How to educate teacher students' scientific thinking – Finnish experiences

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Strategic plan of the University of Helsinki 2017-2020

”Students will be introduced early on to research-driven work methods and participate in research during their Bachelor’s and Master’s level studies.”

http://strategia.helsinki.fi/en/#development-areas2/interaction-and-learning-in-the-scientific-community

The roles of ’teachers’ and ’students’

“Students ‘co-construct’ knowledge via dialogue with each other and their teacher as part of **an academic ‘community of practice**’.” (Vygotsky, 1978; Lave & Wenger, 1998)

“Education must begin with the solution of the teacher-student contradiction, by reconciling the poles of the contradiction so that **both are simultaneously students and teachers**” (Freire, 1970, p. 72)

Research-driven methods

-Research-led: Learning about current research in the discipline. Here the curriculum focus is to ensure that what students learn clearly reflects current and ongoing research in their discipline. This may include research done by staff teaching them.

-Research-tutored: Engaging in research discussions. Here the focus is on students and staff critically discussing research in the discipline as, for example, in many seminar-based courses.

-Research-oriented: Developing research skills and techniques. Here the focus is on developing students' knowledge of and ability to carry out the research methodologies and methods appropriate to their discipline(s) or profession.

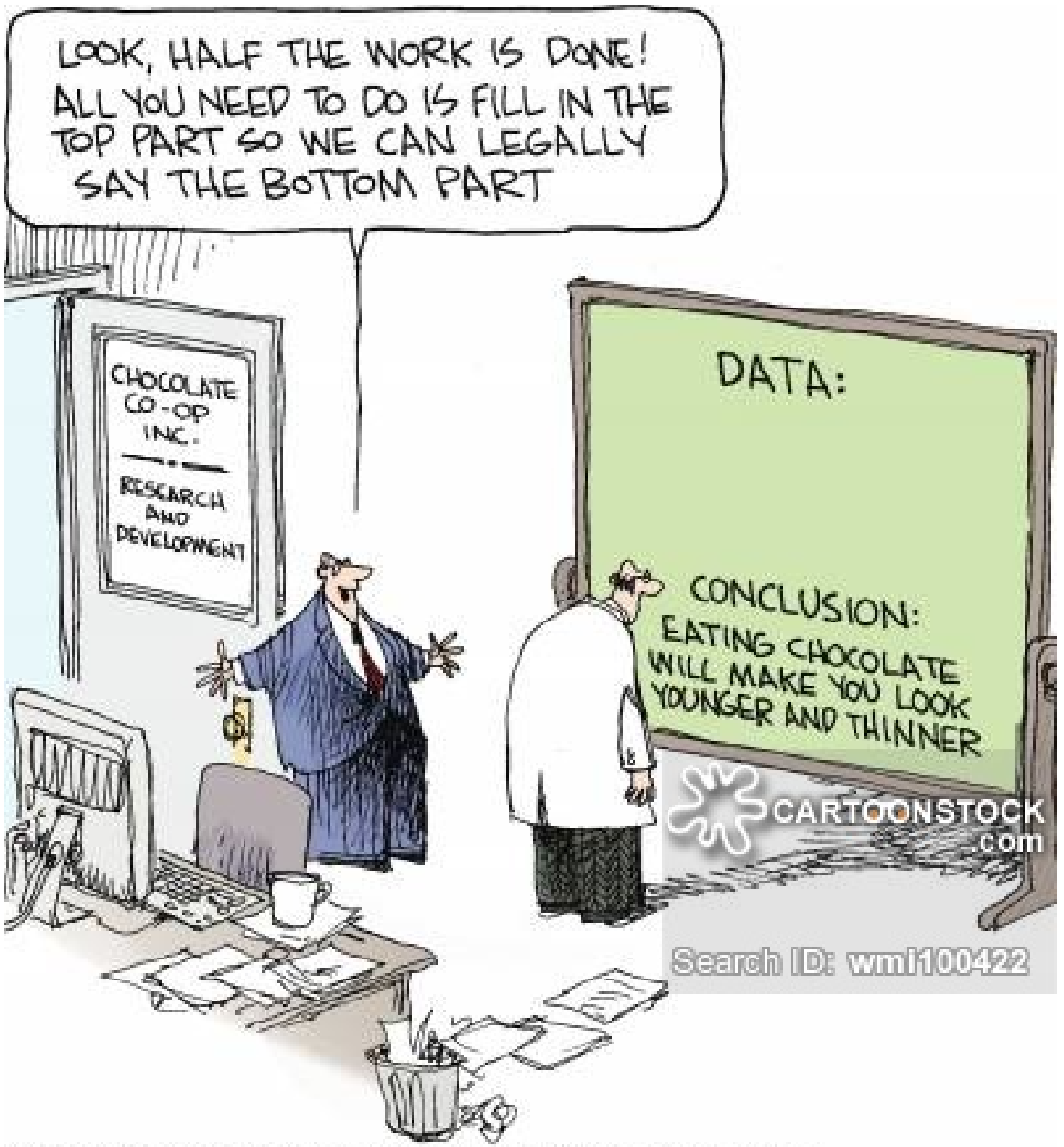
-Research-based: Undertaking research and inquiry. Here the curriculum focus is on ensuring that as much as possible the student learns in research and or inquiry mode."

See: Griffiths, R. (2004) Knowledge production and the research-teaching nexus: the case of the built environment disciplines, Studies in Higher Education 29(6), 709-726

Healey, M., Flint, A., and Harrington, K. (2014). Engagement through partnership: students as partners in learning and teaching in Higher Education. York: HEA. http://www.heacademy.ac.uk/assets/York/documents/resources/publications/DevelopingUndergraduate_ Final.pdf

How to enhance engagement in undergraduate research

1. Define ‘research’ broadly
2. Define ‘publication’ broadly
3. Build publication into course and programme requirements
4. Build publication into dissertation and honours-level requirements
5. Use digital technology to create a repository of work
6. Involve students in the publication process.
7. Co-create a culture where students want to participate and expect to be involved
8. Highlight the employability benefits of undergraduate research.
9. Allow co-production with staff and/or peers
10. Allow students to retain the copyright to their work and follow ethical rules of good research.



Why critical thinking?

Critical thinking <–> scientific thinking

-Critical thinking is an essential part of scientific thinking. By the simple definition it involves the evaluation of sources such as data, facts, observable phenomenon, and research findings.

- Good critical thinkers can draw reasonable conclusions from a set of information and discriminate between useful and less useful details.

- This skill is valuable especially for teachers while co-creating meaningful learning projects extending over the borders of individual school-subjects.

Post-factual era

- The term *post-factual* was initially used by Ralph Keyes in his book *"The Post-Truth Era"* which was published already in 2004.

- "**In the post-truth era we don't just have truth and lies but a third category of ambiguous statements that are not exactly the truth but fall just short of a lie. *Enhanced truth* it might be called. *Neo-truth. Soft truth. Faux truth. Truth lite*." (Ralph Keyes, 2004)**

- Emotions are becoming more and more important than mere facts. People start to base their opinions on their intuitions, feelings and emotions, rather than being rational and listening to statistics, facts and genuine truth.

- Instead of drawing conclusions based on facts, some people just believe what they want to believe in.

Truth becomes a question of power. Whoever rules about the feelings and morales of people, is in the right.

Keep on wondering - learning directed by making questions

WHY?

- ”A good question is half of the answer”
- Asking forces you to think and use information creatively
- In successful learning the learners starts making questions which get more difficult and deep as the process goes along.
- At its best learning is a creative process of making and answering relevant questions.

Home economics teacher education - example

Department of Teacher Education

-On January 1st 2017, **Department of Teacher Education** was established into the Faculty of Educational Sciences

- DTE provides studies in six different educational programmes:

  Class teacher education

  Craft Science and Textiles teacher education

  Home Economics and Home Economics teacher education

  Kindergarten teacher and early childhood education

  Subject teacher education

  Special education

Home Economics Teacher education

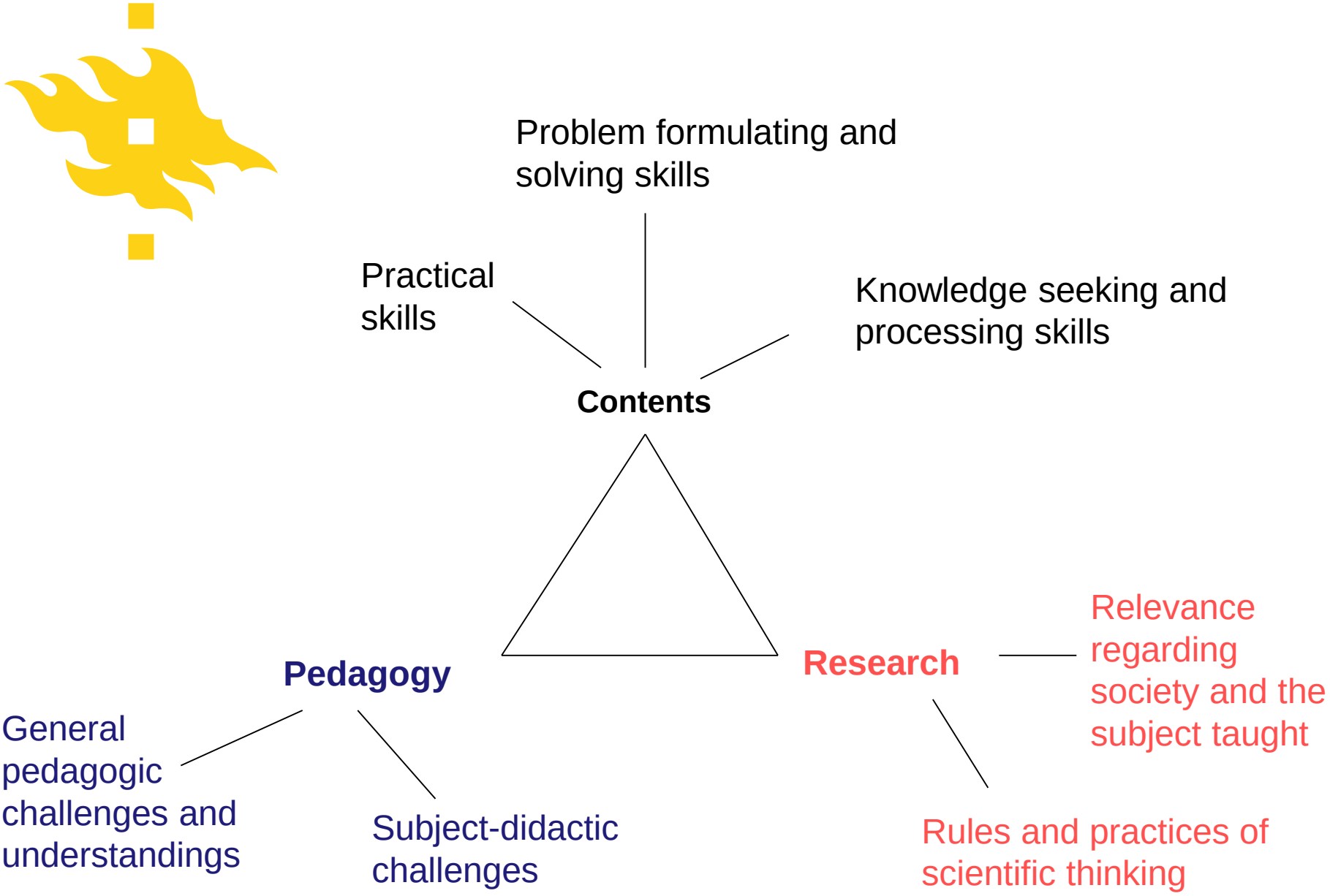
- Students in Home Economics Teacher education complete a Bachelor of Arts (Education) degree (180 ECTS) and **continue directly to Master of Arts (Education)** degree (+120 ECTS).

- Master's level degree is compulsory for a permanent teaching post in Finland.

- Home Economics studies (Master's degree) include 120 ECTS credits of subject studies in the main subject to be taught, i.e. Home Economics.

- Studies in Education include the teachers' pedagogical studies of 60 ECTS credits required for a teacher's qualification, 'ämnesdidaktik' included.

- Path to postgraduate studies is available (doctoral degree).


Problem formulating and solving skills
Practical skills
Knowledge seeking and processing skills
Contents
Pedagogy
Research
Relevance regarding society and the subject taught
General pedagogic challenges and understandings
Subject-didactic challenges
Rules and practices of scientific thinking

SUBJECT DIDACTICAL DEVELOPMENT PROJECTS AND TEACHING PRACTICE AT SCHOOLS

https://blogs.helsinki.fi/kotitalouspedagogiikka/ainedidaktiset-kehittamisprojektit/

2017

- **Ravintolapäivä – Oppilaslähtöisyys kotitalousopetuksessa //Pop-up restaurant-day, co-operative learning**
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- **Aistit ja aistinvarainen arviointi kestävän kehityksen näkökulmasta // Sensory evaluation, sustainable development**

Teach differently!

”The overall theme of the year 2017 Didactic Development Project in Home economics education was to Teach Differently! This slogan encourages the teacher trainees to creatively experiment with new teaching and learning methods and ***to step out of their own familiar comfort zone****.*

We decided to develop and experiment a teaching method previously unknown to us, namely using video-clips as a learning tool. This means that the students design, write manuscript and shoot the short video on a given theme raised from the curriculum. Their task is to keep the designed video pedagogical so that the peers will learn new things by watching it. ”

Conclusions

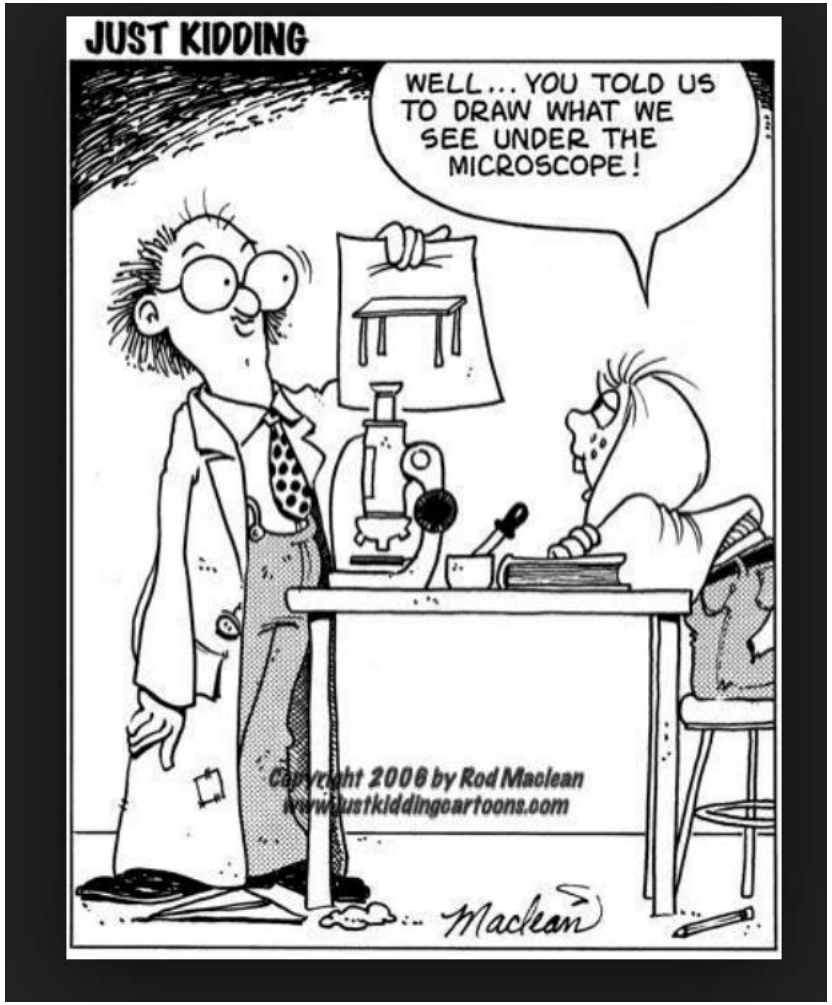
Learning for school or for the real life?

What kind of **learning tasks** are developed/used during teacher studies?

- How these tasks enhance deep-level learning?
- How these tasks enhance transfer of knowledge and skills?
- How these tasks enhance scientific thinking?

Universities <-> training schools <-> schools <-> 'real life'

Metaskills or bits and pieces of information?



- Scientific thinking is the most valuable tool for a teacher and for a teacher educator.

- Thinking, in general, is the most valuable tool in life…

The essence of teacher education?