



EASA Conference 2020

The use of metaphor in education

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Metaphor

“A metaphor is a figure of speech that describes a subject by asserting that it is, on some point of comparison, the same as another otherwise unrelated object.”

Wikipedia

“. . . an explicit or implicit comparison, which is literally false”

Katz, 1998

The sun is a big
yellow duster
polishing the
blue, blue sky





Terminology

- *Metaphor*
- *Simile*
- *Analogy*

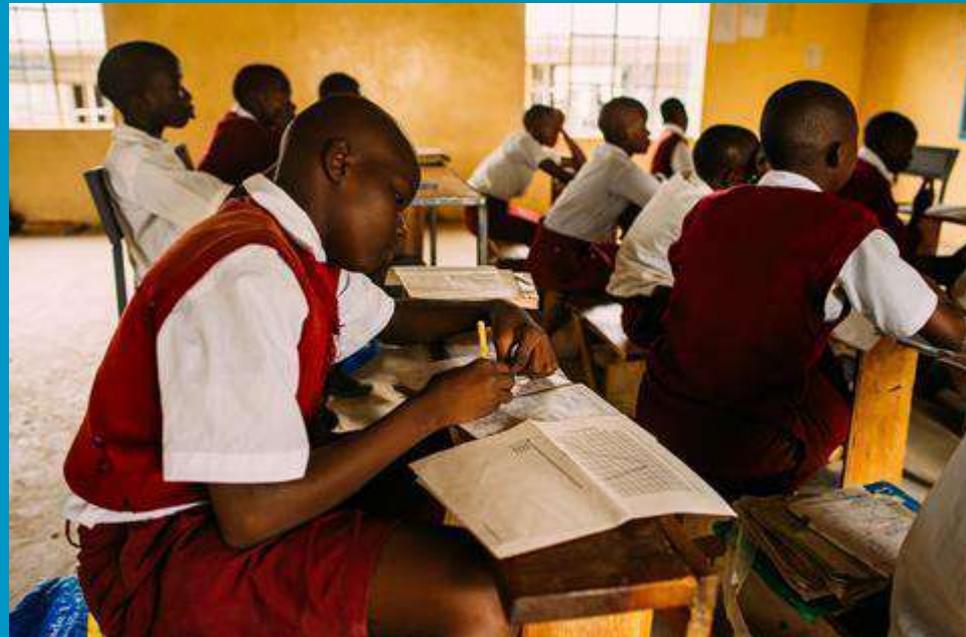
Verbal or visual devices for a purpose of illustration, emulation or modelling to aid understanding, clarify meaning or promote thought



Some examples of the use of metaphor

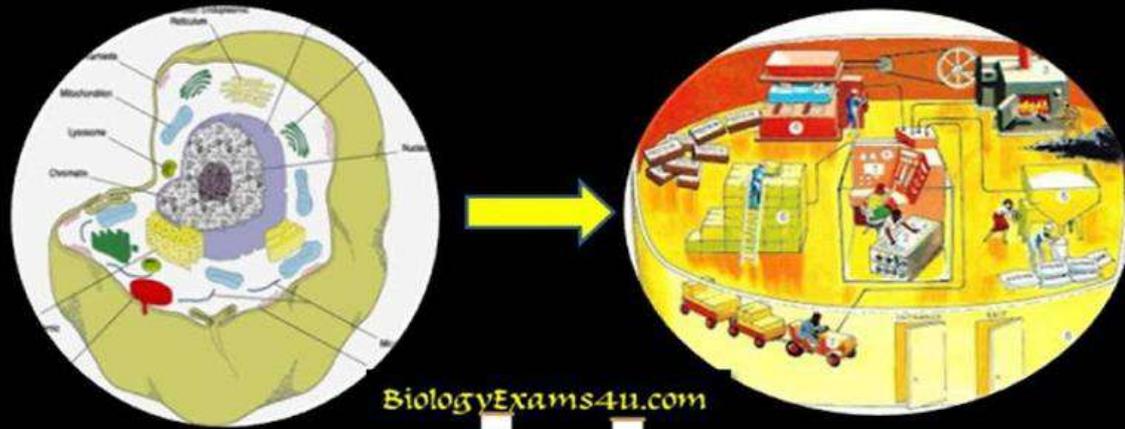
- *To develop conceptual understanding in science lessons*
- *To help explore teachers' ideas about learning*
- *To understand aspects of science teacher professional knowledge*
- *To aid reflection on the process of PhD research*

Developing conceptual understanding in science classrooms

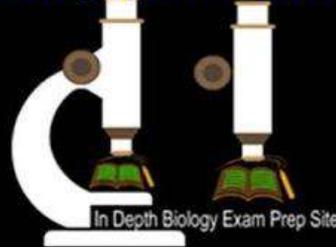


Cell analogy Example

“Cell as Factory”

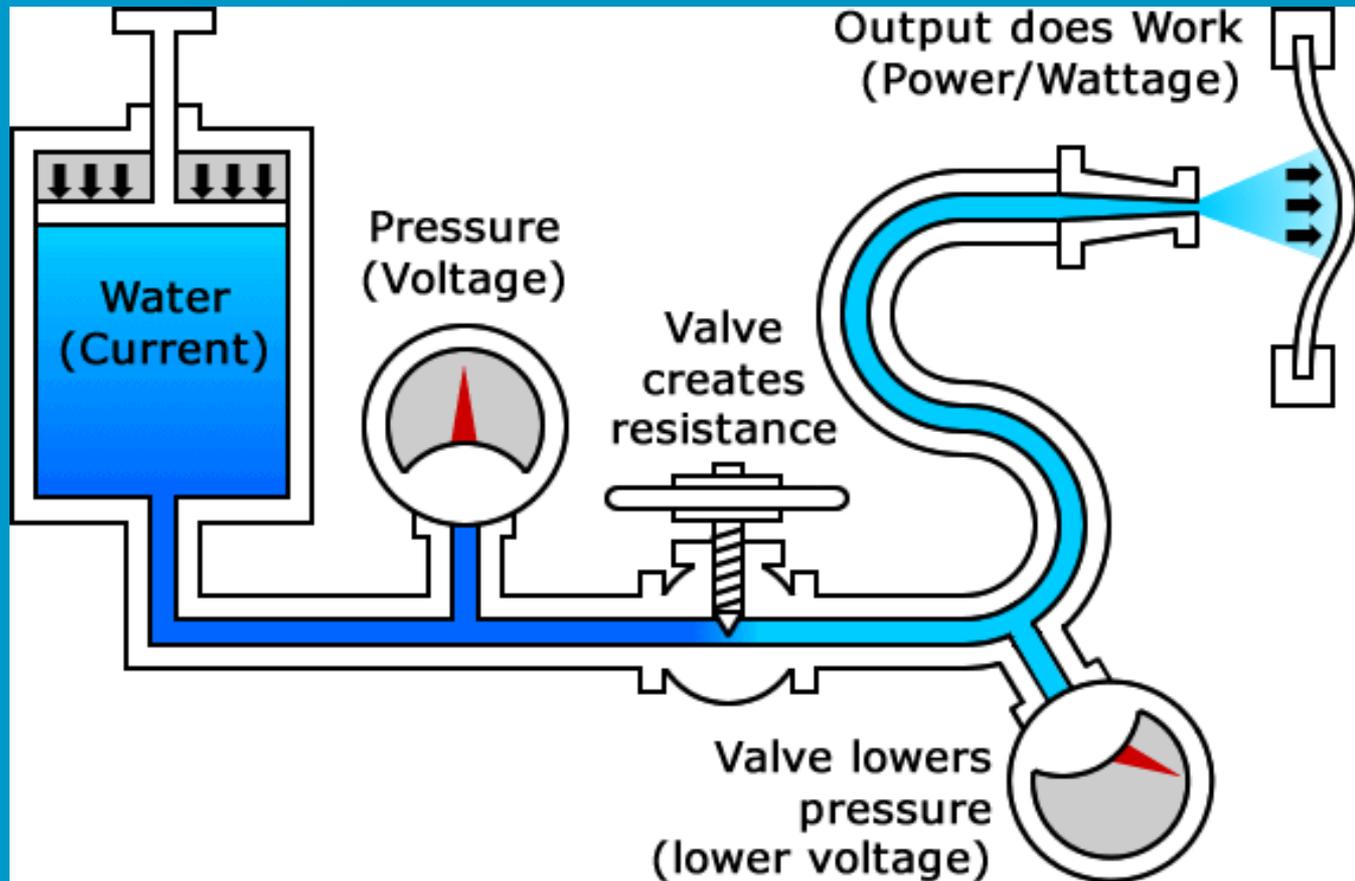


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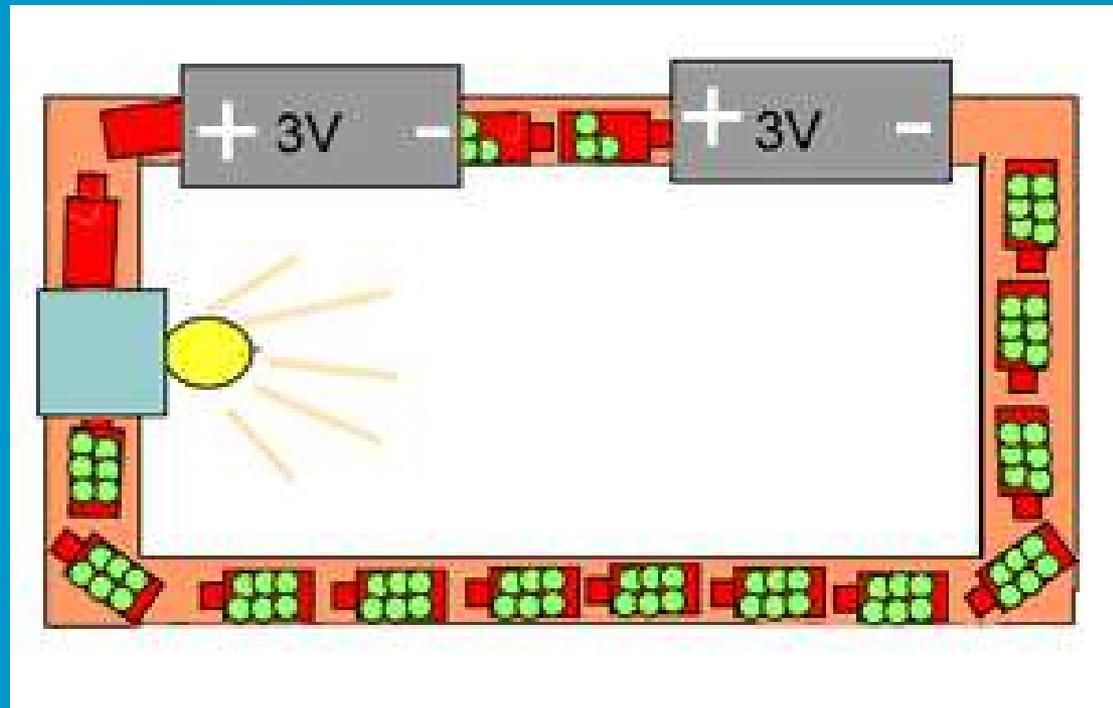


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Hydrostatic models in teaching about electricity



Understanding electron flow

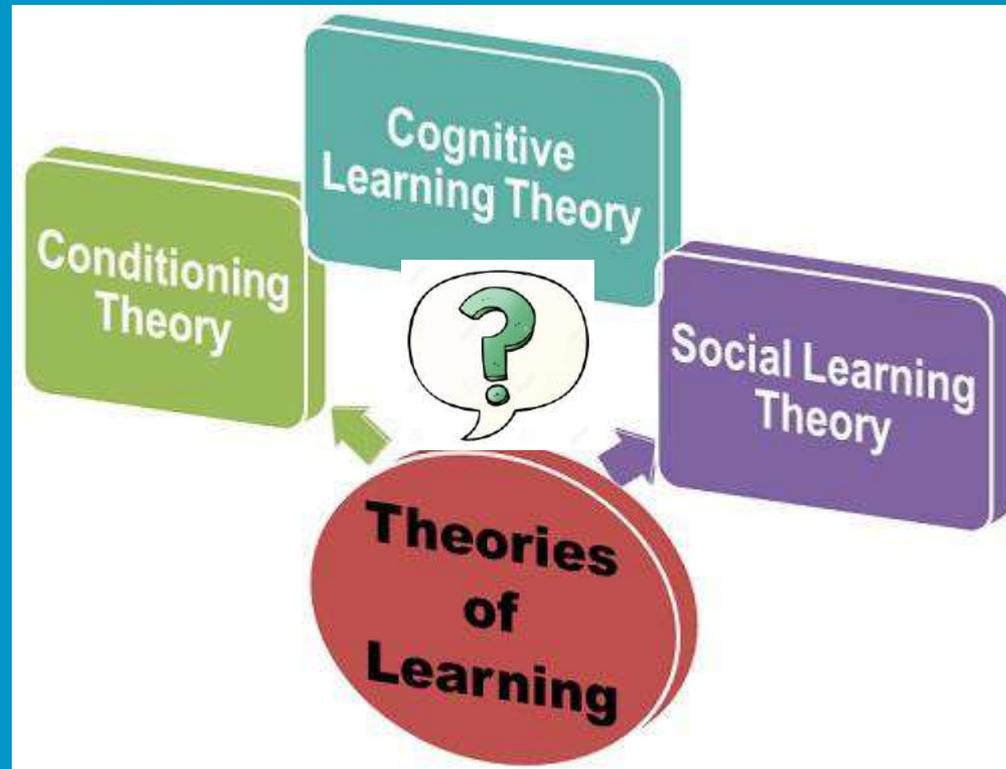


Pros and cons

- Presenting something familiar to explain the unfamiliar.
- Illustrating 'the invisible'.
- But how 'familiar' is the content of the metaphor?
- How helpful is it in explaining the phenomenon?

(Further reading: Aubusson, et al, 2006)

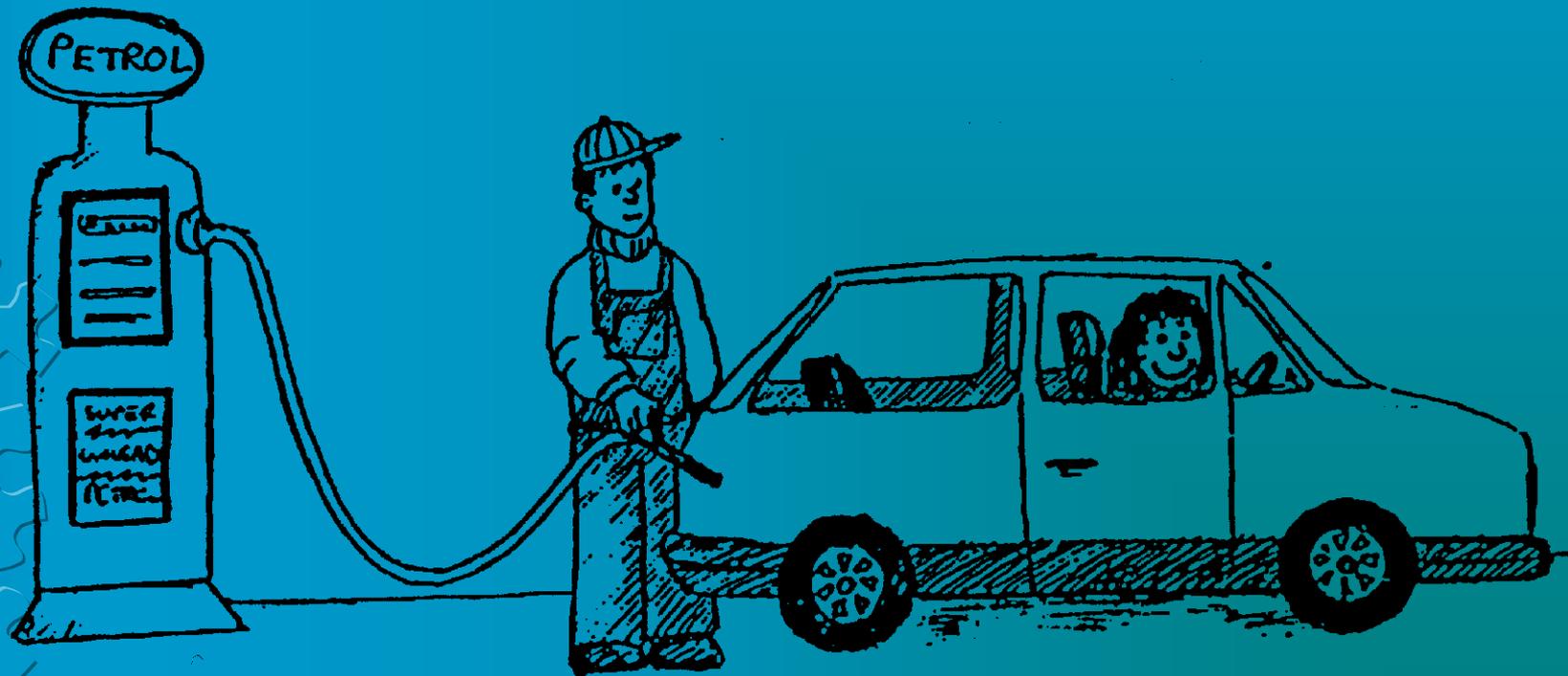
Uncovering teachers' theories of learning



Metaphors for learning

- *Look at the following cartoons to see if you can relate them to the process of learning (and perhaps teaching).*
- *Can you identify the learner (and/or teacher)?*
- *The 'content' of the learning?*
- *The conditions for learning?*

1: The Filling Station



2: The Pond



3: The Mountain Guide



4: *The Potter*

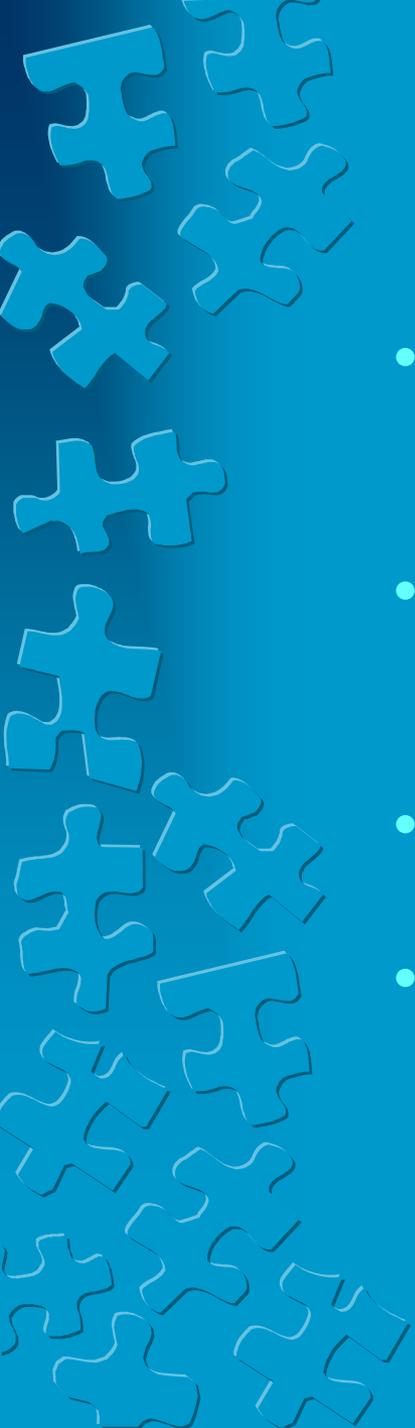


5: The Gardener



6: The Building Site





Implicit theories of learning

- Transfer theory - convey, transmit, put over, tell ...
- Shaping theory - develop, mould, produce, prepare ...
- Travelling theory - lead, guide, direct ...
- Growing theory - cultivate, encourage, enable, bring out ...

Fox, 1982

Metaphors for teaching

Teacher as ...

1. ... knowledge provider
2. ... moulder/craftsperson
3. ... curer/repairer
4. ... superior/authoritative figure
5. ... change agent
6. ... entertainer
7. ... counsellor
8. ... nurturer/cultivator
9. ... facilitator/scaffolder
10. ... co-operator/equal

Table 1. Metaphor categories of teaching and learning science

Category	Metaphor	Teaching and learning
1. Teacher as knowledge provider (student as passive recipient of knowledge)	1.01 Sun, 1.02 Candle, 1.03 Tree/Fruit tree, 1.04 Light, 1.05 Flower, 1.06 Computer user, 1.07 Television, 1.08 Book/ Cookbook, 1.09 Pen, 1.10 Spring, 1.11 Jug/Glass, 1.12 Fountain, 1.13 Rain, 1.14 Writer/Poet, 1.15 Shopkeeper, 1.16 Buddha, 1.17 Sky, 1.18 Wind, 1.19 Food, 1.20 Cook	<ul style="list-style-type: none"> • Teaching is transmission of knowledge from teacher to students. • Learning occurs when students accumulate knowledge transmitted from teacher.
2. Teacher as moulder/ craftsman (student as raw materials)	2.01 Sculptor, 2.02 Painter, 2.03 Constructor, 2.04 Baker, 2.05 Potter, 2.06 Honeybee, 2.07 Cook, 2.08 Jeweller, 2.09 Tailor, 2.10 Carpenter, 2.11 Architect, 2.12 Miner, 2.13 Weaver, 2.14 Ironworker, 2.15 Contractor, 2.16 Technician, 2.17 Mill, 2.18 Factory, 2.19 Garland maker	<ul style="list-style-type: none"> • Teaching is producing students as socially useful products. • Learning occurs when students change as teachers intended.
3. Teacher as curer/ repairer (student as defective individual)	3.01 Doctor, 3.02 Medicine, 3.03 Mechanic	<ul style="list-style-type: none"> • Teaching is diagnosing and fixing students' errors or deficiencies. • Learning occurs when students' errors or deficiencies are fixed.



Why use metaphor to explore views on teaching and learning?

- Using metaphorical language be easier than describing or explaining learning theories in formal propositional terms.
- Thinking about use of metaphor opens up the possibility of accessing visual forms of representation as well as the verbal.
- Implicit theories accessed using metaphor may guide practice in a more powerful way than psychological theories of learning 'learned' in college.



Using metaphor to 'reframe'

“Reframing describes the familiar process in which an event over which we have puzzled for some time suddenly is ‘seen’ differently and in a way that suggests new approaches to the puzzle.”

Munby & Russell, 1990



Accessing professional knowledge and pedagogical reasoning

“Making the tacit explicit”

Loughran, 2008

“Non-propositional knowledge, or ‘knowing-in-action’, resides in performing the activities of teaching themselves, and is only incompletely expressed in propositions.”

Munby & Russell, 1990



Shulman's teacher professional knowledge categories

- content knowledge;
- general pedagogical knowledge;
- curriculum knowledge;
- **pedagogical content knowledge;**
- knowledge of learners;
- knowledge of educational contexts;
- knowledge of educational ends, purposes and values.

Shulman, 1987



So what is PCK?

“It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction.”



So what is PCK?

“... the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students.”

Shulman, 1987



What does PCK look like?

“... the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations – in a word, the ways of representing and formulating the subject that make it comprehensible to others.”



Why is PCK so important?

- PCK is seen to be a key indicator of high quality science teaching and so is at the heart of successful learning.
- It has become a key focus for research in how to develop it, measure and assess it; both in the context of initial teacher training and in further professional development.
- It is also being explored in other subject areas (technology, mathematics, geography).



... and yet, do we really know what it is?

“... PCK skulks about ... it sparkles, but offers little substance ... PCK lurks as an intellectual dead end ... a mirage in the desert ... a mythical siren”

Settlage, 2013



Conceptualisations of PCK

- As a ‘type’/category of knowledge
- As a ‘meta-knowledge’
- As a process (pedagogical reasoning; didactic transposition; PCKg).

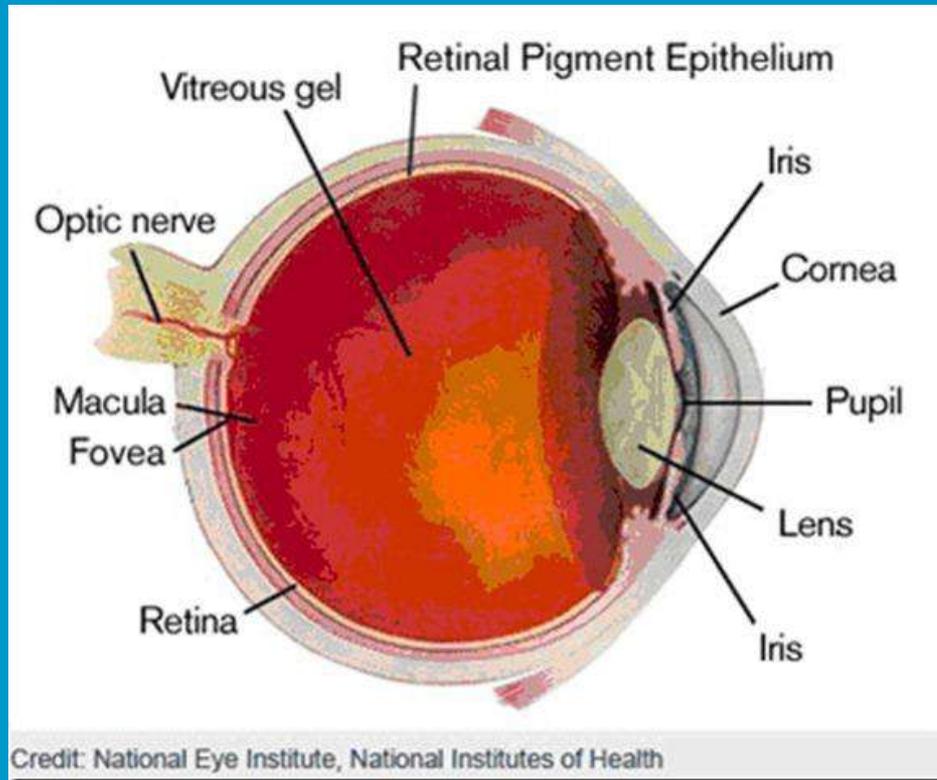
(e.g. Gess-Newsome, 1999
Lee & Luft, 2008;
Abell, 2008;
Kind, 2009)



Chemical (Amalgams,
Mixtures and Compounds)



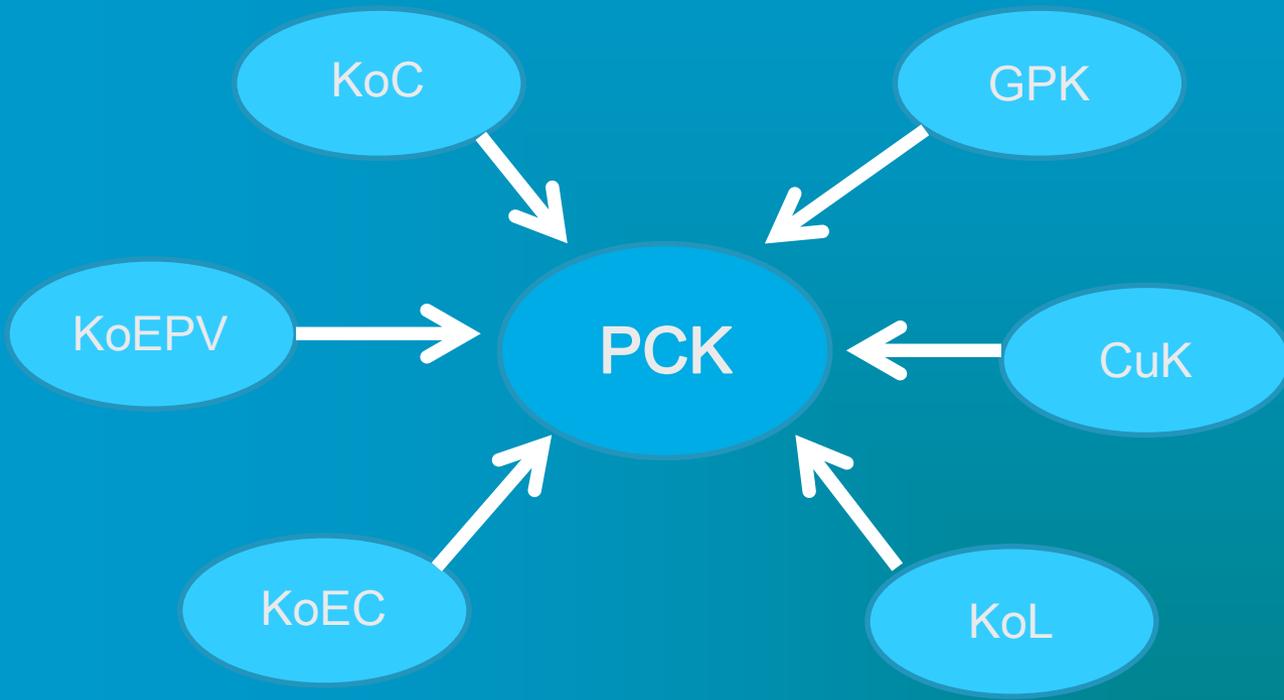
“The elusive butterfly”



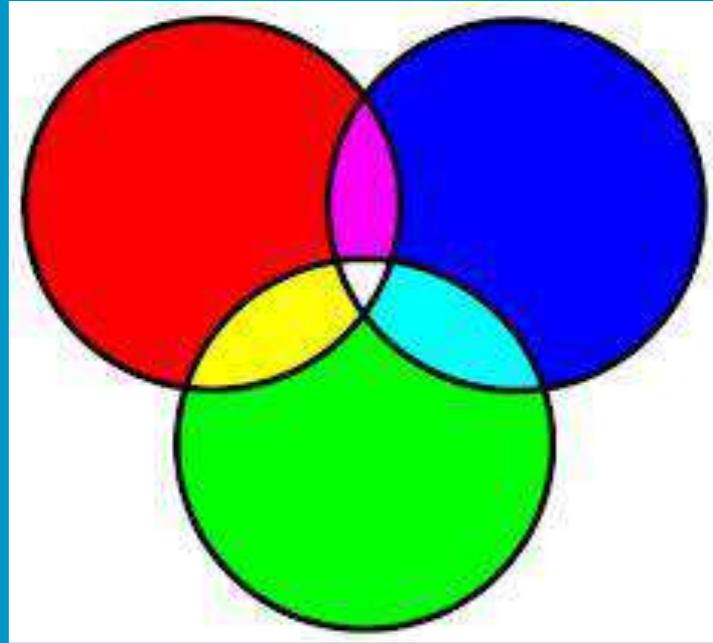
Fovea (“Yellow Spot”)



Chest of drawers



Periphery to Centre
Network



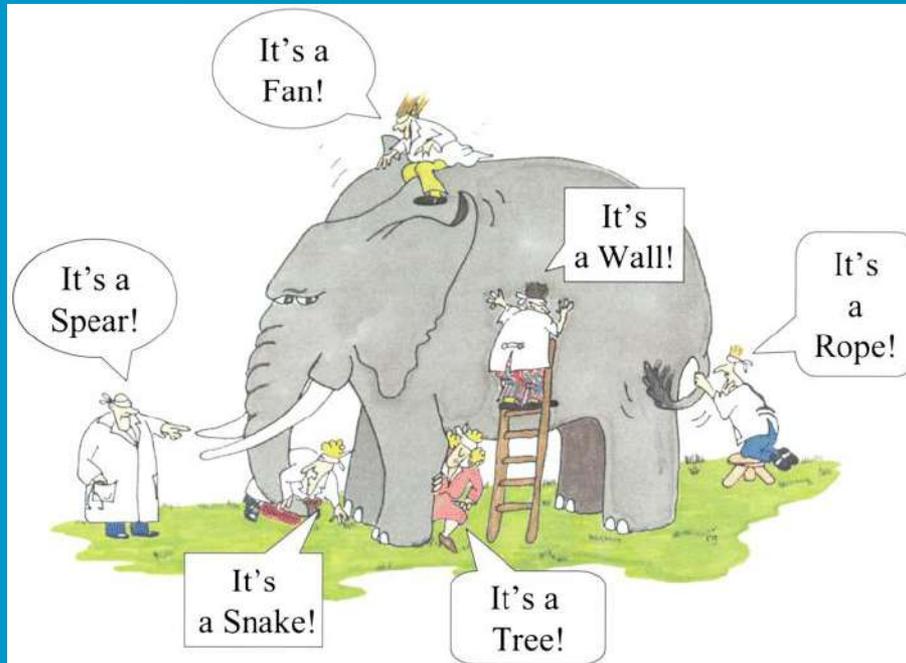
Venn Diagram



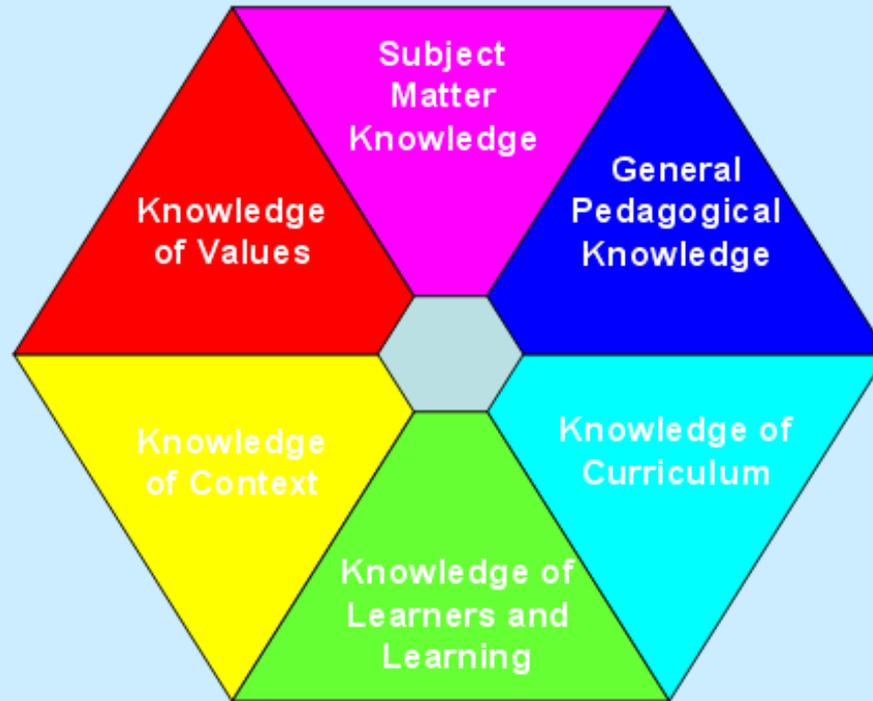
Umbrella



Filling the supermarket trolley



“The blind men [sic] and the elephant”



PCK as a spinning top



PCK as a spinning top



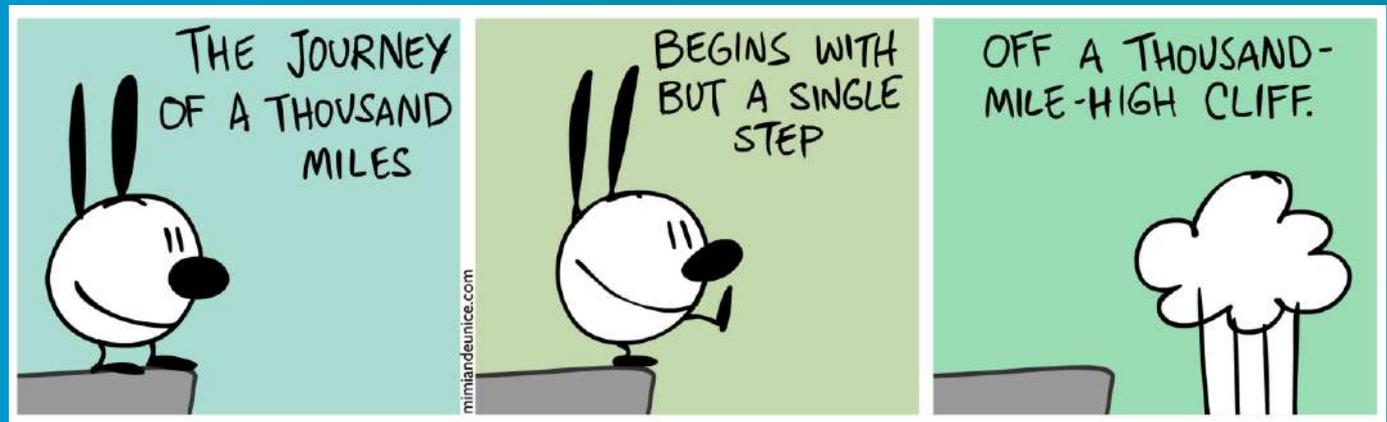
Why do metaphors for PCK matter?

- They might give an insight into conceptualisations of PCK used;
- Provide a 'language' for clarification of ideas about what PCK is and developing shared understandings about it;
- Clarify approaches to recognising, developing and assessing PCK;
- Make PCK more accessible.

Using metaphor with research students



Thinking about a PhD as a journey



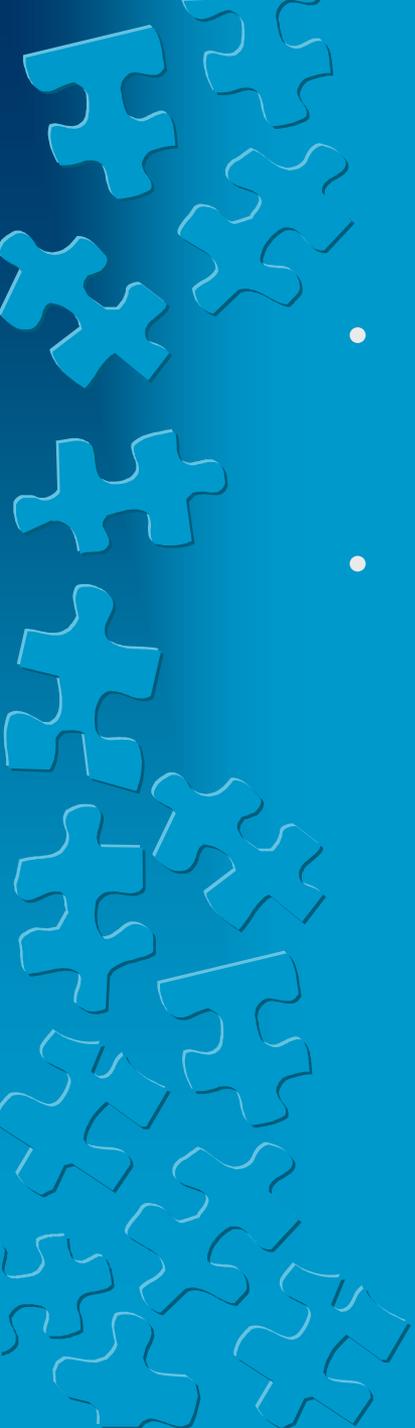
Learning journeys

Students were asked to a simple drawing which represented how they saw their learning journey in terms of their research – where there were at the time, where they had come from and where they were going.

To provide some stimulus we showed them a set of images which might be seen as metaphorically representing their journeys.

We stressed that it didn't need to be a work of art and their drawing might be accompanied by label or sort written passages. When they were completed, we asked them to discuss them with a partner before presenting them to the whole group.

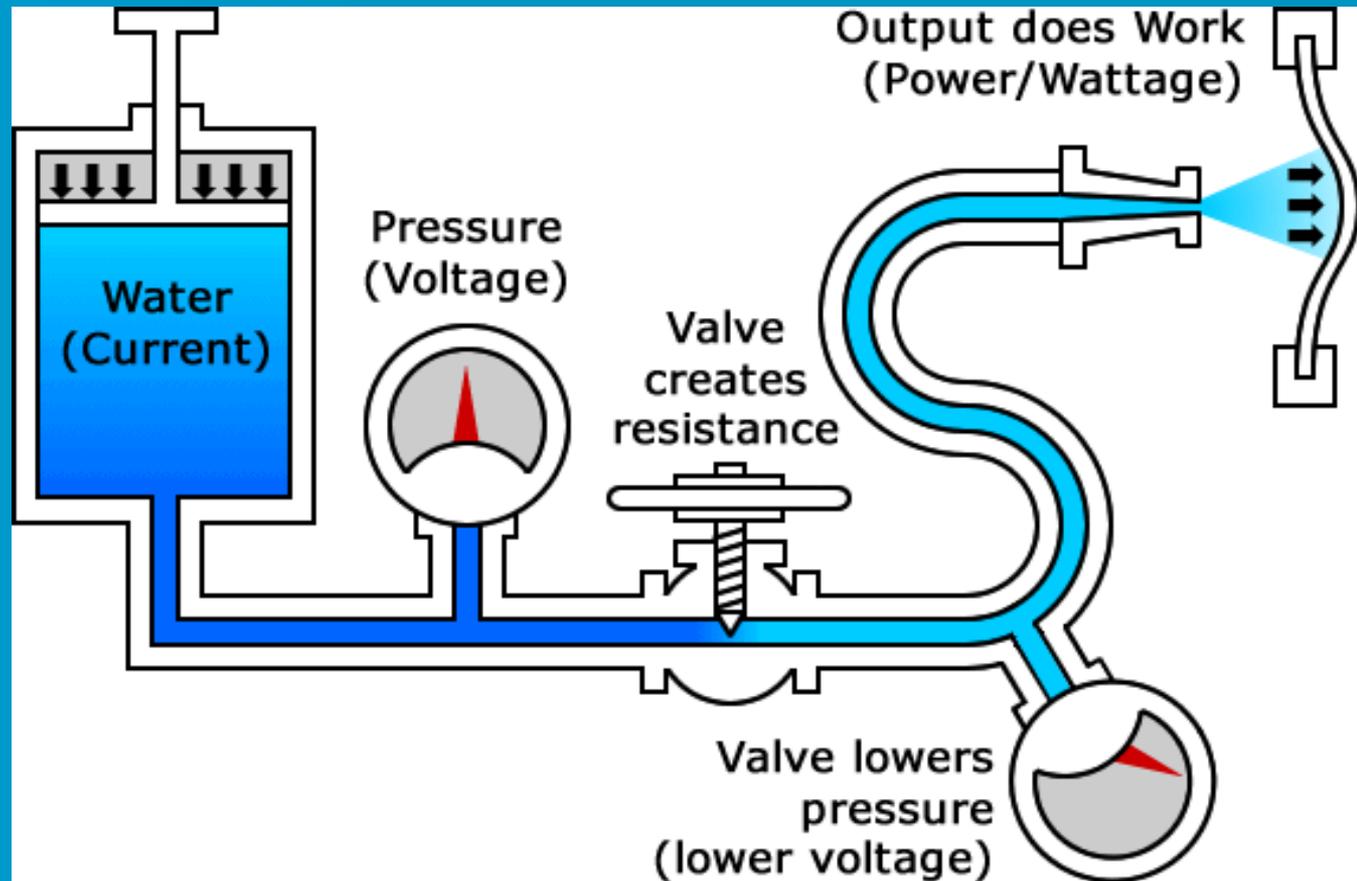




Key takeaways

- The use of metaphors can provide an insightful way of developing understanding.
- However, consideration needs to be given to how appropriate they are and their limitations as well as their strengths.

Hydrostatic models in teaching about electricity





Key takeaways

- The use of metaphors can provide an insightful way of developing understanding.
- However, consideration needs to be given to how appropriate they are and their limitations as well as their strengths.
- Metaphors may provide a different way of looking at educational phenomena to complement conventional approaches.
- There are at least two approaches to the use of metaphors – they can be generated from a process of reflection or used to promote reflection.



In conclusion ...

- Is there further potential for the use of metaphors as a tool to explore, illuminate and explain educational phenomena?
- How can they be used as a research tool to investigate educational issues?
- Can they help us see into some of the Black Holes which are evident in our educational skyscape?



Thank you!

