - What kind of experiments citizens can run on their own CS experiments?
    - How can everyone start their own investigations?
    - Impact of exhibition on visitors
    - How can one raise interest in scientific topics?
    - How can one present science to the general public and schools?
    - Technofeminism
    - Raising awareness on topics related to biodesign
- Scientific knowledge related topics:
    - Relevance of science to everyday life
    - Democratisation of science,
    - Challenging interdisciplinary
    - Limits of scientific knowledge and CS
    - Leveraging citizen data for environmental justice
    - How to understand science by participating in it
    - Answering questions that scientists have not yet answered
    - Ethical frameworks of using animals
- Education**:**
    - Multimedia use in a museum and in education
    - Role of CS in education and how to include in school programs
- Links and tensions between industry and public interests

One interesting finding is the large focus on the issues and tensions of citizen science itself. This suggests the need to reflect on methodologies, processes and limits that make a citizen science investigation successful in terms of high numbers of participants as well as impacts on the whole of society not just science.

5.2.2 Approaches to Citizen Science for Biodesign

The consortium filled out surveys to identify the pedagogical and collaborative approaches that will be adopted. The following table shows the results.

Approaches	Interactive & travelling exhibitions	Conferences / Seminars	Gaming competitions / Online engagement	Discussions / debates at Science public cafés and public screenings	DIY & DIT Workshops
Discussions on sharing good practices, experiences, cross-fertilisation of ideas (bio cafes)		x		x	
Structured debates on political and topical issues such as RRI		x		x	
Technical master classes, introductory talks, instructional videos (passive learning)		x			x
Educational video games online, online competitions			x		
Physical board/strategy games			x		
Targeted Networking	x	x		x	x
Workshops for knowledge and skills transfer	x	x			x
Prototyping and ideation workshops	x				x
Mentored/Guided Laboratory Experiments					x
Data collection and Analysis / mapping					x
Materials and instructions for DIY experiments to do at home (eg postcards)	x				x
Topical films with discussions				x	
Training programmes for educators offering innovative approaches		x			x

The results show that in order to engage a broad spectrum of audiences, it is essential that partners use different engagement approaches that require the use of various activities within the same category. For example, KI uses exhibitions, workshops and discussion events to offer knowledge and skills transfer, to teach participants to build their own equipment but they let participants to decide whether to progress and move at a different level within the escalator or take it in a different direction.

5.2.3 Engagement

i) Level of Engagement

The next table focuses on four levels of engagement that partners expected from the public in their activities. These levels refer to the *escalator model* outlined in Section 4 and it is clear that there is a good balance of activities for all participation levels.

Level of engagement	Interactive & travelling exhibitions	Conferences / Seminars	Gaming competitions / Online engagement	Discussions / debates at Science public cafés and public screenings	DIY & DIT Workshops	Activities by partner
Level 1 'crowdsourcing' Citizens as sensors or contributors of computer resources	2	2	4	5	6	**19**
Level 2 'Distributed Intelligence' Citizens as basic interpreters	1	2	3	3	7	**16**
Level 3 'Participatory Science' Participation on problem definition and data collection	2	1	4	5	7	**19**
Level 4 'DIY Science' Collaborative Science - Problem definition, experiment design and / or execution, data analysis	1	1	3	1	8	**14**

The results demonstrate that all the levels of engagement are being promoted. Results show that during the first phase of the project there were more activities that focus on the lower levels of engagement. There are also fewer activities where participants propose and initiate projects. However, this level requires more commitment and is therefore expected to be more challenging to achieve. During phase 2, leaders from WP1 and WP2 together with event facilitators from each organisation will work with the WP5 team to further adapt the formative evaluation templates (section 5.5.3 in D5.1) and to share and devise adaptable strategies for

public engagement activities using an Action Research approach (D5.1 section 5.5.4).

ii) Incentives

This question tries to capture why a person became a participant in the events. This question created as a multiple-choice question in order to relate to existing categories of motivation within the citizen science literature.

Incentives	Interactive & travelling exhibitions	Conferences / Seminars	Gaming competitions / Online engagement	Discussions / debates at Science public cafés and public screenings	DIY & DIT Workshops	Activities by partner
Acquiring new skills and knowledge	2	2	7	3	6	**20**
Contributing to interesting projects for the common good	0	1	2	1	6	**10**
Being part of a community	2	2	7	4	6	**21**
Solving personal needs	1	1	5	1	4	**12**
Having fun	2	2	6	2	8	**20**
Other	0	0	0	0	Opening up a Discussion	**1**

'Acquiring skills and knowledge', 'being part of a community' as well as 'having fun' were the most frequent incentives, alongside 'solving personal needs'.

These results raise the question of whether the level of engagement strengthens or weakens these objectives. For example, does an activity where a participant listens to a presentation promote more or less knowledge gathering than a hands-on activity? The level of engagement and incentives might be related in such a way that certain incentives or motivations can be strengthened by properly selecting the level of engagement of a proposed activity. We recommend thinking about this relation when designing new activities to make sure both categories are aligned.

5.3 Activity Objectives

The questionnaire asked partners about their objectives for each activity. It was an open-ended question for the 27 repeating activity types within WP1. The results are listed below.

Nº	Objectives	Number of activities meeting these objectives

1	Foster connections, establish knowledge networks and create communities and catalyse new collaborative projects	**6**
2	To create a convivial space for exchange between practitioners and the public and to discuss targeted topics steered by participants	**7**
3	Arouse curiosity, learn, exchange knowledge and discuss approaches to science and CS	**7**
4	Gain trust and develop personal confidence and supporting knowledge	**4**
5	Empower educators and students	**6**
6	Promote, learn, build and use DIY and DIT tools	**7**
7	Raise public understanding of technical concepts (eg. smart cities)	**7**
8	Attract new citizens to science and CS	**6**
9	Unveil dogma and taboos of science communication	**1**
10	To share Biodesign concept, build expert knowledge and get people involved in research projects	**6**
11	Have fun and innovate	**3**
12	To encourage the development of scientific games with a research methodology based on Biodesign	**2**

The table shows that the majority of the objectives are met by the large spectrum of activities. It is coherent with DITOs approach since they reflect the three pillars of the project: knowledge exchange, public awareness and dissemination of citizen science activities and engagement strengthening.

5.3.1 Activity average Duration

This question tried to identify the average length of engagement a participant might spend for the different activities. To illustrate the average duration, an interval for each type of activity can be seen in the following table:

Type of activity	Duration interval	Exhibition availability
Interactive & travelling exhibitions		2 weeks - 3 months
Conferences / Seminars	2-3 days	
Gaming competitions / Online engagement	2 hours - 1 days; 14 weeks (MOOC)	
Discussions / debates at Science public cafés and public screenings	1.5 - 4 hours	
DIY & DIT Workshops	2 hours - 3 days	

The results raised further questions. For example, how does length of an event relates to its goals? What length should a workshop aim at to engage audiences with no or limited background in biodesign to meet the goals of the event? What is the difference in outcomes between one-off events, workshops and online engagement? These kinds of questions arose from this baseline information. The Consortium will endeavour to explore these issues with input from WP5 as this will build partner capacity and the results be used to develop a facilitator's guide to public engagement in science.

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The tables with the complete data per activity can be found in Appendix C.

5.3.2 Audiences

i) Number of Participants

The number of participants that the different event formats intend to reach varied significantly. To give an overview we have created a table that ranks the activities.

Type of activity	Participants interval
Interactive & travelling exhibitions	500 – 6,000
Conferences / Seminars	60 - 100
Gaming competitions / Online engagement	25 – 2,000
Discussions / debates at Science public cafés and public screenings	6-50
DIY & DIT Workshops	4-25

Predictably, exhibitions and online competitions can accommodate more people. With respect to discussions and debates a range from 6 to 50 people is the expected number of participants that usually attend. This includes events such as the Science Film Nights that are held by UCL. Analysis of the summative evaluation and specifically, the satisfaction questionnaire (section 5.2 in D5.1) will help determine the impact of higher numbers of attendees on a productive discussion. Moreover, keeping a detailed documentation of these types of activities as good practice, will contributes toward the developments of strategies that the partners can adapt to their context when organising similar activities.

ii) Target Audience

To have a rough idea about the types of publics that could attend each event, we asked the organisers to identify audience types from these categories: general public, amateurs/makers, activists/hackers/communities of concern, policy makers/decision makers, students/youngsters, educators, academia and others.

Classification of audiences has been organised in the following table:

Audience	Interactive & travelling exhibitions	Conferences / Seminars	Gaming competitions / Online engagement	Discussions / debates at Science public cafés and public screenings	DIY & DIT Workshops	Activities by partner
General Public	2	2	7	5	4	**20**

Audience	Interactive & travelling exhibitions	Conferences / Seminars	Gaming competitions / Online engagement	Discussions / debates at Science public cafés and public screenings	DIY & DIT Workshops	Activities by partner
Doers / amateurs / makers	2	2	8	4	5	**21**
Activists / hackers / communities of concern	2	2	8	4	5	**21**
Policy makers / decision makers	2	2	3	3	1	**11**
Students / youngsters	2	2	7	3	6	**20**
Educators	2	2	7	4	5	**20**
Academia	2	2	7	1	2	**14**
Other				Practitioners		

According to the partners, the most expected audience categories for biodesign activities are: general public, amateurs/makers, activists/hackers/communities of concern, students/youngsters and educators. Thus biodesign activities are designed to reach broad audiences that are in line with WP1 objective O1.1 (Box 1.1).

The audience least catered for are policy and decision makers as well as academia. Since we are focusing on citizens, this result might be reasonable. Yet the aim is also to engage policymakers, so this raises the need for balancing the activities implemented by all partners in the work package (i.e. currently activities that target policy makers are 11). The conclusion from this analysis IS that this work package will focus on collaborating closely with WP4 to provide input into their policy engagement activities and explore tailored policy strategies for WP1.

This integration of activities across work packages is central part of DITOs. The WP1 outreach plan aims to engage citizens as well as policy/decision-makers in activities related to biodesign and provide opportunities for discussion on biodesign policy with policy makers. WP4 aims to create further opportunities of capacity building for policy makers and CS practitioners to work together. This will be facilitated through stakeholder round tables, discovery trips and a pan-European policy forum. Furthermore, discussions on policy-relevant topics arising from WP1 (and WP2) will

feed into the formulation of 4-page policy briefs covering 6 different thematic areas. These include environmental sustainability, biodesign, open science, inclusion and gender, ethics and quality evaluation, link to business and SMEs.

It is important to note that from the point of view of citizen science, the decision making process should be more inclusive and distributed, i.e.: a real DIT process. Due to this issue, terms such as 'policy and decision makers' will need further discussion.

As stated at the beginning of this section, the proposed audience categorisation is intended to help organisers to align goals, activities, materials and language to reach the intended publics.

However, the question of how to evaluate the type of audience that participate in a specific event remains unclear. Giving surveys to participants and asking them identify to their audience category might be problematic. How can the project deal with people that fall into multiple categories such as being a young person and general public? The consensus within the consortium was that participants should be telling their own stories instead of filling in survey forms. This would allow rich qualitative descriptions that would become a good source for audio-visual documentation and ethnographic research. The focus will then shift towards qualitative interpretation of the personal contributions rather than in quantitative data. This method might better capture the broad diversity of participants in CS.

iii) Strategies to include diversity of perspectives

One of DITOs' objectives is to provide access to a wide variety of citizens including women, children and disadvantaged groups. So we asked the partners which strategies they were planning regarding this aspect.

From the responses across the consortium it became evident that not all activities are designed to address this topic specifically. Many of them referred to 'keeping things open' and to making an explicit communication effort to engage different publics. Other suggested strategies were organising open calls for projects to make sure different voices and interests are taken into account. However due to the low number of answers, we must reflect upon this point with the rest of the consortium to make sure that best strategies are adopted.

iv) How to support the creation of links

Fostering links means promoting both professional and personal relationships among participants beyond the event itself. Providing appropriate conditions to let these relationships flourish could have a very positive impact not only in the individual engagement of the participants but also in the creation of communities of interest related to CS projects.

In the questionnaires the strategies that partners use to favour links are very diverse. Common approaches are the use of social media to ease the communication and keep in contact, the creation of work groups so that participants can work towards a common goal or scheduling refreshment breaks to increase social encounters. Some of the partners rely on the facilitators' and mediators' labour, so links between participants are encouraged through role-playing. These connections might have an impact on CS engagement, since getting in contact with people with similar interests may encourage participants to move to the next level on the *escalator model*.

Considering and building on the consortium partners' experience there is a combination of actions that ease to fulfil this objective. Two-week workshops allow participants to have time to talk and know each other. Secondly, organising collaborators and project originators around specific projects encourages debate and reflection within and among group. Third, having a professional team of experienced facilitators can help in suggesting useful links with local entities such as non-governmental and civil society organisations, research centres, council. Finally, we encourage social encounters outside of the workshops by providing a common place to stay during the workshop such as shared apartment or hostel. This means the participants can live together and share experiences and thoughts over a period of days.

5.3.3 Resources for hosting Biodesign Activities

The resources section refers to the personnel and the material requirements that are needed to organize each type of event. This is part of the 'behind the scenes' information, which includes both the resources and the tricks that the partners use to organise each event. If these are well documented and widely shared, the partners will be able to learn from other's experiences. This is why we also included several questions around it in the questionnaire. This section is divided in: *Space, time and materials, and Personnel*.

At this stage, we did not have enough data to evaluate the suitability of these approaches and decided that in a future phase the consortium will carry out deeper analysis.

i) Space, time and materials:

There were very different answers that are interesting to help others reflect about their own needs and about other possibilities. Thus, we present here a list of possible things to have into account:

- Location and environment - consider the desired environment, accessibility and ethos of the event.
- Furniture and facilities - appropriate to the style of event.
- Food and beverage provision.
- Timetabling - with contingency plans for events overrunning, and allowing flexibility time for networking / extended discussion.
- Suitability of activity to anticipated audience - employing techniques such self-differentiating activities and open questions.
- Materials required with contingency for extra participants.

ii) Personnel

During the analysis we realised that most of us were not considering all the roles that are necessary involved in our events. The main reason is that we tend to forget the personnel that work on a daily basis in the places we carry out the activities but who are not specifically employed for these activities. They are still necessary, so we decide to create a comprehensive list of all the people and roles that partners

considered in the questionnaires. In most cases not every role is needed, but this list helps to give a good initial overview on the needs that might arise:

- Event presenters / facilitators
- External advisors / guests
- Support staff (for example technical, facilities management)

  In addition, there is an important point to make: it is essential to distinguish between the needs that arise when organising the event and those which emerge when running it. Curators are essential at the organisational stage, but their presence might not be necessary on a daily basis once an exhibition is opened to the public.

Our partners' experience highlights the importance of cultural mediators: they are specialized workers that not only welcome and assist visitors and participants, but also they listen to audience's interests and try to link them with the activities of the centre where activity is being carried out. Both of these elements are important for expanding links inside and outside MP. This is important for DITOs since cultural mediators can make links between different initiatives and guide participants to identify the best level of engagement for them within the 'escalator' model.

5.3.4 Communication and Dissemination

In order to communicate and disseminate the activities the DITOs partners use many different methods. The next question tried to capture this range. Below is a list of communication and dissemination channels used by the partners.

Communication and Dissemination Channels
General newsletter
Specific mailing lists
Website
Social media (unspecific)
Facebook
Twitter
Meetup, Eventbrite, etc.
Radio
TV
General press
Flyers
Posters
Explainers from specific center
Personal meetings

The results show that that the most preferred communication methods are websites, mailing lists as well as social media such as Facebook or Twitter. Typically the same event is being communicated using multiple communication methods.

5.3.5 Activity Outputs

The survey tries to capture the variety of outputs from the partner activities. The results from the output question are categorised into material and immaterial outputs. Overall the most frequently mentioned outputs were documentation and prototypes.

- ***Material:***
    - Prototypes
    - Exhibition
    - Documentation
    - Data
    - Sheets and post-its of participants
    - Maps
- ***Immaterial:***
    - Collaborations
    - Extended network
    - Follow up on participants' suggestions

5.3.6 Documenting Activities

This section explores the documentation of activities in more detail. In the survey partners were asked about the type of documentation they typically gather. The results show a clear concern about event documentation in terms of practice and materials as well as evidence of their activities during the events and post-event activity (e.g. blog posts). The results show a diverse range of ways of documenting events:

- Collaborative online platforms:
    - Shared online documents
    - Code and blueprints repositories
- Multimedia documentation:
    - Installation instructions
    - Pictures
    - Audio
    - Video
    - Posters
    - Live streaming
- Memory booklet
- Web page
- Blog posts
- Scientific and technical data and information:
    - Notes
    - Maps
    - Spectral data
    - How-to manuals
    - Questions of interest
    - Prototypes/items instructions and manuals

- Pedagogical material:
    - Training curriculum
    - About methodology and production
    - The exhibition itself
- Social networks and tools:
    - Meetup platforms
    - Facebook
    - Twitter
    - Instagram/Flickr/Pinterest
    - YouTube/Vimeo

The partners created a distinction between documenting scientific process via data and documenting the activity itself as photos and videos of participants. However, sometimes the same tools and formats were used for both purposes. Often these categories overlapped so that a document would belong to more than one category:

- Documentation of the preparation/organisation
- Documentation of the scientific process, results and conclusions
- Documentation of the public activity (for communication and dissemination purposes)

When documenting the activity it might be useful to separate the documentation generated via the organisation process of the event such as shared online documents, budgets and the one about the event itself such as photos, videos and interviews. Our objective in the next phase is to link the type of documentation to its goal and use.

Some questions arose from these results: How are the participants going to be acknowledged? How can documentation take into account every participant? How important is a crowdsourced participant contribution compared to the scientist that initiated the research project? How can documentation show that the participant's effort was worthwhile? We think that Wikipedia is a model to get inspiration from: a collective web to share knowledge where every contribution is logged and authorship acknowledged. In our experience, although we have not previously properly addressed this issue, we think that Wikipedia is a possible model to get inspiration from: a collective web to share knowledge where every contribution keeps perfectly logged and author correctly acknowledged.

5.3.7 Participant Feedback

For the DITO's project, gathering feedback is essential, as it will enable improvement of event planning and delivery processes and methodologies.

There were two main approaches used by partners: personal communications and evaluation forms (section 5.5.4 D5.1). Through events carried out in phase 1 new ideas have proposed by the partners and these will be explored in phase 2 together with the WP5 team to improve formative evaluation.

Here it is a comprehensive list of the methods that have been traditionally implemented by the partners to gather opinions and suggestions from participants:

- Personal communications with participants:
    - Direct conversation and comment gathering during and after the event
    - Comparison of their expectations before and after the event
- Evaluation forms:
    - Surveys of visitors
    - Personalised evaluation forms
    - WP5 standard evaluation forms
    - Meetup rating system
    - Comments collected from event website
- New ideas:
    - Money box using play money: '*How much would you pay for an event like this?*' to determine financial sustainability of an event after the end of the project

5.3.8 Good practice challenges

Phase 3 of the project involves the compilation of a good practices for participatory environmental citizen science. In preparation for this, we asked each partner to identify the main challenges they face when designing or organising activities. These answers will be used to develop a facilitator's guide to address these challenges. This will begin in phase 2 in collaboration with the WP5 team using Action Research (section 5.5.4 in D5.1).

- **Audience challenges:**
    - Dealing with a wider diversity of participants, e.g. less represented or marginalised groups
    - How to reach and listen to participants interests
    - How to address participants' expectations
    - How to manage their discovery process when exposing to something new
    - How to encourage the evolution of engagement through the different steps in the *escalator model*
    - How to create stronger connections between participants
    - How to encourage more active participation from the public in more passive events such a as a conference
    - How to equip participants with skills to forward the knowledge on to other participants
- **Developing strategies:**
    - To communicate better the concept of each event such as Playshops
    - To improve the collaborative work within the groups
    - To better manage conflicts
    - To document, present and promote prototypes including maintenance and automation when necessary
    - To document and show the process of activities
    - To find or prepare guests and speakers to engage more with the public

    - To approach research institutions to openly discuss collaborative projects with artists.
- **Developing appropriate evaluation indicators:**
    - The impact and scope of the event
    - Further developments of prototypes
    - Personal links produced during the event
    - The evolution of participants engagement
- The best way facilitate 'living exhibitions' that change over time, while hosting small activities such as workshops, demos and discussions around the prototypes.
- The best way to predict the resources that large scale activities might require in terms of budget, personnel and materials.
- The best way to manage the accessibility and availability of the data generated during activities.

6 Summary and Discussion

This section summarises and discusses the common answers amongst partners that might be considered examples of good practice for designing and delivering public engagement in science events.

6.1 Good Practice Summary

Analysing the data from the survey and our own experiences have lead us to identify a series of good practice patterns:

- Data gathering, visualisation and development of accessible and collaborative tools are popular trends among DITOs partners as approaches to biodesign in citizen science.
- Providing opportunities for pleasure and recreation and exchanging knowledge are two popular incentives for people to participate and organisers should encourage them.
- Web pages and social networks are the most popular channels for spreading information about activities. However, is also common to use more than one communication channel. These channels will depend on the target audience one expects to reach.
- Currently, the majority of the biodesign participants to our events are mostly students, scientists and citizens who are already familiar with biology. The challenge to reach and include more marginalised audiences such as people who live in remote areas and illiterate or with low scientific literacy still remains. Placing an event at the right escalator level can be extremely helpful in terms of targeting specific audiences; e.g. level 1 event to approach and include illiterate rather than level 4 events. Inclusion of various publics can be further enabled through various institutional partnerships.

- Personal interviews with participants may be better methods for identifying the target audience and gathering contextualised feedback rather than survey forms. The methodology chosen needs to be appropriate to the situation and context.
- The different meanings and interpretations of biodesign, influence participants' expectations and usually confuse them. To address this problem it is recommended that event organisers explain biodesign within the context of that particular event in ways that are understandable by intended audiences.
- The survey suggests that in order to maintain diversity of perspectives requires the implementation of structurally open and public processes such as open calls for proposals. These structures will help with listening to participant comments and opinions.
- The best strategies for encouraging links between participants is to create projects and activities where participants actively work and create together. Social encounters outside of the activities also play an important role.
- It is advisable to use professional facilitators and cultural mediators that welcome participants, listen to their interests and encourage them try activities according to their level of engagement.
- Biodesign events should use more appealing names (especially to target audiences) that clearly communicate the content and nature of the event; e.g. "Touch|Play|Learn" organised by UCL successfully attracted youngsters and families to the event.
- Improve collaboration between partners to create diversity of events in different parts of Europe. In Phase 2, it is encouraged that partners collaborate, design and run events together, rather than simply 'being part of' an event; e.g. UPD and Tekiu are co-hosting round tables.

6.2 Questions from the Analysis

Interesting questions have arisen during this process that require further reflection and debates between partners:

- In order to maximise fulfilment of participants' expectations, the expected level of engagement and participant incentives should be drawn together.
- Popularising participatory research approaches for biodesign will require links with citizen science communities and decision makers at city, national and European levels. One way to facilitate such links is to organise public engagement events that can attract policy makers because they meet their own interests and concerns. Good practices in this regard will be shared with WP2 working closely with WP4, providing input into DITOs policy engagement activities and exploring options for WP1.
- Develop and strengthen relationships with local communities involved in CS, while taking into account their needs and expectations. For instance,

expectations from local NGOs and biohackers should not be assumed but rather strategies to work and engage with them should be developed – especially those who are already working with communities to understand what their specific needs are.

- In Phase 2, the consortium partners should allocate time to establish and improve already existing relationships with local citizens i.e. UPD should spend the time to build events with related citizens. Therefore, DITOs should be an opportunity for institutions to:
    1. Adapt other institutions of project
    2. Collaborate and create a 'goal together' - Now is the time to get inspired by other project
    3. See what are the resources and aim of the institution to adapt the activity to the context
- The decision-making process needs to be more inclusive and distributed, and terms such as 'policy and decision makers' need to be further discussed amongst the partners.
- There needs to be reflection about how to properly acknowledge the contribution of participants. This did not emerge from the questionnaires but was a key issue during conversations amongst the partners. This is essential for engaging with the public, so it must be carefully debated.
- 'Feedback' is a powerful tool but there are many ways to gather it. For example, UCL inspired us with their 'Money Box' concept ("How much would you pay for an event like this?"). Therefore we suggest the need for consortium discussions on other ways of getting feedback on activities.
- Encouraging, enabling and maintaining interdisciplinary discussions in biodesign is particularly important. The effective communication across people from different disciplines, especially when several different terminologies exist.
- Language is still a barrier across Europe, thus it is very important that all engagement material is translated to the local language and if necessary that translators are included to the events.
- Due to the different nature of events held in both WP1 and WP2 during phase 1 statistical analysis of significant value was not possible. It has to be taken into account that partners and also the events have different contexts. Therefore, in addition to quantitative assessment, qualitative assessment such as case-by-case assessment is of equal importance.

To improve our own methodology for gathering event information, the WP1 leaders proposed a very interesting information sheet that structures all the survey information in an easy readable way. The template for this can be found in Appendix C. This sheet has given both WP1 and WP2 teams the opportunity to analyse the information sheet's usefulness and propose some improvements.

Since our joint goal is to design strategies that capture best practices when organising public engagement events, we propose testing an iteration of this design

in the next phase. This information sheet is designed as a double sided, folded sheet where the front includes information about the activity that is useful for both participants and organisers. This mean the sheet can be used as a flyer to promote an event. On the back the sheet includes information that is relevant for organisers such as information about activity objectives, expected audience and resources that are needed. In this way the information provides best practices information for organisers. The design is tentative and will be reviewed with the WP5 team throughout phase 2. Here is a draft scheme of the template:

Front

1. Institution
2. Activity title
3. Appealing self-descriptive picture of the event
4. Where, when and how long?
5. Activity description:
    a. What?
    b. How?
    c. For whom?
6. More info at: web, etc.

Back

1. Activity Objectives
2. Audience & Engagement
3. Partners
4. Agenda set-up
5. Communication channels
6. Documentation
7. How to acknowledge participants
8. Resources need: people, time, budget, space
9. Evaluation
10. Improving tips and advices from experience

6.3 Reflection on Methodologies for Data Collection

By carrying out this survey process we realised that the questionnaire managed to capture suitable information, but some questions were not answered because they were not clear. This will means that the survey questionnaire will have to be revised and improved for future evaluation.

We realised that it is necessary to collaborate very closely with the leaders of the various work packages, WP2 (MP), WP4 (ECSA) and WP5 (UCL). The key aspect involves synchronising methodologies to implement a common framework to gather the relevant information while avoiding repetition when interviewing participants and partners.

- The next iteration of the survey should map each activity against the *escalator model.*

- After some internal discussion, we think that the questions related to biodesign could be augmented and improved. Our suggestion is to create a specific section for biodesign citizen science, and be more clear and specific in the questions.
- The open-ended question about activity goals is important to understand the organisers' intentions and should be kept in future questionnaires.
- We suggest adding a multiple-choice question with objectives we identified in this phase. This can help avoid repetitions and identify common goals between organisations and facilitate the sharing of good practices.
- The 'average duration' question might lead to confusion. It might refer to the duration of a certain activity for a participant, how long an exhibition is publicly available, or even the required time to organise an event. We suggest separating these three elements for clarity.
- The 'personnel' question might be too broad. We suggest being more specific by using a predefined set of roles in combination with the times required. This can be divided in three stages, before the event, while this is running, and once it is finished, gathering documentation and dissemination of results.
- In terms of documentation, we suggest distinguishing between the means, the tool or the format and the information being documented. Thus it may be related to the organisation of the event such as personnel needs, to the event itself such as photographs of the event or to the results of the event such as the source code.
- It would be advisable to include a question about how participants are being acknowledged in the activity.

We missed more personal reflections and tips from previous experiences from partners. Thus, we suggest questions to gather qualitative information such as, which problems have you encounter when running these activities? How would you prevent them? What tips would you give to somebody to organise an event like this?

7 Conclusion

This deliverable fulfilled three objectives:

First, a description of the initial implementations of biodesign activities has been developed. The information for these activities was gathered via a survey questionnaire filled in by the DITO's partner organisations. The analysis of the data from the survey has allowed us to provide a categorisation of the main qualities of the different activities in this work package.

Secondly, this analysis has identified some key issues and questions that must be addressed in the next phase in order to fulfil the goals of WP1 within the DITOs project. The concrete result was the design of a two-sided information sheet that can be used by both participants and organisers. The goal is that this will become a working tool for exchanging experiences and organisational details between partners.

Finally, the results from the survey have identified some weaknesses in the questionnaire methodology in fully capturing all aspects of the activities. This has led to the proposal of a set of improvements for the next phase of DITOs.

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Appendix A. Working definition for Biodesign

Appendix A summarises and discusses the various definitions, approaches, and perspectives in biodesign based on the data WP1 collected during Phase 1. This is work in progress so the DITOs process we will continue to discuss and incorporate participant feedback into this live document. Hence, what is presented below is not a conclusive and exhaustive review but a starting point for a very fruitful discussion that contributes to the biodesign citizen science context.

The first section A.1 discusses the definitions and approaches of biodesign that were provided by the consortium partners. Section A.2 provides more details about the biodesign views and insights of the various WP1 event participants. A3 reviews current fields and concepts related to biodesign and discusses concepts such as biomimicry and cross-disciplinarity in arts and sciences. Finally in Section A.4 we synthesise these viewpoints and provide an initial working definition for DITOs.

The opportunities, tensions and considerations that arise from the definitions will help guide our practices and will be a contribution to the legacy of DITOs.

A 1.1 Definition of Biodesign by Partners

Biodesign was selected by the consortium partners as the term to refer to a broad range of activities that are carried out in WP1. Although, the terms synthetic biology and DIYbio were considered initially as alternative terms for this WP, the consortium finally rejected it due to its failure to capture the breadth of DITOs bio-related activities. However, this creates some implications and challenges since biodesign is an emerging field without a commonly agreed definition and this means that even partners across the consortium may perceive and use the term in somewhat different ways as it is discussed in this section.

A.1.1 Partner Definitions

In order to understand how each partner organisation planned their activities and communicated events to their target audiences, they were asked to define their understanding of biodesign, as the term used within the context of their institution.

The table below lists all biodesign definitions provided by DITOs partners.

Partner Name	Institutional Mission statement	Definition for Biodesign
UPD	French university promoting new education techniques and strategies to empower the students to take initiative and develop their own research projects.	Main focus of Biodesign for UPD is public outreach and interdisciplinarity, as a collaboration between life sciences, engineering, art, design. By engaging citizens through Biodesign activities, we are looking for new models of doing research.

	#research #education #interdisciplinarity	*#interdisciplinary #language #designingbiology #publicoutreach*
UCL	British university working with citizens at local level, design new technologies and practices, improve the environment and people's lives, highlighting the power of ordinary people's capacity to act as civic agents. *#bottom-up #interdisciplinarity #science*	Biodesign is when engineering, art and biology are combined together in an interdisciplinary fashion, when anyone can get involved. *#art #science #creative #engineering*
WS	Dutch institute exploring emerging technologies by giving art a central role in designing new applications for novel advances in science and technology. *#art #science #technology*	The process or outcome of conscious choices in the creation of artefacts out of biological materials or the use of biological concepts. *#biological #purpose #choices #life*
ECSA	The European Citizen Science Association (ECSA) is a non-profit association based in Germany set up to encourage the growth of the Citizen Science movement in Europe. It draws on 200+ individual and organisational members from over 28 countries across the European Union and beyond. *#citizenscience #exchange #network*	Biodesign is a concept introduced to address new forms of inter- and transdisciplinary research along with related activities, collaborations and communities in the life sciences *#lifesciences #future #responsibility #transdisciplinary*
MP	Spanish citizen laboratory of production, research and broadcasting of cultural projects that explores the forms of experimentation and collaborative learning which emerges from digital networks. *#culture #participation #prototypes*	Biodesign is an interdisciplinary process that incorporates or manipulates biological materials, components, and organisms for the fabrication of functional or speculative artefacts. *#biological #interdisciplinary #creativity #experimentation*
KERSNIKOVA	Slovenian non-profit institution operating in the field of art, culture, education, technology and society. *#art #culture #education*	Biodesign is a way to address entirely new questions, discovering new areas, and catalyse our thoughts and discourse on new possibilities through their visions. "Biodesign" is an opportunity to challenge moral values and ethics that attempt to keep human society in equilibrium to remain in harmony of nature. (For detailed version see Appendix 2.) *#art #creativity #humanizedbiotope #responsibility #future*

MERITUM	Polish NGO active in the field of training personal development and sustainability. *#education #sustainability #people*	The process of designing products or services with use of biology and technology. *#sustainability #life #ethics #design*
Tekiu	SME with expertise in the knowledge transfer, VIP technical visits, policy engagement, workshop facilitation and science communication. *#knowledgeexchange #policy #innovation*	The interface between the creative aspects of biology and design or "design thinking for biology"; Using biological materials or processes to create something with a novel purpose. *#creativity #ethics #artscience #biotools*
UNIGE	A public lab based in University of Geneva that offers schools and the public a new way to discover the world of scientific research through practical workshops and citizen science projects. *#look #think #share*	Biodesign is an interdisciplinary process that incorporates or manipulates biological materials, components, and organisms for the fabrication of functional or speculative artefacts. *#politics #life #craft #technology*

The definitions provided reveal our shared objectives across the consortium. Although each partner presented a unique definition and chose different keywords/hashtags, there were many overlaps. *#Creativity*, *#interdisciplinarity, #ethics/responsibility, #life* and *#future* were some of the commonly used terms. Many partners also expressed an interest in material exploration and tangible outcomes of biodesign.

Three partners provided additional material on resources and theory that helped to inform their approaches (see Boxes 1-3). Other partners will similarly be encouraged to develop their conceptual framework in biodesign. Consortium partners are encouraged and will continue the dialogue across other institutions with the aim to incorporate their approaches in biodesign into future DITOs events. This could help broaden the variety of event types that run across EU in biodesign.

Box 1: A working approach to Biodesign from Kersnikova Institute

Ever since humankind started using tools, we have never stopped changing our surrounding environment. By selective breeding we domesticated plants and animals, making them become a part of our humanised biotope.

Today, new discoveries in biotechnology are enabling us to better understand plants and animals, and thus **manipulate the living systems around us** with more precision. Greater possibilities demand of us a higher level of responsibility towards nature, this is why we find ourselves in a time where **designing living organisms is no longer in exclusive domain of scientific prestige and industrial-economic efficiency**. It has become, to a large extent, **a domain of moral values and ethics that tries to keep our human society in equilibrium with the rest of nature.**

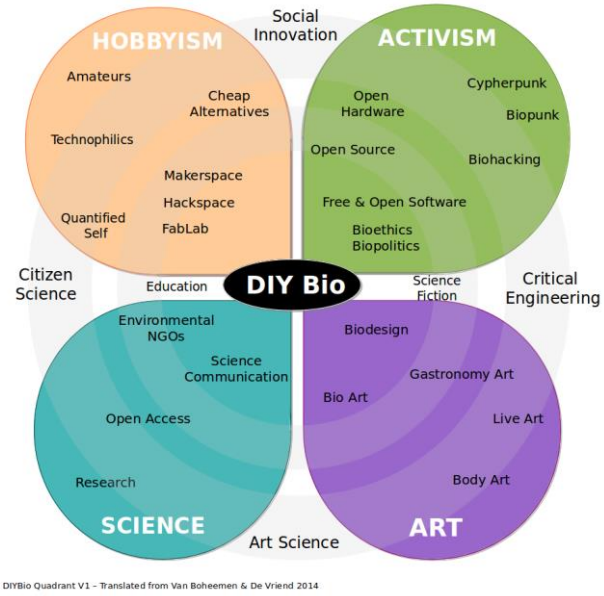
So, “Biodesign” is now not only in the domain of industry which **designs and creates new organisms for the aim of supplying us with ever better and cheaper products**, but also an extremely fascinating and utilized playfield for the creative sphere as **a form of practice for industrial designers**.

Speculative design is many times inspired by new materials and scientific protocols that have not yet reached the required level of applicability or production, but are driven by understanding the possible implications and applications. Some industrial and fashion designers are already designing niche products with narrow applicability potential, and are presenting us with **creative applications of living materials (biosymbiosis)** and new technologies.

From a creativity and innovation point of view, “Biodesign” is being overtaken by **artistic practices where artists utilise various life systems**, and **offer us much more thrilling prospects on Life Sciences** as their **unconventional approaches** are relieved of pressure for instant effect.

In the field of contemporary investigative art, we have been witness to a number of **art projects inspired by scientific and engineering production** with potential that is or will shape our future society. It is no coincidence that the fields of biotechnology, evolutionary biology and environmental problematics are exciting artists and designers, as it is **nature that has always been a never-ending source of their inspiration and a reference point for their “recreation of nature”**. Artworks which are but a living heartbeat away from perfection have become a reality of contemporary artistic expression on one side, and a challenge for traditional, decorative art and public on another side.

We have art projects **incorporating materials and protocols of synthetic biology which are focusing on the synthetic biology itself** (Paul Vanouse, Maja Smrekar, Eduardo Kac…), art projects where artists draw from the pool of tissue engineering, **using cells and tissue in their living artworks** (Symbiotica, Guy Ben-Ary, Špela Petrič, …), and projects where artists are interested in **hybridisation of various species** for the aim of presenting us with post-humanistic possibilities (Art Orienté Objet, Saša Špacal, Maja Smrekar, …). These are just some of many that are asking and addressing entirely new questions, discovering new areas and catalysing our thoughts and discourse on new possibilities through their visions.



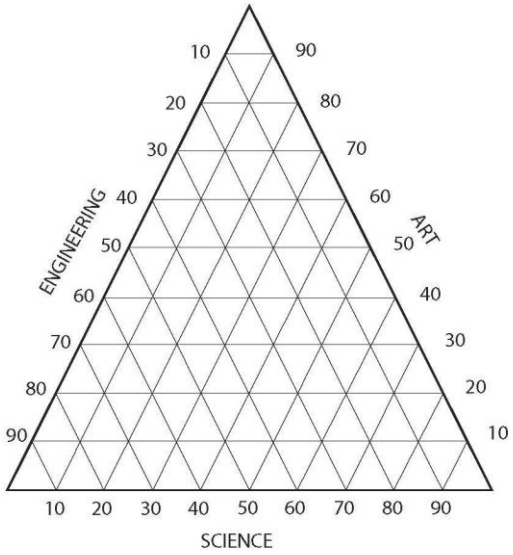
Box 2: A working approach to DIYBio from Waag Society

Biodesign is a term that includes and overlaps a wide range of fields. No single approach, artifact or result can exclusively be labelled as biodesign, without a reference to these subdisciplines. In order to assist the categorization of DITOs events Waag Society proposes to develop a visual tool that plots the relationships between biodesign and other disciplines, such as bio art, science communication, biohacking and DIYbio. A tool similar to the one shown below, which was the result of the study on DIYBio in The Netherlands[3].

The image plots of terms related to DIYBio, clustered into four quadrants Hobbyism, Activism, Art and Science. The distance between words are an indicator for the strength of the relationship. (Van Boheemen & De Vriend, 2014)

Box 3: A preliminary discussion of biodesign from UPD:

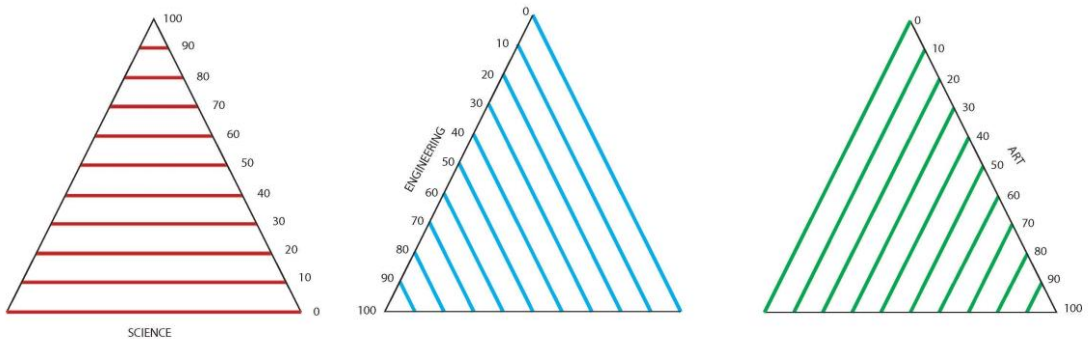
[3] "Do It Yourself Biology, een verkenning van ontwikkelingen in Nederland" http://www.cogem.net/index.cfm/nl/publicaties/publicatie/signalerende-aanbiedingsbrief-bij-onderzoeksrapport-do-it-yourself-biology-een-verkenning-van-ontwikkelingen-in-nederland



"The fundamental objective of DITOs is the inclusion of citizens in science and UPD sees value in defining Biodesign focused towards collaboration of disciplines for the context of DITOs. From our investigation on definitions of biodesign used by the consortium partners, we suggest that biodesign is situated between Arts, Science and Engineering. We see biodesign as an interdisciplinary approach that integrates design and modern life sciences, engineering, sciences and art.

This approach acknowledges the range of topics (Arts, Science and Engineering) in DITOs practices. Design, in this context, is understood as the methodology that fuses disciplines together. Design as a meta-concept is bringing together everything to create an output and it operates as a link for the disciplines and design assists the output of the collaborative efforts."

The diagram below was developed by UPD to help work towards the definition of Biodesign. A preliminary ideas is the diagram can be used to indicate the balance of ESA (Engineering, Science and Arts) in each WP1 event. If consortium partners are able to categorise each WP1 to a coordinate position within the prism, this might be used as the basis of a quantitative analysis for WP1 (if it is needed). Discussions among partners highlighted that these categories are currently poorly defined and it is unclear which criteria each individual partner should use when assigning coordinates to ensure reproducibility and avoid arbitrary decisions.



"We are not suggesting how the relationships between these disciplines will be formed, but we are instead introducing this diagram to DITOs partners to can be reshaped, challenged and adapted to local contexts."

A.3 Biodesign Interpretations by Event Participants

Below we provide some examples to demonstrate the different biodesign interpretations and perceptions of the participants in Phase 1 events.
We asked the question:

'***How would you define biodesign?'***

Event 1 (Gamelier event, June 2016)

"Creativity inspired by nature or a living matter"
"A discipline between science of living things and design, engineering and architecture",
"Creating something new in a given field"
"Using biological material to improve a functionality or interface"

Event 2 (Biodesign Workshop, July 2016)

"Biodesign is an opportunity to go into depth in a biohackspace environment. Normal academia may not have a definition... [this] allows the chance of depth".
"Biodesign is transdisciplinary/post-disciplinary - we are looking at disciplinary boundary. We are looking at collaborating with science and engineer and arts."

The descriptions provided above express a variety of viewpoints, similar to the differences observed within the partner's definitions. It is worth considering whether these differences are due to miscommunication by event organisers or reflect the personal imprint of each individual on the term according to their own particular interest. Throughout DITOs, all partners must clearly define and communicate their approach to biodesign during their events to avoid a misalignment of expectations between organisers and participants.

A.4 Biodesign Concepts and Fields

This section is the result of our first attempt to map existing definitions, themes and practices related to biodesign, with the aim to provide an overview of the full breadth of activities and concepts that DITOs partners are considering to include in their WP1 activities.

A.4.1 Design (Inspired) by Biology: Biomimicry

Biodesign can be interpreted as design by biology or design that's inspired by these natural phenomena, often also labelled as biomimicry. Examples of design by biology are beaver dams and bee nests. The biomimicry Institute defines biomimicry as "*an approach to innovation that seeks sustainable solutions to human challenges by emulating nature's time-tested patterns and strategies*" (Biomimicry Institute, 2016). Biomimicry includes inventions such as velcro that is inspired by burdock burrs sticking to dog fur (Science, 2013), bullet trains inspired by kingfisher birds (Earthsky.org, 2016) and antibiotics inspired by bacterial resistance of red algae (Bird, 2008).

A.4.2 Design in Coexistence with Biology

Biodesign recognises the potential utility of organisms in their interaction with the environment. The curator William Mayers suggests that biodesign involves the integration of design with biological "systems" to achieve better ecological performance. For example the growth of bricks out of fungal structures (Biomason) or the production of materials similar to leather by fungi (MycoWorks). Apart from utilising biology for the creation of products, the design of processes that utilise biological agents to degrade products are also considered to be part of this category, such as bioremediation: "*a process of using organisms to neutralize or remove contamination from waste*" (Conserve Energy Future, 2015).

A.4.3 Artificial & Synthetic Biology

Biodesign practices that go beyond the utilisation of existing biological agents or materials and focus on the design of the organism or material itself are called Artificial or Synthetic Biology. These biodesign disciplines often receive most attention in popular media.

Synthetic Biology is a field, which uses the concepts, vocabulary, and culture of engineering while focusing on the subject of biological sciences. The main objective

is to abstract biological engineering using standardization to enable the development of computer aided design tools (f.e. GenomeCompiler) and computer simulation of biodesigns (f.e. TinkerCell). Due to this abstraction a “SynBio Engineer” it is no longer required to fully understand or work with living materials. These recent developments reduce the obstacles to engage with biological engineering and enable the rapid uptake by both researchers from traditional academia and industry to hobbyist biohackers in community biolabs.

International competitions such as the International Genetically Engineered Machine (iGEM) Competition have been critical in raising the profile of Synthetic Biology. Teams are typically made up of young scientists that come either from universities or community labs (Igem.org, 2016). Such competitions allow participants to pilot and test innovative ideas that sit within the boundary of research and design.

Artificial Biology is a discipline that aims to create living organisms out of non-living components or alter living organisms to such an extent that these are no longer compatible to the current definition of life. For example the replacement of DNA bases by chemically altered substitutes (also referred to as Xenobiology) or the creation of artificial cells out of individual components.

Products within this field covers topics as diverse as culturing artificial meat (Tissue Culture and Art Project, 2003), creation of novel biofuels (Jule Unlimited) and growing bone with patient’s stem cells (Epibone.com, 2016).

A.4.4 Design Cross-Disciplinary Collaborations in Biology: new ways to investigate life sciences

Biodesign can be seen as an inter- or trans-disciplinary field that borrows language and methodologies from the Arts, Life Sciences and Bio Engineering. In doing so, cross-disciplinary teams working in biodesign create common questions, problems and a workflow that are accessible to all team members. The creation of an interdisciplinary field is an effort to find common practices and methodologies that can ease cooperation and exchange. There is still discussion with regards to the appropriateness of the labels interdisciplinary, transdisciplinarity and cross-disciplinarily within biodesign. Such terminology proposes biodesign as the nexus between different disciplines of design, bio engineering and modern life sciences.

The emergence of biodesign as an interdisciplinary practice can be seen in institutions across Europe, such as RCA Design Interactions programme and Waag Society’s BioHack Academy. UPD also offers a series of workshops called Co-lab that aim to propose alternate research trajectories through the collaboration of

designers, scientists through three day workshops (Open Science School, 2016). Also an increase in programs that promote collaborations between arts and sciences, for example through art residencies in laboratories, e.g. StudioLab (studiolabproject.eu), Bio Art & Design Award (badaward.nl) and Future Emerging Art & Technology (featart.eu).

Many art festivals have acknowledged bioart like the Ars Electronica festival, which dedicated the festival to Life Science in 1999. These efforts show that "*partnerships with bioartists can contribute cultural and aesthetic contexts essential to translating basic research into useful applications* "(Yetisen et al., 2015), as well as problematise and deconstruct the biological sciences as can be seen in the EU program Trust me I am an Artist.

Another interdisciplinary dimension is the transgression from institutional to grassroots biodesign. A well-known example is the Biohacking movement, which aims to democratise access to biotechnology. There is a growing number of community-run biolabs worldwide, with many facilities within Europe (see http://www.biohacklabs.org/List for an up-to-date list). These spaces allow their members or users to carry out biological experiments, of which the majority can be considered at the level of biology classes in schools while some involve the latest genetic modification techniques and synthetic biology practices.

A.5 (Towards a working) DITOs definition for Biodesign

It should be clear by now that current DITOs activities and their content do not fully utilise all various biodesign angles and contexts. This preliminary investigation and our activities will continue to contribute to and draw from that.

During this analysis it become clear that the term biodesign might not be the most appropriate term to communicate WP1 activities to the public as it is not a well-known and popular concept. As pointed out in the variety of interpretations given by event participants were mostly associated with the subjects of "biology" and "design". Consequently, WP1 partners will adapt their vocabulary and labelling for each activity according to the target audiences (ie.for children, partners could use the terms "make, create, experiment, play with biology").

Appendix B. Questionnaire

The questionnaire was designed to cover different aspects of the work package and types of activities. It consists of seven sections and here we present the data gathering templates: Partner presentation (B1), Biodesign definition (B2), Event good practice compilation (for each of the various types of events: Interactive and travelling exhibitions, Conferences/seminars, Gaming competitions/online engagement, Discussions/Debates & Public Screenings, and DIY & DIT workshops).

B.1 Partner presentation

Partner Name	Three words describing your organisation's work in the format: #word1 #word2 #word3	One sentence on your organisation
UPD		
UCL		
WS		
ECSA		
MP		
KERSNIKOVA		
MERITUM		
TEKIU		
UNIGE		

The data gathered from this table helps us to have a baseline for partner's organisational identity, which we can use to track over the duration of the project in conjunction with WP5 as partners share practices and their activities take shape.

B.2 Biodesign Definition

Using the same table format, we sought each partner's input on:

- Four words describing your definition of biodesign in the format: #word1 #word2 #word3 #word4
- What would be your definition of "Biodesign"? (you can discuss it with your colleagues)

As above, this information helps us to understand where each partner stands and what perspectives they hold in terms of definition. As a baseline, it helps us gage the gaps and work needed to get to a working definition.

B.3 Event good practice compilation

Using the same table format, we sought each partner's input on:

- Name of event
- Short description of the format and methodology (max. 50 words)
- Objectives
- Picture(s) that reflects the methodology (please paste)
- Average duration
- This type of activity is usually planned: (select from: during the day, on evenings, during the week, on weekends
- Approximate number of participants
- "Target audience" (select from: general public doers/amateurs/makers, activists/hackers/communities of concern , policy/ decision makers, students/ youngsters, educators, academia, others (please specify))
- Audience level of engagement (select from: attending/ listening, hands-on activities, discussing or contributing to existing projects, proposing and initiating new projects)
- What is (are) the approach(es) to citizen science for biodesign?
- Topics that could be discussed during this type of event
- How are the contents/program/agenda configured? Are they decided only by the organiser, or is there any type of open call?
- What communication channels and tools do you use for this type of event?
- What are, in your opinion, the incentives that motivate participation in this type of event? (select from: acquiring new skills and knowledge, contributing to interesting projects for the common good, being part of a community, solving personal needs having fun, other (please specify))
- How is the budget spent? (give an approximate % per)
    - Travel/ accommodation
    - Communication/ dissemination
    - Materials and equipment
    - Fees/ personnelOther
- Is there any person to present, explain, talk about the contents, facilitate? Please explain his/her role
- Do you have specific strategies to include participants with a diversity of perspectives? If yes, which are those?
- Estimation of the time and personnel necessary to plan and carry out the event How do you plan your events in terms of the arrangement of the space, provision of tools and equipment, refreshments, etc.?
- How do you think these decisions affect how your event unfolds? How is the budget spent? (give an approximate % per)
- Does this type of event favour links between participants beyond the event itself? If yes, how do you think this is achieved?
- What kind of documentation results from this type of event? Who does it? Is it publicly accessible? What license is used?
- Outcomes: are there tangible outcomes / prototypes / results? In what way are these used? Do you follow up on these?
- Feedback: how do you acquire feedback? In what way has it reshaped the event?
- What is in your opinion the greatest challenge or improvement for this type of event?

As explained in section 5.1 above, these questions were selected by WP1 and WP2 leaders with input from WP5 and guidance from all other partners, especially those whose role is that of facilitators and who would gain the most out of gathering this information on good practices.

Appendix C. Summary Tables

C.1 Number of Participants

The table shows the expected number of participants per activity.

Type of activity	Activity (Institution)	Number of participants
Interactive & travelling exhibitions	The Science Bus (WS)	6000
	BioArt (KI)	500
Conferences / Seminars	Biodesign NightScience (UPD)	100
	Perspectives on DIYBio (UNIGE)	60
Gaming competitions / Online engagement	iGAMER (UPD)	500
	Gamelier events (UPD)	25
	MOOC (UPD)	2000
	CRI Journal (UPD)	n.a.
	Reddit ask me anything (WS)	500
	Workshop Lab Books (KI)	n.a.
	CityHacking (Meritum)	n.a.
	DIY Science Postcards (UNIGE)	n.a.
Discussions / debates at Science public cafés	CwB Biocafés (UCL)	6 - 8
	Science Film Night (UCL)	6 - 50
	Open Evenings (WS)	40
	BioTalks (KI)	15 -20
	Biodesign Café (Meritum)	15 - 20
	BioNights (UNIGE)	40
DIY & DIT Workshops	Biodesign Workshops (UPD)	20
	High school Biodesign Workshops (UPD)	16
	Leadership Programme (UPD)	20
	CwB BioPlayshops (UCL)	4 - 10
	Do-It-Together Bio (WS)	25
	OpenBio workshop (MP)	20
	Bio Friday Academy (KI)	10
	Bio Citizen Science (KI)	6 - 10
	Bio Hack The City (Meritum)	15 - 20

C.2 Average Duration per Activity Table

This table shows that 9 out of 19 activities that lasts less than half a day, 2 that requires almost a day and another 2 that require more than one day. There is not data for 6 of those activities.

Type of activity	Activity (Institution)	Activity duration
Interactive & travelling exhibitions	The Science Bus (WS)	3 months
	BioArt (KI)	2 – 4 weeks
Conferences / Seminars	Biodesign NightScience (UPD)	2 days
	Perspectives on DIYBio (UNIGE)	3 days
Gaming competitions / Online engagement	iGAMER (UPD)	2 days
	Gamelier events (UPD)	4 hours
	MOOC (UPD)	4 -12 weeks
	CRI Journal (UPD)	Continuous
	Reddit ask me anything (WS)	2 hours
	Workshop Lab Books (KI)	Continuous
	CityHacking (Meritum)	n.a.
	DIY Science Postcards (UNIGE)	Less than 1 day
Discussions / debates at Science public cafés and public screenings	CwB Biocafés (UCL)	1.5 hours
	Science Film Night (UCL)	3 hours
	Open Evenings (WS)	3 - 4 hours
	BioTalks (KI)	2 hours
	Biodesign Café (Meritum)	2 hours
	BioNights (UNIGE)	n.a.
DIY & DIT Workshops	Biodesign Workshops (UPD)	3 days
	High school Biodesign Workshops (UPD)	2 hours
	Leadership Programme (UPD)	4 hours
	CwB BioPlayshops (UCL)	2.5 hours
	Do-It-Together Bio (WS)	3 – 4 hours
	OpenBio workshop (MP)	2 – 4 hours
	Bio Friday Academy (KI)	4 hours
	Bio Citizen Science (KI)	6 hours
	Bio Hack The City (Meritum)	8 hours

C.3 Objectives

This table show the objectives that are most frequently addressed by each activity.

Type of activity	Activity (Institution)	1	2	3	4	5	6	7	8	9	10	11	12
Interactive & travelling exhibitions	The Science Bus (WS)			X					X				
	BioArt (KI)	X											
Conferences / Seminars	Biodesign NightScience (UPD)	X		X				X	X				
	Perspectives on DIYBio (UNIGE)			X				X					
Gaming competitions / Online engagement	iGAMER (UPD)												X
	Gamelier events (UPD)	X				X					X		X
	MOOC (UPD)					X		X	X		X		
	CRI Journal (UPD)										X		
	Reddit ask me anything (WS)				X								
	Workshop Lab Books (KI)						X						
	CityHacking (Meritum)							X					
	DIY Science Postcards (UNIGE)						X		X				
Discussions / debates at Science public cafés and public screenings	CwB Biocafés (UCL)		X	X	X								
	Science Film Night (UCL)		X										
	Open Evenings (WS)		X				X						
	BioTalks (KI)		X	X					X				
	Biodesign Café (Meritum)	X	X										
	BioNights (UNIGE)		X						X				
DIY & DIT Workshops	Biodesign Workshops (UPD)	X	X	X		X	X	X			X	X	
	High school Biodesign Workshops (UPD)			X		X	X				X		
	Leadership Programme (UPD)					X					X		
	CwB BioPlayshops (UCL)				X							X	
	Do-It-Together Bio (WS)				X		X						
	OpenBio workshop (MP)						X					X	

	Bio Friday Academy (KI)					x		x					
	Bio Citizen Science (KI)									x			
	Bio Hack The City (Meritum)	x						x					
Number of activities meeting these objectives		**6**	**7**	**7**	**4**	**6**	**7**	**7**	**6**	**1**	**6**	**3**	**2**

Appendix D. Proposed structure for information sheet

This is the design of information sheet proposed for both D1.1 and D2.1, which has evolved towards the two side sheet proposal in section 6.2.

WHAT	**Event name**
	Type of activity ☐ Interactive & travelling exhibitions ☐ Conferences / Seminars ☐ Gaming competitions / Online engagement ☐ Discussions / debates at Science cafés & Public screenings ☐ DIY & DIT Workshops
	Description (format & methodology) **Examples of topics that could be discussed during the event** **Pictures**
WHY	**Objectives** **Audience level of engagement:** ☐ attending/listening ☐ hands-on activities ☐ discussing or contributing to existing projects ☐ proposing and initiating new projects
WHEN	**Average duration:** ☐ < 1 hour ☐ 1-2 hours ☐ 3-4 hours ☐ 4-6 hours ☐ 1 day ☐ 2 days ☐ 3 days ☐ 4-6 days ☐ > 1 week (specify): **This type of activity is usually planned:** ☐ during the day ☐ on evenings ☐ during the week ☐ on weekends
WHERE	**Location:** ☐ museum/art gallery ☐ primary/secondary/high school ☐ university ☐ hackerspace / fablab ☐ other (specify):
WHO (TARGET)	**Approximate number of participants:** ☐ < 15 ☐ 15-40 ☐ 40-100 ☐ 100-200 ☐ 200-500 ☐ 500-1000 ☐ > 1000 **Target audience:** ☐ general public ☐ doers / amateurs / makers ☐ activists / hackers / communities of concern ☐ policy/decision makers ☐ students / youngsters ☐ educators ☐ academia ☐ other (specify):
HOW	**How are the contents/program/agenda configured?** ☐ decided by the organiser (specify): ☐ open call (specify): **Communication channels and tools:** ☐ social media (Facebook/Twitter/…) ☐ Eventbrite/Meetup ☐ website ☐ mailing list ☐ posters/flyers ☐ other (specify): **Incentives that motivate participation in this type of event:** ☐ acquiring new skills and knowledge ☐ contributing to interesting projects for the common good ☐ being part of a community ☐ solving personal needs ☐ having fun ☐ other (specify): **Strategies to include participants with a diversity of perspectives** **How do you plan your events in terms of the arrangement of the space, provision of tools and equipment, refreshments, etc?** **Is there any person to present, explain, talk about the contents, facilitate?** **Estimation of the time and personnel necessary to plan and carry out the event**
OUTCOMES & EVALUATION	**Does this type of event favour links between participants beyond the event itself?** **What kind of documentation results from this type of event?** ☐ photos ☐ videos ☐ articles ☐ posts on social media (Twitter/Facebook/…) ☐ booklet ☐ other (specify): **Are there tangible outcomes / prototypes / results?** **How do you acquire feedback?** ☐ questionnaire ☐ interview ☐ other (specify): **Greatest challenge or improvement for this type of event**