



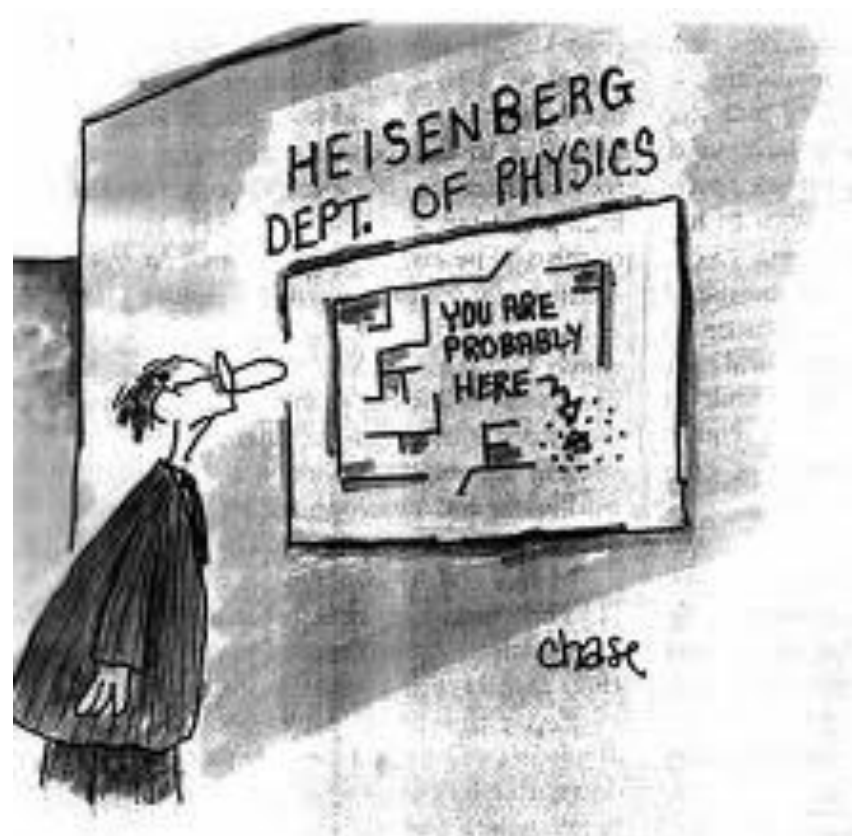
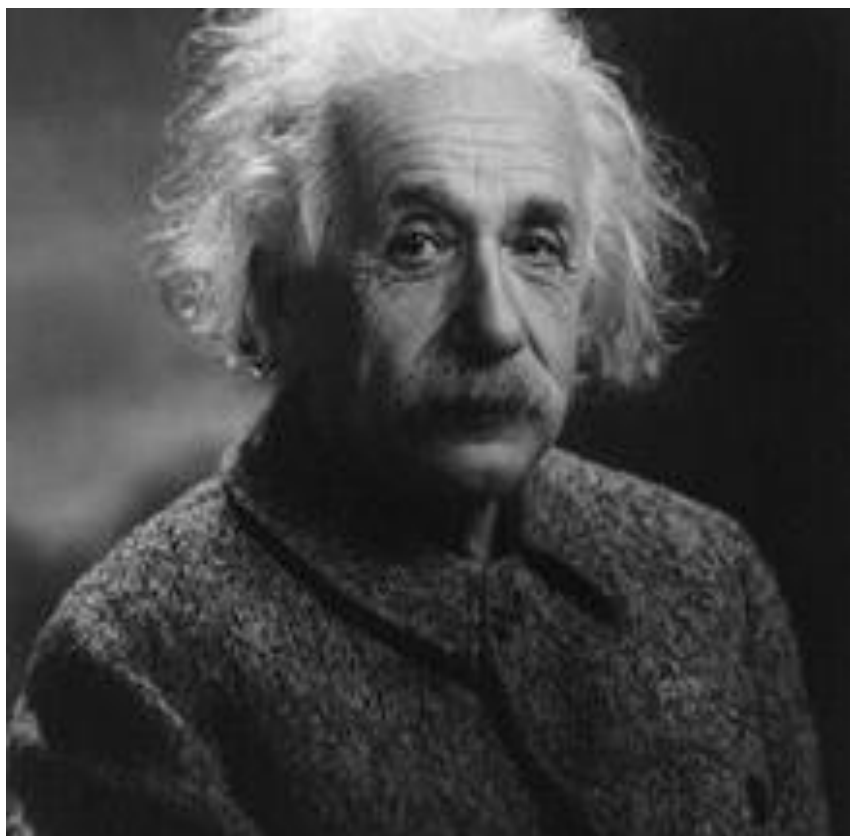
The Open University

Learning to Teach Science

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Being a physicist....



Being a teacher..





The constructivist view

- Knowledge is socially constructed through a process of negotiation.
- Children are not 'empty vessels', nor are they learning in isolation.
- They come to school with knowledge about and understanding of the world around them.
- It is the job of the teacher to build on that knowledge, to discover any misconceptions and to help them to construct new meanings.



What makes an effective science teacher?

- Knowledge and understanding
- Attitudes, Values and Attributes
- Practices
- Skills

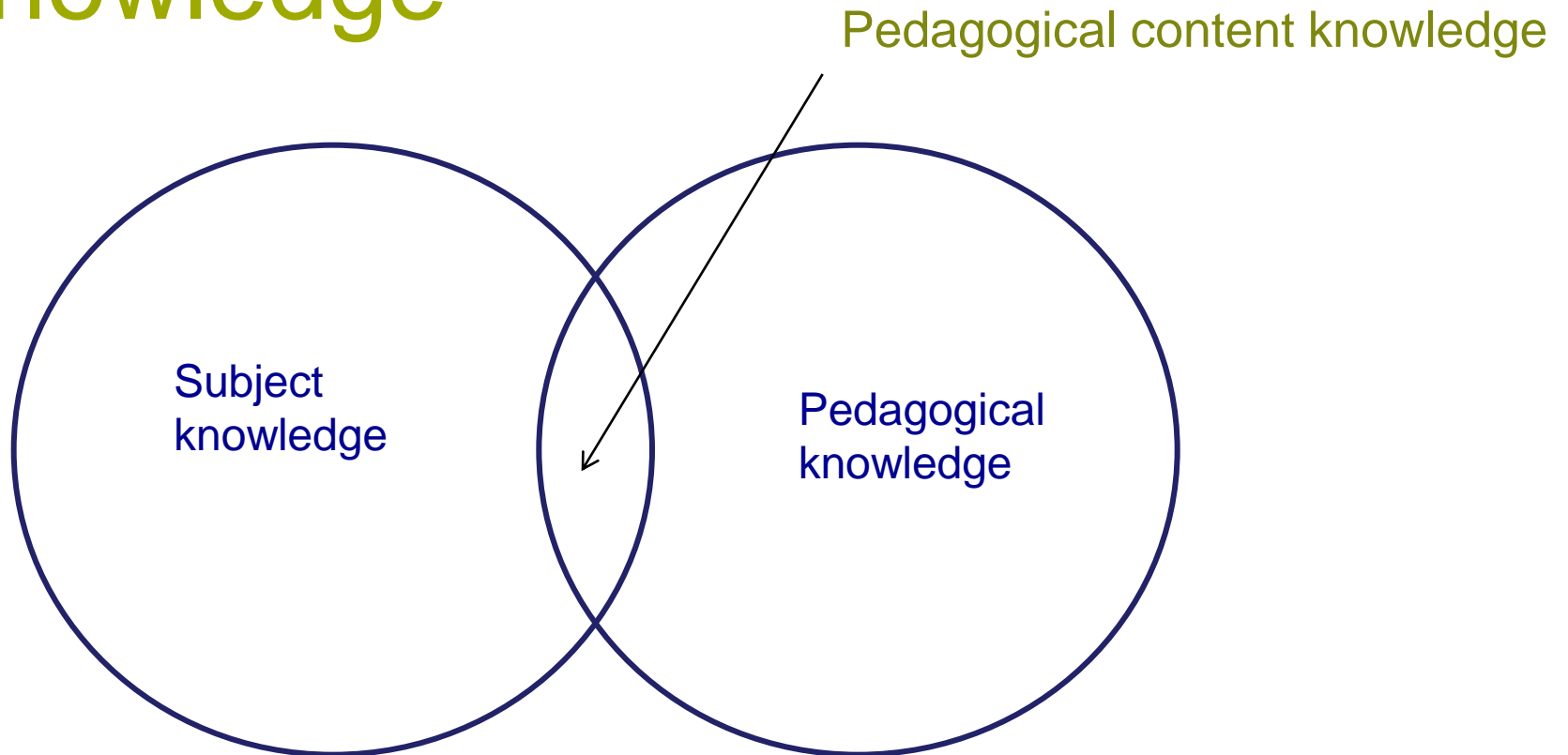


Pedagogical themes

- Probing childrens' understanding
- Making science practical
- Making science relevant to everyday life
- Problem solving and creativity
- Understanding difficult concepts



Teachers' professional knowledge

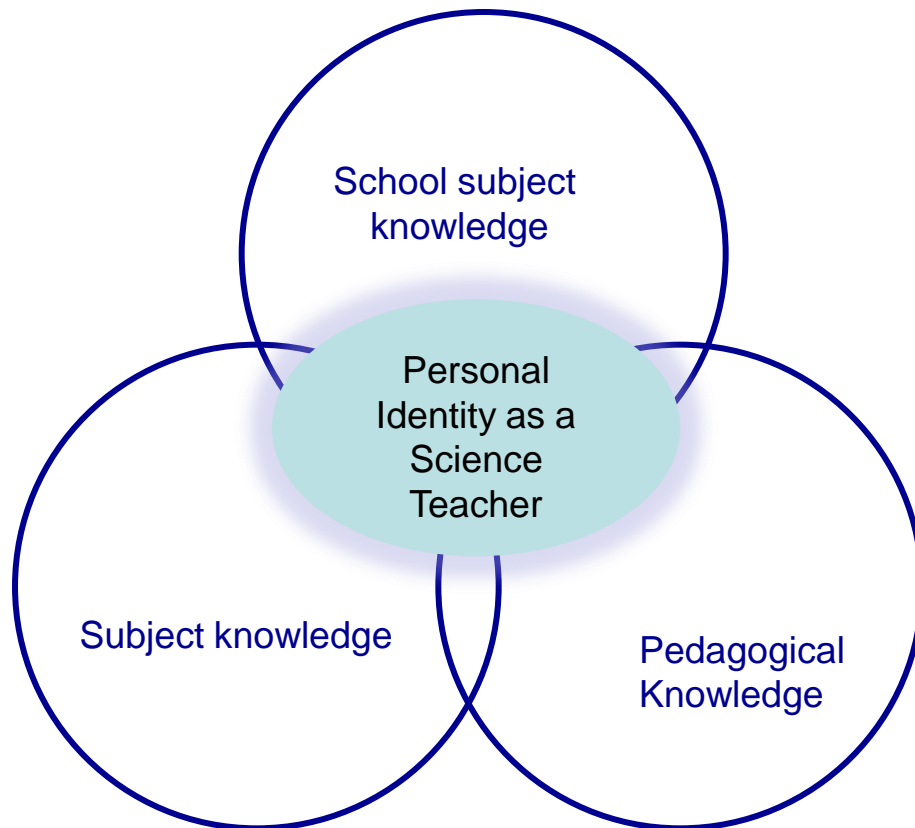








Teachers' professional knowledge





Developing Pedagogy: Probing childrens' understanding

- Chemistry – think, pair, share



Elements, mixtures and compounds

- Elements – the simplest sort of substance that there is. An element cannot be broken down into anything simpler and only contains one type of atom
- Compounds – contain two or more different elements, chemically bonded together. A compound will have its own unique properties, different from the elements from which it is made.
- Mixture – contains two or more different substances, not chemically bonded together.



Points arising.....

- Effective learning took place
- Low risk for the children
- Identifying misconceptions
- Discussion of ideas – Vygotsky – socially constructing understanding
- Modelling pedagogy



Developing Pedagogy: problem solving and creativity

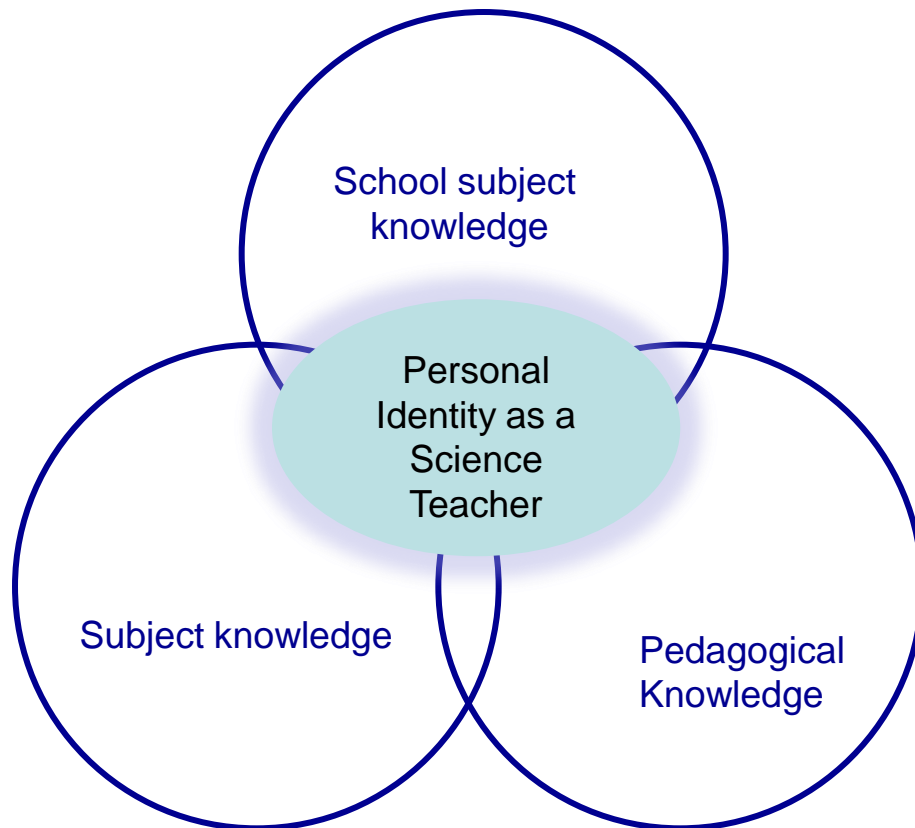
Generating electricity.

You live in a remote village in Africa, with no electricity supply. Should you buy a small diesel generator or install solar panels?

- How long would it take to recover the cost of the solar panels?
- What other things might you want to consider.



Teachers' professional knowledge





Learning to teach science

- Developing a professional identity as a scientist
- Appreciating that ‘school knowledge’ is different from degree knowledge
- Developing pedagogies that reveal misconceptions
- Recognising that there is a body of knowledge that brings the sciences together.



Learning to be a science teacher

- Base-line assessment – part of the interview process
- Subject knowledge audit
- Subject knowledge tracker
- Taught sessions – opportunity for physicists, biologists and chemists to work together.
- School experience – 24 weeks in two different schools in one year
- How science works outcomes



Key principles

- Student teachers need to acquire knowledge and develop a set of skills.
- Theory and practice need to be specifically linked
- Initial teacher education represents the start of a journey. Student teachers need to develop as reflective practitioners



Implications for science teacher educators

- Focus on the similarities between the science subjects – being an effective teacher and the sort of pedagogies you might adopt.
- Focus on the **school** subject knowledge – this may be less well-understood than you think.
- Help student teachers to develop their identity as a teacher of science rather than a physicist, chemist or biologist.

