Naturfaget og naturfagdidaktikkens rolle i lærerutdanninga – Fra fragmentering til integrering

Doris Jorde

ProTed

Framework for PCK

1. How do we define the subject matter?
2. What are different purposes for teaching it?
3. What does understanding look like?
4. What curricula are available for teaching?
5. How to assess student understanding?
6. What are the practices that characterize teaching the subject?

Designing a teacher education program that allows for reflection and practice around these questions

Grossman, P., Schoenfeld, A., and Lee, C. (2005) *Teaching Subject Matter*. In, Preparing teachers for a changing world. What teachers should learn and be able to do. National Academy of Education

Teachers for the school of the future: «Change agents»

Transformative perspective

Ian Menter,
Oxford University

Different Teacher «types»

- **The effective teacher** – emphasizing skills, content, performativity and measurement
- **The reflective teacher** – skills and content but with the addition of knowledge about learners and consideration of the values underlying and the purposes of education
- **The inquiring teacher** – systematic inquiry into all of the above, deploying research and evaluation methods and techniques
- **The transformative teacher** – adopting a critical inquiry approach looking beyond the classrooom, considering social context, moral and ethical issues

Ian Mentor, 2016

The transformative teacher

This is the teacher that will help children recognize the way in which environmental matters relate to their own communities as well as to the wider world, the teacher making use of new technologies, while developing critical awareness of their use at the same time.

Re-conceptulization of teaching

Scholars agree that powerful teacher education programs:

- **Break down divisions between subject, pedagogy and practice**
- **Should be closely tied to practice, breaking down the theory/practice divide**
- **Should be coherent both conceptually and structurally (reorganize around a set of core practices)**

Grossman, Hammerness and McDonald, 2009

Teaching Core Practices

- Advocate an approach to practice-based teacher education that identifies “core practices” of teaching and supports novice teachers in learning how to enact them competently.

Pam Grossman,
University of Pennsylvania

Core Practices of TE

- Practices that occur with high frequency in teaching;
- Practices that novices can enact in classrooms across different curricula or instructional approaches;
- Practices that novices can actually begin to master;
- Practices that allow novices to learn more about students and about teaching;
- Practices that preserve the integrity and complexity of teaching; and
- Practices that are research-based and have the potential to improve student achievement.

Grossman et al. 2009

Examples of high leverage (Core) practices

- Leading a guided reading lesson
- Reading aloud to children
- Leading a classroom discussion
- Providing clear instructions and explanations

Learning about Core Practices in TE
Leading a discussion

- Leading discussions
  - Identifying generative questions
  - Choosing rich problems to discuss
  - Re-voicing student ideas
  - Responding to student ideas

- Importance of integrating these practices into subject courses
  - What are good questions in science? Social studies?

Learning about Core Practices in TE
Creating a classroom culture

- Teaching students routines for working together (within subject domains)
  - Understanding group dynamics
  - What to do when groups don't work
  - Peer response to writing – constructive feedback, etc
  - Asking good questions within the group

Learning about Core Practices in TE
Learning about student understanding

- Eliciting student thinking
- Anticipating student responses
- Eliciting further thinking – asking «why» or can you explain
- Knowing about alternative conceptions

Proposing a Core Set of Instructional Practices and Tools for Teachers of Science

Windschitl, Thomson, Braaten and Stroupe

2012, Science Education

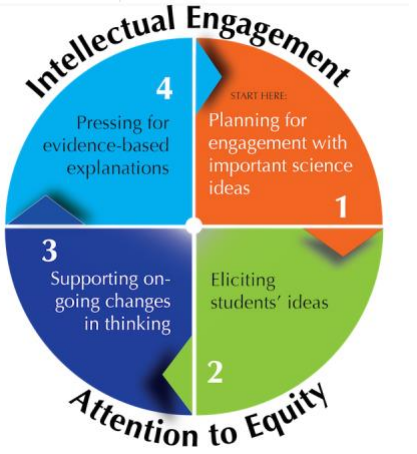
High Leverage Practices

- Practices are activities teachers engage in to support student learning.

1. Constructing the Big Idea
2. Eliciting students' ideas to adapt instruction
3. Supporting on-going changes in thinking
4. Pressing students for evidence-based explanations

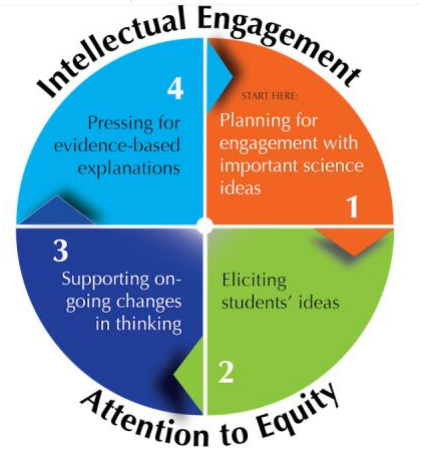
Planning for Engagement with the Big Ideas of Science

- Batteries and bulbs is really about the transformation of energy.
- Necessary to identify big ideas in order to accomplish ambitious teaching.



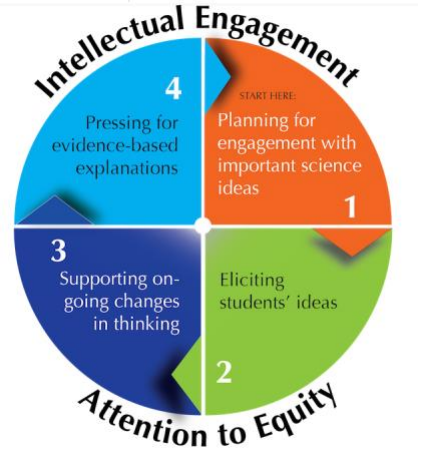
Eliciting students' ideas

- Eliciting observations from students about the phenomenon
- Encouraging students to offer initial causal hypotheses about the phenomenon
- Revisiting ideas of instruction



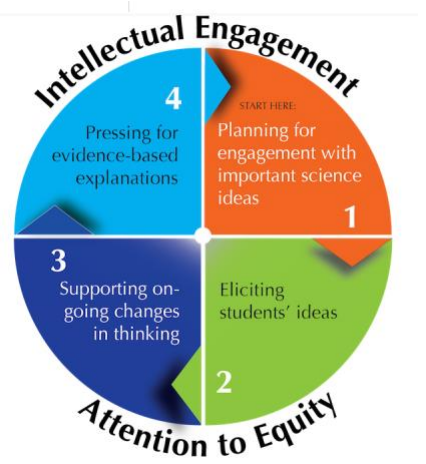
Support on-going changes in thinking

- Development of models to help with conceptual understanding of the scientific phenomenon.
  - Introduction of scientific language

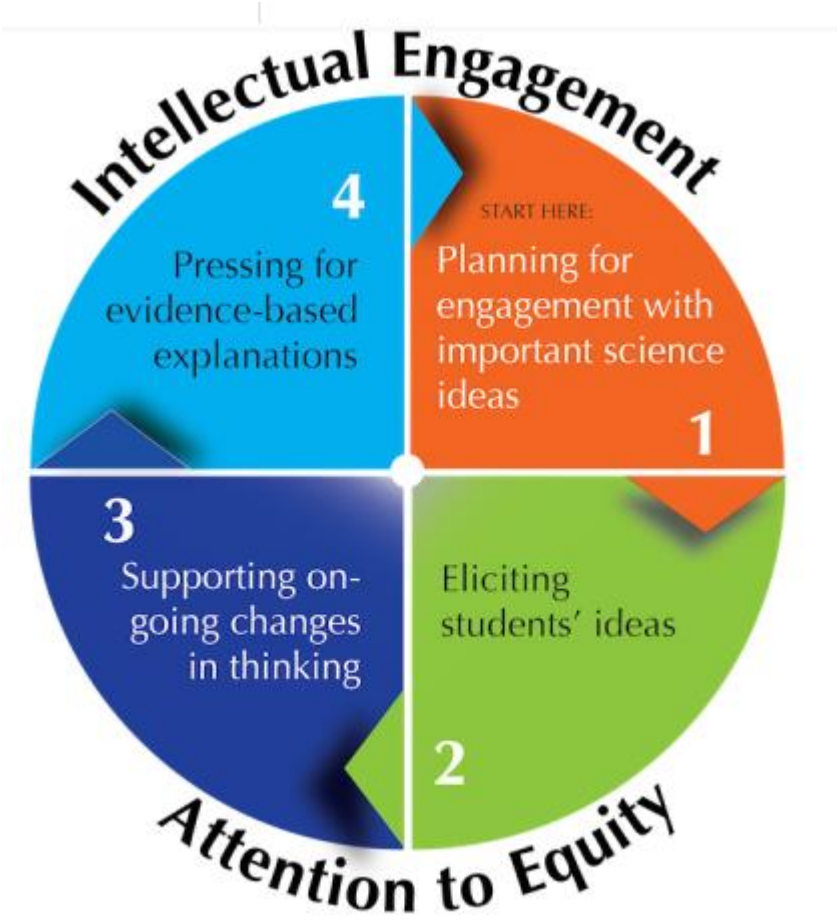


Pressing Students for Evidence-Based Explanations

- Drawing on all evidence to finalize an explanatory model.



Tools for Ambitious Science Teaching



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