Land use change and future spatial development

Promoting pre-service primary school teachers' ***Learning to Think Spatially*** through the Model of Educational Reconstruction



Student FS19, Foto: K. Huser

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Study's intentions: Teaching *Spatial Thinking* through geography



Main question:

How can pre-service primary school teachers' spatial competence be promoted (in 3 lessions)? (e.g. Komorek & Prediger 2013; Jo & Bendnarz, 2014)

Aim: Quality improvement of teaching at the university of teacher education.

Type: explorative study (e.g. Budke 2015, 10-11; Hoffmann 2015, 99)

Introduction

Example: difficulties of the issue

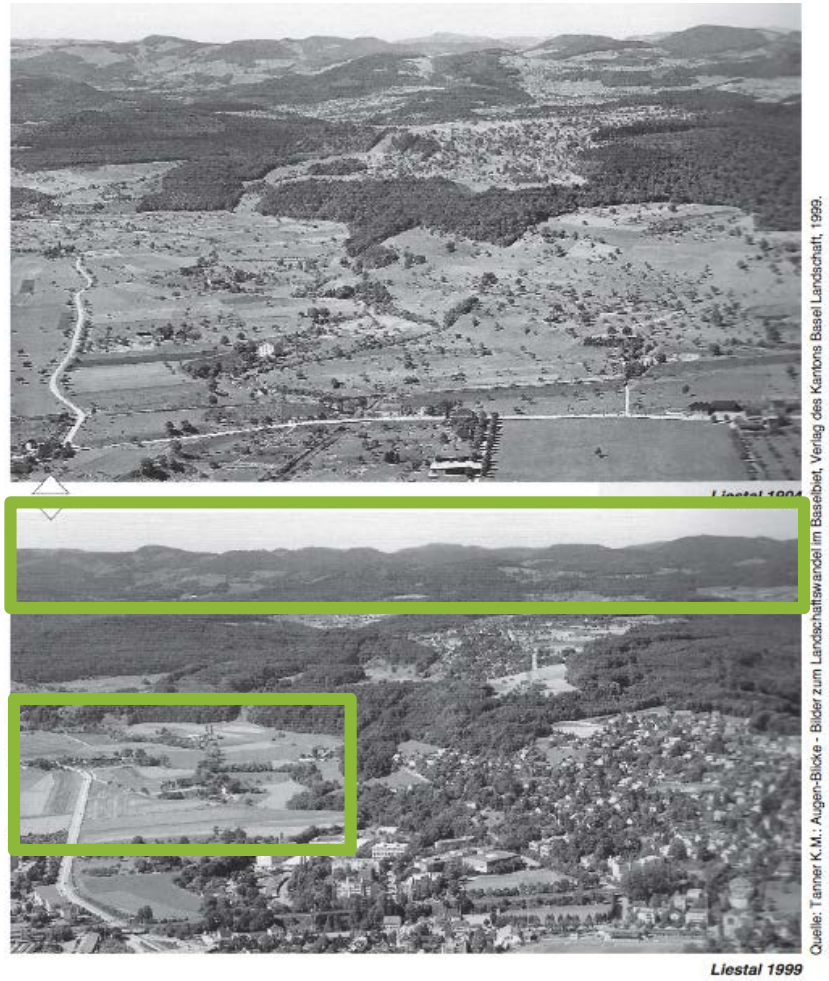
Swiss Curriculum 21: Pupils can detect spatial changes (D-EDK 2016, 53)



Introduction

Example: difficulties of the issue

Swiss Curriculum 21: Pupils can detect spatial changes (D-EDK 2016, 53)



Pre-service teachers' preconception (N 39)
Describe what has changed.

- Deforestation (7)
- Fewer single trees (4)

Confirmation bias (e.g Möller 2007; Reinfried 2015, 80-81)

Lack of knowledge (e.g Kalcsics & Wilhelm 2017, 55; Kattmann 2017, 6)

Design

Model of Educational Reconstruction (Gropengiesser & Kattmann 2013)

Aim: make scientific knowledge teachable and learnable

comparision

Experts' knowledge
6 texts, 117 p.



Pre-service teachers' preconceptions (N39)
open questions, questionnaire

Guidelines for learning opportunities;
creating and evaluating the learning opportunities (N20)
Collecting: open questions; pre- post- follow up tests

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Theory

Embodied cognition and metaphors (Lackoff & Johnson 2011; Schmitt 2017)



https://www.melbournechildpsychology.com.au



https://de.dreamstime.com

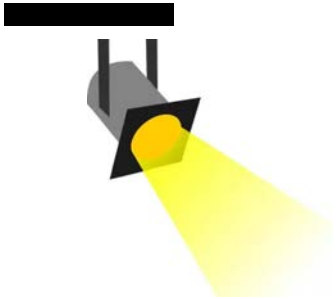
concrete **abstract**

LAND USE CHANGE IS MORE OR LESS (LOSS) OF SOMETHING IN THE CONTAINER

«Because of population growth…more and more landscape is lost.» (Student G, 23 age)

Theory, example

Embodied cognition and metaphors (Lackoff & Johnson 2011; Schmitt 2017; Caviola et al. 2018, 14)



«Because of population growth…more and more landscape is lost.» (student G, 23 age)

More people → less landscape

Highlighting effect: number // man not a part of landscape

language create issues (Discours linguistics) (e.g.Caviola et al. 2018, 14)

space is constructed by spatial language (Daun 2007; Kühne 2015)

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Methods

Interpretation Pattern Analysis (Meuser 2018; Oevermann 2001)

Aim: Reconstruction of collective spatial knowledge

Collection

Students' view: open questions (Petersen 2014) , questionnaire

Experts' view: 6 specialist texts, 115 p. (2012-2017)

Analysis	**Qualitative Content Analysis** (Mayring 2015, Gropengiesser 2008) **Metaphor Analysis** (Lackoff & Johnson 2011; Schmitt 2017)
1. Summary	commonly used terms
2. Explication	what (content analysis) how (metaphor analysis) } concepts
3. Structuring / Classification	Figures of thought → inter-rater reliability

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Results - examples

Students' problem definition of land use change

Study question: What kind of knowledge do students show?

–«…the population growth is great and many new buildings must be constructed. The problem is…nature as fields and forests are suffering. There are many destroyed ecosystems and habitats for animals.» (student K)

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Results - examples

Problem definition: Students ‘figures of thought’

Study question: What kind of knowledge do students show?



Planned buildings, felled trees. Foto: K. Huser

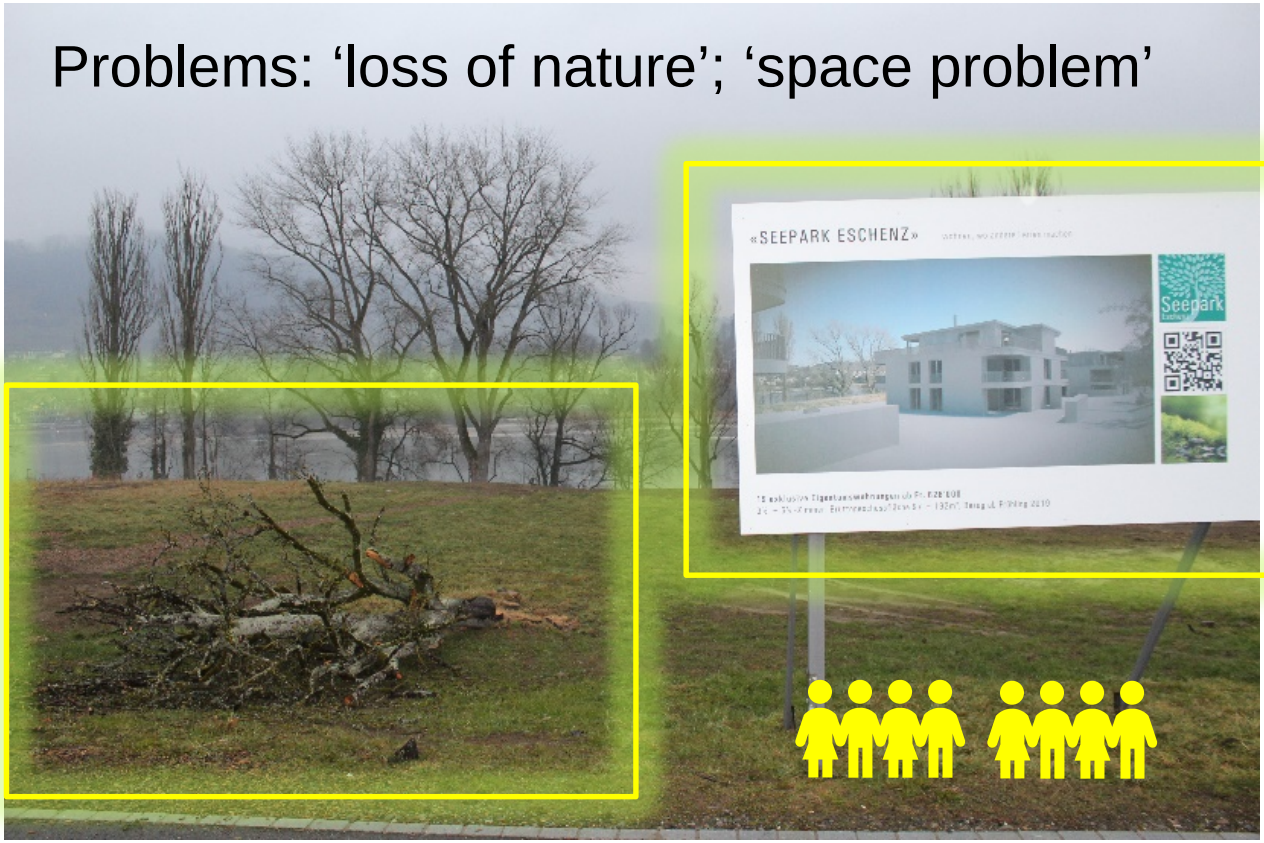
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Results - examples

Problem definition: Students ‘figures of thought’

Study question: What kind of knowledge do students show?



Planned buildings, felled trees. Foto: K. Huser

Results - examples

Experts' problem definition of land use change

Study question: What kind of knowledge do experts show?

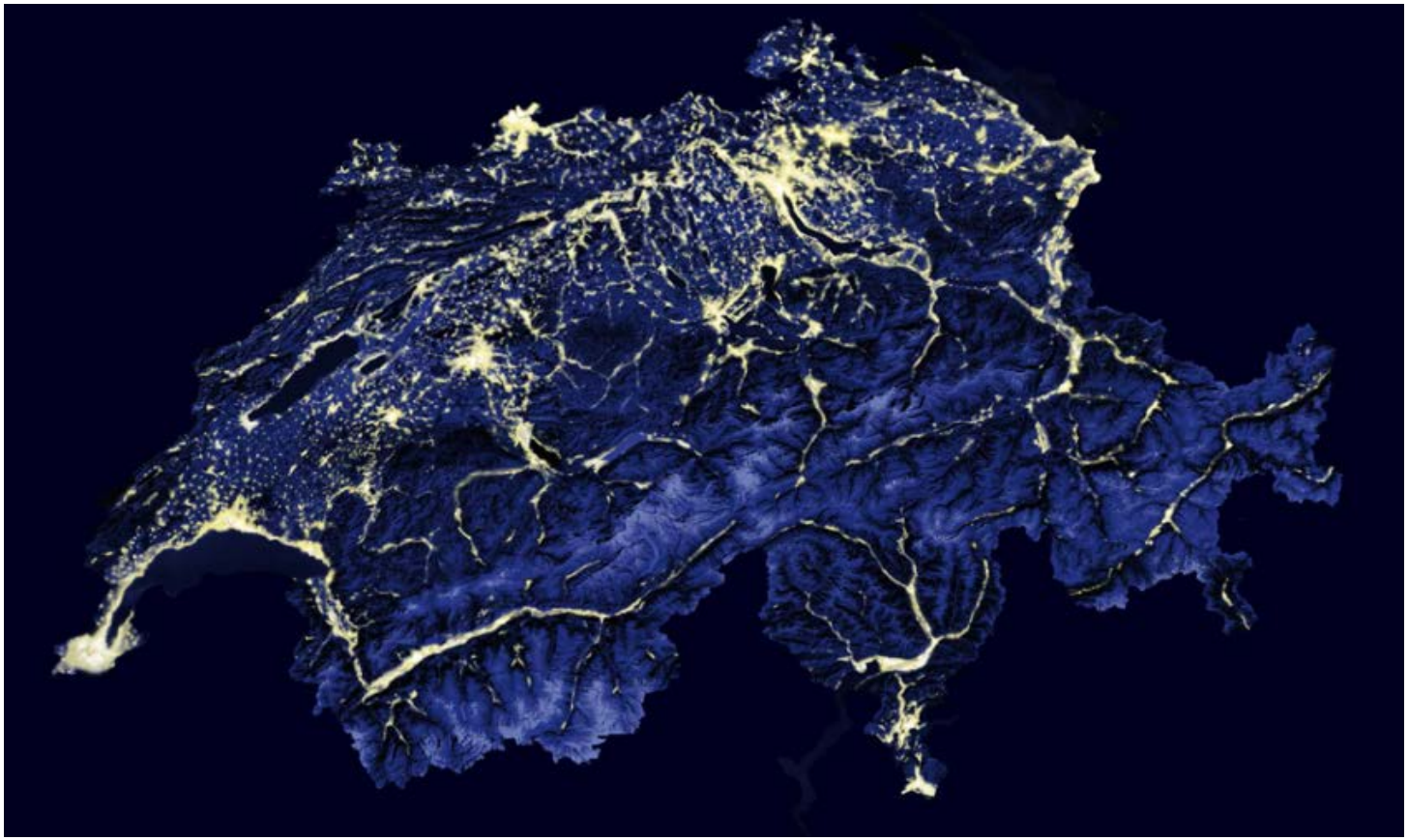
- «... landscape qualities are lost due to population growth and increasing resource consumption.» (BAFU, WSL 2017, 7)
- «…the pressure on landscape quality...is...high. This affects biodiversity, the ability of natural resources to regenerate, the quality of life and the potential for recreation, leisure and tourism.» (Schweizerischer Bundesrat 2016, 18)

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Results - examples

Problem definition: Experts ‘figures of thought’

Study question: What kind of knowledge do experts show?

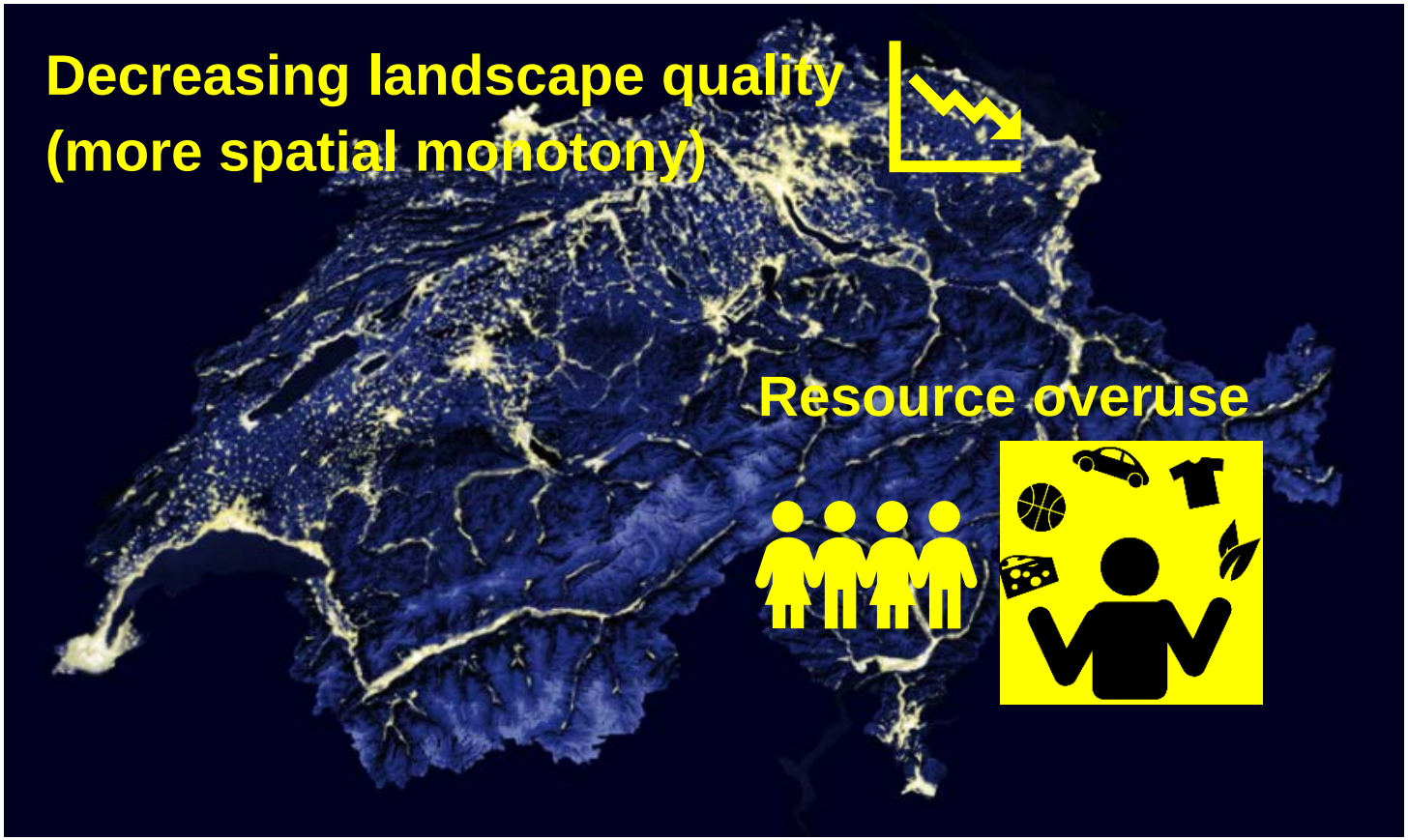


Swiss light emissions, http://www.umsicht.ch/grenzenloses-licht/

Results - examples

Problem definition: Experts ‘figures of thought’

Study question: What kind of knowledge do experts show?



Swiss light emissions, http://www.umsicht.ch/grenzenloses-licht/

Results – examples

Comparison

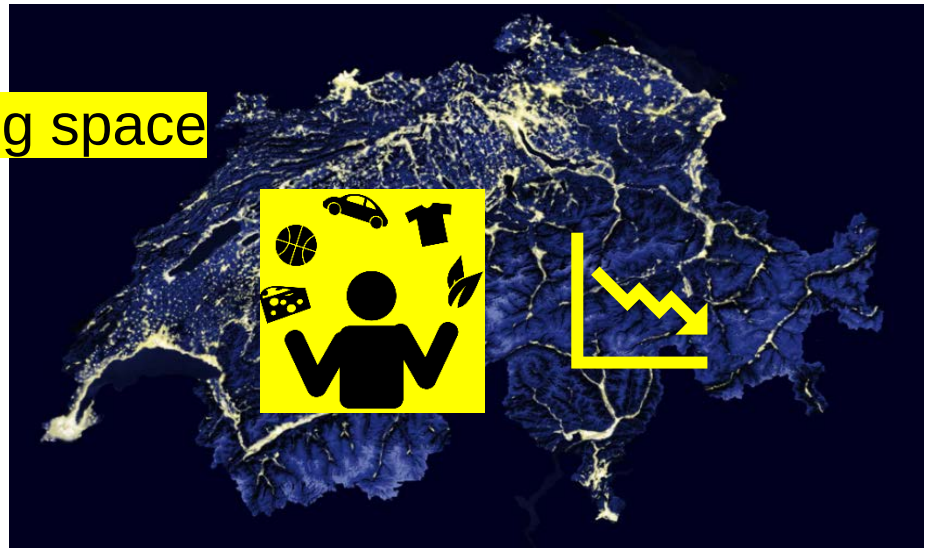
Students' problem definition
loss of nature, space problems

Experts' problem definition
resource overuse (lifestyle); decreasing landscape quality (spatial monotony)



Planned buildings, felled trees. Foto: K. Huser

shrinking space



Light emissions, http://www.umsicht.ch/grenzenloses-licht/

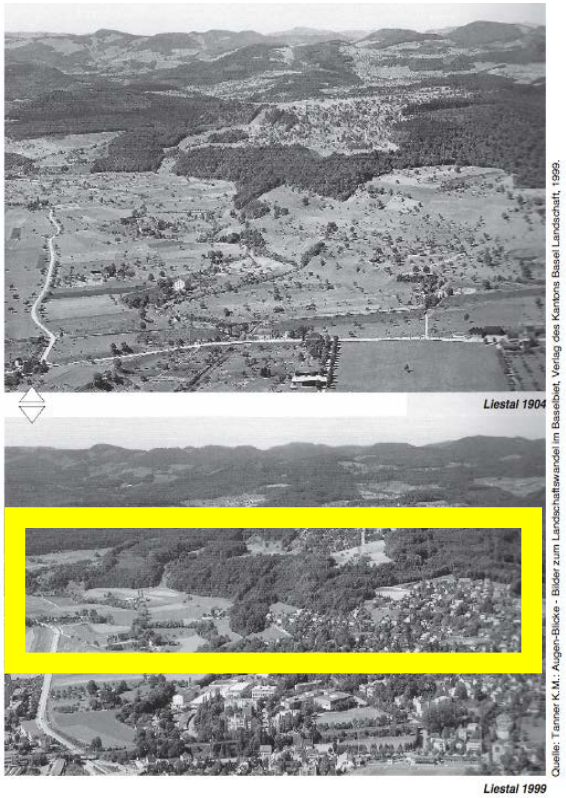
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Result - example

Guidelines

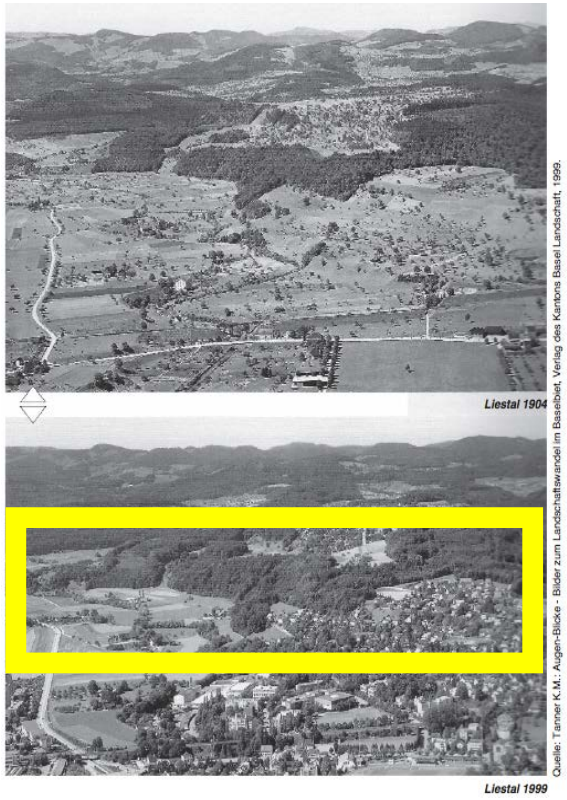
Study question: What guidelines result from the comparison?



Result - example

Guidelines

Study question: What guidelines result from the comparison?



Guidelines

- CK: Promotion of perception and knowledge about spatial diversity.
- CK: Communicate spatial diversity as an important value for society, nature and economy.
- PCK: Transfer for primary school



http://www.birdlife.ch/node/882

http://www.greencity.ch/de/areal/



Transfer 2th: Detect and communicate spatial diversity as value» (e.g, Lehplan 21, Adamina et al. 2016; OECD 2018)

School Hirschthal



Summary

Importance of CK and PCK

Remember Spatial Citizenship (Adamina et al. 2016, 9 & 2013, 5; OECD 2018, 5)



students PHZH 2018; K. Huser

Landscape quality

We are all part of the problem, so we are all part of the solution.



9 year old builds a diverse mini-landscape, K. Huser


Thanks!
To find out more: Spring 2020
http://www.herausforderung-lehrerinnenbildung.de/index.php/hlz
Astronomy Picture of the Day
2000 November 27
http://antwrp.gsfc.nasa.gov/apod/astropix.html

Literatur

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