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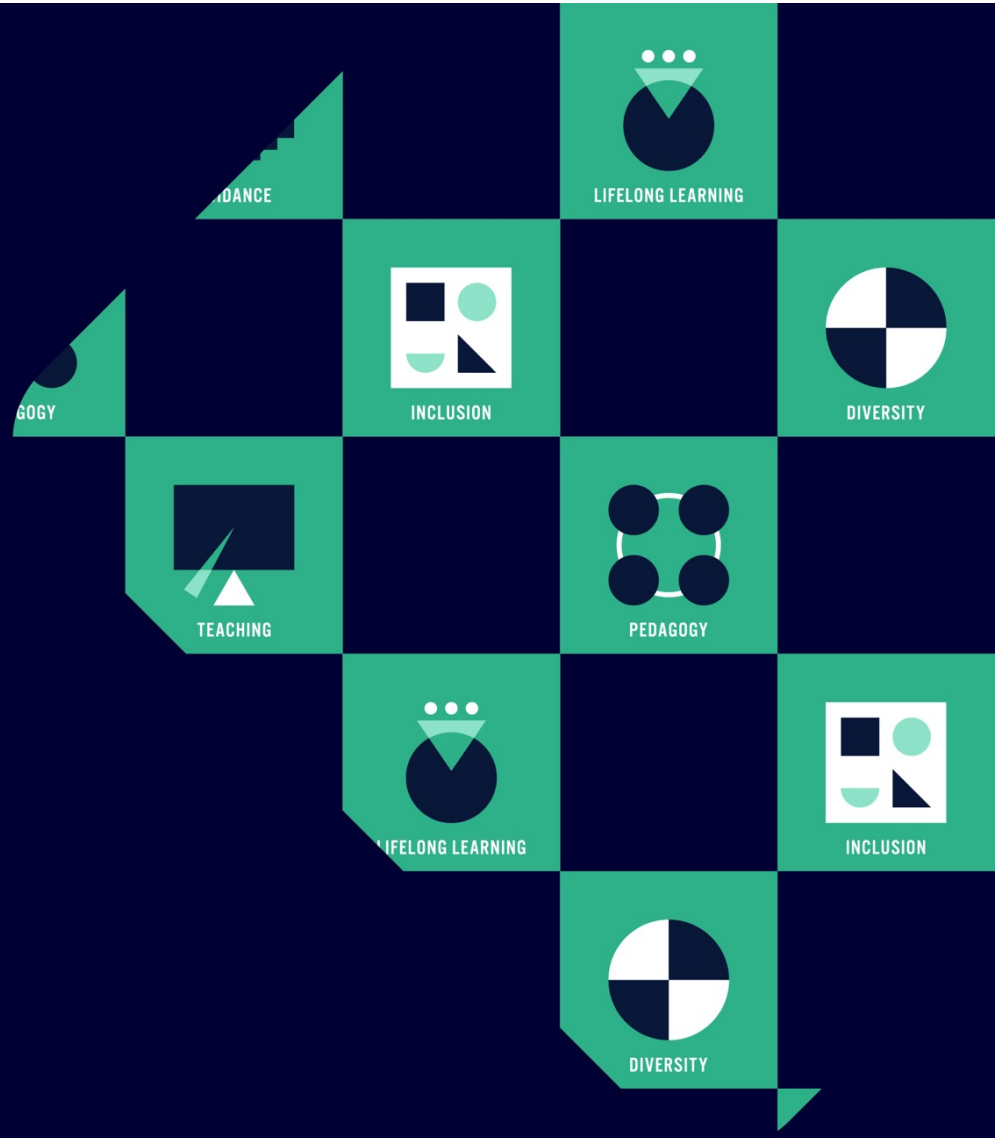
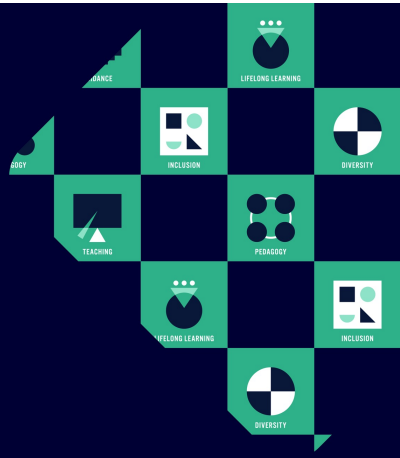
Developing Scientific Literacy in Pre-Service Primary School Teachers

07/02/2025 - ACT - Teaching Day

FACULTY OF HUMANITIES, EDUCATION AND SOCIAL SCIENCES



Pedagogical Problem

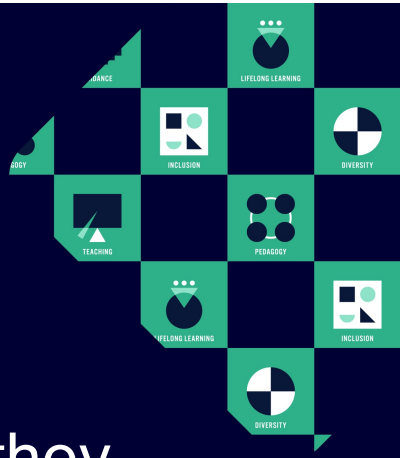


- Develop scientific reading & writing competences
- Capacity to engage with research literature
- Develop a scientific stance
- Capacity to independently form scientifically informed positions, empowerment & emancipation
- Informed decision making, evidence-based teaching, effective communication (colleagues & parents)
- Leitmotif: reflective practitioner (Schön, 1987)
- Theory-practice integration

Pedagogical Problem

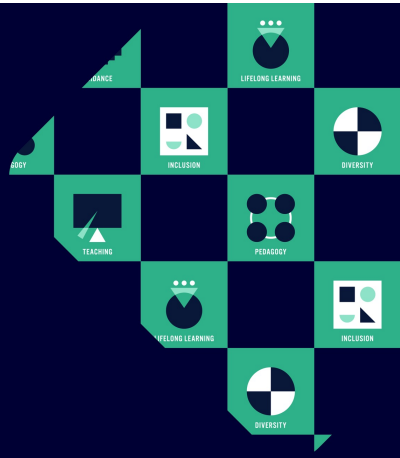
- We wish to develop **rational** thinking, **conceptual** thinking, **logical** thinking and **critical** thinking in our students (**Libre Examen** at ULB, Brussels/Belgium)
- Learning to read and process scientific literature and learning to write in a scientific way, helps students **becoming reflective practitioners** that go b**eyond intuitive** and even **deliberate reflection**, being able to **systematically reflect** on their own teaching, and on the students learning process.

Pedagogical Problem



- We strongly belief that developing academic reading and writing skills are important for the development into autonomous and creative teachers. **Autonomous** means they do not just teach the way they have been thought and **creative** means they find new ways of teaching.
- Learning to read and process scientific literature and learning to write in a scientific way, helps students **becoming reflective practitioners** that goes **beyond intuitive** and even **deliberate reflection**, being able to **systematically reflect** on their own teaching, and on the students learning process.

Our Solution



Workshop with active pedagogy approaches, auto-socio-construction of knowledge, like project-based learning, problem-based learning, meaningful tasks, student autonomy, collaborative and cooperative learning, dialogues, and discussions, aiming to establish communities of learners

Our Solution

Students are required to **collaboratively write** a **review of the literature**, where they develop an empirically grounded answer to a **self-chosen research question**. Before writing their review, they need to (1) **search** for 15 scientific, primary, empirical and peer-reviewed research papers, (2) **read** them, **analyse** and **evaluate** them in terms of content, relevance and credibility, (3) develop an **annotated bibliography** about 5 sources.

In addition, they have to **document** their working and learning process and to **reflect** on it.

Our Solution

- We provide a diversity of online **resources**, as well as systematic **formative feedback**. We **scaffold** their learning process without doing the work for them.
- We have them work in groups.
- We let them choose their own research question.
- The university provides them with a large online library with research papers.

Challenges

Students struggle with certain aspects of the course:

- **First**, they did not have much prior exposure to scientific or academic writing. They do need to re-learn how to read and how to write, because academic papers are far from their habits.

Challenges

Students struggle with certain aspects of the course:

- **Second**, they tend to bring along a positivist conception of science that makes it difficult for them to engage in critical thinking about research papers. This also often leads them to work on research questions that concern socio-economic contextual factors or longitudinal effects, which have little direct relevance on in-class teaching strategies.

Challenges

Students struggle with certain aspects of the course:

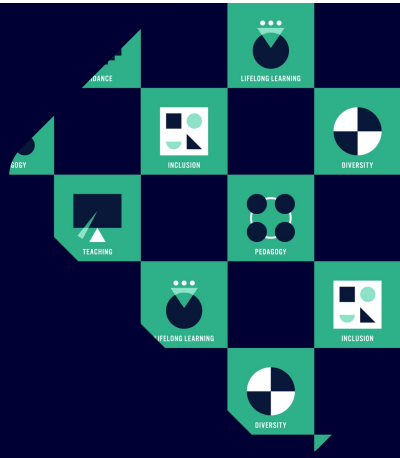
- **Third**, they struggle with how to organise themselves as a group of learners, they underestimate the need to work over the semester and to overcome moments of frustration. Some groups, for instance, would rather change their research question, if they do not find suitable sources, than rethinking their bibliographic search strategies.

Challenges

Students struggle with certain aspects of the course:

- **Finally**, many students find our teaching approach itself very challenging, because we give them a lot of freedom to make choices, which also means that they become responsible for them.

Reflections

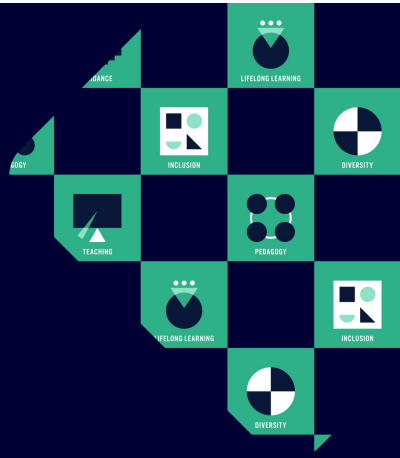


First, we would understand that some of you are surprised to see that we have special courses on scientific reading and writing in our initial teacher training programs, because in many places students are expected to develop these skills on their own, when confronted with scientific papers in other courses and when required to write academic essays.

Reflections

- Overall, we are quite satisfied with our teaching practices, in both programmes, because we think that
  - (1) teaching scientific reading and writing to our future teacher students is important and relevant, and
  - (2) that we implement appropriate hands-on, learning by doing approaches.

Reflections



- We are trying to **empower** them, to help them develop the tools for their own **emancipation** which - hopefully, will enable them to navigate the stormy seas of a **knowledge society**.

Reflections

- There are nevertheless some challenges we have been facing and wish to address in future iterations of our courses, given the increasing number of students that we will have in future years.
- And we would love to do more systematic empirical research about the “impact” of our pedagogical practices, to critically reflect them.

Questions to you?

- What do you think about scientific reading & writing being a part of the the curriculum of ITT?
- What are your own experiences with teaching scientific reading & writing in your programmes?
- What's your opinion about the solution that we put in place?
  - What did you like?
  - What did you not like?
  - What could you imagine copying?
  - How would you improve our solution?

Let’s keep in touch

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