waag academy

Transfer of innovation

Contents

Introduction

By way of Waag Academy[1], Waag Society offers curricula for multiple levels of professional education. The formats and content are based on our experience in (digital) social innovation[2] and are customised to specific contexts and questions. The most important aspect in the Waag Academy is the fact that creative professionals are actively challenged in 'hands-on' master classes, workshops and trainings.

The Waag Academy programmes have been developed with partners in education, the cultural and creative sector, business, and science. They are aimed at social innovators: creative, original thinkers who are able to make connections between disciplines and build networks that offer space for knowledge innovation and new ways of working.

In addition to Waag Academy, Waag Society's Creative Learning Lab offers services for pupils, teachers, and school management in primary and secondary education.

In this booklet you will find descriptions of a selection of Waag Academy Modules that are directed at supporting creative sector professionals to improve their (methodological) skills and knowledge in linking art, science, and technology in their daily practice: Learning by Making, Heritage and Education, Future of Art-Science Collaborations, Applied Gaming for Health & Care, and PhDO.

Before going into the specific modules we will introduce the context of our work on human centred innovation. The texts ends with information on the VETLICAT project.

Context

New perspectives on human centred innovation

The challenges our society faces today - aging, sustainability, citizenship, lifelong learning, cultural diversity and privacy - are complex, and almost always impact more than one domain. At the same time, technology is becoming a dominant factor in contemporary society. However, technological developments are often implemented in a top-down fashion, driven by governments or large companies. Governments and municipalities, for example, try to build 'smart cities' and focus on infrastructure, transport, communication networks and efficiency, but forget to build on, and further enable human agency[3]. Educational publishers develop online adaptive learning environments, and invisibly gather a great deal of user data and personal information as consequence (intentionally or not). Health care commodifies our personal health records, but citizens and patients generally don't get to see their own data.

In the coming decades, urgent issues are at stake across multiple domains that simultaneously impact healthcare, education, urban development and the public domain, rendering the existing innovation approaches insufficient. New approaches require cooperation between research institutes, universities, healthcare institutions, government, creative industry, and business in a context of interdisciplinary research methods and practical experiments.

They need to involve end-users and professionals at all levels and through all layers of society, allowing for collectively imagining, building, and experiencing new futures. They require open and transparent, inclusive and creative practices.

All over the world, people take bottom-up action[4]. They self-organise, form co-operations, share resources; and take responsibility for the care of children and elderly, environmental health, the preservation of buildings, renewable energy, the origin of products and ownership over public space. They are driven by the need to understand our technologically enriched environments, to be able to control, influence and fix things ourselves. The Maker Movement and open hardware projects like Arduino are revolutionising design and manufacturing. Participatory mechanisms and open democracy initiatives are transforming the traditional models of representative democracy.

To bridge these different worlds, both of which need to be part of successful innovation processes, recent studies[5] have introduced the notion of a creative structure within a local environment: a local dynamic in which creativity is cultivated and new opportunities are explored. Such a creative structure consists of three different layers: the upperground, the middleground and the underground. The upperground is the level of the formal institutions, whose role it is to bring ideas to the market. The underground is composed of creative individuals who have no connections to the institutional and commercial world, such as artists or other creative professionals. The middleground has an essential role in a creative structure as it represents the level where communities and intermediate groups contribute by creating common platforms of knowledge necessary for communication and learning that pioneer innovation. Waag Society and other cultural and creative organisations are part of the middleground in (digital) social innovation.

Methodology

Waag Society focuses on solving 'wicked problems' in a societal context. Either by prototyping new solutions that tackle a specific societal question, or by creating learning processes and arrangements that stimulate knowledge transfer, engagement, participation, and ideation. To create these learning environments, a variety of methods are devised and/or adapted to get users and professionals (such as designers, researchers, and artists) involved in social innovation projects on an equal basis. All methods work together to activate people and stimulate ownership. This fosters an active exchange of knowledge and experience between people with different skills, experience, motivations and perspectives, and as such creates a 'hands-on' learning environment. Fostering the right attitude is crucial: the desire to learn, the will to explore personal boundaries, to follow intuition, and to deal creatively with new, and – at times – disruptive knowledge.

The activities in the learning environments materialise in a range of tangible results (such as publications, designs, objects, toolkits,

performances and systems) and often also involve public debate or dialogue between new partners. Investigating, building, thinking, and acting are inextricably linked, as are intervening, networking, and sharing.

Waag Society's research practice is referred to as 'Users as Designers'[6]. This consists of a combination of existing and customised participatory and empathic design methods that have a qualitative nature and are drawn from art and social science. Based on the issue at hand, a decision is made on how to relate to users and how to optimise their involvement. This design philosophy is particularly appropriate when more challenging user groups are involved, like mentally handicapped persons or seriously ill children. Inspirational research methods help to facilitate the dialogue needed to elicit personal and contextual information that helps define users' needs and desires.

Co-creation[7] is at the heart of the Users as Designers' methodology. Co-creation is a method to engage users in design processes, by way of thinking, designing, and building together in multidisciplinary teams in which personalised and unique experiences arise.

Co-creation is particularly interesting and valuable in an early phase of the innovation process. By helping end-users in constructing their own solutions, we allow and enable crucial information and ideas to enter into the development process and empower end-users to be in charge of their own situation.

We preferably engage artists (in residence) in our projects and design processes. This stimulates taking into account completely different points of view. It enables speculative design, and helps to stretch the boundaries of the way we think about technology, identity, interaction, intuitive design, and gameplay etc.
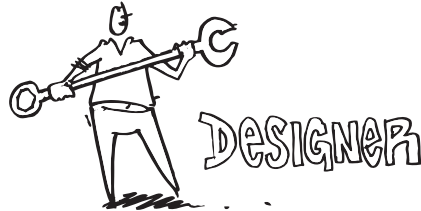
'Users as Designers' is published under a Creative Commons license and can be downloaded at our website[8]. In the booklet, we focus on a hands-on description of our methods. Through this publication we intend to spread the use of Users as Designers; improve our own understanding by sharing and learning from the responses; and eventually sow and grow seeds of change that we hope will flourish.

In the next chapter, we describe a number of Waag Academy modules that cover a wide range of thematic domains we operate in and differ in terms of approach, methodology, target audience and results. We elaborate on the applied methodologies, describe aims, objects, and lessons learned and the way we engage users and multidisciplinary group. In doing so, we hope to transfer our principles, practices, and philosophies to our (international) partner organisations and other creative sector peers.

Modules

Learning by making

ASK — QUESTIONING THE QUESTION
MAKE — THINKING THROUGH MAKING
TRY — TESTING & EVALUATING

Example FabSchool flyers

Example FabSchool Instructable 'Diavolino'

Title	Learning by Making
Case	FabSchool
Short description	'What I hear I forget, what I see I remember, what I do I understand.' - Confucius.

We understand the world better when we are actively engaging with it. In creating the world around us, we gain new experiences and learn about what works and what doesn't. The process of 'making things' leads to new knowledge, insights, and opportunities.

FabSchool[9] as a format follows the method of 'learning by making', and focuses on creativity, cooperation, and entrepreneurship.

'Maker spaces' play an important role in the implementation of this method in an educational environment. Through creative manufacturing processes students discover their talents and are supported in the development of these talents.

Fact sheet
Case circumstances & problem

We are living in a society full of new technology and professions. But in schools people are trained in antiquated ways and are held to old standards. There is a growing need to transform education into a post-industrial structure, where skills such as entrepreneurship, ICT literacy, creativity, collaboration, problem solving, and informed citizenship play a major role. It enables people to play an active role in society, thereby improving their environments and social opportunities.

Instead of working with the existing 'classroom teaching model' more attention should be paid to stimulate the potential of the individual. Not preparing students for the industry, but empowering people to develop themselves should be central in learning.

Media and technology play an important role in the 'maker movement'. This movement came about by the increasing accessibility of production technology. Open source resources like 3D printers and digital milling machines have moved the production process from the factory to the 'maker space' or the Fablab.

The Massachusetts Institute of Technology (MIT) in Boston developed the concept of Fablabs in 2003. In a Fablab, people use high tech equipment to realise their ideas in a prototype or product. The strength of a Fablab is in its interdisciplinary nature. There are people and organizations working in different disciplines, fields of expertise and with different skills sets on projects together.

At the moment there are more than 200 Fablabs scattered all over the world. From America to Asia, Europe to Africa.

This is the next phase of the digital revolution. People want, more than ever, to give meaning to their own products. New professions arise at the intersection between virtual and physical reality: the crafts of the 21st century.

Purpose of module program

Any FabSchool programme starts with the definition of a real problem, usually linked to a social theme.

This creates context and students do not just learn for the sake of learning. Learning becomes meaningful. By presenting a practical assignment, FabSchool offers students the opportunity to work on an assignment or a specific challenge and are given practical tools to act.

Essentials / Prerequisites

Examples: multidisciplinary teams, multiple iterations, co-creation, etc.

In these assignments 'making' is a prerequisite and there is plenty of room for new ideas and interpretation. Furthermore, FabSchool is based on four principles.

These principles are always applicable, regardless of the form of execution (workshop, series of lessons, inspiration session, etc.):

1. Learning by making

By going through the creative processes, students learn how 'things' and 'systems' are put together. Everyone works from their own motivation to make / know / achieve something.

2. Working in multidisciplinary teams

Each student discovers and develops his own talent and works from his own discipline, which celebrates differences. Students learn about the skills of others and are encouraged to explore these possibilities for teamwork.

3. Open / share

Students document their work and share it with each other and the world. In this way they can build on (each) other's ideas. Opening and sharing are important building blocks for the enterprise of the future.

4. Meaningful learning

By linking learning to a social issue or external client (business, social organization, individual) learning is contextualised.

Partners / stakeholders

Fablabs, Maker spaces, Schools, Students, Craftsmen

Target audience

Anyone willing to learn and explore his or her talents as well as new technologies is a potential student of FabSchool.

Involvement of users

The students are an integral part of the learning process. The teachers are not so much educators as they are facilitators and motivators. The students decide what they want and need to learn in order to fulfil their assignment or explore their (societal) challenge. The teachers are there to guide the students and help research their options. The students are the users of the knowledge, but they also work with real clients that can give input on their designs.

Methodology and lessons learned

The method of Design Thinking[10] is essential in the FabSchool program, since the students are considered to be designers in this context. The Design Thinking method Waag Society fosters splits the design process roughly in three phases: Ask, Make and Try.

The design process always starts with a question or a problem that the students solve together. Secondly, they create a prototype that can be investigated as a possible solution. Then the prototype is tested to see if it provides answers to the initial question or a suitable solution for the problem. Often these findings bring up new questions that can start off the design process again.

Within the Ask, Make, Try framework, there are five steps to go through in order to reach a solution. At each step other skills are needed, and each step can be repeated as often as needed.

- Question the question. What is information hidden behind the question? Explore and discuss.
- Sketch a solution. Start with a question such as 'how can you…?' to shape the design process. Quick sketching can activate creativity

and inspiration a lot better than just researching or talking.

- Make an idea tangible. Design a prototype out of paper or cardboard - and work towards the 'better' materials later.

- Test the prototype. The only way to know whether something is working or not is by testing it. Working with the product can both trigger solutions and new questions that enhance the design.

- Present and evaluate the prototype. Although you might not think a product is finished, the feedback of 'outsiders' or peers can help you improve your design. To get this feedback, you need to present your (intermediate) results.

Anecdote and/or Impact

- Makers' manifesto[11] handed to the Dutch parliament and discussed and approved as part of the discussion on educational priorities and budgets.

- Weekly episodes of FabSchool Kids at Fablab Amsterdam.

- Cooperation between many Fablabs on a educational level.

- Publication 'FabSchool'[12.]

- Launch of the online platform FabSchool.nl.

Instructions for implementation

FabSchool as a methodology is applicable to all ages and audiences. But, you need to make a customization for each target group. The principles remain the same, but the level of difficulty, the degree of freedom that a student can handle, the abstraction of the assignments, and the preparation depends on the group of students.

So you need to know exactly whom you're dealing with, and – before you start – you need to make an inventory of knowledge, skills,and tools. You must also be flexible in adjusting these during the course of program.

Experiment & Further research

Waag Society has executed a wide variety of FabSchool trainings. The majority of these have been directly linked to an educational situation: school-going children, or students from a design school or technical university. It would be interesting to facilitate these learnings in a life-long learning context for adults interested in fine tuning and enhancing their problem solving skills by exploring the world and the technology in it.

Links

fabschool.nl
fabacademy.org
instructables.com
waag.org/fabschool
fabschool.rotslab.nl

Heritage and education

Example toolkit

Example visual report and maps

Hortus Arcadie
Onze tuin in kaart

Drie proeftuinen in woord en beeld

Planten voor de Toekomst, maart 2013 - december 2014

Hortus Botanicus Leiden
Onze tuin in kaart

Title	Heritage and Education
Case	Plants for the Future (NVBT | Dutch Association of Botanical Gardens & Waag Society)
Short description	Waag Society's Future Heritage Lab focuses on innovative heritage practices. How do social, sensor, and mobile network infrastructures and interactive devices help to create new connections between heritage institutions and audiences?

Important research themes underlying Waag Society's heritage projects are:

• Novel interactive tools to tell the stories behind heritage collections: How can you create multi-layered interactions with a diversity of stories based on heritage objects?

• Physical and embodied interfaces: How can you experience the power of a beautiful or interesting heritage object with your whole body, not just intellectually?

• Community engagement and social cohesion: How can cultural heritage provide value for an increasingly diverse society?

• Creative and DIY approaches: How can cultural heritage be a force in the stimulation of creativity, education, and the European economy?

• Location based storytelling: How can heritage be used and enjoyed outside of designated museum spaces?

In the collaborative project Plants for the Future[13], the Dutch Botanical Gardens Association (NVBT) connects the existing botanical collections and engages with the public in innovative new ways. The NVBT cooperates closely with Waag Society to develop the public programming through co-creation with both existing and potential new visitors and others involved. The support of the National Postcode Lottery provided space and opportunity for the 21 members of the NVBT to start working together to strengthen their role as the knowledge centres in the field of biodiversity of plants. This will enable the gardens to bridge their rich heritage and a sustainable future.

In order to make the step towards an audience-centered approach, Waag Society will organise three co-creation labs over a period of 1,5 years, which is the basis for the module described in this document. This project will run until 2017, the Year of the Botanical Garden.

Fact sheet **Purpose of the heritage** **module programme**	Training professionals to foster an open attitude on all levels within the organisation (NVBT), sharing knowledge, devising new strategies for audience engagement, creating ownership (including new tools) by way of co-creation.
Case circumstances & problem	The gardens of the NVBT are managing an invaluable living heritage collection. The 21 gardens are very diverse: some are academic, some are connected to large park areas, some are connected to zoos, etc. Their collections and stories are relevant to a large number of current societal topics such as food safety, sustainability, reconnecting to nature, circular economy, etc. But they fail to renew their audience and connect to younger groups. The joint research project started with an exploration of what stories are there, what audiences are (not) reached, what infrastructure (in terms of collaboration and technology, national and international) is future proof through the co-creative labs.

Essentials / Prerequisites

When facilitating a co-creative process for audience participation within heritage institutions you need:

- Multidisciplinary teams of garden employees (max. 15) that cross the different levels within the organisation, working with a team of Waag Society.

- A team of multidisciplinary facilitators (Waag Society), consisting of a concept developer, a designer ,and a technical programmer; so the discussion and working assignments can be facilitated from different angles.

- A set 'working agenda' over longer period of time, but enough freedom to improvise and deviate from it when new opportunities arise.

- To facilitate encounters with (new and existing) members of the audience.

Partners / stakeholders

NVBT organisation, all individual gardens and Waag Society.

Target audience

A combination of internal professionals (garden employees and volunteers), and new and existing audiences have the main focus.

Professionals from the Dutch Botanical Gardens experimented with new technological tools to attract new audiences to the gardens. Concepts that were explored included storytelling trees, a magnifying glass to discover the invisible world of plants, a citizen-science app to invite visitors to share knowledge and stories on plants, a spatial installation to guide a multi sensorial group activity about plants for elderly, and many more.

Involvement of users

Not all gardens could be included in one co-creation lab. Involving too many participants would have had a negative effect on the quality of work and discussion. Therefore, three consecutive labs were organised, alternating participants in each lab period, and changing location every other week.

Methodology and lessons learned

First, all the gardens were invited to send one or two employees to the kick-off meeting. They brainstormed about the future of botanical gardens and empathised with potential future audiences.

A reporting toolkit was created. With this kit, participants of the co-creation sessions could make a map with their highlights, interview their visitors with a logbook, and photograph surprising spots with a disposable camera. In this way, all gardens were given the floor to contribute to the starting point of the first meeting.

In the first co-creation lab, participants used the garden's stories as starting points for new ideas for existing audiences. New technologies were used as inspiration for new ideas to attract people to the gardens.

In the second co-creation lab, the main focus was exploring new target groups for the gardens. The participants designed new concepts and developed prototypes as a means to start a discussion with and about new audiences.

The third co-creation lab was less about exploration and more about conversion and choosing. The participants developed four potential concept directions based on the work done in Lab 1 and 2 and chose two potential concept directions.

Waag Society developed those ideas into scenarios and paper prototypes, and sent those into packages to be evaluated by all gardens. Again, employees could give feedback on the concept directions based upon their expertise, and combined with their

audience's opinion. After that, all gardens were empowered to decide together which concept should be developed for 2017.

Audience members were recruited while visiting the gardens or invited to participate through the networks of garden employees and Waag Society. They were interviewed, they co-created, and they evaluated ideas and tested (paper) prototypes.

Tools

The key was to create ownership by the participants (through DIY toolkits, involving many people, shared decision making), creating maps and solutions to kick start a different type of dialogue (generative prototypes, 'design thinking' formats) and activate them to organise their own knowledge and engage with their audience (toolkits, interviews, paper prototypes).

Lessons learned

The co-creation kickstarted a dialogue that transfers to all topics and domains, education, communication, and exhibition design. It Also created a spin off of informal connections and a need for a more solid process of transformation in the long run.

The focus of the gardens has been very much on broadcasting and not so much on listening. Bridging the gap to (new) audiences is challenging and terrifying for them; which creates a need for more training on multiple subjects.

The biggest hurdle is varied and lively content: they have stories but these stories are not verified and not accessible. New programmes have (organisational) consequences (editorial, ensuring continuity, audience feedback) which need to be facilitated.

Anecdote and/or impact

- The method of co-creative labs taught the gardens a lot about the process of public participation. If they want to attract new audiences, they must get to know the audiences first.

- Big spin off in informal connections between the gardens.

- Exchange of educational formats between the gardens.

- More than 20 new ideas, resulting in scenarios for future audience engagement, one or two of which will be developed into new applications, allowing the individual gardens to start experimenting with new content and new communication styles.

Instructions for implementation

Co-creation can be part of many (ad hoc/ informal) learning environments and is applicable to all audiences and age groups. However, the process needs to be customised for each target group and needs flexibility in adjusting these during the course of program.

Principles

Work in multidisciplinary teams.

Work in inspiring locations (not the regular office spaces).

Structure the process and communicate the flow of activities early on in the process to the participants:

- Desk research (establishing the context)

- Garden visits and first interviews (observing and learning)

- Kick-off meeting with all gardens, distribute reporter toolkits

- Return toolkits and analyse input

- Co-creation Lab 1; divergence; theme 1: storytelling and new applications

- Co-creation Lab 2; divergence; theme 2: new visitor groups

- Co-creation Lab 3; convergence: new tools to be developed further

- Distribute evaluation-kits (participatory assessment of feedback on ideas)
- Collect response forms
- Decision making session (tying things up)
- Keep communication going between the sessions.
- Experiment and further research Development of chosen concept(s) into interactive application would be a next step. User and audience involvement continues.
- Experiment with new/other methods to keep sessions interesting and challenging for facilitators too.

Links

waag.org/en/project/botanical-gardens
botanischetuinen.nl
waag.org/en/blog/first-lab-botanical-gardens-started
waag.org/en/project/users-designers
(blog posts mostly in Dutch)

Future of
Art-Science
Collaborations

Photo: Luca di Tommaso

Examples of lecture videos at the Vimeo channel

Day 2 Debate The Future of Art & Science ...
Day 2 Debate The Future of Art & Science collaborations

Day 1 Kat Austen The Future of Art & Scie...
from Open Wetlab

FASC day 5 An imaginary organisation
from Open Wetlab

FASC Day 5 group presentation1
from Open Wetlab

Day 1 Debate The Future of Art & Science ...
from Open Wetlab

FASC Day 5 group presentation 2
from Open Wetlab

FASC Day 5 group presentation3
from Open Wetlab

FASC day 4 Review
from Open Wetlab

FASC Day 5 Keynote by Lucas Evers
from Open Wetlab

FASC Day 5 Review
from Open Wetlab

Martijntje Hallmann presentation dag 4
from Open Wetlab

Maarten Lamers dashboard presentation ...
from Open Wetlab

FASC day 5 organisations 3
from Open Wetlab

day5organisations2
from Open Wetlab

Crystal Cambell presentatie dag 4
from Open Wetlab

FASC Day5 presentation Huub de Groot
from Open Wetlab

Example art-science collaboration from the Open Wetlab

Amsterdam Yeast, photo: Jennifer Willet
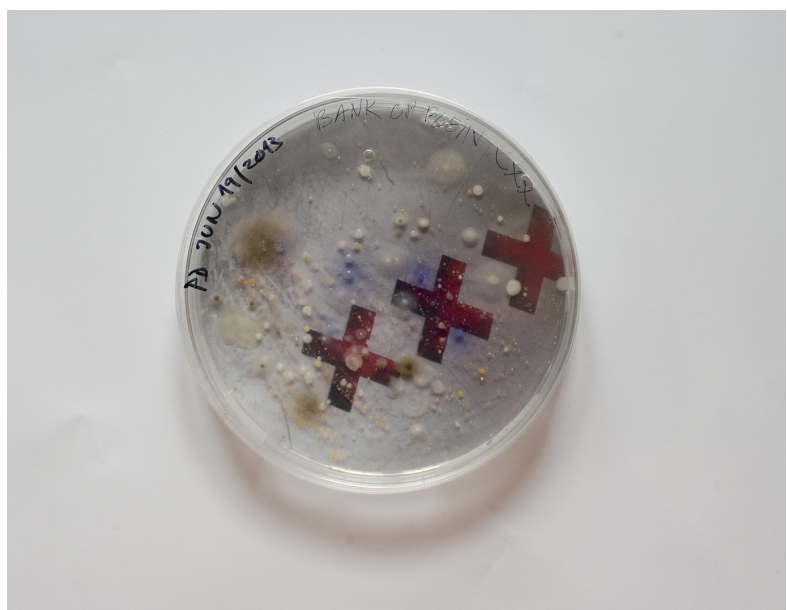
Title	Future of Art-Science Collaborations (FASC)
Short description	FASC[14] consists of a one-week workshop with an international group of invited art-science practitioners, a lecture, and an event series to investigate the future of collaborations between the arts and sciences in terms of the workings of its diversity, its ecology, and its economy. The project also serves as a platform to further the mutual understanding between the arts and sciences, and function as a network of its practitioners and a window to a general and professional audience. FASC has led to several new fruitful collaborations between artists and scientists.

Fact sheet

Purpose of the module	Collaborations between the arts and sciences have a long history and are undergoing a renaissance. Before scientific technology was able to master the virtues of the arts, arts and sciences were one discipline. After a long era of deep specialisation in both fields, it seems that where the deep thinking and creativity of both come together, the ontological need of the arts to communicate with an audience can be of great benefit to the innovation of societal knowledge appropriation and dynamics. Understanding the revival of collaboration between art and science will improve not only those collaborations, but also their societal effects.
Case circumstances & problems	Media arts and creative research have found scientific knowledge and innovation anew as a field of artistic representation and expression. Interactions between the arts and sciences however cannot be taken for granted. While the arts and science, fundamentally, have similar understandings of research (through the rigorous questioning of all assumptions about reality), they also created distinct politics and systems of investigation. The two disciplines can learn a lot from these differences, but conflicts can also arise.
	The arts have a broader understanding of aesthetics. Where the sciences often have an interest in the arts producing pretty pictures, the arts see all scientific activity as potential form and possible philosophical, social, ethical, and other meanings. The arts, on the other hand, may lack the level of understanding needed to see beyond the awe for scientific information. Therefore, they may become trapped again in producing pretty images that fail to bring forth questions about the ethical, political and social complexities/ ambiguities of the knowledge industry. Hence the question is how to bring the arts and sciences together in order to produce a collaboration that is free in terms of what is permitted to be questioned; framed/restricted in terms of what is needed to become practically productive, and produces more than just better art; and more knowledge.
Essentials / Prerequisites	It is important to understand that every art-science collaboration is unique, and there is no recipe to organise for a one-size-fits-all success. It is important within the framework of FASC to take time to discuss many different examples of collaborations along the lines of what the motives are, chosen models, definitions of success, and how to organise for success. Only then is one able to go beyond the anecdotal of such collaborations.
Partners / stakeholders	FASC has been organised by Jacco van Uden of the Netherlands Study Centre for Technology Trends and Lucas Evers of Waag Society in collaboration with The Royal Academy of Visual Arts The Hague, Rijksakademie Amsterdam, the Leiden Institute of Advanced Computer Science and Medical Museion Copenhagen, by the Lorentz Centre of Leiden University. Public lectures and presentations took

place at the Hortus Botanicus, Leiden; Waag Society, Amsterdam; Royal Academy of Visual Arts, the Hague; Museum Boerhave, Leiden.

Target audience

Both a professional artistic and scientific audience was addressed, but also a general audience with an interest in art and science interactions as well as those with an interest in policy and the democratization of technology.

By connecting the program with the EU funded collaboration Art & ICT Connect, FASC produced traction with the EU DG Connect where it was decided subsequently to grant a greater role to the arts within its Horizon 2020 innovation programme.

Involvement of users

Both the professional audience and the general audience proved to be very active in discussions and q&a's. Since the workshop (that takes about a week) is about finding motives, language, roles, and definitions of success, active participation is required. Though not the first of its kind, a heritage of activities is still happening because of FASC.

Methodology and lessons learned

To create a large, influential network, you need to attract a rather extensive group of people that are intrinsically motivated to convene, present, share, and discuss. By providing careful curation, good content, room for thought, and a welcoming setting, you can achieve this.

Anecdote and/or impact

During the workshop at the Lorentz Centre in Leiden, the group experienced the luxury to narrate and discuss one particular work of art over and over again, namely Bradley Pitts' work 'Eye Meets I'[15]. Each time they could return to the richness of interactions between the scientists and artists it represents, something one would not be able to do by solely experiencing the object (and hence leaving behind the paradigm that art should speak for itself).

Interpersonal power relations, institutional power relations, blind spots in aerospace research, boundaries between an art object and scientific knowledge and utilitarianism (to name a few) were discussed to the bone. Each time, these discussions reflected back to the different factors of motivation, language, roles, power, and (mutual) success factors[16].

'Eye Meets I', a work of Bradley Pitts (artist and aerospace engineer) deals with the desire of space research to perceive faraway distances juxtaposed with the artist's interest in looking inside oneself through long, extreme yoga practise. The work consisted of a parabolic mirror made to enable the artist, Pitts, to look from one eye into his other eye. The work got much attention of neurologists, but a replica of the piece (allowing other people to use this mirror) was never produced.

FASC:

- Brought together a diverse group of art-science practitioners, scientists, journalists and policy makers and general audience;

- Published a HOW TO book on arts-science interactions;

- Initiated several new art-science collaborations;

- Informed EU policy makers about artistic involvement in innovation;

- Raised awareness of the research funders that there should be more opportunities to combine arts, design, and research practice;

- Forged lasting links between people who had never met before;

• Created free publicity for the partners behind the programme.

Instructions for implementation

As FASC was a diverse series of events, there are no one-size-fits-all instructions like other Waag Academy modules (e.g. PhDO). Most important to keep in mind are the great differences and diversity of backgrounds among the participants in the conversation, and (simultaneously) the enormous willingness to engage in dialogue and exchange.

When selecting interactions between the arts and sciences to discuss, keep in mind that the most interesting exchanges occur when there is a high expectation of hybrid practice. In other words, where art and science cannot be understood separately.

Taking time for stories and anecdotes about the interaction from both the side of the scientist and the artist is rewarding, and makes the final results of the collaboration tangible.

After the stories and anecdotes, the chosen setting can use the scheme of discussing motives for collaboration, the division of roles within the collaboration and factors, and organising for success, in order to bring the dialogue beyond the anecdotal.

Experiment, suggestions & further research

• Connecting between not only arts and sciences, but also arts and politics, activism and finance, innovation and law, between performance and PTS disorder simulation would be very interesting.

• The findings and experiences of FASC offer a frame to connect between different arts and different sciences, ranging from developmental biology and stem cell research to neurosciences and socio-mathematics.

• Locating resources to enable long term art-science interactions.

• Favour dialogue over presentations more.

• Set up formal / structural collaboration with universities and art schools.

• Engage in community management between the sessions to keep the network active, provide incentives for participating, and help it grow in new directions.

• Strengthen the matchmaking between practitioners and research positions.

Links

Project site: waag.org/fasc
Documentation website: futureartscience.wordpress.com
Waag Society organiser Lucas Evers: waag.org/en/evers
Co-organiser Jacco van Uden: dehaagsehogeschool.nl

Other websites of co-organising parties:
Netherlands Study Centre for Technology Trends: stt.nl
Lorentz Centre: lorentzcenter.nl
Medical Museion: museion.ku.dk
Leiden Institute of Advanced Computer Science: liacs.nl
Rijksakademie: rijksakademie.nl
Koninklijke Academie voor Beeldende Kunsten: kabk.nl

Applied Gaming for Health & Care
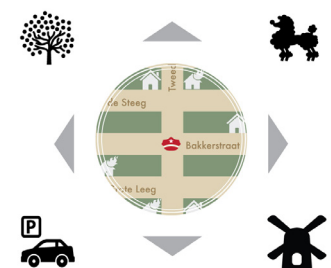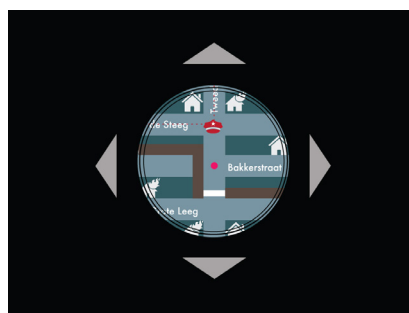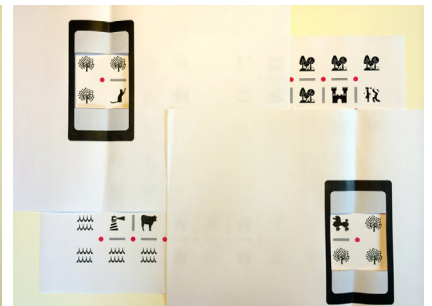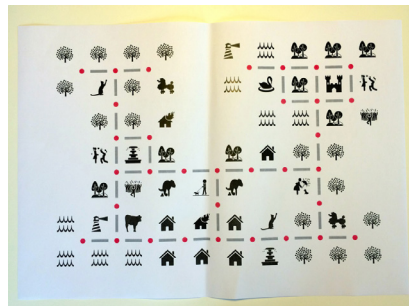

Photo: Gameranx

Example generic visuals used for CHASING

Photos by Marc Wathieu

Example game prototyping for CHASING

Visuals by Douwe-Sjoerd Boschman, Waag Society

Title	Applied Gaming for Health & Care
Case	CHASING
Short description	Applied gaming for Health & Care gives insights on how to develop games to support patients and healthcare professionals in a playful manner.
	A lot of therapies are not very motivating and rather repetitive. This module shows how to develop game principles and mechanics following the users as designers methodology.
Fact sheet	
Purpose of the module	Applying games for fields other than entertainment is becoming a growing field of interest. This is also the case for health and care.
Case circumstances & problem	The CHASING project (short for: CHAllenging Speech training In Neurological patients by interactive Gaming) is an extension of the previous EST research program, which investigated the potentials of web-based speech training for neurological patients. Results so far indicate that patients appreciate web-based speech training as opposed to face-to-face training with a therapist, and that this training has positive effects for chronic neurological patients with dysarthric speech and diminished speech intelligibility.
	Chronic patients with Parkinson's disease, or those who suffered a stroke, tend to succeed in realising the targeted increased voice intensity (i.e. loudness), which is required for adequate communication, but speech intelligibility lags behind. Improved articulation is believed to lead to improved speech intelligibility. But this requires further research. Since auditory speech discrimination skills in neurological patients calls for augmentative feedback, patients received visual feedback on their speech, which was perceived as static and abstract.
	Within CHASING, an advanced, motivating training device is developed that provides guidance on articulation improvement and allows the integrated benefits of intensified, independent speech training. Applied games are known to have strong motivational power. To study to what extent applied games and games principles motivate and support neurological patients in speech training, an interactive, intuitive, user adaptive game for speech training is combined with existing advanced speech technology.
Essentials / Prerequisites	Working in multidisciplinary teams and brainstorming with other project members having different backgrounds can help to see how technology can be used in new ways to design social applications and practices.
	The design team members all have specific areas of knowledge, but they share broad interests. By being open to new developments, the team absorbs external knowledge, finds new questions, and shares new, outside knowledge within the team. Attitude is crucial: the desire to learn, the will to explore your own boundaries, to listen to your intuition, and to deal creatively with new knowledge.
Partners / Stakeholders	The research has been done in close collaboration with experts in the field of linguistics, speech trainers, developers, researchers and designers from the Radboud University Nijmegen and St Maartenskliniek (rehabilitation).
Target Audience	User research has been carried out to identify the home setting in which Parkinson patients are training their speech. Several paper prototypes and tablet-applications were tested with the target group to identify their needs. This knowledge is of interest to a wide

audience, interested in applied gaming and health and care.

Involvement of Users

The design follows an iterative process, executed in a multidisciplinary team. Co-creation sessions have been held, which included the users, so that concepts could be developed based on their input. The users are involved from the beginning in the co-creation process.

Methodology and lessons learned

Context research has been conducted as part of CHASING.

The input for this research consists of the needs experienced in society and selected individuals; and the ideas, inventions and ways of thinking that comes from free experiments. The user experience plays an important role here: how does a person feel about using the game compared to traditional speech training?

The context research is followed by transition research in order to facilitate change within rehabilitation practices. As soon as relevant (academic) institutes outline the specific effects of novel tools or processes, a different debate is facilitated, helping organisations take on new positions or new roles.

Involving users early and continuously in the design process and involving the same users throughout the design and development process, helps developers to build a strong relationship and intimate connection with those exemplary users. During the design process, the number of users involved increases. Starting from a dialogue with a few users to refine the research question, concepts are developed then and evaluated with a select number of users in an iterative process. When validating real-life implementation, the population becomes considerably larger.

When users and designers work together in accordance with this design philosophy, both take on multiple roles throughout the design process. The designer starts out as a collector, taking information and insight from the environment of the user, the inspirer, and creating an understanding of and empathy for their life and life stories. In the next phase, the designer and the user both take on the roles of maker and expert, materialising ideas, making and exploring early solutions, and conducting technical iterations. The user is the expert on his or her own life and experience, and the designer is the trained disruptive force. Both their signatures are valuable in the process.

The user is triggered by the designer's ideas, and feeds the designer with more suggestions and feedback on the usability and experience of the prototype. Next, the user becomes the integrator and introduces the prototype into their own environment, defining new strategies and routines around the novel application, taking it into their own realm. The designer takes on the role of interpreter, using these new insights to evaluate and enhance the prototype still further.

Anecdote and/or impact

For CHASING, we asked a group of independent advisors to give feedback in different stages of the project. The advisor on applied gaming was involved in a co-creation session in the concept development phase. The choice was to either develop a single player game (which is easier in a way) or a multi-player games.

His advice was very straightforward. A game – if it is a game for entertainment or an applied game – should be fun in the first place.

"If it is more fun for the users to play it with others, you should follow that path even though it does involve a more complicated process."

The measurement of the impact of the applied game takes a longer period of time since we would like to conduct research on:

• Are people more motivated to play the game to train their speech instead of the traditional ways?

• Is the applied game more efficient than the traditional ones?

To measure impact we will follow the users for a longer period of time.

Instructions for implementation

Care organisations, rehabilitation centres and speech therapists are included in the different steps of the co-creation process. To increase the chance of becoming implemented, we need to develop and design with the users and not for the users.

Principles for implementation:

• Multidisciplinary approach;

• Living Lab-methodology[17];

• Develop business case early in the process.

Visit the environments where the applied game will be used, and observe how potential users are handling their condition.

Experiment and further research

The game principles will be tested with the primary target group (Parkinson patients) but also with the secondary target group of CVA-patients (people who have had a stroke). Further research is also needed on motivational aspects (how to motivate patients to start gaming and to keep on gaming to train speech) of the game, and personalisation (what type of people want to play what type of games?) of the games.

Links

waag.org/chasing
ru.nl/clst/
hstrik.ruhosting.nl/chasing/

PhDO

Photo: Jennifer Kanary

**Example images from
'Labyrinth psychotica'**

PhDO.

**Example from
'Trust me, I'm a robot'**

Moral concerns about
ethical caredroids

Margo van Kemenade

Title	PhDO – a network of practitioners linking science, art & design
Short description	PhDO[18] consists of a series of well-curated networking events, attracting practitioners and students in the creative sector and people working in (academic) research and development. The network aims to develop and stimulate a realistic understanding of the process of preparation, application, design and implementation of practice-based (academic) research, by, with and for the creative sector. It is also a platform for presenting unconventional research outcomes, research positions and fellowships to a relevant and highly motivated audience.

Fact sheet

Purpose of the module	Many creators, designers, artists and decision makers in the creative sector feel the desire to add in-depth knowledge and tools to their professional experience. Linking practical, hands-on knowledge to scientific research will improve the quality and impact of creative work. However, there are many hurdles between this desire and it's actual implementation. PhDO addresses these and connects creative people with research ambitions with people who are actually doing it, or have done so before.
Case circumstances & problem	Meaningful innovation in arts and design needs people who deeply reflect on their practices. At the same time, innovation in science needs the involvement of artists and designers to come up with entirely novel ideas and ways of seeing. Therefore, the links between the practice and work of designers and artists and that of formal, academic research needs to be bridged in terms that both worlds understand.
	In the academic world, the way to go about this is obtaining a formal PhD, which is becoming increasingly interesting for professionals in the creative sector. At the same time, in the Netherlands there are but a few successful examples. In general, little is known about how to do a design or arts based PhD in practice, which currently prevents potentially successful candidates from starting a design or arts based PhD.
	PhDO aims to stimulate research in and on the creative sector, and enable motivated individuals in design and art to substantially deepen their knowledge. The programme does this by inviting practitioners to share their research practice with a knowledgeable audience. In the slipstream of this, PhDO aspires to be a matchmaker between individuals, institutes and research positions.
Essentials / Prerequisites	Essentials include a well-established network, an easy way to reach them, and careful curating a mix of inspiring and complementary speakers as well as participants. Furthermore, careful moderation of the sessions is important, for it will set the scene in which fruitful dialogues and discussions can unfold.
Partners	PhDO has been organised by Waag Society in conjunction with the Dutch conceptual artist Arne Hendriks, and co-funded by the Dutch Research Council NWO, Innovation Platform IIP Create and the Fund for the Creative Industries.
Target audience	We aimed for a combination of young artists, scientist and designers, 15 – 40 for each event. Over the course of ten editions, we had a total audience of about 300 visitors, from different fields and walks of life.
Involvement of users	Participants, that were sourced from the combined networks of the organisers and the co-founders, proved to be very active in commenting, questioning, and clarifying positions. Many of them

were recurring participants, regardless of the theme.

Methodology and lessons learned

To create a large, influential network, you need to attract a rather large group of people that are intrinsically motivated to convene, present, share and discuss. By providing good content, room for thought, and a welcoming setting you can achieve this.

The sessions took place in bimonthly series.

It is wise to bring in a community manager.

Anecdote and/or impact

Waag Society has organised ten editions in a period of two and a half years, on topics as wide as social media, co-design, biotech, robotics, art versus design, health care and citizen science.

The sessions included contributions from artist / researcher Jennifer Kanary, Tjeerd Hoek (Frog Design); bio-artist and researcher Rich Pell, professor Jan Simons (UvA / Embedded Researchers), Clare Brass (Royal College of Art, UK), Elske Gerritsen (NWO Humanities), Piem Wirtz (V2_) and artist Špela Petric (Slovakia) – and many more.

Based on their work and approach, talks we conducted about the necessity, history, present and future of these types of research.

Waag Society had the luxury to involve an artist from Waag Society, Christine van den Horn, in the choreography of the space. She carefully crafted the way people were sitting, what was on their tables, how the lighting was done, to set a mood conducive to new encounters between people, and in thoughts. This is part of the success, when you do something new.

PhDO has helped to:

• Motivate and help artists and designers to pursue a (part-time) research career.

• Provide researchers with stimulating discussions and new thoughts.

• Raise awareness to the research funders that there should be more opportunities to combine arts, design and research practice.

• Forge lasting links between people who have never met before.

• Get free publicity for the partners behind the programme.

Instructions for implementation

You need:

• Around 15-30 participants;

• Two hours with drinks;

• Informal setting; end of the day, end of the week;

• No more than once every two months.

Steps

Introduction and welcome, reminding the participants of the purpose and creating an open, interactive, safe atmosphere.

2-3 cases, that combine the perspectives of an artist/designer plus an academic researcher. For example: have PhD candidates together with their promoter. The can put each other's stories into context. Have them talk openly about the approach, the questions and the lessons learned, more than the outcomes.

General discussion, involving the speakers and participants and help them to get to know each other.

Call for ideas & speakers for next event.

Experiment, suggestions & Further research

You could make the PhDO sessions a podium for the network participants, without additional curating.

You could experiment with:

- Having participants actually make new artifacts together, instead of 'just' talking – possible making use of Fablab and Wetlab facilities.
- Favour dialogue over presentations more.
- Setup formal / structural collaboration with universities and art schools.
- Engage in community management between the session, to keep the network active, provide incentives for participating, and help it grow in new directions.
- Strengthen the matchmaking between practitioners and research positions.

Links

Project site: waag.org/en/phdo

Example edition: waag.org/en/blog/phdo-7-theo-s-trip

Waag Society organiser: waag.org/en/kresin

Co-organiser Arne Hendriks: arnehendriks.net

Very active participant, artist/scientist/role model: labyrinthpsychotica.org

About VETLICAT

A European consortium of cultural organizations, gathered in the VETLICAT project and coordinated by CIANT in Prague, asked Waag Society to describe and transfer the working practices of its Academy model.

VETLICAT (Vocational Education and Training - Linking Creativity and Advanced Technology) addresses creative industry professionals, both vocational and educational training (VET) providers and consumers such as artists, designers, and creative sector decision makers. The project addresses the problem that existing VET scenarios do not blend effectively creativity with advanced technologies.

The main project objective is to improve this situation by offering our participants the possibility to educate themselves. The VETLICAT project supports attendees to improve their methodological knowledge and skills, and facilitates them to meet significant peers and professionals and familiarises them with contemporary trends in linking art and new technologies. It is our primary aim to increase competences and skills of creative sector professionals.

The main objective of the project is to work together in order to transfer and adopt elements of Waag Society's Academy model. The consortium is composed of VET providers, creative sector operators and SMEs with compatible training experience as well as innovation needs. The specific objectives will be to transfer, localise, and pilot-test selected training modules and learning tools.

vetlicat.net

About
Waag Society

waag society

Waag Society is an institute for Art, Science and Technology, based in Amsterdam, the Netherlands. The organization develops creative technology for social innovation. Waag Society is one of the oldest and largest independent Media Labs in Europe and is linked, both local, national and international to a large network of people and organizations in the scientific and artistic community.

Founded in 1994, Waag Society has its roots in the Digital City (1994): the first online Internet community in the Netherlands, which aimed to make the Internet available for the public. Nowadays the Internet is all around us; hence, the organization focuses on new technologies and innovations in gaming, participation and distributed cooperation.

It uses the method of Creative Research. Creative Research is experimental, interdisciplinary research. Artists, creatives, and end users have a central position and a large influence on the final result: Users as Designers. The classic approach of science and the standard model of research and development is enhanced by this method that cross-links arts, culture, and science. Creative Research creates applications suited to the needs and possibilities of users and is related to participatory design, rapid prototyping, practice-based research and tinkering.

In close co-operation with end-users Waag Society develops technology that enables people to express themselves, connect, reflect, and share. Next to this the institute hosts events in its historic location De Waag in the medieval centre of Amsterdam and plays an important role in debates on technology and related issues like trust, privacy, and intellectual property rights.

Important aspects in Waag Society's practice are:

- Focussing on real questions of real people
- Letting users, designers, artists, innovators and communities co-create knowledge and solutions
- Using prototyping as a new form of creative dialogue
- Mixing the digital and the physical worlds
- Democratising technological tools, and lowering the threshold to get to these tools
- Developing new technological applications for innovation – to foster social connectedness, to enhance and enrich learning etc.

With its long standing, international experience in community building and managing innovative and avant-garde projects Waag Society has developed several ground breaking prototypes and applications in (inter)national projects and programs. It houses six thematic areas: Creative Care Lab, Creative Learning Lab, Future Internet Lab, Open Design Lab, Future Heritage Lab, Open Wetlab. Its projects have won numerous prizes for their visionary perception of the technological needs in society.

waag.org

Notes

1   waag.org/en/labs/academy

2   digitalsocial.eu/

3   waag.org/en/blog/design-rules-smarter-cities

4   waag.org/en/blog/manifesto-smart-citizens

5   Cohendet, P., Grandadam, D., & Simon, L. (2010). The Anatomy of the Creative City. Industry and Innovation, 17(1), 91-111

6   waag.org/en/project/users-designers

7   en.wikipedia.org/wiki/Co-creation

8   waag.org/sites/waag/files/public/Publicaties/Users_as_Designers.pdf

9   waag.org/en/project/fabschool

10   en.wikipedia.org/wiki/Design_thinking

11   waag.org/en/news/petition-put-making-back-education

12   waag.org/en/news/fabschool-publication

13   waag.org/en/project/botanical-gardens

14   waag.org/en/project/future-art-science-collaborations

15   bradleypitts.net/projects/eio/

16   vimeo.com/channels/fascvideo

17   waag.org/en/project/amsterdam-living-lab

18   waag.org/en/project/phdo

Colophon

waag academy

By way of Waag Academy, Waag Society offers curricula for multiple levels of professional education. The formats and content are based on our experience in (digital) social innovation and are customised to specific contexts and questions. The most important aspect in the Waag Academy programme is the fact that creative professionals are actively challenged in 'hands-on' master classes, workshops and trainings.

The Waag Academy programmes have been developed with partners in education, the cultural and creative sector, business and science. They are aimed at social innovators: creative, original thinkers who are able to make connections between disciplines and build networks that offer space for knowledge innovation and new ways of working.