GEOGRAPHISCHES INSTITUT

UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

Transformative Umweltforschung (TrafU): neuer MINT-Schwerpunkt im Master of Science Geographie

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Transferforum A: Transformative Skills und gesellschaftliche Verantwortung im Curriculum

Gefördert durch
Baden-Württemberg
Ministerium für Wissenschaft, Forschung und Kunst



UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

LEITLINIEN LEHRE DER UNIVERSITÄT HEIDELBERG
FÜR EINE FORSCHUNGSORIENTIERTE, CHANCEN-GERECHTE UND ZUKUNFTSGERICHTETE LEHRE

Lehre ist Empowerment zu verantwortungsvollem Handeln

Unsere Lehre zielt darauf ab, Studierende nicht
auf gesellschaftliche Herausforde
Chancengerechtigkeit, Diversität
ethischen Grundsätzen. Unser An
transformativen Kompetenzen aus
drängender Fragen beizutragen, S
eine lebendige, standhafte Demok

und neue
Herausfor
Reflexion

Seite 1 von 2

Perspective

npj | climate action

https://www.nature.com/articles/s44168-026-00360-8

https://doi.org/10.1038/s44168-026-00360-8

Fostering transformative climate action through the integration of transdisciplinary research and university teaching

Check for updates

Nicole Aeschbach[1,2,3]

November 2025

https://www.uni-heidelberg.de/de/serviceportal-lehre/exzellente-lehre/leitlinien-lehre

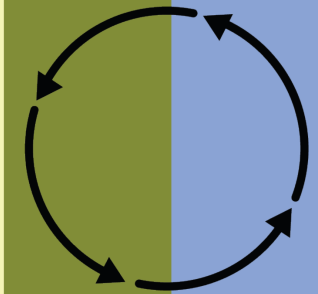
Transformative Umweltforschung (TrafU)

neuer MINT-Schwerpunkt im Master (100 %) Geographie an der Universität Heidelberg: Physische Geographie & Geoinformatik & transformative Kompetenzen

> 60 LP (inkl. Masterarbeit) im Schwerpunkt / 120 LP im M.Sc. Geographie

TrafU
Transformative Umweltforschung
Transformative Environmental Research

transformative Kompetenzen
als Querschnittsperspektive:
kritisches und systemisches Denken, Problemlösefähigkeiten, Data Literacy, Kooperations- und Kommunikationskompetenzen, Anpassungs- und Veränderungsmanagement, Perspektiv- und Verantwortungsübernahme, ethische Aspekte von Technologien



Forschung und Lehre zu ***Themen und Methoden der Geoinformatik und der Physischen Geographie*** u. a. Klima- und Umweltwandel, Klimaschutz und Anpassung an Klimawandelfolgen, Naturgefahren, Trockengebiete, hochaufgelöste 3D-Analyse, nutzergenerierte Geoinformationen, Machine Learning, hydrologische Modellierung

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LERNMATERIAL

Gefördert durch
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Lernmaterial als *Open Educational Resource (OER)* zum Einflechten transformativer Kompetenzen in MINT-Studiengänge:

SECTION 1
Climate change and Earth systems

SECTION 2
Transformative research, transdisciplinary research and transformative competencies

SECTION 3
Transdisciplinary research methods in theory and in application

SECTION 4
Environmental transformative research in practice

Transformative Environmental Research

A companion facilitating your process to acquiring transformative literacy — Third edition

Naomi Held and Nicole Aeschbach

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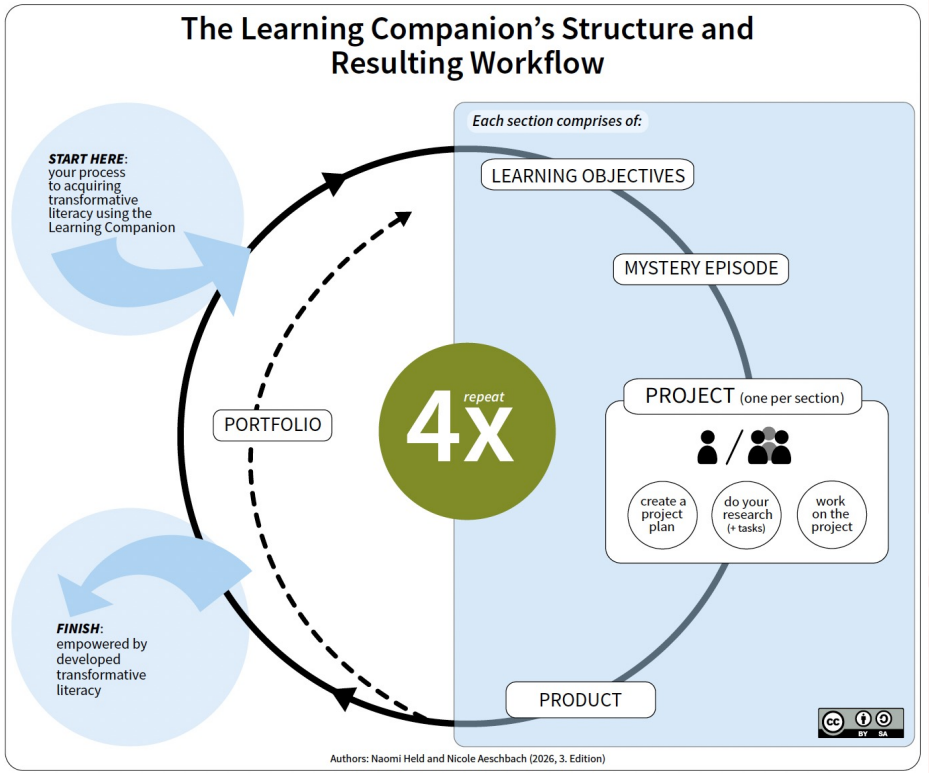
hochschuldidaktische Beratung:
Abt. Lehren und Lernen

hei SKILLS KOMPETENZ- UND SPRACHENZENTRUM
UNIVERSITÄT HEIDELBERG ZUKUNFT SEIT 1386



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LERNMATERIAL

Introduction

The mystery begins – the vanishing point

It was a stormy Tuesday afternoon at Halcyon University, where the clouds hung heavy over the gothic architecture like a secret too long kept. Raine Delaney, a fourth-year geography student, was jogging through the chilled corridors of the geography building. They were late again for their weekly check-in with Professor Iris Vantoft, the department's brilliant, razor-sharp, and slightly intimidating star researcher and faculty advisor for the university's youth media initiative. And today, uncharacteristically, she hadn't responded to Raine's texts or emails.

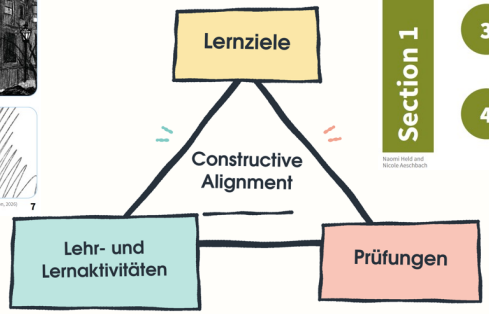
As Raine approached the professor's office, they noticed that the door was slightly ajar. That wasn't unusual in itself. Professor Vantoft had a reputation for being approachable. But today, something didn't seem quite right.

They knocked.

There was no answer.

Raine knocked again, then pushed the door open. "Professor Vantoft?"





Section 1

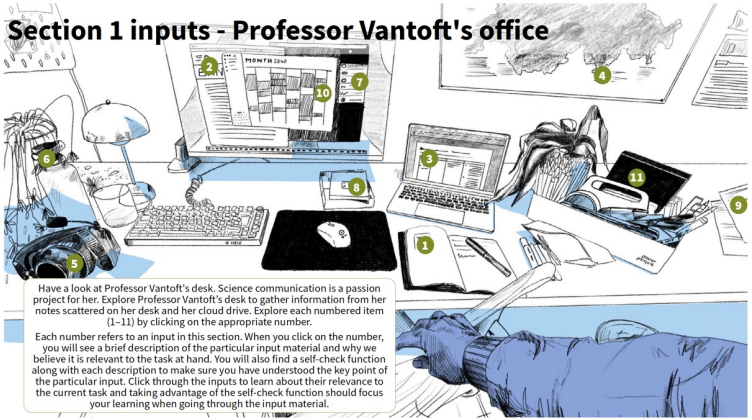
Section 1: Learning objectives

By the end of this section, you will be able to...

1. ...describe the status quo of the Earth's climate based on scientific evidence. You can explain the impact of the climate crisis on society, that it is man-made and the challenges society faces as a result. #GLO1
2. ...explain the role of scientific knowledge in climate change discourse using relevant concepts such as, but not limited to: Planetary Boundaries, Anthropocene, Footprint, Earth Overshoot, Keeling Curve, and the Carbon Budget etc. #GLO1
3. ...demonstrate the potential of solution-focused approaches to climate change (Doughnut, SDGs, Handprint, Solution-oriented approach to teaching). #GLO1
4. ...clarify the essential differences between climate change adaptation and mitigation approaches and explain the potential benefits of participatory approaches for both. #GLO1, #GLO2

Section 1

Section 1 inputs - Professor Vantoft's office



Have a look at Professor Vantoft's desk. Science communication is a passion project for her. Explore Professor Vantoft's desk to gather information from her notes scattered on her desk and her cloud drive. Explore each numbered item (1–11) by clicking on the appropriate number.

Each number refers to an input in this section. When you click on the number, you will see a brief description of the particular input material and why we believe it is relevant to the task at hand. You will also find a self-check function along with each description to make sure you have understood the key point of the particular input. Click through the inputs to learn about their relevance to the current task and taking advantage of the self-check function should focus your learning when going through the input material.

Section 1

Project 1: Planet Pals

You are covering for Professor Iris Vantoft and are responsible for the prep work for the Planet Pals episode: "Science in simple terms – the status quo of climate change." You are welcome to come up with a more creative name for the episode, if you wish. Prepare the show's script, so that it is ready for recording. Meet up in your teams and decide what work needs to be done, by whom, and when it should be completed. The aim of the episode is to explain climate change from a solution-oriented perspective, and to motivate children to take action and participate in initiatives that aim at the mitigation of and adaptation to climate change.

Your script must be both child-friendly and factually correct. Define the age range of your target audience. Choose a range of a maximum of two years, from the ages of 12 to 18. In addition to your script, you will prepare a storyboard, which, among other things, visually shows how the content of your program develops.

It is up to you whether you use existing clips and images, or draw your own sketches. Additionally, you are asked to include all your sources used for your text and visualization using an academic citation style, such as APA citation.

In the appendix you can find a template for the storyboard, which you are welcome to use. If you create your own storyboard layout, make sure that there is always a specific dedicated space in your layout for the visual presentation of each scene, the associated text, and your detailed citations. The spoken script should be roughly five minutes in total.

Work through and structure the following section inputs (1–11) and follow a solution-focused approach for your news program. You may choose a response to a specific climate change catalyst or a range of climate change mitigation or adaptation measures, which you will read about throughout the input material. You are also welcome to use other sources, make sure to cite all of them.

To help you stay on track, you will need to make a project plan. What are the time requirements? Which tasks do you need to be aware of? How can you appropriately distribute the work amongst your team to be most effective? What are your first steps? A template of a project plan is provided in the appendix of this document.

Submit:

- ☐ Project plan
- ☐ Storyboard

Submission date:

Screenshots Learning Companion Held & Aeschbach, 2026; Gestaltung inkl. Zeichnungen: Naomi Held | Grafik zum Constructive Alignment: Konzept Biggs & Tang, 2011; Visualisierung: GPT-6 Sol

BLENDED-LEARNING-SEMINAR

während des Seminars:

- Präsenztreffen im Plenum und in den Lerngruppen (in der 1. Sitzung inkl. einer Einführung in den Einsatz generativer KI beim Lernen im TrafU-Seminar und Vorstellung der Eigenständigkeitserklärung)
- Selbstlernen auf Basis der Inputs aus dem Learning Companion inkl. Portfoliofragen zur begleitenden Reflexion
- Projects und Tasks aus dem Learning Companion mit schriftlichen Abgaben inkl. Deklaration des Einsatzes generativer KI
- Feedbackgespräche zu den Projects und Tasks

am Ende des Seminars:

- schriftliches Assessment
- Learning-Review-Gespräche

TrafU WAS WIR UMGESETZT HABEN...

- ❖ Lernmaterial entwickelt
- ❖ Blended-Learning-Seminar konzipiert
- ❖ neue Prüfungsformate entwickelt
- ❖ Studienschwerpunkt TrafU implementiert

TrafU WAS WIR ERREICHT HABEN...

- ✓ Perspektivenvielfalt gefördert
- ✓ Übertragbarkeit sichergestellt
- ✓ Zielgruppe erweitert
- ✓ Sichtbarkeit erhöht

TrafU WAS WIR GELERNT HABEN..

- ➢ OER-Lernmaterialproduktion ist aufwändig.
- ➢ OER-Lernmaterialproduktion ist sinnvoll.
- ➢ Veränderungen können auch schnell gehen.
- ➢ Transformative Kompetenzen stärken Teilhabe.



DOWNLOAD DES LERNMATERIALS:
https://doi.org/10.11588/heidok.00039355

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TrafU
Transformative Umweltforschung
Transformative Environmental Research

...und natürlich auch auf dem
< ZOERR >

VIELEN DANK FÜR IHRE AUFMERKSAMKEIT

DR. NICOLE AESCHBACH | https://www.geog.uni-heidelberg.de/de/trafu