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Innovative Teaching Formats at the Science-Society Interface: Reflections and Future Directions in Swiss Higher Education



#### **IMPRINT**

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#### **ACKNOWLEDGEMENTS**

We thank Yves Flückiger (Swiss Academies of Arts and Sciences), Philipp Burkard (Science et Cité) and Frédéric Darbellay (University of Geneva) for the review of this publication and all lecturers, students, and university employees who took part in the workshops or in bilateral exchanges about science-society teaching.

#### TRANSLATIONS

CMB Translations, Claudia Mozaffari-Bollier, Geneva

#### LAYOUT AND COVER

Push'n'Pull. Bern

#### **PRINTING**

Länggassdruck, Bern

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Recommended form of citation: Genin M., Hofmann B., Bärnreuther, S., Zemp C. (2025) Innovative Teaching Formats at the Science-Society Interface. Swiss Academies Communications Vol. 20 (7).

DOI: doi.org/10.5281/zenodo.17311718

ISBN: 978-3-905870-01-5 (online) ISBN: 978-3-905870-02-2 (Print)

ISSN: 2297-184X (online) ISSN: 2297-8275 (Print)



# Innovative Teaching Formats at the Science-Society Interface: Reflections and Future Directions in Swiss Higher Education

Morgane Genin, Benjamin Hofmann, Sandra Bärnreuther, Clara Zemp

# SDGs: The international sustainability goals of the UN

With this publication, the Swiss Academies of Arts and Sciences are contributing to SDG 4: Quality Education - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Sustainable Development Goals (SDGs) are goals for sustainable development at the economic, social and ecological levels. In 2015, the heads of state and government of the United Nations adopted the 17 Sustainable Development Goals. These new goals are to be implemented globally by all UN member states by 2030 and serve to ensure sustainable development.

- > sustainabledevelopment.un.org
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# Summary (English)

#### BACKGROUND

Science-society dialogue is crucial for addressing pressing societal challenges. One important avenue for strengthening this link, in an inter- and transdisciplinary perspective, is teaching formats that encourage students to engage in the public sphere. Such courses equip students to incorporate perspectives of societal partners into their research and tailor the communication of their findings to specific target audiences. However, an illustrative collection of best practices in Swiss higher education has been lacking so far. In this context, members of the Swiss Young Academy (SYA) developed the project "Innovative Teaching Formats at the Science-Society Interface" to explore such teaching formats in Swiss higher education institutions (HEIs). This practice-driven report draws on a non-exhaustive stocktake of existing courses in Switzerland and participatory workshops among lecturers.

#### **KEY INSIGHTS**

First, the report introduces a **new typology of science-society teaching formats**. It enables the characterization of courses across six dimensions: academic foundation, direction of knowledge flow, orientation of the learning process, form of engagement with societal partners, target audience in the public sphere, and type of output. By outlining these dimensions, the typology supports lecturers in making reflective design choices.

Second, the report provides **illustrative examples of innovative science-society courses** at Swiss HEIs. These examples feature diverse methods, including art-based approaches, counselling, service learning, simulations, knowledge co-production with partners, and creation of multimedia outputs. They also demonstrate that science-society courses vary in terms of disciplines, study level, student group sizes, and societal partners.

Third, the report examines the opportunities and challenges of science-society teaching formats from the perspectives of lecturers, students, and societal partners. Generally, these formats **offer multiple unique opportunities**, such as networking among all three groups, educational value from lived experiences, trust building, and facilitating graduates' integration into the labor market

At the same time, these **teaching formats face challenges** that need to be addressed. They require active management of relationships and communication between lecturers, students, and societal partners, which often leads to an increased workload. Moreover, a lack of financial resources and the rigidity of the academic framework can act as practical barriers to implementing science-society teaching formats.

The report identifies three priority areas for strengthening innovative science-society teaching formats:

- Exchange and network: Foster experience sharing among lecturers and build robust communities of lecturers, student representatives, and societal partners.
- (2) Institutional recognition: Integrate science-society teaching in institutions' strategic plans, reduce administrative barriers, re-evaluate credit allocation to better reflect workload, develop micro-certificates for engagement in real-world problem solving, and create long-term funding mechanisms
- (3) Evaluation and use of feedback: Develop general guidelines for evaluating the effectiveness of course formats and actively use students' and partners' feedback to refine course design.

# Summary (Deutsch)

#### HINTERGRUND

Der Dialog zwischen Wissenschaft und Gesellschaft ist für den Umgang mit dringlichen gesellschaftlichen Herausforderungen von ausschlaggebender Bedeutung. Ein wichtiges Mittel zur Förderung dieses Dialogs aus inter- und transdisziplinärer Perspektive sind Lehrformate, die Studierende dazu anregen, sich in der Öffentlichkeit zu engagieren. In solchen Kursen lernen die Studierenden, wie sie die Perspektiven gesellschaftlicher Partner in ihrer Forschung berücksichtigen und die Kommunikation über ihre Forschungsergebnisse auf bestimmte Zielgruppen abstimmen können. Allerdings fehlte bisher eine illustrative Sammlung über die diesbezüglichen Best Practices an Schweizer Hochschulen. Daher starteten Mitglieder der Jungen Akademie Schweiz (JAS) das Projekt «Innovative Lehrformate an der Schnittstelle zwischen Wissenschaft und Gesellschaft», um das Angebot an solchen Lehrformaten in den Schweizer Hochschulen zu ergründen. Der vorliegende, praxisorientierte Bericht stützt sich auf eine nicht abschliessende Bestandsaufnahme des entsprechenden Kursangebots in der Schweiz und partizipative Workshops mit Dozierenden.

#### WICHTIGE EINBLICKE

Einleitend wird in dem Bericht eine neue Typologie der Lehrformate für den Dialog zwischen Wissenschaft und Gesellschaft eingeführt. Darin werden die Kurse nach sechs Aspekten gegliedert: akademische Grundlage, Richtung des Wissensflusses, Ausrichtung des Lernprozesses, Form der Zusammenarbeit mit gesellschaftlichen Partnern, Zielpublikum in der Öffentlichkeit und Art der Ergebnisse. Diese Typologie hilft den Dozierenden, die Kurse nach diesen Aspekten bedarfsgerecht zu gestalten.

Anschliessend liefert der Bericht verschiedene Beispiele für innovative Lehrformate für den Dialog zwischen Wissenschaft und Gesellschaft, die an Schweizer Hochschulen eingesetzt werden. Diese Beispiele zeigen verschiedene Methoden auf, darunter kunstbasierte Ansätze, Beratung, Lernen durch Engagement, Simulationen, Koproduktion von Wissen mit Partnern und die Erstellung von Multimedia-Produkten. Sie zeigen auch, dass je nach Studiengang, Studienebene, Gruppengrösse und gesellschaftlichen Partnern unterschiedliche Kursformate zum Einsatz gelangen.

Abschliessend werden in diesem Bericht die Chancen solcher Lehrformate und die daran gestellten Herausforderungen aus Sicht der Dozierenden, Studierenden und gesellschaftlichen Partner untersucht. Generell bieten solche Formate **zahlreiche einzigartige Chancen**, wie z. B. die Vernetzung zwischen den drei Gruppen, den Bildungswert gelebter Erfahrungen, den Aufbau von Vertrauen und die Erleichterung der Integration der Absolvierenden in den Arbeitsmarkt

Gleichzeitig müssen diese **Lehrformate verschiedene Herausforderungen meistern**. Sie erfordern ein aktives Management der Beziehungen und der Kommunikation zwischen Dozierenden, Studierenden und gesellschaftlichen Partnern, was häufig zu einer erhöhten Arbeitsbelastung führt. Zudem können mangelnde finanzielle Ressourcen und der starre akademische Rahmen die Umsetzung von Lehrformaten für den Dialog zwischen Wissenschaft und Gesellschaft in der Praxis behindern.

In diesem Bericht werden drei wichtige Bereiche aufgezeigt, die zur Stärkung von innovativen Lehrformaten für den Dialog zwischen Wissenschaft und Gesellschaft beitragen:

- (1) Gegenseitiger Austausch und Netzwerk: Förderung des Erfahrungsaustauschs zwischen Dozierenden sowie Aufbau robuster Gemeinschaften aus Dozierenden, Vertreterinnen und Vertretern der Studierenden und gesellschaftlichen Partnern.
- (2) Institutionelle Anerkennung: Aufnahme der Lehre zum Dialog Wissenschaft-Gesellschaft in die strategische Planung der Hochschulen, Abbau administrativer Hindernisse, Vergabe von Kreditpunkten, die dem Arbeitsaufwand besser Rechnung tragen, Entwicklung von Mikrozertifikaten für das Engagement zur Lösung realer Probleme und Schaffung langfristiger Finanzierungsmechanismen.
- (3) Kursbewertung und Berücksichtigung von Feedback: Entwicklung allgemeiner Leitlinien für die Bewertung der Wirksamkeit von Lehrformaten und aktive Nutzung des Feedbacks von Studierenden und gesellschaftlichen Partnern zur Verbesserung der Kursgestaltung.

# Summary (Français)

#### CONTEXTE

Le dialogue entre la science et la société est crucial pour relever les défis sociaux urgents. Dans une perspective interdisciplinaire et transdisciplinaire, des formats d'enseignement qui encouragent les étudiant·e·s à s'engager dans la sphère publique constituent une piste importante pour renforcer ce lien. Ces cours permettent aux étudiant·e·s d'intégrer dans leurs recherches les perspectives des acteurs de la société et de communiquer leurs résultats de manière différenciée selon les publics cibles spécifiques. Toutefois, il manquait jusqu'à présent une collection illustrative des bonnes pratiques dans l'enseignement supérieur suisse. Dans ce contexte, des membres de la Jeune Académie Suisse (JAS) ont développé le projet Innovative Teaching Formats at the Science-Society Interface (« Des formats d'enseignement innovants à l'interface entre la science et la société ») afin d'examiner ces formats dans les hautes écoles. Ce rapport axé sur la pratique s'appuie sur un inventaire non exhaustif des cours existants en Suisse et des ateliers participatifs avec le corps professoral.

#### POINTS CLÉS

Premièrement, le rapport introduit une **nouvelle typologie des formats d'enseignement traitant des rapports entre science et société**. Elle permet de caractériser les cours en fonction de six dimensions : fondement académique, direction du flux de connaissances, orientation du processus d'apprentissage, forme de l'engagement avec les acteurs de la société, audience cible dans le domaine public et type de résultats. En décrivant ces dimensions, la typologie aide le corps professoral à faire des choix de conception réfléchis.

Deuxièmement, le rapport fournit des **exemples de cours innovants sur les rapports entre science et société** proposés par des hautes écoles suisses. Ces exemples incluent diverses méthodes, notamment des approches fondées sur l'art, le conseil, l'apprentissage par le service, des simulations, la coproduction de connaissances avec des acteurs et la création de contenus multimédias. Ils montrent aussi que les cours sur les rapports entre science et société varient en fonction des disciplines, du niveau d'études, de la taille des groupes d'étudiant-e-s et des acteurs de la société.

Troisièmement, le rapport se penche sur les opportunités et les défis des formats d'enseignement traitant des relations entre science et société du point de vue du corps professoral, des étudiant·e·s et des acteurs de la société. En général, ces formats **offrent de nombreuses opportunités uniques** : réseautage entre les trois groupes, valeur éducative tirée des expériences vécues, renforcement de la confiance et soutien à l'insertion des diplômé·e·s sur le marché de l'emploi.

Dans le même temps, ces **formats d'enseignement rencontrent des défis** à relever : ils nécessitent une gestion active des relations et une communication entre le corps professoral, les étudiant-e-s et les acteurs de la société, ce qui entraîne souvent un surcroît de travail. En outre, un manque de moyens financiers et la rigidité du cadre académique peuvent constituer des obstacles pratiques à la mise en place de formats d'enseignement traitant des rapports entre science et société.

Le présent rapport identifie trois domaines prioritaires pour renforcer les formats d'enseignement innovants traitant des rapports entre science et société :

- (1) Échanges et réseaux : encourager le partage d'expériences au sein du corps professoral et développer de solides communautés de professeur·e·s, de représentant·e·s des étudiant·e·s et d'acteurs de la société.
- (2) Reconnaissance institutionnelle: intégrer les cours sur les rapports entre science et société dans les plans stratégiques des institutions, réduire les barrières administratives, réévaluer l'attribution des crédits pour mieux refléter la charge de travail, développer des microcertificats pour la participation à la résolution de problèmes concrets et créer des mécanismes de financement durables.
- (3) Évaluation et utilisation des retours : développer des directives générales pour évaluer l'efficacité des formats de cours ainsi qu'utiliser activement les retours des étudiant·e·s et des acteurs pour améliorer la conception des cours.

# Introduction

Science-society dialogue has become increasingly relevant in recent years as more and more scientists perceive the need to engage with partners in society and produce action-oriented knowledge to inform societal decisions (Caniglia et al., 2021). In an inter- and transdisciplinary perspective, science can not only provide knowledge for understanding sustainability problems, such as climate change and biodiversity loss, but also contribute to developing possible solutions (Courter et al., 2012; Lang & Wiek, 2022).

Besides research, another important channel for stronger science-society linkages is teaching formats that encourage students to engage in the public sphere. Such courses train students to incorporate perspectives of stakeholders into their research and communicate their findings effectively by tailoring communication to different target audiences (Pearce et al., 2018). The material produced by students in such science-society courses can take various forms, like multimedia outputs, pedagogic activities for children, or interventions in the public space.

Despite calls for more innovative science-society teaching formats (Gassmann et al., 2023), an overview and common understanding of best practices in Swiss higher education has been lacking. Likewise, lecturers using innovative formats are not well connected, which limits opportunities for experience exchange and learning.

In this context, members of the Swiss Young Academy (SYA) developed the project "Innovative Teaching Formats at the Science-Society Interface" in order to understand and promote such teaching formats in Swiss higher education institutions (HEIs). To begin with, a non-exhaustive stocktake and mapping of existing courses led to the development of a typology of innovative sciencesociety teaching formats. Next, the group facilitated exchanges between lecturers of HEIs in Switzerland who already use or are interested in using innovative teaching formats for science-society dialogue. A network-building workshop was organized in June 2024 at the House of Academies in Bern. The workshop brought together 28 lecturers from different disciplines and institutions across Switzerland and fostered exchanges about innovative teaching methods. In the end, the group validated and discussed the findings in two **additional workshops** co-organized with partners in the area of sustainability, a frequent topic in the stocktake of science-society teaching formats. One was the workshop "Transforming our university teaching towards sustainability" led by WWF in October 2024. The other was a workshop at the first ETH Domain Conference "Social Sciences on Environment, Technology & Sustainability" in January 2025.

This report summarizes the insights gained in this process with the aim of providing a basis for further discussion about science-society teaching. First, it introduces a typology of innovative teaching formats at the science-society interface and examines their opportunities and challenges from the perspective of multiple stakeholders. Opportunities and challenges were gathered from the discussions during the workshop organized in June and were validated and extended in subsequent workshops. Second, it presents an illustrative collection of best-practice examples that comprises different course setups and first-hand experiences by lecturers from Swiss HEIs. Third, it discusses the way ahead for science-society dialogue in teaching.

# Typology of teaching formats

Teaching formats at the science-society interface are highly diverse, particularly with regard to forms of engagement with partners in society. Courses often produce outputs, which can be divided into five categories:

- Multimedia outputs: videos, podcasts, blogs, social media publications, websites
- Written and policy outputs: policy-making drafts and resolutions, newspaper articles
- Service-based outputs: service learning, consulting, counselling
- Process-oriented outputs: workshops, focus group meetings, new collaborations and partnerships
- Creative outputs: posters, artworks, exhibitions, performances
- Experiential learning and interactive activities: simulations, games, competitions

Many courses combine several of these categories. All formats typically involve group work as a central strategy in active learning. Students involved in such approaches learn how to apply and process ideas, moving beyond passive listening (Hodges, 2018). Additionally, students engaged in active learning strategies, such as group work, show improved learning outcomes and enhanced positive attitudes (Freeman et al., 2014; Hake, 1998; Springer et al., 1999; Vernon & Blake, 1993). For example, eye-opening experiences in transdisciplinary processes contribute to a shift in students' attitude towards stronger integration of knowledge from different disciplinary experts and societal actors (Horn et al., 2024). It has also been reported that experiential immersion and dialogue with involved actors helps students to understand the complexity of problems, such as those related to the environment and sustainability (Ruggerio et al., 2024).

Considering the diversity of courses, a typology of science-society teaching formats has been developed with six dimensions, each representing a spectrum:

- 1. Academic foundation: Is the substance of the course anchored in one scientific discipline (disciplinary), or does it integrate two or more scientific disciplines (interdisciplinary)?
- 2. Direction of knowledge flow: Does the course aim to transfer knowledge from science to partners in society (transfer) or to co-create knowledge together with partners in society (co-production)?
- 3. Orientation of learning process: Does the course primarily aim to make students understand problem causes and implications (problems) or develop, test, or evaluate potential solutions (solutions)?

- 4. **Form of engagement:** Does the course aim at indirect forms of engagement between students and partners in society, for instance, through media and simulations (**indirect**) or at direct forms of engagement, for example, through workshops, presentations, or interventions in the public sphere (**direct**)?
- 5. Target audience in the public sphere: Does the target audience of the deliverable constitute a specific group, such as children or businesses (homogenous), or various groups or the broader public (heterogenous)?
- 6. **Type of output:** Is the deliverable of the course a concrete output, such as a video, podcast, artwork, or website (**product**), or an action that students provide to partners in society, such as service learning or consulting (**service**)?

Each of these dimensions and questions allows researchers and lecturers to situate the design of their course in terms of engagement with partners in society. Additionally, the typology may help to understand better the impact of courses on the various stakeholders involved, such as students, lecturers, and partners in society.

# **Opportunities**

Together with actors actively taking part in and developing innovative sciencesociety teaching formats, we identified opportunities that these formats provide for students, lecturers, and partners in society. Some of the opportunities relate to one particular group of stakeholders, whereas others cut across different groups.



One key aspect benefiting all stakeholder groups is network building, which is fostered by science-society teaching. Students make first professional contacts, partners in society connect with scientists, and lecturers disseminate knowledge and extend the impact of their courses.

Stemming from this enhanced networking capacity, other opportunities emerge at the intersections of stakeholder groups:

For partners in society and students, courses allowing them to interact mean that partners contribute to education of younger generations and can learn about their concerns and wishes. They also support partners, as employers, in their search for promising job candidates, and students in finding work opportunities.

For students and lecturers, innovative teaching formats support a wide variety of pedagogical methods. Moreover, higher learning retention may occur through "eye-opening," "lived" experiences that students make in these more active learning settings.

For lecturers and partners in society, interacting through these courses may increase partners' trust in science. Additionally, these collaborations can test the relevance of research topics and help to integrate them into broader contexts. Finally, these courses foster increased accessibility and outreach of research.

In addition, some opportunities are specific to certain stakeholders:

#### For partners in society:

- Partners in society can benefit from the fresh ideas and quality outcomes produced bottom-up by students that can help solve real-world problems.
- Partners in society can use the course as a platform to network amongst them.

#### For students:

- Collaborating and learning in novel ways support skill and personal development.
- By taking these courses, students gain insights into and prepare for professional life.
- Science-society courses bring students into contact with real-world problems, make them embrace complexity, and enable them to get to know different types of knowledge.

#### For lecturers:

- Teaching innovative courses at the science-society interface is varied, routine-breaking, and fulfilling.
- These courses enable lecturers to develop and gather experience with new topics and methods.

# Challenges

Innovative teaching formats at the science-society interface also come with distinct challenges. The same approach as in the previous section is adopted, with an initial overview of commonly shared issues followed by more specific obstacles.



Three central challenges have been identified that relate to all stakeholders. First, the potential for **communication gaps**, as lecturers have to mediate the relationship between partners in society and students. Students may misunderstand requests from partners in society. In turn, the latter may misinterpret the course concept and make demands that do not align with the expectations of lecturers and students. These diverse or unclear expectations mean that tailoring communication to the societal target group can be a challenge for both lecturers and students, e.g., in terms of framing knowledge in accessible and relevant ways.



Second, relations between different stakeholders can affect the learning process and experience. Again, lecturers generally play a key role in finding a balance between the different stakeholders involved. Miscommunication can lead to challenges around the hierarchy of relationships that, for instance, could hinder knowledge co-production on an equal level.



Third, the workload that comes with innovative science-society courses can be high for different participating actors. On the side of partners in society, stakeholder fatigue may occur, which refers to diminished engagement and interest due to prolonged involvement and repeated requests for inputs. This can endanger the relationship between lecturers and their partners in society as well as the long-term feasibility of courses. On the students' side, managing the workload and complexity of these courses may be challenging. For lecturers, organizing such courses requires additional time and coordination efforts, which are often not rewarded institutionally.

These three challenges are reflected in the other issues that emerge at the intersections of stakeholder groups:

For partners in society and students, requirements regarding the openness of the process differ. While the learning process of students involves the need to structure messiness, the inherent uncertainty may conflict with partners' preference for clear-cut solutions.

For students and lecturers, the intergenerational gap that sometimes exists between them can affect the learning process in terms of communication, hierarchies, goal setting, and expectations. Different prior knowledge of students and group dynamics are challenges for fair grading. Keeping up student **motivation** in light of unforeseen challenges inherent to open-ended processes is another challenge.

For lecturers and partners in society, the biggest challenge is to properly manage expectations, which are greatly dependent on good communication and collaborative engagement among all actors involved. Another important point is confidentiality issues that might emerge with partners in society, for example, when sharing students' outputs with a broader audience. In case more extensive communication of results is desired, effective dissemination of students' deliverables to the right target audience may be a challenge. Finally, bridging the gap between scientific theory and real-world practice is another challenge in implementing science-society courses.

Some challenges are also specific to certain stakeholders:

## For partners in society:

- As outcomes strongly depend on student engagement and skills, the **quality** of some final outputs may not meet the expectations of partners in society.

#### For students:

- Partners in society sometimes require outputs that demand certain skills or competencies that students do not necessarily possess.
- Innovative science-society courses demand a high level of cooperation and commitment, which is not always self-evident, especially as work styles may differ

#### For lecturers:

- Setting up innovative science-society courses often requires financial resources, especially to ensure a long-term perspective for the course. However, these funds are not always available or only available for initial course development.
- Given that students receive academic credits for these courses, lecturers often need to grade them. They have to navigate the dual role of coach and assessor. Grading can hamper aspired knowledge co-production and be challenging given the novel nature of certain deliverables.
- Lecturers need to provide a safe learning space for students, where they
  are allowed and encouraged to make mistakes to improve themselves. This
  requires specific competences from the lecturers and trust from students.
- The academic system's rigidity in terms of course administration, implementation, accreditation, grading, and funding opportunities can prevent lecturers from developing and/or offering innovative science-society courses.

# Illustrative examples

To illustrate the typology of teaching formats and to inspire future teaching at the science-society interface, this section highlights illustrative examples of innovative courses from Swiss HEIs. They showcase how students successfully engaged and collaborated with diverse partners in society.

The examples were selected from presentations of course formats at the workshop for lecturers organized by SYA and on additional bilateral contacts of the project group with lecturers. The aim was to include a diverse set of course formats with respect to student deliverables as well as in terms of geographical distribution of HEIs and disciplines. The selection of examples does not intend to be representative or exhaustive for the entire teaching landscape at Swiss HEIs.

To obtain accurate descriptions of the teaching examples, these were collected directly from the responsible lecturers and only edited by the authors of this report.

# ART

# Age, Time and Change - Temporal Explorations on the Furka Pass

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 11-25 students
- · Curricular status: core elective
- · Discipline/program: MA Transdisciplinarity in the Arts
- · Duration of engagement with societal partners: 1 semester

#### INSTITUTION AND LECTURERS

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Zurich University of the Arts

COURSE TOPOLOGICAL PROFILE			
Academic foundation Disciplinary			
Knowledge flow Transfer Co-production			
Orientation Problems Solutions			
Engagement Indirect Direct			
Audience Homogenous			
Output Product Service			

#### **COURSE DESCRIPTION**

In this course, students from diverse artistic backgrounds – fine arts, design, film, music, art education, publishing, dance – engage with ecological topics during an annual project week. The course is co-taught at the Alpfor research station on the Furka Pass, where ecologists share their expertise through presentations and field visits. Each year, a focus theme is chosen, such as water, landscapes, plant life, human-nature relationships, or perceptions of time. During the week, artists develop projects informed by the scientific insights they gain, addressing the focus theme. Mentoring and feedback sessions help refine these projects, which are presented at the end of the week.

A key aspect of this course is the interaction between scientists and artists. Both present different perspectives and may be considered representatives of society. Discussions about scientific inputs and artistic perspectives during the project week allow both groups to reflect on their respective practices, thought styles, and worldviews. Another layer of science-society engagement occurs in the public exhibition of the final projects. The artistic results often explore scientific ideas, processes, and ways of thinking, making them more accessible to a wider audience. By thematizing scientific artefacts and rhetoric, the artists create bridges between science and society, making the sciences more tangible and relatable.

This arts-science interaction highlights the unique role of artists as both societal representatives and mediators. Their ability to translate scientific concepts through art fosters deeper public engagement with science, demonstrating the potential of transdisciplinarity to make science more approachable through creative intervention.



**Figure 1.** View of the "Furka" exhibition 2023, which makes the results of the Arts and Science Project Week accessible to the public. The exhibition was shown at the Zurich University of the Arts in the Toni-Areal.

# COLLABORATIVE RESEARCH WITH VULNERABLE GROUPS

Urban Geography: Research and Methods

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 11-25 students
- Curricular status: core elective
- · Discipline/program: Human Geography
- Duration of engagement with societal partners: 1 semester

#### INSTITUTION AND LECTURERS

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→ www.zueri-urban.com/toolkit University of Zurich

COURSE TOPOLOGICAL PROFILE		
Academic foundation Disciplinary		
Knowledge flow Transfer Co-production		
Orientation Problems Solutions		
Engagement Indirect Direct		
Audience Homogenous		
Output Product Service		

#### COURSE DESCRIPTION

Although knowledge is increasingly developed in collaboration between academic, industry and civil society partners, knowledge production in teaching often remains entrenched in traditional roles and formats. To integrate collaborative research within the university curriculum, research-based projects have become a particularly fruitful teaching format.

The collaborative research-based teaching project "KoLab: Kollaborative Lehrforschung in der Stadt," is one such format. The project encompassed the collaboration between the Sans-Papiers Anlaufstelle Zürich (SPAZ), an association advocating for the rights of undocumented immigrants (known as Sans-Papiers) in Zurich, and Züri Urban, the research-based teaching project of the Social Geography and Urban Studies unit at the University of Zurich. The context of this project was the master's-level elective course "Urban Geography: Research and Methods" in 2023. It involved course instructors, members of SPAZ, master students in geography and Sans-Papiers who teamed up to conduct qualitative research about Sans-Papiers' housing conditions in Zurich.

The course instructors developed a toolkit to facilitate the development of collaborations with non-university partners in research-based teaching projects. Its target audience are educators interested in collaborative and innovative teaching that benefits learners and supports vulnerable partners while fostering interdisciplinarity to address real-world challenges. The objectives of this toolkit are to provide guidance and reflect on the challenges of (1) developing meaningful research-teaching collaborations with non-university partners (NGOs, community and advocacy organizations, and individuals) that account for their capacities and vulnerabilities; (2) synchronizing these collaborations with the university curriculum and the schedules of non-university partners; (3) creating formats, assignments and activities that integrate practical experiences and promote in-class collaboration, active learning, reflection and critical thinking; and (4) evaluating the results of the collaboration as well as the quality of the collaboration itself.

## CO-PRODUCTION WITH STAKEHOLDERS

# Umweltproblemlösen (Tackling Environmental Problems)

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 100+ students
- · Curricular status: mandatory
- · Discipline/program: Bachelor in Environmental Sciences
- · Duration of engagement with societal partners: 2 semesters

#### INSTITUTION AND LECTURERS

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FTH Zurich

COURSE TOPOLOGICAL PROFILE		
Academic foundation Disciplinary Interdisciplinary		
Knowledge flow Transfer Co-production		
Orientation Problems Solutions		
Engagement Indirect Direct		
Audience Homogenous		
Output  Product Service		

#### COURSE DESCRIPTION

"Tackling Environmental Problems" is a mandatory first-year course in the Bachelor in Environmental Sciences at ETH Zurich. Each year, a different sustainability case study in a Swiss region is addressed, such as regional development in the Jurapark Aargau, achieving net zero in the city of Zurich, or creating a climate-positive canton Uri. Students are confronted with wicked real-world problems to foster their transdisciplinary competences, including problem framing and solving, systems and critical thinking, communication, and reflection. This is not possible without the involvement of regional stakeholders who are represented in an advisory group, which includes representatives from administration, business, science, and civil society, as well as course lecturers, tutors, and student representatives. Together, they develop the specific questions for the case study.

Around 120 students work in self-organized groups of five to seven members. Initially, they acquire knowledge on a subtopic, guided by local experts who contribute their expertise and participate in the grading process. On the basis of this foundation, students learn to identify challenges using a problem-solving approach – a combination of design and systems thinking. They then develop actionable solutions in collaboration with local stakeholders. Students independently contact approximately 200 different stakeholders.

The course is special due to its size, with around 120 students, and its status as a compulsory course in a bachelor's program's first year. Additionally, stakeholders participate at all course levels: from topic development, through knowledge contribution, as partners in the implementation of the solutions, and in the evaluation of students' reports. Lecturers accept the high time commitment involved as they are convinced that both students and stakeholders benefit from this collaboration. Students learn to understand the needs of affected people and what is required to develop sustainable solutions. Stakeholders, in turn, benefit from the creative insights of young people.



Figure 2. Students with their prototypes for the "Umweltproblemlösen" course at ETH Zurich. Picture credit: Yuri Schmid, 2020.

# COUNSELLING

# Digital Assistant for the Town of Lugano

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 1-10 students
- Curricular status: elective
- · Discipline/program: Bachelor in Communication
- · Duration of engagement with societal partners: 4 semesters and more

#### INSTITUTION AND LECTURER

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Università della Svizzera italiana

COURSE TOPOLOGICAL PROFILE			
Academic foundation Disciplinary			
Knowledge flow Transfer Co-production			
Orientation Problems Solutions			
Engagement Indirect Direct			
Audience Homogenous			
Output Product Service			

#### COURSE DESCRIPTION

The course allows students to collaborate as digital assistants with Punto Digitale, a service offered by the town of Lugano to help citizens with digital issues. Specifically, the service is designed as a counter where citizens can go to solve problems that require digital knowledge.

By participating in the course, students are expected to acquire skills in communication (empathic listening, inter-cultural and -generational communication), problem solving, and digital skills. The course's special value lies in the real-world experience, where students test their skills in daily situations - an opportunity that strongly motivates them to engage. Furthermore, having students at the town's service can also be important to strengthen connections between the university and the city.

Direct teaching is limited to an introductory session of four academic hours, where Punto Digitale is presented and some relevant topics for the assistance activities are introduced, such as empathic listening, common ground, and digital divide. During the rest of the course, students primarily assist at Punto Digitale and engage in reflective practice on their work experiences through a brief report on their activities and learnings at the end of the course.



Figure 3. "Together it's easier": a flyer with the logo of Punto Digitale.

## MULTIMODAL MEDIA COMMUNICATION

Beyond Research Communication: Transformative Geography for Sustainability

#### PRACTICAL AND ADMINISTRATIVE COURSE TOPOLOGICAL PROFILE INFORMATION Academic foundation Classroom size: 11-25 students Disciplinary Interdisciplinary Curricular status: core elective Knowledge flow · Discipline/program: Geography Transfer Co-production · Duration of engagement with societal partners: 1 semester Orientation Problems Solutions INSTITUTION AND LECTURERS Engagement Eda Elif Tibet, Jinat Hossain, Susan Thieme, Indirect Direct Mirko Winkel Audience → elif.tibet@wyssacademy.org Homogenous Heterogenous University of Bern Output

Product

#### COURSE DESCRIPTION

The course focuses on both the theoretical and practical aspects of research communication in relation to sustainable development. In recent years, applied research has increasingly focused on addressing socially relevant issues by collaborating with civil society, administration, and businesses to co-produce solutions for sustainable development challenges and inform global-local policymaking. Effective communication of research outcomes through diverse methods and media is central to this process, but often remains challenging for the researchers, policymakers, and practitioners in terms of application and impact. This is largely due to limited practical skills and training in communication. This seminar addresses this gap by equipping students and researchers with essential communication skills for both the research process and outreach.

Blending theoretical insights with practical applications, the course fosters strong peer-to-peer collaboration and public engagement. Participants explore diverse multimodal media formats, including social media campaigns, blogs, posters, story maps, short films, video essays, audiovisual installations, and participatory tools like photo voice and elicitation. Topics such as non-fictional film language, post-production, and digital communication technologies are critically examined using research materials produced as part of the Media Lab (mLAB) from Bangladesh, Nepal, and the Mediterranean region to co-create projects.

The seminar culminates in a collaborative science-society café, where students showcase their projects and engage with the public. Examples of their cocreative projects include (1) Stories from the Sundarbans Delta, an interactive quiz on the trade-offs of shrimp farming in Bangladesh; (2) Human-Nature Connections, a sensorial multimedia journey through Mediterranean cultural landscapes; and (3) Health(y) Care Workers, a hospital-like setup offering insights from doctors in Switzerland and Nepal.

Co-taught by lecturers from the Institute of Geography's Critical Sustainability Unit and mLAB, the course balances structure with creative freedom. Their experience highlights the importance of accommodating diverse student needs, and future iterations of the course will integrate more neurodivergent tools and inclusive learning strategies.



Figure 4. Science Society Cafe with the students as the final installment of their projects engage the audience in the Institute of Geography at the University of Bern.

## PODCAST

## Sound & Society

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 26-50 students
- Curricular status: elective
- · Discipline/program: Contextual Studies (all disciplines)
- · Duration of engagement with societal partners: n.a.

#### INSTITUTION AND LECTURER

Paula Bialski

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# Academic foundation Disciplinary Interdisciplinary Knowledge flow Transfer Co-production Orientation Problems Solutions Engagement Indirect Direct Audience Homogenous Heterogenous Output Product

COURSE TOPOLOGICAL PROFILE

#### COURSE DESCRIPTION

This course introduces bachelor students to the sociology of music through immersive engagement with the music industry. Rather than relying solely on academic texts, students engage directly with musicians, producers, and other industry professionals through interviews and ethnographic fieldwork, including visits to concerts, production studios, and other key sites of music production and consumption. This hands-on approach allows students to analyze the social, economic, and cultural dynamics shaping the music industry while honing their research skills.

A key aspect of this course is its emphasis on project-based learning. In an era where AI challenges traditional assessment methods, students develop original research projects, culminating in a podcast series. This format fosters storytelling, public engagement, and the ability to translate sociological insights into accessible narratives for a broader audience. By producing a podcast, students gain experience in media production, interviewing techniques, and knowledge dissemination, strengthening their ability to communicate research beyond academic circles.

Pushing students into the field, the course requires them to navigate real social interactions, negotiate access, and reflect on their positionality as researchers. It is also unique in its focus on music as both an artistic and economic domain, offering a multidimensional view of cultural production. The podcast output further distinguishes the course, giving students the opportunity to craft research projects that have a life beyond the university and to connect with wider audiences. Although not a podcast production course, students engage deeply with field material.

Experiential learning fosters deep engagement, transforming students' understanding of social dynamics by encouraging them to step into the spaces they study. It reinforces the importance of qualitative research and storytelling, skills that remain vital despite AI's impact on academia. The podcast component underscores how research is a public endeavor, demonstrating that academic work extends beyond analysis to meaningful communication with the world.

# SERVICE LEARNING

Service Learning: Microbes Go to School

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 11-25 students
- Curricular status: elective
- · Discipline/program: Biology, Biology & Ethnology, Biology & Sports, Natural Systems
- · Duration of engagement with societal partners: 1 semester

#### INSTITUTION AND LECTURERS

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University of Neuchâtel

COURSE TOPOLOGICAL PROFILE			
Academic for Disciplinary	undation	Interdisciplinary	
Knowledge f Transfer	low	Co-production	
Orientation Problems	0000	Solutions	
Engagement Indirect	00000	Direct	
Audience Homogenous	00•00	Heterogenous	
Output Product		Service	

#### COURSE DESCRIPTION

Launched in 2020, the program "Microbes go to school" builds new connections between academia and society by using schools as connectors. The program aims to inform children on essential topics in microbiology like antibiotic resistance and microorganisms' roles, such as waste degradation or bioactive compound production, while training biology students in science communication for a lay audience.

The approach used is based on the pedagogical concept of service learning, which aims to link learning, teaching, and community service. Service learning is relatively new in Switzerland and not often used in the context of the natural sciences. Concretely, bachelor students and PhD candidates in biology are trained to communicate scientific knowledge to a non-specialist audience, in this case children at school.

During the program, participants learn a key skill: how to present scientific concepts to school pupils aged 6 to 12. In turn, pupils explore microbiology topics rarely covered in school curricula and engage in enriching educational workshops both in and outside the classroom. This includes visits to university premises, thereby bridging the gap between academia and society. This mutual relationship provides many societal benefits by enhancing scientific literacy in the next generation of decision-takers.



**Figure 5.** Example of a playful activity in which two pupils use a game designed by students taking part in this class to learn concepts in microbiology.

## **SIMULATION**

## Politics of International Organizations

## PRACTICAL AND ADMINISTRATIVE INFORMATION

- Classroom size: 11-25 students
- Curricular status: elective
- · Discipline/program: International Relations, Political Science
- · Duration of engagement with societal partners: 1 semester

#### INSTITUTION AND LECTURER

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Geneva Graduate Institute (Initially the course took place at University of Lausanne)

# COURSE TOPOLOGICAL PROFILE Academic foundation Disciplinary Interdisciplinary Knowledge flow Transfer Co-production Orientation Problems Solutions Engagement Indirect Direct Audience Homogenous Heterogenous Output Product

#### **COURSE DESCRIPTION**

This course is organized in a three-step interaction between students and stakeholders - practitioners working for international organizations (IOs) like the United Nations: (1) Students conduct a research interview with an aid worker from the field of humanitarian action or (sustainable) development. (2) Building on the knowledge shared by the stakeholders and a desk study, students design a simulation kit. (3) With the lecturer's support, students organize a role-reversal simulation for IO practitioners working in humanitarian emergency action and development aid workers. After the simulation, stakeholders share their feedback and students produce different outputs (videos, podcasts, blogposts, etc.) publicly shared online to give visibility to the role-play.

This course targets social learning for all parties involved in a ludic manner. Students get to learn about the everyday life of the practitioners they aim to become, understanding their daily practices and struggles. In the role-play, participating stakeholders experience the constraints of their counterparts. This hopefully helps short-term humanitarian aid practitioners understand longterm development work, while IO staff from the development sector gain insight into the challenges faced by emergency responders.

This course is very rewarding for the lecturer as it creates a sense of purpose to the pedagogical project, which extends beyond the classroom. It offers a stimulating learning environment for students while also allowing a better transmission of academic knowledge through a very practical activity. In this case, teaching at the science-society interface requires in-depth knowledge of stakeholders' field of action, a strong partner network, and significant time and logistical organization.

# The way ahead

As illustrated by the examples, teaching at the science-society interface holds great potential to innovate learning experiences. Three topics have been identified for advancing and promoting these formats at Swiss HEIs:

#### 1. EXCHANGE AND NETWORK

Exchange between interested lecturers to spark ideas and share best practices should be encouraged. Involving other societal actors as partners and knowledge contributors in these conversations would enhance networks and learning experiences. Concretely, this requires investing time in relationship-building between lecturers, partners in society, and student representatives. Constructing robust communities and networks is crucial for the longterm success of innovative science-society formats.

#### 2. INSTITUTIONAL RECOGNITION

There is a need for increased institutional recognition of innovative sciencesociety teaching formats, which can take several forms:

- valuing and promoting innovative teaching at the institutional level, e.g., by reducing administrative barriers for courses that span different study programs and faculties;
- embedding science-society teaching in institutions' strategic plans as a sign of public engagement and social responsibility;
- creating frameworks that recognize interdisciplinary, experiential and co-creative learning for academic achievement;
- creating long-term relationships with societal partners through the development of Memoranda of Understanding (MOUs), jointly designed curricula and regular dialogue forums;
- allocating time to innovative teaching formats in teaching schedules;
- re-evaluating credit allocation for innovative courses to better reflect the workload required;
- developing micro-certificates or digital badges that recognize engagement in real-world problem solving;
- creating long-term funding mechanisms and teaching innovation prizes that reward engaged lecturers.

#### 3. EVALUATION AND USE OF FEEDBACK

The effectiveness of the teaching formats depends on the viewpoint of the stakeholders (i.e., learning objectives for students differ from the objectives of the partners in society). While the effectiveness is related to the specific objectives of the course and of the curricula, developing general guidelines for evaluating the effectiveness of the format according to views of different stakeholders is needed. This might include indicators to assess changes in student attitudes, stakeholder satisfaction, or changes in their perspectives and practices.

By actively considering and using students' evaluations and feedback from partners in society, lecturers can continually refine their course syllabi. This contributes to maintaining a high-quality experience for all actors involved and to strengthening the long-term perspective of innovative teaching formats.

Enhanced exchange and networking, institutional support, and integration of feedback will support the long-term perspective, scalability, and impact of teaching formats that engage with partners in society. More generally, such formats contribute to a fruitful role and use of science in societal debates. Further efforts are needed to analyze in depth how to scale up or transfer the science-society teaching formats to other contexts or disciplines.

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## More Information

Innovative Teaching Project



Swiss Young Academy



## Who are we?

Swiss Young Academy: As part of the Swiss Academies of Arts and Sciences, the Swiss Young Academy provides young researchers the opportunity to carry out inter- and transdisciplinary projects and activities at the many intersections of science and society. The Young Academy gives voice to young academics within the Swiss Academies of Arts and Sciences and serves as a networking platform to bring together individuals from many different scientific fields and institutions of higher education.

Swiss Academies of Arts and Sciences: The Swiss Academies of Arts and Sciences (a+) are an association of the five scientific academies of: the Swiss Academy of Sciences (SCNAT), the Swiss Academy of Humanities and Social Sciences (SAGW), the Swiss Academy of Medical Sciences (SAMS), the Swiss Academy of Engineering Sciences (SATW) and the Swiss Young Academy (SYA). In addition to the academies, they include the TA-SWISS and Science et Cité centres of excellence as well as other scientific networks. The Swiss Academies of Arts and Sciences network the sciences regionally, nationally and internationally. They represent the scientific communities in a disciplinary, interdisciplinary and independent manner, regardless of institutions and subjects. Their network is long-term oriented and committed to scientific excellence. They advise politicians and society on knowledge-based and socially relevant issues.

