



Science Shops – creating mutual benefits from public engagement for universities and society

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22 September 2024



Science Shop at FSE's Science Center *Science LinX*



MSc Science Education and Communication



ENL[▲]IGHT ENLIGHT RISE

Research & Innovation agenda with and for SociEty

This session

From *Science Communication and Outreach*
To *Public Engagement*
To *Open Science*:

From *Citizen Science*
and *Service Learning*
To *Science Shops*

Examples *Engaged Research and Learning*

How to...

Q&A

Higher Education Act

- › Missions of the University
 - Education
 - Research
 - Social services (outreach)

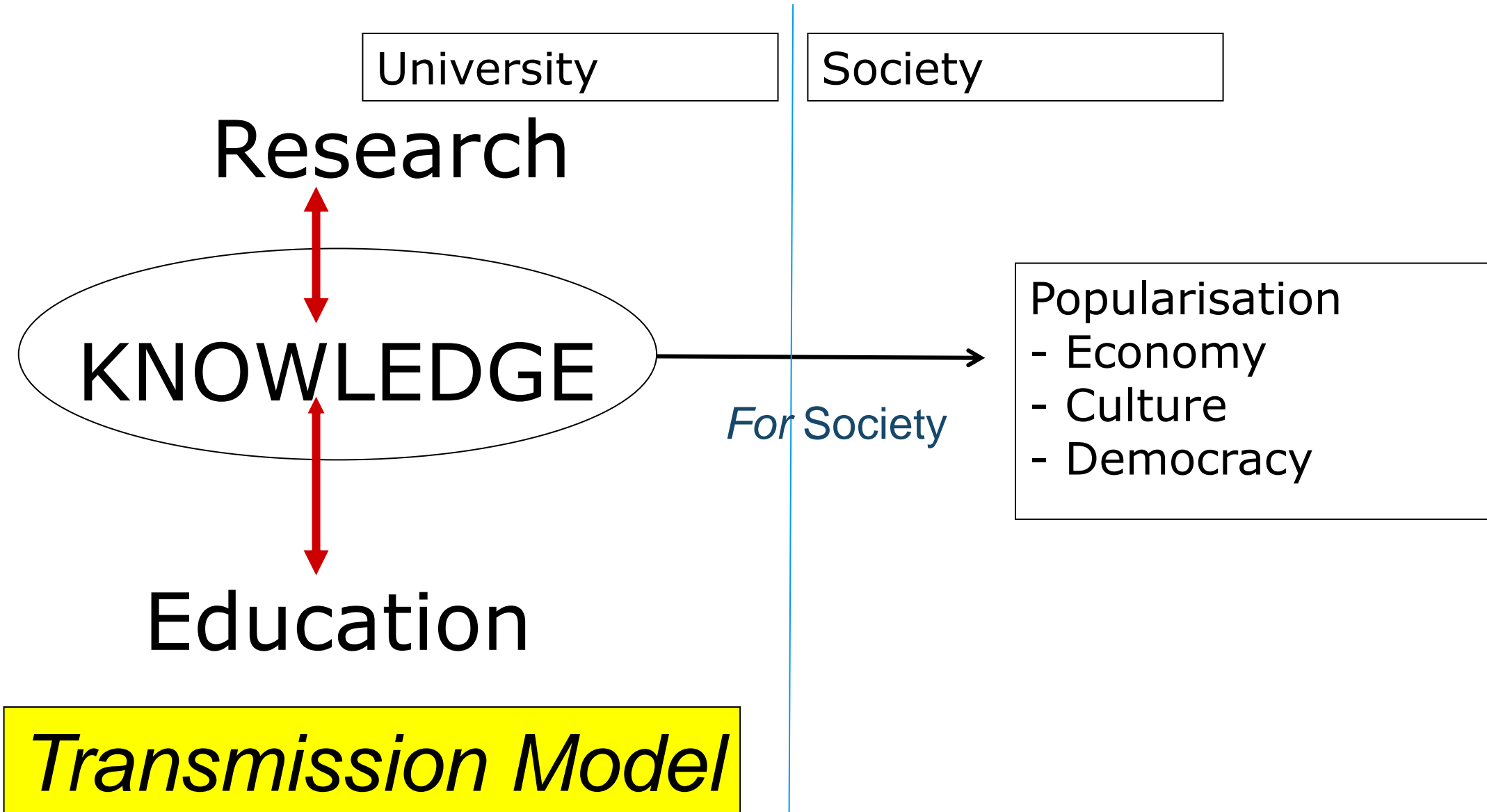
- › *Universities are responsible for providing scientific **education** and conducting scientific **research**. In any case, they provide initial training, conduct scientific research, provide training for scientific researcher or technological designer and **transfer knowledge for the benefit of society** (Dutch Higher Education Act, Art 1.3.1, 1992).*

Universal Declaration of Human Rights

Article 27 (1)

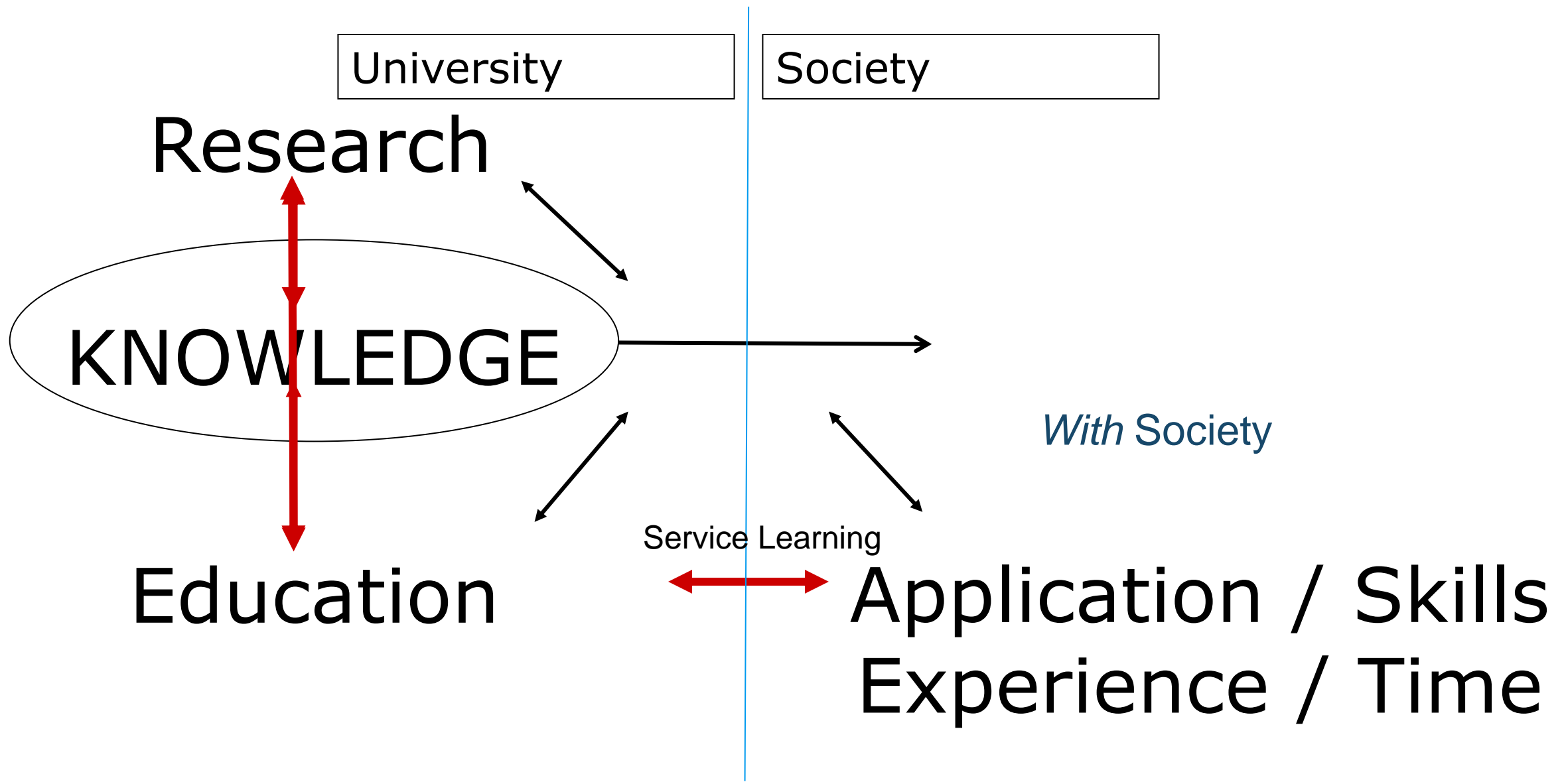
Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and ***to share in scientific advancement and its benefits***



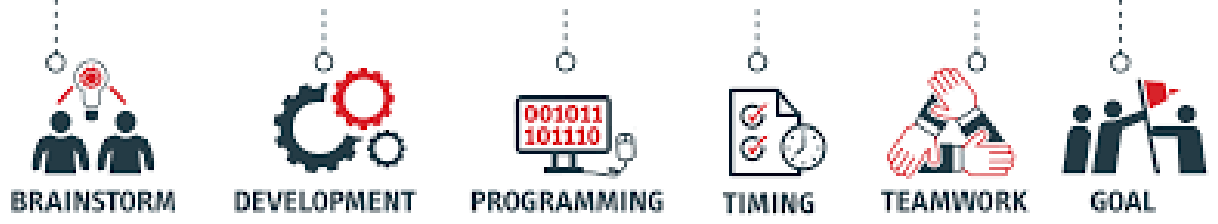


Traditional Science Communication & Outreach

- Websites / Podcasts / YouTube / Social Media
- Studium Generale / Science Cafés
- Researchers Night / Weekend of Science / Events / Public Lectures
- University Museum / University Cultural Center
- Science Center: Science LinX
 - Discovery Truck / Outreach / Events / Expositions / Star Observatory*
- High School Students' Support / Children's University / Science Knot



HACKATHON



SAVE THE DATE!
**AIHACK
 COVID**
 24 - 27 JUNE 2021
 - FREE -

Do you have what it takes to solve this **AI/Medical** challenge?

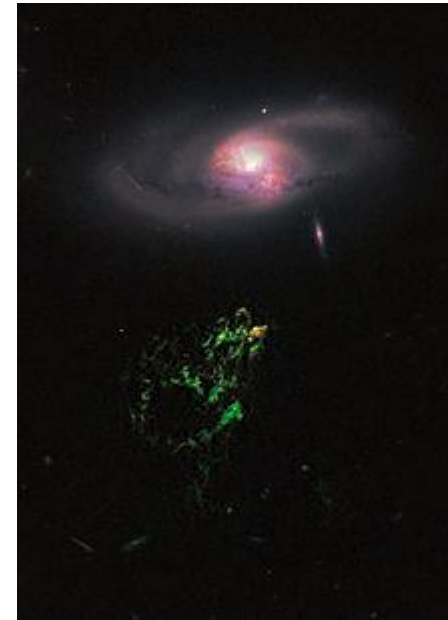


Scan & join our mailing list for updates!
aihackcovid@gmail.com



“Citizen Science”

- > Data Supply and Analysis
 - Bird counting
 - Galaxy Zoo
- > Experimental data collection
 - Particulate matter measurement (iSpex)
- > Games
 - Eyewire (Mapping the Brain)
 - FoldIt (3D protein structures)



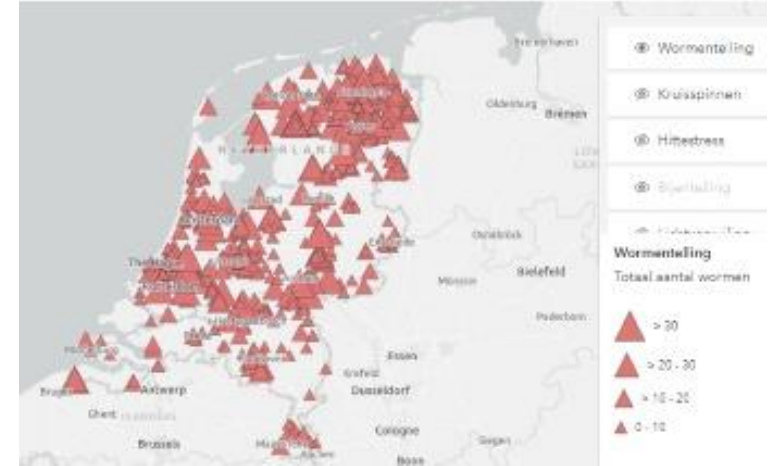
<https://www.zooniverse.org/>

“Citizen Science @ FSE-RUG”



CurioUs ?
BURGERWETENSCHAP VOOR NIEUWSGIERIGE NOORDERLINGEN

- Create sustainable campus
- Make healthy diet more attractive for young adults



> CurioUs

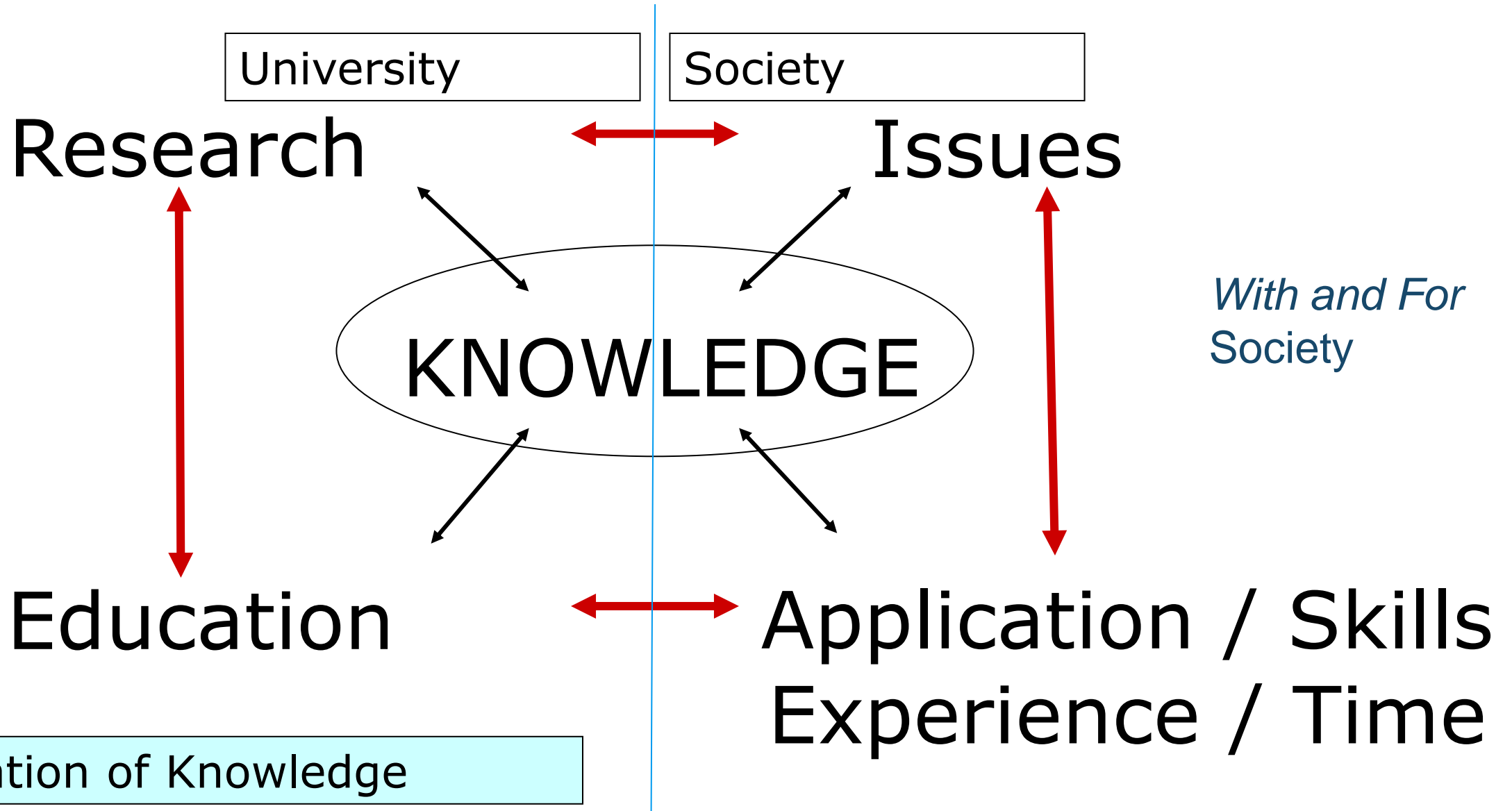
- Data gathering
 - Air Quality
 - Worms / Bees / Garden Spiders
 - Rain / Nitrogen
- Meet-O-Theek
 - Equipment Lending





“Citizen Science”

- › Citizens contribute to scientific knowledge (*in another role than respondent or test subject*)
 - Common Skills, Specific Skills, Knowledge
 - Enjoyment, Interest, Self-esteem
 - For ‘Science’ as such: Public Awareness, Learning
 - For Researchers: Data for Science
- › DIY: Health hacking
- › Projects started from CSOs with invoked support from research institutes



Public Engagement (NCCPE-UK)

"Public engagement describes the myriad of ways in which the activity and benefits of higher education and research can be shared with the public.

*Engagement is by definition a **two-way process**, involving interaction and listening, with the goal of generating mutual benefit."*

Public Engagement

- Democratic Reasons:
 - Impact of research on every day life
 - Public funding
- Instrumental Reasons:
 - Better solutions to grand challenges
 - More public awareness, trust



HORIZON 2020

Responsible Research and Innovation (RRI)

“generate innovation that reflects societal views & needs”



Open Science



Science Shop

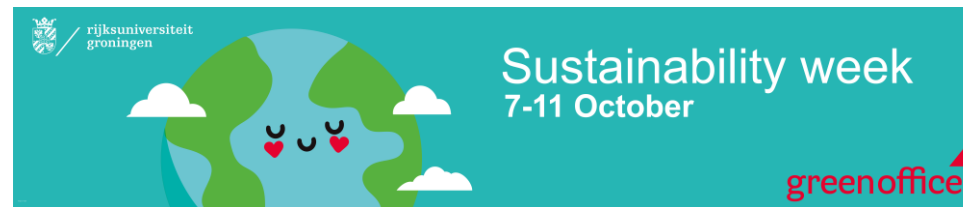
- › A Science Shop provides independent & participatory research support in response to concerns expressed by civil society
- › Research *for*: civil society organizations (CSOs), citizen groups, non-profit organisations
- › Research *by*: students (course credits) under staff supervision
- › Free/low cost (coordination paid by university)
- › Dialogue; interactive Science Communication

University of Groningen

5 Science Shops (since 1979)

- Medicine and Public Health
- Languages, Culture, Communication
- Didactic and Educational Sciences
- Science and Engineering
- Philosophy

+ Green Office



Neighbourhood Efforts Students and Young People (~WISE)
Hanze University of Applied Sciences and Municipality of Groningen + 2 vocational schools + WIJ (Social Work Groningen) + RUG

2023	Questions	Answers	Students
Health	54	45	14
Science & Engineering*	32	27	66
Education Studies*	19	13	16
Language, Culture, Communication	43	30	164
Philosophy	21	18	68
Green Office	21	21	46
TOTAL	190	154	374**

* 2022

** 374/7000 students in a year = 5.3%

Groningen Science Shops

- Algorithms and News Room
- Archeology Monastery Thesinge
- “Landlady 2.0”
- “Pearl-plan” Village Schools

DAGBLAD VAN
NOORDEN HET



Ben Feringa Impact Award 2022

- › ‘Cultural Engagement of Young Adults in Het Hogeland’
(Science Shop Fac. Arts)
- › Municipality of Het Hogeland
- › *The jury was impressed by the practical impact of the project, including the mind shift that the research triggered in the organizations involved and the newly established Cultural Youth Network.*

Science Shop Groningen

- > City of Assen: Street Lighting in Natural Area:
 - Social Safety
 - Energy saving
 - Does not disturb nature
- > Ecology Department + Student
- > NGO “Bats Working Group”
- > BügelHajema Environmental Consultancy Firm

- > Green coloured LED lights
- > GREEN LIGHT FOR BATS!
- > Follow-ups: More colours, more intensities, more animals & LCA studies of street lights



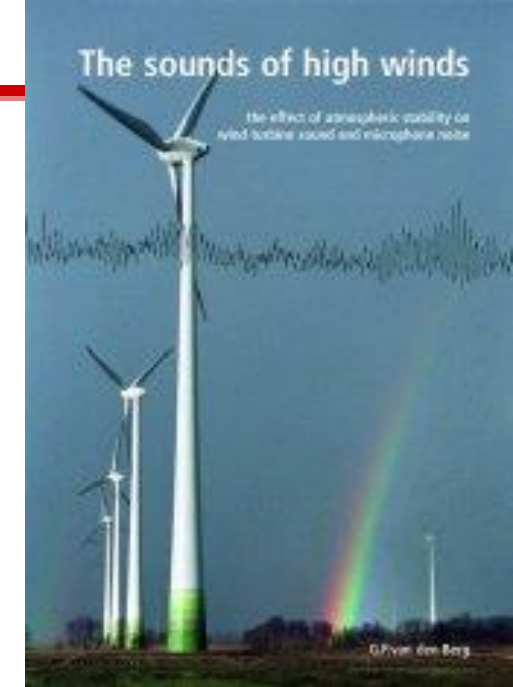
Examples Groningen

Science Shop / Physics

- *Residents:*
Wind Turbines → Noise at night
→ PhD

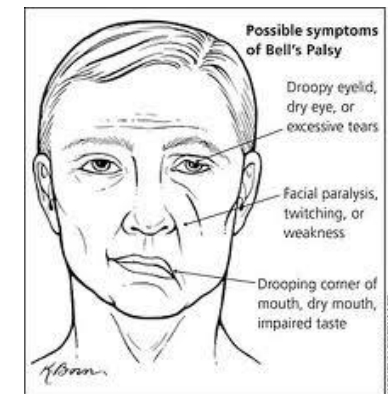


$$L_W = L_{eq} - 6 + 10 \cdot \log(4\pi \cdot R^2 / A_0)$$

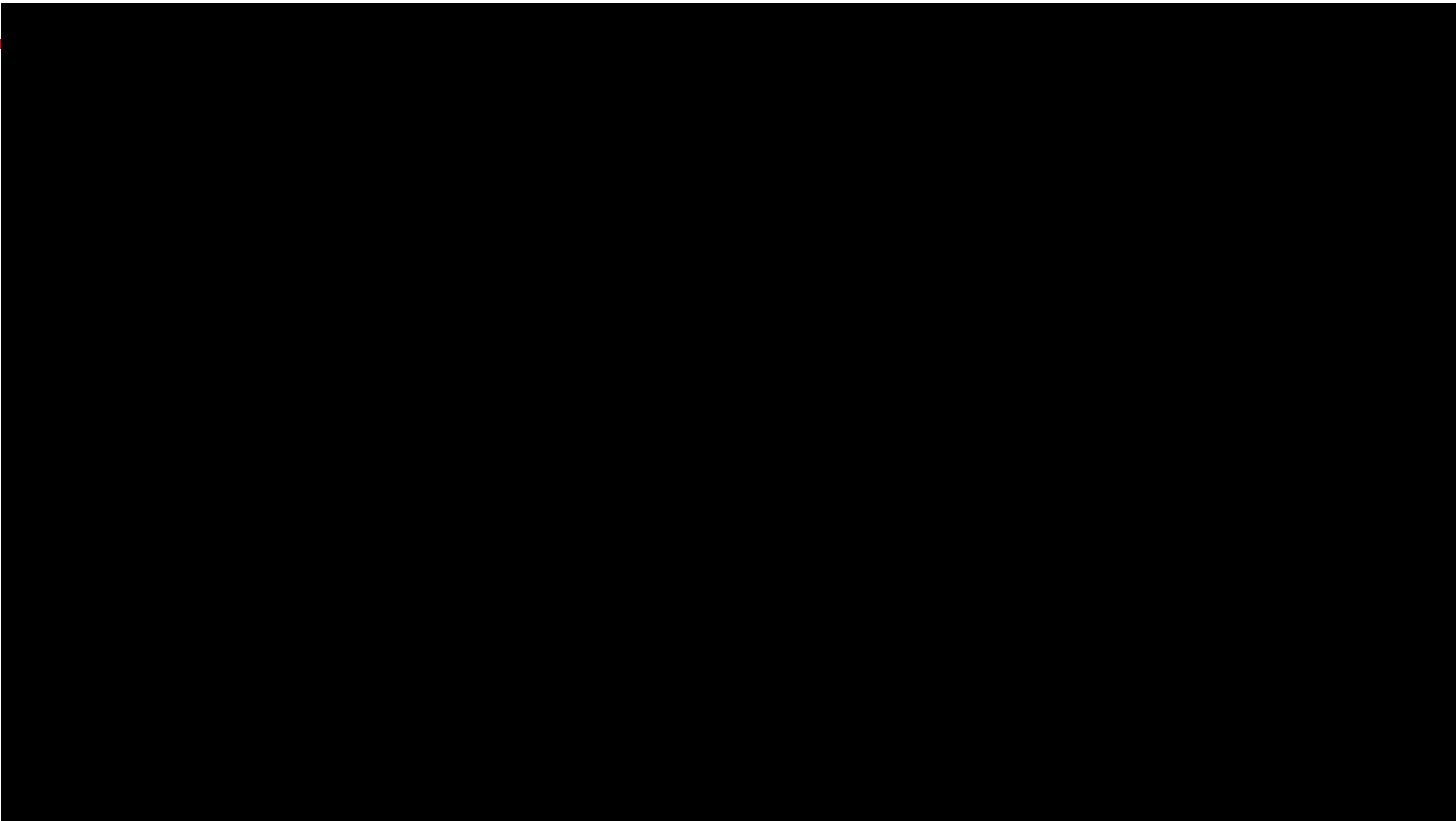


Health Projects Examples

- › Living with facial paralysis (Patients, RUG)
- › Living with Inflammatory Bowel Disease (Patients, RUG)
- › Care for families with children with Down syndrome (Parents, ULeiden)
- › Position of Lay carers and stroke (Lay Carers Organisation, QUB)
- › Mental health needs of immigrants (Immigrants Organisation, DCU)



- › Blood loss measuring during bath birth



Women's Enterprising Breakthrough



...is making changes



The Basement
Night Drop-In
Shelter

Picton Neighbourhood Resource Centre



Queen's University
Belfast

Daisy's Café



Poverty

University of Tilburg

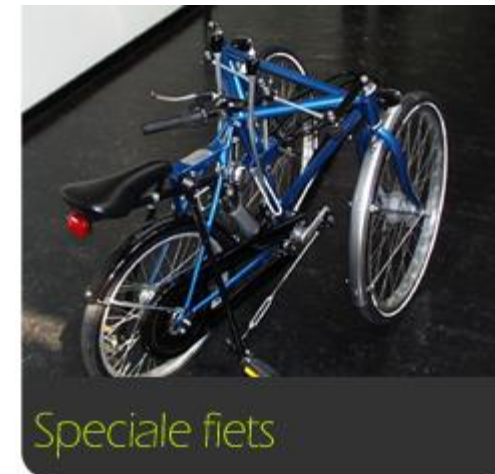
- > MA project
 - Position of patients in mental health care: consequences of having to repeat their stories to new psychs (Patients Association).
- > PhD projects:
 - Young veterans and sense of guilt (Association of Veterans)

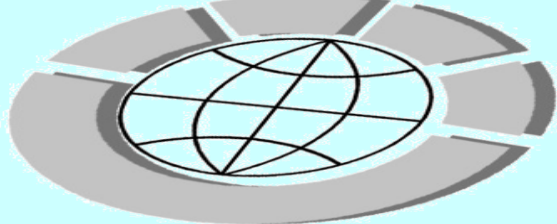


TU Eindhoven

Design Research (Large & Small)

- > Architecture playground cantina
- > Pavement sensor
- > Special bike (hip powered)





Living Knowledge

The International Science Shop Network



*Science Shop – Wetenschapswinkel – Boutique de Science – Epyllion
 Videnskabsbutikken – Wissenschaftsladen – BioSense – IntHum
 Bazar de las Ciencias – Intermediu – Interchange – CUPP Helpdesk
 Community Knowledge Exchange – Research Shop – Echop a sciences
 Forskningstorg – Knowledge Co-Op – Community Based Research Center
 Community Academic Research Links – Students Learning with Communities
 Teadusturg – CURL – ShopFront – Office of Community Based Research
 - Научная лавка – Accès Savoirs - Sportello della Scienza*

上海大学生科学商店

- 1970s Netherlands (USA, Canada)
- 1980s Australia, Denmark, England, Northern Ireland, Germany, Austria, France, Belgium
- 1990s Canada, Spain, Romania, New Zealand, Malaysia, Czech Republic, South Korea, South Africa
- 2000s Belgium, France, South Korea, Portugal, Japan, Ireland, Hungary,
China, Italy, South Africa, Latvia, Turkey
- 2010s Cyprus, Israel, Norway, Lithuania, Belarus, Tunisia, Poland, Scotland, Finland,
Haiti, Benin, Senegal, Burkina Faso, Cameroun, Ivory Coast, Niger, Togo,
Burundi, Guinea, DR Congo, Estonia, Greece, Wales



Impact

- > CSOs: empowered in their work and actions for the wellbeing of citizens
 - > Students: motivation, skills, social awareness
 - > Staff: data, networks, new angles, outreach
 - > University: PR, education, social responsibility
 - > Policy makers: more data to base decisions on
-
- > Efficient: *add-in*, combines 3 missions university
 - > Limitations: timing, funding, rewards

How to....

Process



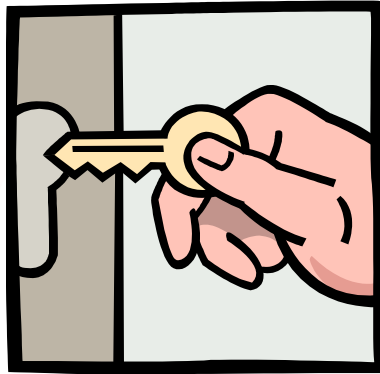
- 1 Receive/solicit clients/partners and (new) questions
- 2 Map the problem (articulation)
- 3 Preliminary research: Refuse, Refer, Advice or Formulate (scientific) research question (Incl. funds if required)
- 4 Find a (co-) supervisor
- 5 Find a student or researcher
- 6 Maintain communication and process
- 7 Facilitate useable presentation/publication of results
- 8 Help client implement results and formulate follow up actions
- 9 Make inventory of follow-up research/themes
- 10 Evaluation



2. Map the real problem

❖ Intake

❖ Problem analyses



- *cause-effect*

- *problem enlarging / mitigating factors*

❖ Objectivity (tone of voice)

❖ Test Underlying Assumptions (eg chelates and MS)

❖ Research needed / of use?

❖ Stakeholders analyses

Mapping the Real Problem

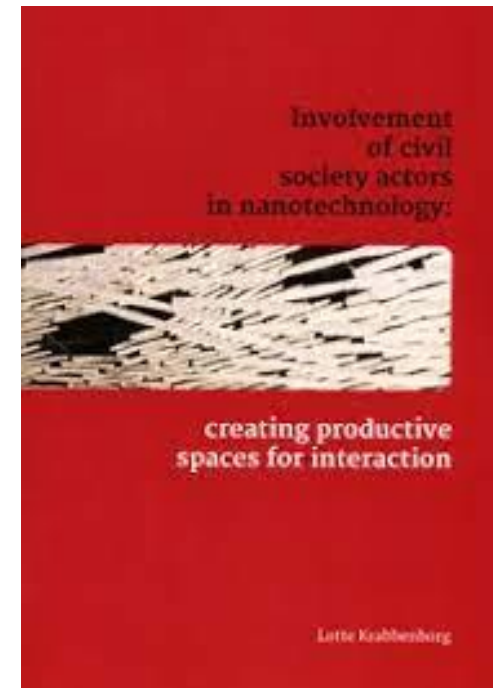
An organisation of disabled people who still live on their own calls you: “The nurses who have to help us get out of our beds are coming later all the time in the morning. Can you help us?”

→ Articulate the real problem by simulating asking questions in this phone conversation. Make a list of possible answers that you could get, and for each different ‘real problem’ write down which discipline would you ask to do research (if the answer (or real problem) is then I would turn to discipline with the goal to by answering the research question through the method of)

Look for question behind the question

- Question: Nanotechnology ??!
- (Monitoring Network Environment and Health)
- Role NGOs in nano-dialogue (PhD)

nano  ned



Accepted Research Projects

- › Research must be achievable
- › Methods must be clear
- › Research must be ethical
- › Clear access to participants
- › Organisation willing to support student
- › Student and Science Shop to be recognised when report is used

3. Formulate a (scientific) research question

❖ Preliminary research

- *literature, databases, web, contacts*
- *refuse, refer, short advice*



❖ Draft Research Plan

- *research question*
- *required expertise*
- *time frame*

4. Find a (co-) supervisor



❖ Search expertise

- ***NARCIS = Dutch research database***
- ***university guides;***
- ***science shop advisory board; etc.***

❖ Make project attractive

- ***case + theory;***
- ***funding;***
- ***contacts;***
- ***lower workload staff***

5. Find a student or researcher

- ❖ Advertisements, web, teacher, contacts, thesis-market, speed date

- ❖ Science Shop Advisory Board

Choices:

- ❖ Student: credit-points; “outside-the-box” thinking, eye openers

- ❖ Sometimes Paid Researcher needed

- ❖ Criteria: Available Funds, quality, time-pressure

- ❖ Client: participation?

Projects in curriculum

- ❖ In existing (or new) courses / practical periods
 - ❖ First year physics practical (Gron.)
 - ❖ “Communication & Presentation” (Gron.)
 - ❖ “Science & Society” (Bacau)
- ❖ Novel optional “course”
 - ❖ “Science shop project” (Gron.)
- ❖ As B / M thesis (General)
- ❖ As PhD thesis
- ❖ Skills Portfolio
- ❖ Honours Programs



Skills for Students



- 1 Project planning
- 2 Writing
- 3 Social competences
- 4 Social and Political Awareness
- 5 Apply/develop knowledge in context
- 6 Learning by doing

→ **Challenge-based learning**



Dublin Descriptors

Cycle

1 (B)

2 (M)

3 (PhD)

Knowledge and understanding:

supported by advanced text books

basis for originality in developing or applying ideas often in a research* context

systematic understanding of their field of study and mastery of the methods of research*

Applying knowledge and understanding:

1 (B)

2 (M)

3 (PhD)

devising and sustaining arguments

problem solving abilities [applied] in new or unfamiliar environments within broader (or multidisciplinary) contexts

ability to conceive, design, implement and adapt a substantial process of research* scholarly

Making judgements:

1 (B)

2 (M)

3 (PhD)

gathering and interpreting relevant data

the ability to integrate knowledge and handle complexity, formulate judgements with incomplete data

capable of critical analysis, evaluation and synthesis of new and complex ideas

Communication

1 (B)

2 (M)

3 (PhD)

[of] information, ideas, problems and solutions

[of] their conclusions and the underpinning knowledge and rationale (restricted scope) to specialist and non-specialist audiences (monologue)

with their peers, the larger scholarly community and with society in general (dialogue) about their areas of expertise (broad scope)

Learning skills

1 (B)

2 (M)

3 (PfD)

have developed those skills needed to study further with a high level of autonomy

study in a manner that may be largely self-directed or autonomous

able to promote, within academic and professional contexts, technological, social or cultural advancement

Student Projects

- > Experience Interchange Liverpool
- > Deliver:
 - Report for client (product)
 - Reflective report for university
 - How the research was done
 - The student's learning experience
- > Remember (General):
 - Fit assignment & supervision to student's level !
 - Students need safe learning environment !



How to find suitable courses?

Course Catalogue: Project / Practical /
 Problem-based / Internship / Communication / Skills
 / Ethics / Multidisciplinary / Case / Interdisciplinary /
 Transdisciplinary / Applied / Research / Thesis /
 Colloquium / Participatory / Community / Social /
 Society / Public / Optional / Voluntary / Student
 selected / Environment / Sustainability / Energy /
 Health / ... and any other field you need supply in

❖ **Approach Coordinators: Options/Criteria,
 Deadlines (first ideas, full proposals; start;
 finish)**



Make project fit



❖ Split

❖ *Disciplines (Chemistry, Medicin, Communication; Economics)*

❖ *Multi-disciplinary teams*

Q: How about a local energy plan for your city?
(eg household energy use, traffic, recycling)

Households Energy Use

Program	Department	Stud	Year	Reason
DoMUS	Environmental quality control	3	last	Diploma Project
DoMUS	Installation Eng.	1	last	Volunteer
ASE 2.1	Environmental quality control	15	last	Practical Placement
ASE 2.1	Automotive Eng	2	last	Master Program
ASE 2.1	Civil Eng.	2	last	Diploma Project

Sustainable Cities and Traffic

Program	Department	Stud	Year	Reason
ToolSust*	Sociology	2	first	Volunteer
ToolSust*	Physics/ Chemistry	1	last	Volunteer
OmniTrans*	Automotive Eng.	1	Ph.D.	Professional Interest

* More students, or volunteers from outside the university, may work on the project in the near future.

Make project fit



Split



❖ *Disciplines (Chemistry, Medicine, Communication; Economics)*

❖ *Multi-disciplinary teams → multi-disciplinary course units (Academic Consultancy – Wageningen; Minor Future Planet Innovation Groningen, ...)*



Enlarge

❖ **Case + theory (thesis)**



Timing

❖ **Fit client's scheme & students availability**

6. Maintain communication and process

- › Expectation Management!!!
- › Students are allowed to make mistakes
- › Students need safe learning environment



7. Facilitate useable presentation/ publication of results

❖ Advisory Letter

❖ Report

- Student extra reward for editing
- Editing by science shop

❖ Press release

❖ Articles

- Popular
- Scientific

❖ Other output



8. Help client implement results/formulate next steps

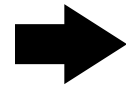
- Presentations, public hearings
- Meetings
- Pressconference
- Juridical procedures
- Contacts
- Follow up research proposals



9. Make inventory of follow-up research / themes

Science Shop for Medicines, University of Groningen

- Several small questions on medicine use in the tropics

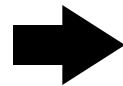


Two larger (PhD) projects

- tropical tablets
- dermatological preparations

- Many individual questions on pregnancy and medicine use

- Some student projects
- PhD thesis



Pregnancy and medicine became a structural research theme in Research Group for Farmaco-Epidemiology
















































Chemistry Shop RUG

- Green chemistry Cases  ⁵⁶ Program

10. Evaluation

- ❖ All involved
- ❖ Client:
Once again after 6 months
- ❖ Impact assessment is always difficult
- ❖ Statistics in Annual Report



	Citizen Science					
	Traditional Science	Scientific Consulting*	Contributory	Collaborative	Co-created Citizen Science	Collegial / Participatory Action Research
Question					 	
Study Design					 	 
Data Collection						
Data Analysis and Interpretation				 	 	 
Understanding results				 	 	 
Management Action / Publication				 	 	
Geographic scope of project	Variable	Narrow	Broad	Broad	Narrow	Narrow
Type of people taking action	Managers	Community Groups	Managers	Individuals	All	Community Groups
Research priority	Highest	Medium	High	High	High	Medium
Education priority	Low	Medium	High	High	High	High

*often called Science Shops

 Public  Project owner

Mariya Gabriel (then) EU Commissioner Innovation and Research, Culture, Education and Youth



Public Engagement in Conclusion

- › Engagement can happen with various intensities
- › Engagement can be done throughout the research process:
From setting research question, through collecting and interpreting data,
to joint implementation of outcomes (action research)
- › Collaboration is needed to tackle grand societal challenges and reach
sustainable development goals
- › This leads to co-production of knowledge

- › For both democratic and instrumental reasons
- › Both university (staff & students alike) and society benefit

10th Living Knowledge Conference 2024

Building and sustaining next generation engagement



Dates & Location

Conference: Wed. 26 June until Fri. 28 June, 2024.

Pre-conference: Tue. 25 June 2024

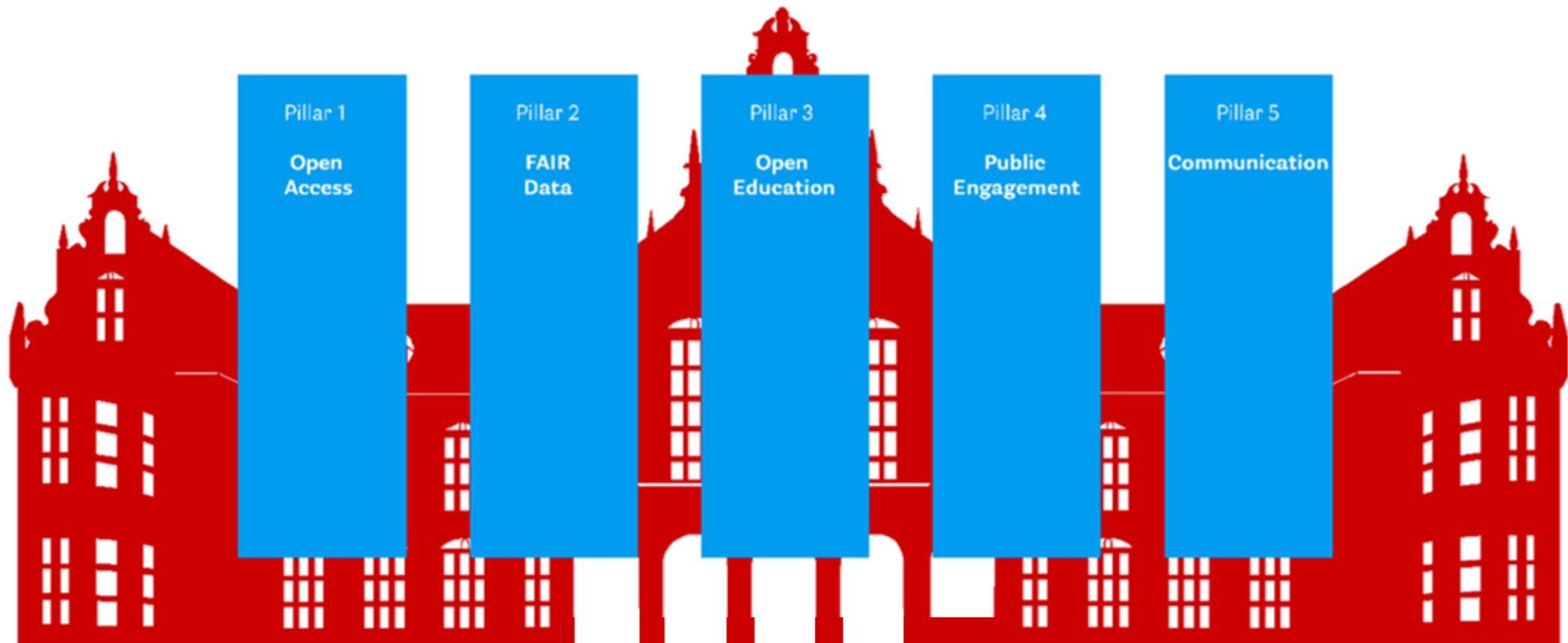
Location: Faculty of Arts, Universitat de Girona (Catalonia, Spain)

<https://livingknowledge.org/2022/10/17/10th-livingknowledge-conference-2024/>

Thank you for your attention!

Questions?

Embedding PE @ RUG: Open Science Programme



Open Science Programme: Pillar Public Engagement

PE fully aligns with University of Groningen's Strategic Plan 2021-2026 and its core values of community, connection and collaboration, as well as with its commitment to dialogue, mutuality and wider social benefit.

Actions:

- PE Community
- PE Support / Trainings
- Seed Funding Collaborative Projects

Faculty of Science and Engineering (FSE) Strategic Plan 2021-2026:

'more and more, universities are expected to have an explicit impact on society: by preparing students for their professional life, by collaborating with societal partners in research projects, and by engaging the general public in their activities'. FSE 'embraces these developments and plans to use them to its advantage'.

Actions:

- > Support for PE activities
- > Strengthen *Citizen Science*

FSE Career Paths for Tenure Track

Assistant Professor: Focus on Research (30-60%) *or* Teaching (30-60%)
Organisation (10%), Impact (pm)

Associate-Full Professor: Focus on Research *or* Teaching *or* Impact
(since 2023!)

- > Research (Min 20%)
 - > Education (Min 40%)
 - > Organisation (10%)
 - > Impact
- 30% → to divide



Effective strategist with impact

- › Leadership in executing an effective strategy leading to impact.
- › Active and growing networks
- › Show results of their influence on societal change beyond their own research field.
- › Continuity in activities and impact
- › Aim to influence change in behavior, relationships, actions and/or activities of private and public stakeholders, and/or to undertake entrepreneurial activities with the potential to have societal impact.
- › Independence and integrity, in accordance with the ethics and values of the university.

Types of Impact

Excel in at least one of these:

1. Collaboration with industrial and other societal partners
2. Entrepreneurship
3. Influencing policy making
4. Public engagement

PE – Structures and Activities – ENLIGHT

Structures for PE

- > Units organizing public engagement events
- > Organizations supporting formal and informal education
- > Museums and Science Centres
- > Science Shops
- > Multidisciplinary Schools
- > Living Labs

Activities

- > Outreach Activities
- > Online Information Services
- > Public Lectures/[Informal Dialogue Events](#)
- > Science Festivals/Exhibitions
- > [Consultancy Services](#)
- > [Hackathons etc](#)
- > [Service Learning](#)
- > [Citizen Science Projects](#)
- > [Co-creation alliances/User Committees](#)



Open Science

> **UG Policy:**

*Open Access, FAIR Data and Software, Open Education, and **Public Engagement***

> **Dutch National Policy:**

*FAIR Data, Open Access, **Citizen Science***

> **European Policy:**

- *Research integrity & reproducibility of scientific results*
- *Open Access*
- *Open Data (FAIR): European Open Science Cloud (EOSC)*
- *Altmetrics and Rewards*
- *Education and skills for Open Science*
- ***Citizen science: The general public should be able to make significant contributions and be recognised as valid European science knowledge producer***

