



VILNIUS COLLEGE
OF TECHNOLOGIES
AND DESIGN



How to run a Science Shop project



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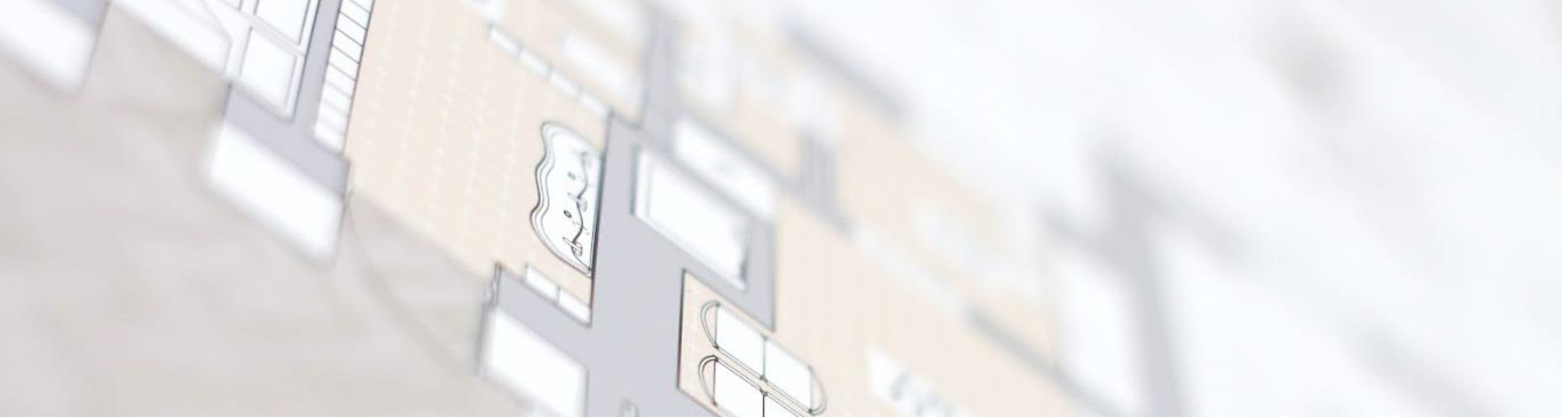
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Aim

The training material is produced to increase students' engagement and to support VTDK lecturers who would set up Science Shop projects in the frame of their course.

Competences to be developed

Training topic	Participants will gain the following competences	Target group	Type of training
How to run a Science Shop project: where do you start and how to proceed?	Transdisciplinary teaching Collaboration	Lecturers	Workshop
How to approach CSOs and collect their problems?	Action skills Situational awareness Ethical thinking Skills to anticipate futures	Students	Lecture+ Live activity
How to transform practical problems into research question?	Situational awareness Openness & Transparency Ethical thinking Skills to anticipate futures	Students	Workshop
How to transform a problem into project and develop solution?	Action skills Collaboration Situational awareness Skills to anticipate futures	Students	Workshop
How to present the results of the research/project in a visual, clear and credible manner?	Communication Openness & Transparency	Students	Workshop
How to evaluate student team	Fair and motivating evaluation of team work	Lecturers	Seminar



The Concept of a Science Shop

A definition of a Science shop is given by Gnaiger and Martin (Gnaiger, Martin, 2001): “A science shop provides independent, participatory research support in response to concerns experienced by civil society”.

The contemporary history of Science Shops in Europe was initiated by critical university staff and students in the Netherlands in the 1970s; their establishment coincided with the emergence of project-based education in universities, and was fed by an emerging environmental awareness in society. After a short experimental period, a decision was made on its final development, and within 10 years science shops had been established at all Dutch universities as a bureau of the institution, serving many scientific disciplines (Living Knowledge Network, 2019).

During the 1980s, a great dissemination movement occurred, mainly in northern and western European countries and around the world (South Africa, Malaysia, Israel, Canada, USA). Even the idea spread rather successfully, there were some cases when it did not come to life immediately. For example in France, up to sixteen science shops were created during the 1980s but these had to be discontinued very soon. The reasons for this failure were well presented in the European SCIPAS project report (Study and Conference on Improving Public Access to Science through science shops) (Mulder et al., 2001), and can be summarized in three major points: nearly half of the questions to science shops came from individuals (low social impact of research), the lack of student involvement, and a decreased amount of government funding for a growing number of shops. The common feature of these first science shops was to carry out research according to a delegation mode and not to follow a cooperative mode. The consequence was that the CSOs had low involvement in the research work (Savoia, Lefebvre, Millot, Bocquet, 2017).

There is a variety of operating models for the Science Shops, but the following stages are common in all of them:

1. Identification of society's needs (communicating directly with partners or via a website where partners can register various issues)
2. Selection of identified problems based on certain criteria, e.g.:
 - The need directly reflects the interest of society / community
 - Problems are raised by non-profit organizations
 - The results of the study must be made publicly available and contribute to solving society's problems
 - Stakeholders are not able to finance the research themselves
3. Developing the problem into a scientific question for researchers.
4. Conducting the study
5. The results of the research are usually described in two different reports - one academic, and the other one is relevant to the stakeholder



Administrative models

There are three main types of administrative models: university, non-profit organization and hybrid model, which rely on a community-based and university partnership (Savoia, Lefebvre, Millot, Bocquet, 2017). In case of non-profit organization model, the science shop is better connected to civil society with a good knowledge of social needs, but this model is harder to sustain because the financial and material support must be sought regularly (Mulder et al., 2001), but university model much more easily involves students and researchers. Nowadays the university model is the most common.

The name

Newcomers often raise the question regarding the name „Science Shop“ – where does it come from and do they need to use it? According to the Living Knowledge Network (2019), many countries use the literal translation of "Science Shop" (e.g. Wetenschapswinkel, Videnskabsbutikken, Wissenschaftsladen, Bazar de las Ciencias, Boutique des Sciences, etc). However, you can "be" a Science Shop without calling yourself by that name. The name "Science Shop" or its literal translation may not sound "right" in all languages/situations, for example it could have too many associations with a "store" where one can buy things. However, since "Science Shop" started to function as a brand name, it is now generally used to distinguish Science Shops from other knowledge transfer or science communication activities. The EU now uses the phrase "Science Shop or like institute". Science Shop activities can often be just a part of institution's work, next to funded research, commercial knowledge transfer, etc.

Relevance to VTDK Strategy 2019-2021

Accelerating technological, demographic, and socio-economic changes transform industrial and business models, change the need for knowledge and skills, so transformation of education systems is inevitable (a report by World Economic Forum „Future Jobs“, 2016):

- ✓ teaching integration is required at all levels of education
- ✓ intensive cooperation between business establishments, government and educational institutions is required for the development of the most relevant study / training programs in line with the country's development needs
- ✓ Strategy of future talent management should be based on cooperation rather than on competition the necessary cross-sector networking, where the expertise of the individual partners is synergetic
- ✓ Education 4.0 should capitalize on the potential of digital technologies, personalized data, content access and globalization (Fisk, 2017)

One of the three strategic goals presented in the Strategic Plan 2019-2021 is "to contribute to the development of the sustainable society through applied research".

To achieve this goal the implementation of the following tasks is suggested:

- ✓ Develop partnerships in applied research based on the needs of business and society.
- ✓ Convey the results of scientific and innovative activities to the general public.

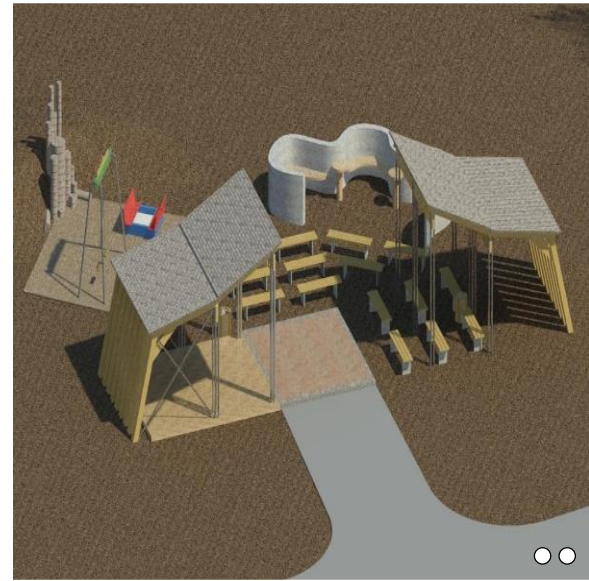
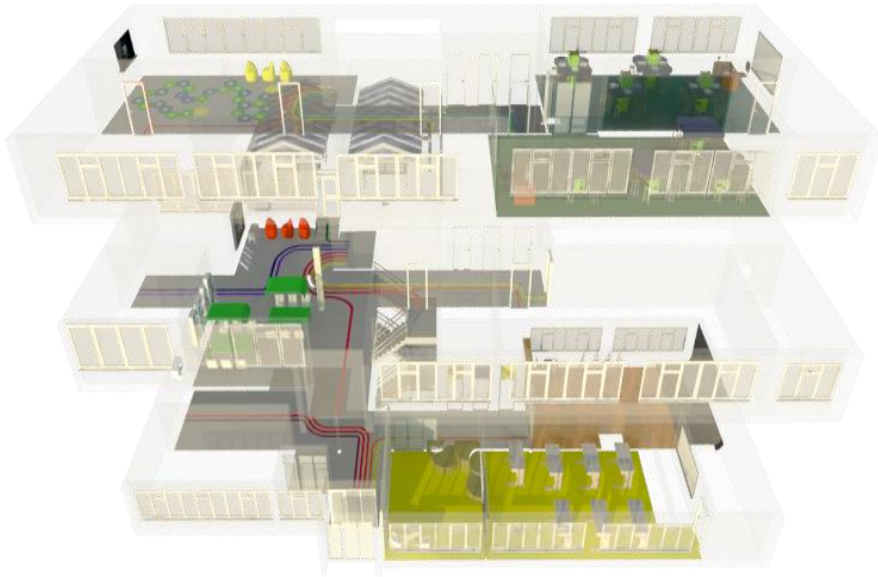
To strengthen the integration of studies and science, for the last few years college students have already started research that reflects public interest in the framework of the research and innovation program Horizon 2020. In the future, cooperation with various non-governmental organizations, communities and other organizations representing the public interest is planned to be strengthened both in the implementation of applied research and in promoting the results of research and innovative activities.

The VTDK Initiative Teachers' Group started implementing pilot Science Shops in 2016. They carried out intense discussions of what is the subject of a workshop in the light of engineering or design studies, with whom the College will work in this context. It was decided that not only non-governmental organizations, associations, communities, individuals, but also government and self-government institutions could be the stakeholders of a Science Shop project, and in exceptional cases even business organizations. The most important feature indicating that the research or project can be the object of a Science Shop is the compliance of the project with the public interest. In case the research question is only relevant to a specific organization, then such a project is regarded as commercial research. On the other hand, if the tackled problem addresses issues of a public concern, then it is a project of a Science Shop.

VTDK Science Shop project shall have these features:

- ✓ **It reflects public interest - the raised issue is relevant to society (local community or larger group of the society);**
- ✓ **It is necessary to conduct research during the project.**
Professional service or consultation do not serve as objects for a Science Shop.
- ✓ **Project is implemented free of charge (when required, certain research costs incurred while implementing the project, can be covered by the stakeholder, e.g. travel expenses, printing costs, etc.)**

The specificity of Science Shop project



The Science Shops were started at the College in 2016 as a pilot initiative while participating in a project EnRRICH „Enhancing Responsible Research and Innovation through Curricula in Higher Education“ (No 665759, funded by the European Union Research and Innovation Program Horizon 2020). As the College cooperates with business enterprises, public organizations, government and self-government in the development of applied research, the question naturally arises as to how the project of Science Shops differs from other research projects carried out by students.

The practice of the Science Shop in Europe and beyond is varied – in the Netherlands, for instance, it is mostly applied to work with non-governmental organizations, in Ireland Science Shops are implemented with a particular focus on marginalized communities. However, some Science Shops work with representatives of self-government as well.

Examples of the topics for the Science Shop project

Topic	The purpose of the project and the impact on society
Development of Educational Zones at a School of General Education	To analyze premises of the secondary school, to design educational zones for various subjects (mathematics, chemistry, arts, physics) which would encourage creativity and study motivation. Such practice, if justified, could be applied in other schools as well.
Planning of a public space on a land plot	Adapting a land plot in Agrastų str. in Vilnius for the needs of local community by creating a public leisure time zone. Implementation of the suggested plan would result in the development of common space for community quality time.
Improvement of traffic management of regulated intersections in Vilnius.	The European Commission's 2015 road safety statistics indicate a very poor decrease in the number of deaths on Lithuanian roads. However, in many cases the reason for this is not only careless driving, but also not that good condition of the roads in Lithuania, especially in black spots. The project was aimed at analyzing ten most dangerous intersections in Vilnius. After analyzing the situation and requirements set in the normative documents (KETs), proposals for improvement of traffic organization were formulated.



CSOs' Needs in Lithuania

In order to better understand the context and facilitate initial communication with local communities, CSOs' (Civil Society Organisations) within the frames of ENtRANCE (2017-1-BE02-KA203-034736, co-funded by the Erasmus+ programme of the European Union) project needs study was conducted in Lithuania, as well as in other partners' countries.

In Lithuania there are developed strategic documents, in which the importance of active citizenship and citizens' involvement in policy development and service delivery is recognized. However, according to the Ministry of Social Security and Labour (Lietuvos Respublikos Socialinės apsaugos ir darbo ministerija, 2018), the NGO sector is not yet sufficiently developed at the moment to be able to play its' important role of strengthening civil society, NGOs are often facing essential problems in the field of human resources and institutional capacity, lack fresh ideas and innovations. On the other hand, the concept of Science Shop is still relatively new in Lithuania (currently 2 Science Shops operate there, first one established in 2013), as well as participatory action research is a quite new approach to research (Jarasiunaite 2015). So it's natural that the cooperation between HEIs and CSO is also not strong yet and needs to be developed.

77 CSOs' participating in the online survey were mainly represented by NGOs (52%) and associations (44%). The respondents are mostly working in the fields of the following societal challenges: Health & Wellbeing, Inclusive, Innovative and Reflective Societies, Secure Societies, Environment & Resource Efficiency.

Only half of the respondents indicated they need research by addressing societal problems. This finding was confirmed by interviews as it has emerged that research was basically considered as nonrelevant and incomprehensible for CSOs – interviewees considered research neither as a priority nor as an important part of their activities in the future.

CSOs in need of research mostly are working with the challenges of Health & Wellbeing (60%) and Inclusive & Reflective Society (15%), they mainly aim to inform, educate, advise and support people in terms of goods, services or ideas.

Respondents mentioned they are facing all types of research problems – often these are simple research problems, requiring expertise from a single academic discipline, sometimes the research problems are complicated or complex, when a multidisciplinary approach is needed. A significant share of respondents (37,5%) think they rarely face wicked problems, but despite of this opinion, the research topics offered for students in frames of this survey could be considered rather as complex or wicked – CSOs expect students to offer some creative solutions.

CSOs consider that most important skills in order to be able to tackle research problems are as following: an ability to anticipate future (93%), situational awareness (97%), collaboration (98%), openness&transparency (95%), ethical thinking (95%), and ability to act (98%).

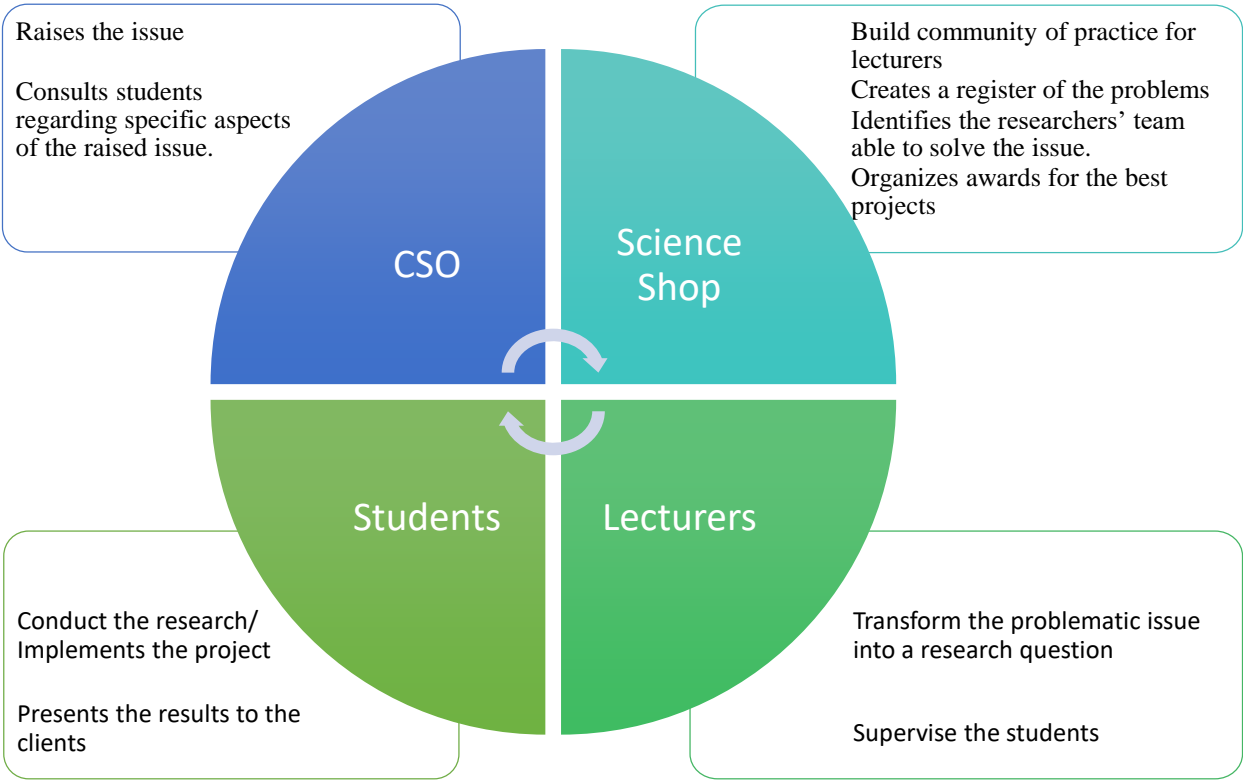
Almost half of the respondents in need of research (47,5%) indicated they don't know if they would like to cooperate with HEIs. As an argument it was mentioned that there is no experience of such collaboration, which was also confirmed by interviews – it appears that CSOs and HEIs had some certain specific interactions and common projects, but not for research. CSOs also are not sure if research findings would be reliable – they have some doubts if students have enough competence and if they would be engaged enough in order to meet the deadlines.

Recommendations for sustainable collaboration of HEIs and CSOs

In order to strengthen the necessary cooperation between CSOs and HEIs by addressing societal challenges, we suggest the following:

- By approaching CSOs it is important to remember that they are very short in time due to the problems with human resources. So at the initial stage of collaboration it could be helpful to present previous projects of this kind in order to clarify what CSOs could expect.
- It would also be helpful if HEIs would not ask to identify a research problem, but would just observe organizations' daily activities, would have a conversation with CSOs' representatives and then would „translate“ their findings into research problems.
- Again, due to the fact that majority of CSOs consider research nonrelevant for their activity, due to a lack of time and weak collaboration traditions, it is less likely that CSOs will ask HEIs for help, so HEIs should be proactive by establishing cooperation.
- CSOs are more likely to expect not only some research, but rather a solution to some particular problem they face – suggestion for a new model, a creative solution etc. Thus HEIs could think about embedding of educational models allowing to combine research and action resulting in solution of societal problems.
- In order to keep process smooth and build trust, it is necessary to teach students how they should work with CSOs in terms of communication, ethics and time management.
- CSOs have mentioned that their activity is not as visible as it should be, so it would be important to discuss with students how to introduce the project's results to the stakeholders and to develop appropriate communication model.

The Ecosystem of VTDK Science Shop



How are Science Shop Projects Implemented?



The Science Shop project is implemented through the following steps:

1. The problem is identified
2. The issue is transformed into the research question
3. A team of researchers is formed
4. A kick-off meeting with the client is held
5. The plan for project implementation is drawn up
6. Students carry out research
7. The results of the project are presented to the client
8. Students are assessed

1. Identification of the problem

Problems identified by the local community, non-governmental organization, municipality or other social partner are registered on the Internet: moksloDIRbtuves.vtdko.lt

Quite often in Lithuania CSOs do not think that research could help to solve the issue they address. Problems are common to be identified on a variety of occasions – during conferences, in focus groups or via informal communication. Therefore, it appears appropriate to register the named problems in the database (this can be done directly by stakeholders). This would result in the formation of the problem database, which could be used by both lecturers and students when choosing the real problem with which they would like to work.

When choosing the problem for the Science Shop project, the following criteria should be followed:

- ✓ the problem is relevant to the society or a group of people, and does not reflect issues of a single person;
- ✓ the issue was raised by a CSO/community group, but not a profit-seeking organisation;
- ✓ the results of the research/project should be made accessible to the public and create value in solving societal problems;
- ✓ the client has no possibility to conduct the research on its own.

2. The issue is transformed into the research question

The distinctiveness and added value of the Science Shop projects is their relevance to the actual societal issues. Initiative Group of VTDK lecturers has prepared recommendations in order to reformulate real-life problem into a research question (see Annexes "HOW TO APPROACH CSOS AND IDENTIFY THEIR PROBLEMS?", "HOW TO TRANSFORM THE IDENTIFIED PROBLEM IN THE RESEARCH TOPIC?"). The research question will inevitably relate to the objectives of one or another study subject as Science Shop projects are usually carried out within the framework of a specific study subject.

3. A team of researchers is formed

Depending on the complexity of the research question and the form of the project (final thesis, course paper, creative workshop, etc.), the lecturer chooses one or more students to do the work. The lecturer and the students discuss the goals and course of work, the expected outcome.

4. A kick-off meeting with the client is held

High quality project implementation and sustainable partnership can only be achieved when properly communicating and managing the expectations of all stakeholders. During the first meeting with partners, it is important to discuss the objectives of the project, the implementation deadlines, the desired results, the communication process.

5. The plan for project implementation is drawn up

The aim of the project is to involve the community as much as possible, therefore it would be expedient to discuss the project implementation plan with the client. The client may have valuable insights into community involvement in the research/project.

6. Students carry out research

6. Students carry out research – methodical recommendations for the project planning and implementation are provided in Annex "HOW TO TRANSFORM A PROBLEM INTO PROJECT AND DEVELOP SOLUTION?"

7. The results of the project are presented to the client

Since the research/project is carried out within the framework of a specific study subject, students often focus on preparing academic report and do not devote enough attention to the report intended for the client. When presenting the results to the client, it is important to emphasize relevant aspects of the solution in the user-friendly language (avoiding specific scholarly terminology). Recommendations for the presentation of the project's results are provided in the Annex "HOW TO PRESENT THE RESULTS OF THE PROJECT IN A VISUAL AND CREDIBLE MANNER?"

8. Student assessment

in many cases, Science Shop projects are performed by groups of students. The inevitable questions that arise in this case is how to objectively assess the contribution of each student, how to model the evaluation system that would motivate the student to implement the project qualitatively? Annex "SCIENCE SHOP: EVALUATION OF STUDENTS' TEAM" presents a student assessment model which lecturers could use to evaluate the students implementing Science Shop project.

Annexes

1. How to approach CSOs and identify their problems?
2. How to transform the identified problem in the research topic?
3. How to transform a problem into project and develop solution?
4. How to present the results of the project in a visual, clear and credible manner?
5. Science Shop: Evaluation of Students' Team.
6. Science Shop Project Task Description (template)
7. Science Shop Project Report (template)