A guide to Teaching Tricky Topics

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From Instructional to Learning Design and Beyond …

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& Rachel Rogers

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Overview

- Instructional Design
  - ❖ – overview & limitations
- Learning Design
  - ❖ overview and activities 1 & 2
- Tricky Topics
  - ❖ overview and activities 3 & 4

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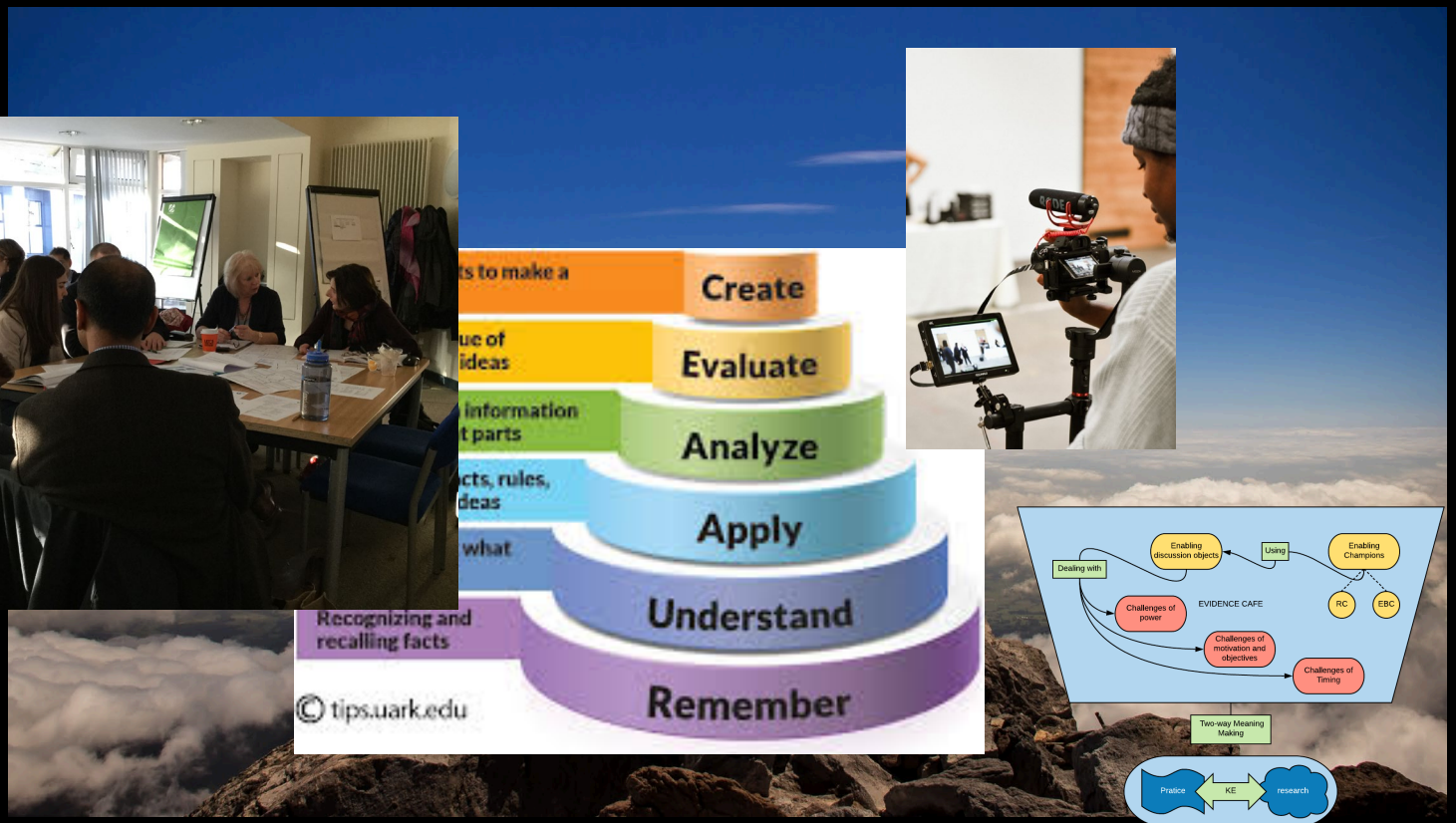
Instructional and Learning Design



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What is Instructional Design?

Instructional Design improves instruction and learning experienced based upon curriculum outcome needs to:

- Analyze learning needs
- Develop improved learning experiences

- Examples of Instructional Design approaches:
  - Subsumption Theory (David Ausubel, 1963)
  - Blooms Taxonomy (from remembering to creating)
  - Kolb (1984 learning cycle) Addie model Gagnes events of instruction
  - Merrills (2002) principles of instruction.

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BUT

Your learners your aren't all the same
AND learning is not a factory assembly line

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What is Learning Design?

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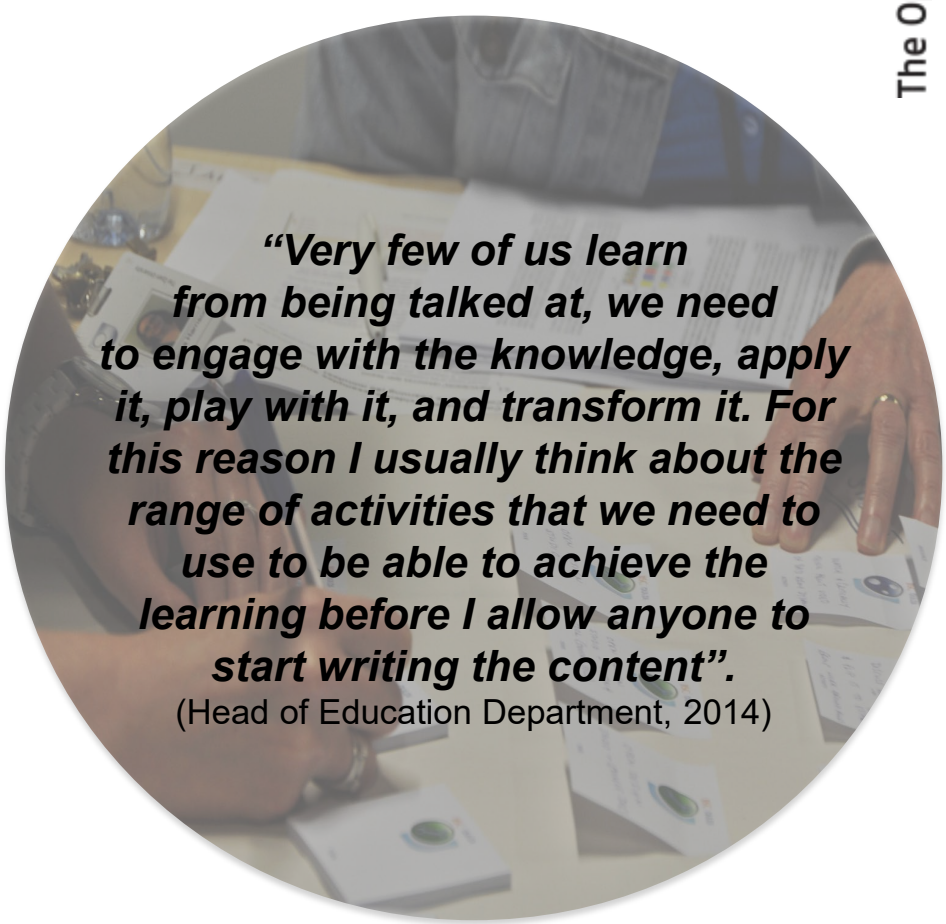
Learning that is Designed with the **student learning journey** at the heart.

About designing for student engagement with learning tools, materials and communities

Two key purposes:

- Learning / curriculum design
- Quality enhancement



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Learning Design workshops

Who are the learners?

What outcomes do they need to achieve?

What do we want their experience to be?

What will they do in order to learn?

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Learner Profile

Activity 1a: Agree broad topic area

Activity 1b: decide who the learners are - Age, Background, Challenges

Activity 1c – use whiteboard

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Learner Experience Activity

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OU Tools for Learning Design

http://aws-website-wordwheel-4lb80.s3-website-us-east-1.amazonaws.com/

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Learning Experience

	Innovative	
Different	Amazing	Interactive
Distinctive	Extraordinary	Collaborative
Innovative	Ingenious	Co-operative
Pioneering	Exceptional	Connecting
	Demanding	
Ambitious	Complex	Challenging
Enterprising	Involved	Thought-provoking
Adventurous	Multifaceted	Stimulating
Aspiring	Intricate	Questioning
	Professional	
Skills	Independent	Practical
Ability	Self-sufficient	Pragmatic
Capability	Self-supporting	Functional
Proficiency	Self-regulating	Competent
	Supportive	
Effective	Rewarding	Confidence
Relevant	Worthwhile	Encouragement
Applicable	Valuable	Buoyancy
Constructive	Fulfilling	Trust

Learner Experience

Activity 2: Choose what Learning experience you want your learners to have

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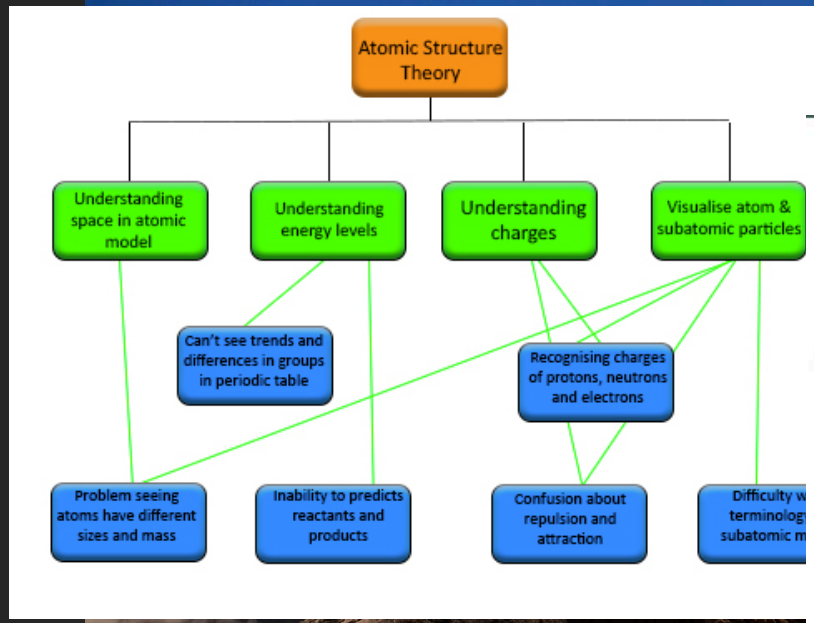
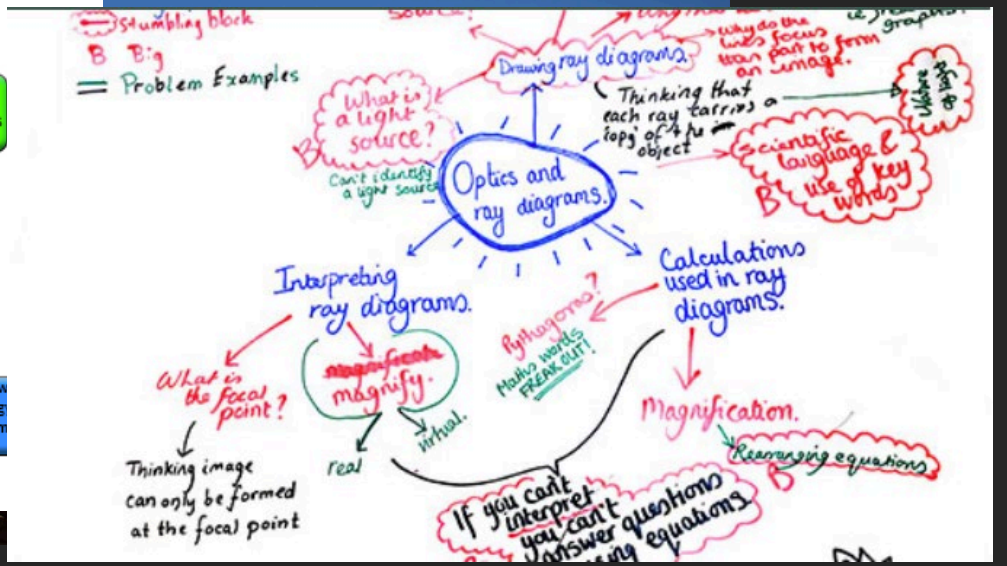
Threshold Concepts & Tricky Topics





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BUT how does this connect to LEARNING YOUR subject?

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OU Learning Design Categorises the learning experiences: Assimilative, Assimilative etc.

Again this is a standardised approach to learning. How does this connect to your students learning your subject?

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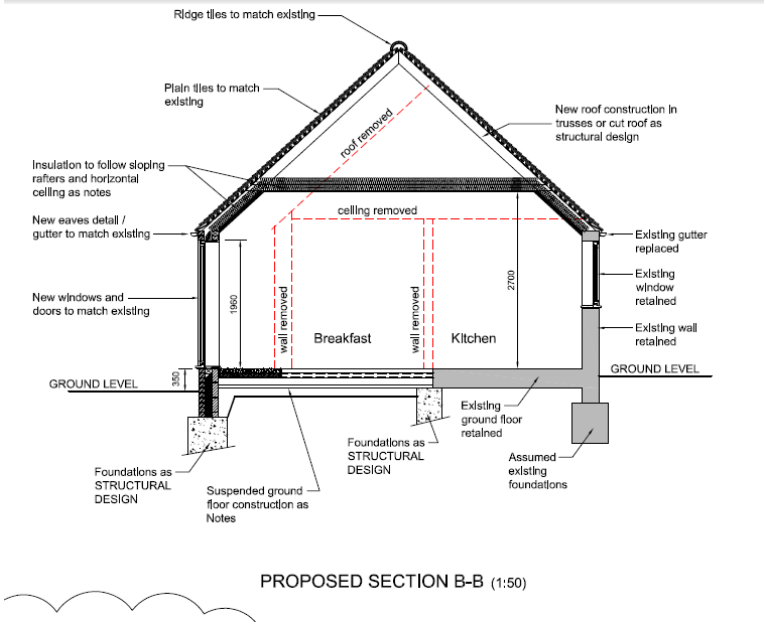
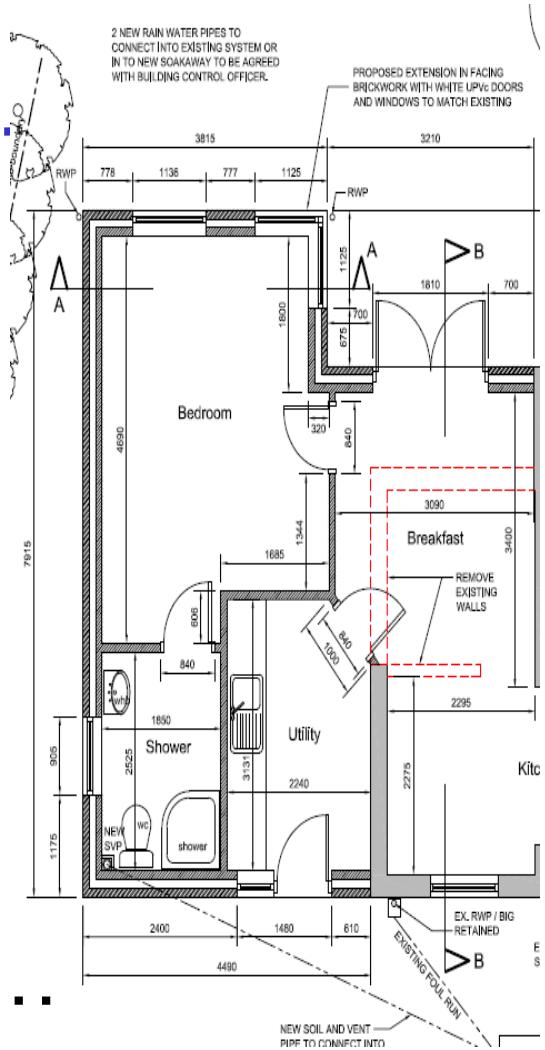
Or in other words…





It's a bit like building a house for your subject – you need good student foundations

What gaps are there…

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Figure 1 I don't understand

Thought:
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STEP INTO MY SHOES

@bryanhmathers

BARRIERS to LEARNING

- What are **learners gaps**?
- Why do students (and teachers) think they've **learnt** something BUT they **fail** the exam?
- How do we **engage students** in **difficult learning**

Image from http://www.theguardian.com/edu

‘SURFACE’ and ‘DEEP’ Learning

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- Surface learning: skimming, regurgitating
- SKATING on the surface of understanding

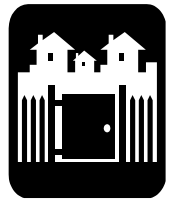
- Deep learning: changes how we think, ‘foundations’ for further knowledge,

Houghton (2004) from Biggs (1999), Entwistle (1988) & Ramsden (1992)

Threshold Concepts

Meyer and Land (2003, 2006)

- Central gatekeeping concept



"something without which the learner cannot progress"

"akin to a portal, opening up a new and previously inaccessible way of thinking about something"

- Lightbulb moments

"It represents a transformed way of understanding, or interpreting"

- Troublesome knowledge – often Counter-intuitive

ABC Learning Gains

A – Affective

B – Behavioural

C - Cognitive

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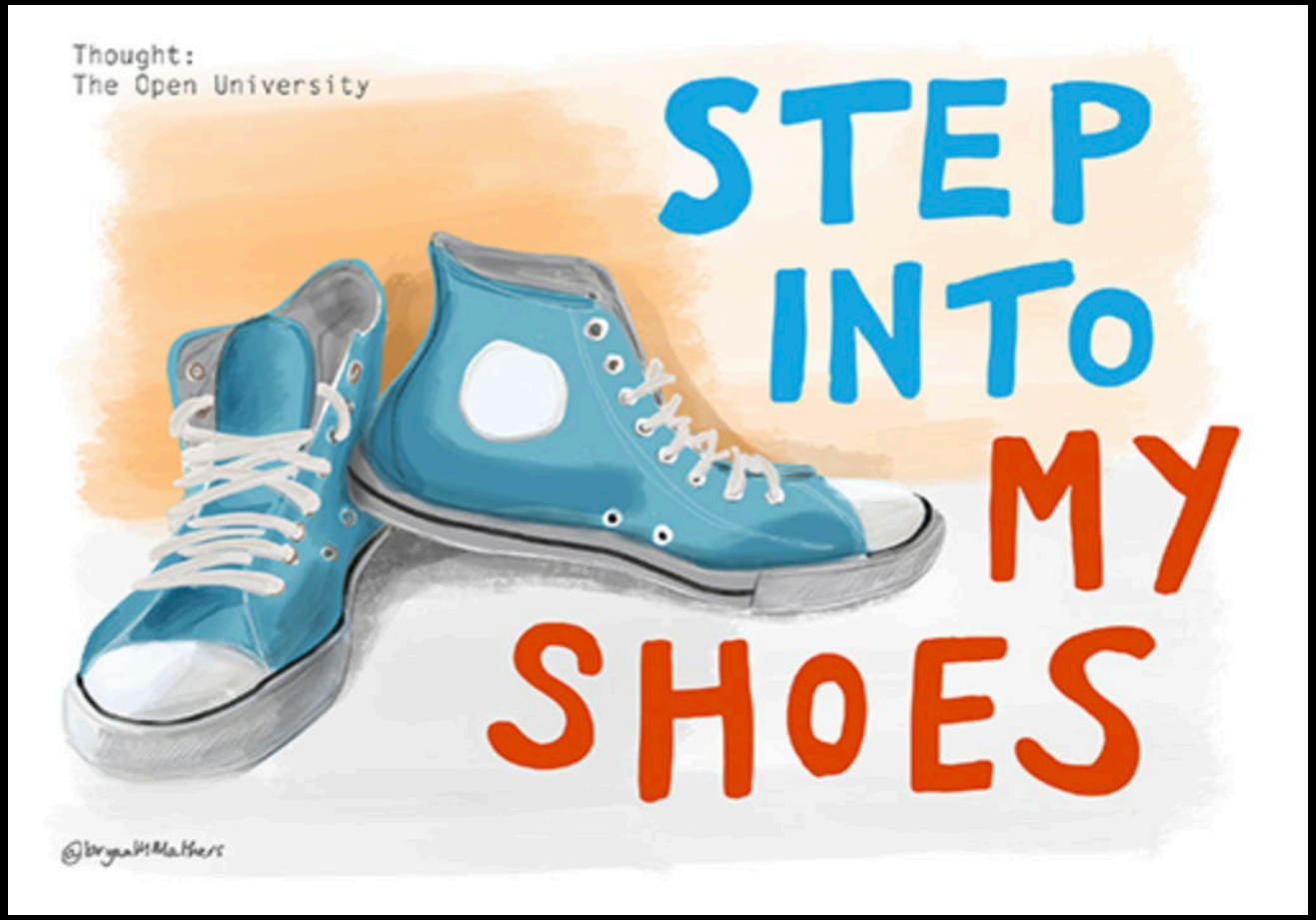
Tricky Topic Activity



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1. Bring teachers together

Bring teachers together for a 2-3 hour workshop; 3 – 20 teachers is ideal. Arrange into small groups of 2 – 4 and introduce the three stages in the Tricky Topic process: identify, capture, and assess.

Each group must agree upon a suitable topic which is considered tricky or difficult for students to comprehend.

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2. Brainstorm activity

Through a brainstorm activity, each group breaks down their Tricky Topic into identifiable parts. These parts are specific examples of problems that students say, do or assume which suggest that they find the topic tricky. The groups write these problems down into a Mind Map.

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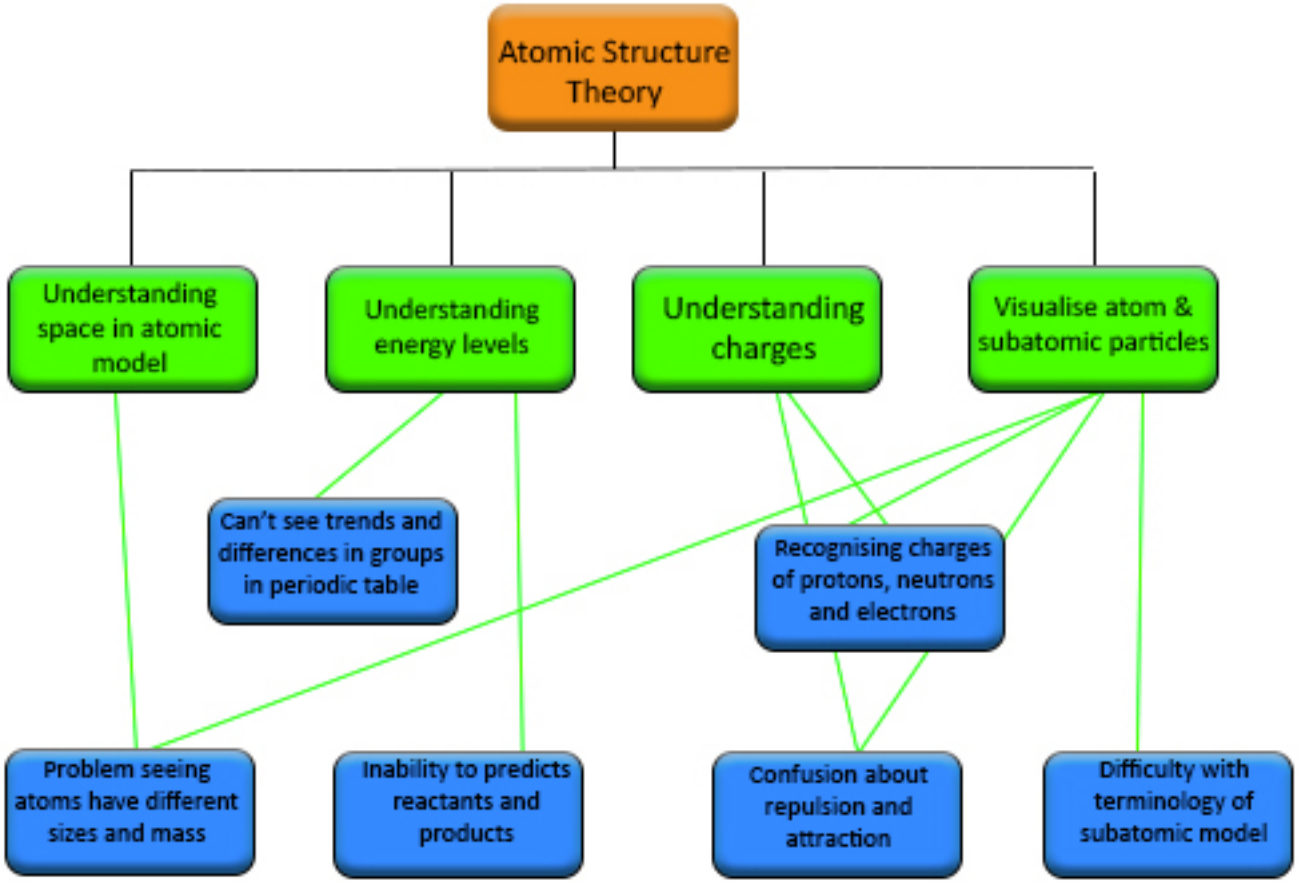
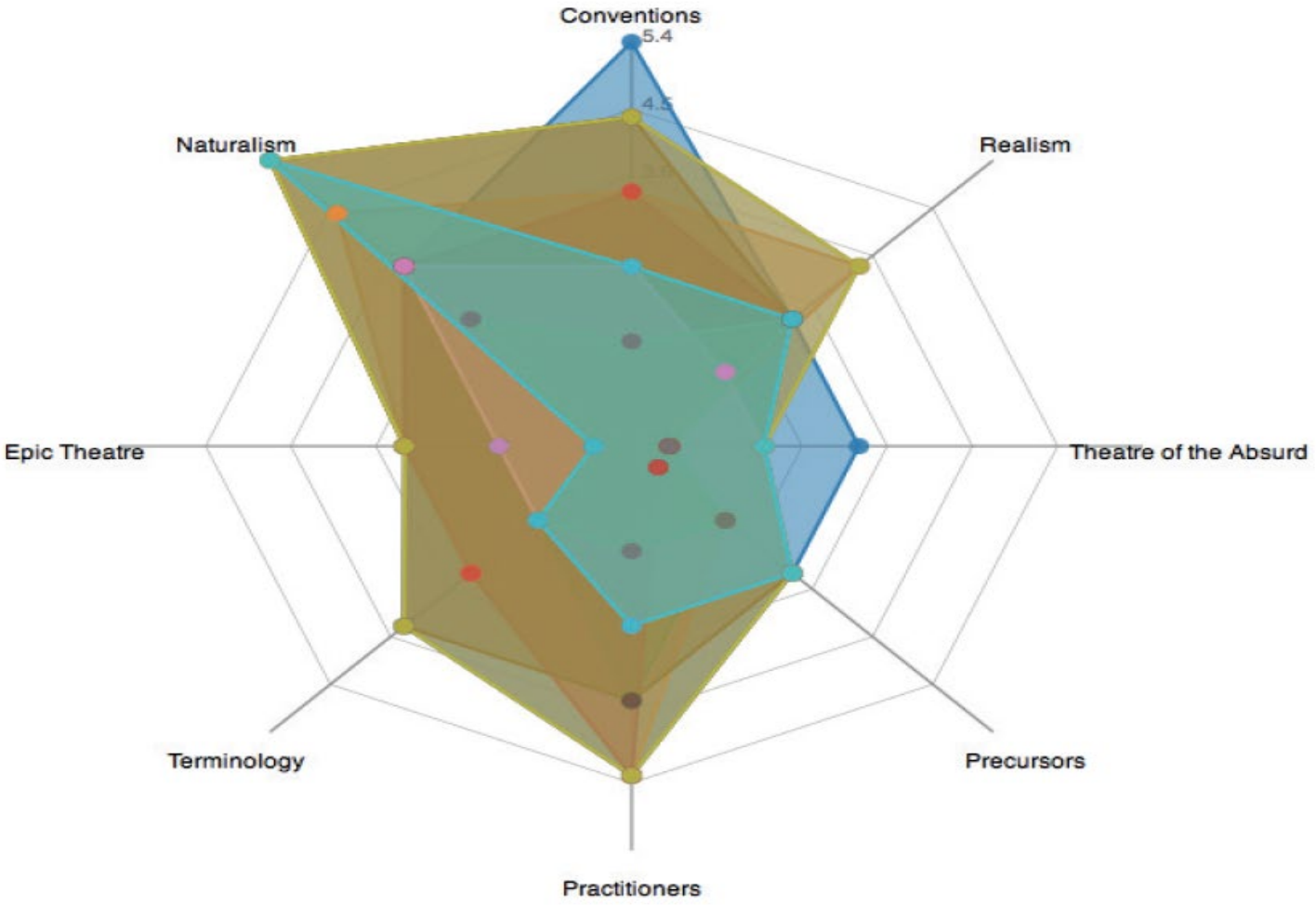
WHAT, HOW, WHY

- WHAT do they not understand - 1 challenging area
- HOW do they not understand it – GIVE EXAMPLE, DETAIL
- WHY do they not understand it

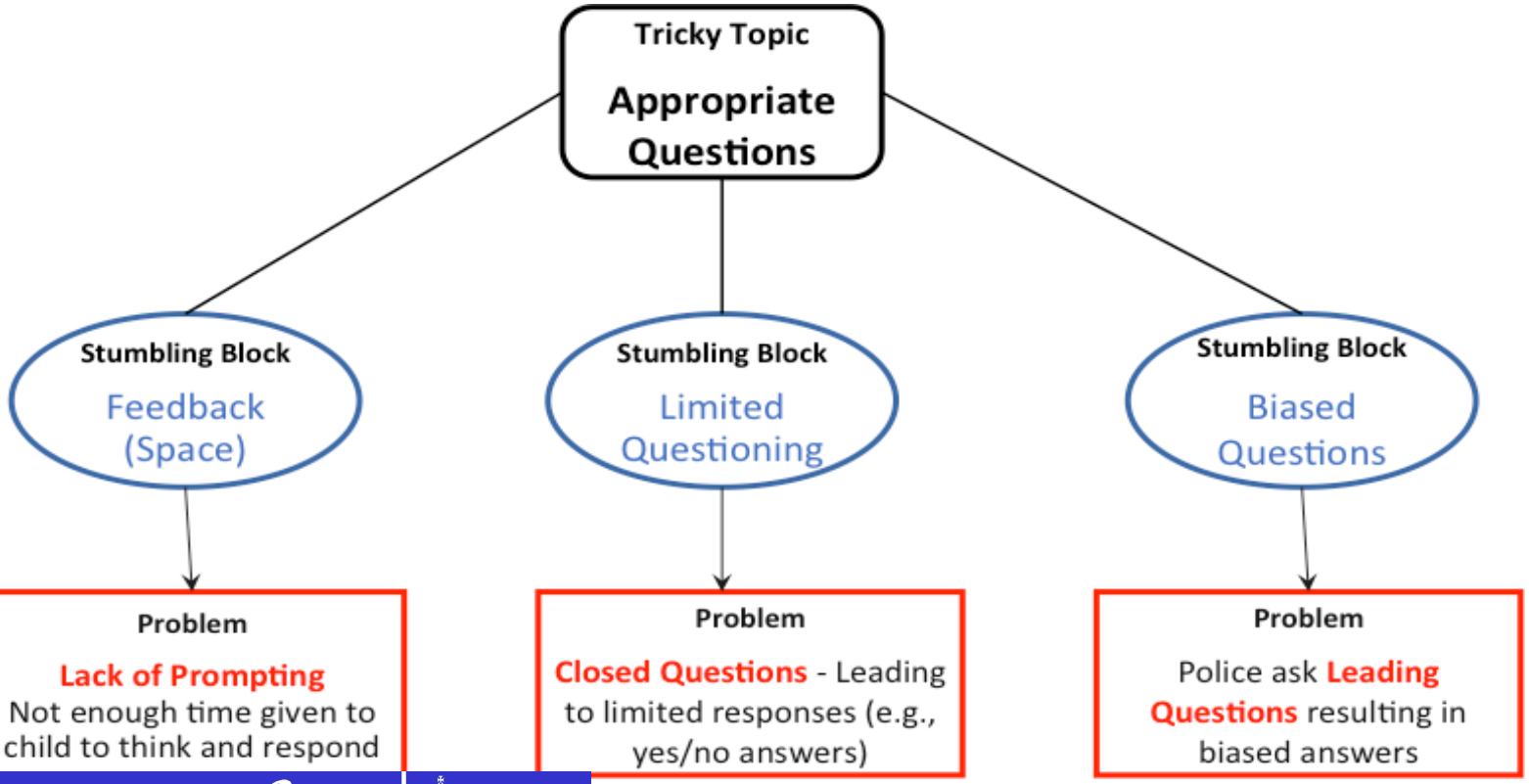

Tricky Topics
Stumbling block
B Big
Problem Examples
Optics and ray diagrams.
Drawing ray diagrams.
What is the source?
Why is there only two lines?
Students expect to quantify the diagrams. ie) reading graphs.
Why that direction?
Why do the lines focus then past to form an image.
What is a light source?
Can't identify a light source
Thinking that each ray carries a 'bit' of the object
Where did it go?
Scientific language & use of key words
Interpreting ray diagrams.
What is the focal point?
Thinking image can only be formed at the focal point
magnify.
real
virtual.
Pythagoras?
Maths words FREAK OUT!
Calculations used in ray diagrams.
Magnification.
Rearranging equations
If you can't interpret you can't answer questions using equations
By: Katie, Fliss, Heli, Naomi


Atomic Structure Theory
Understanding space in atomic model
Understanding energy levels
Understanding charges
Visualise atom & subatomic particles
Can't see trends and differences in groups in periodic table
Recognising charges of protons, neutrons and electrons
Problem seeing atoms have different sizes and mass
Inability to predicts reactants and products
Confusion about repulsion and attraction
Difficulty with terminology of subatomic model

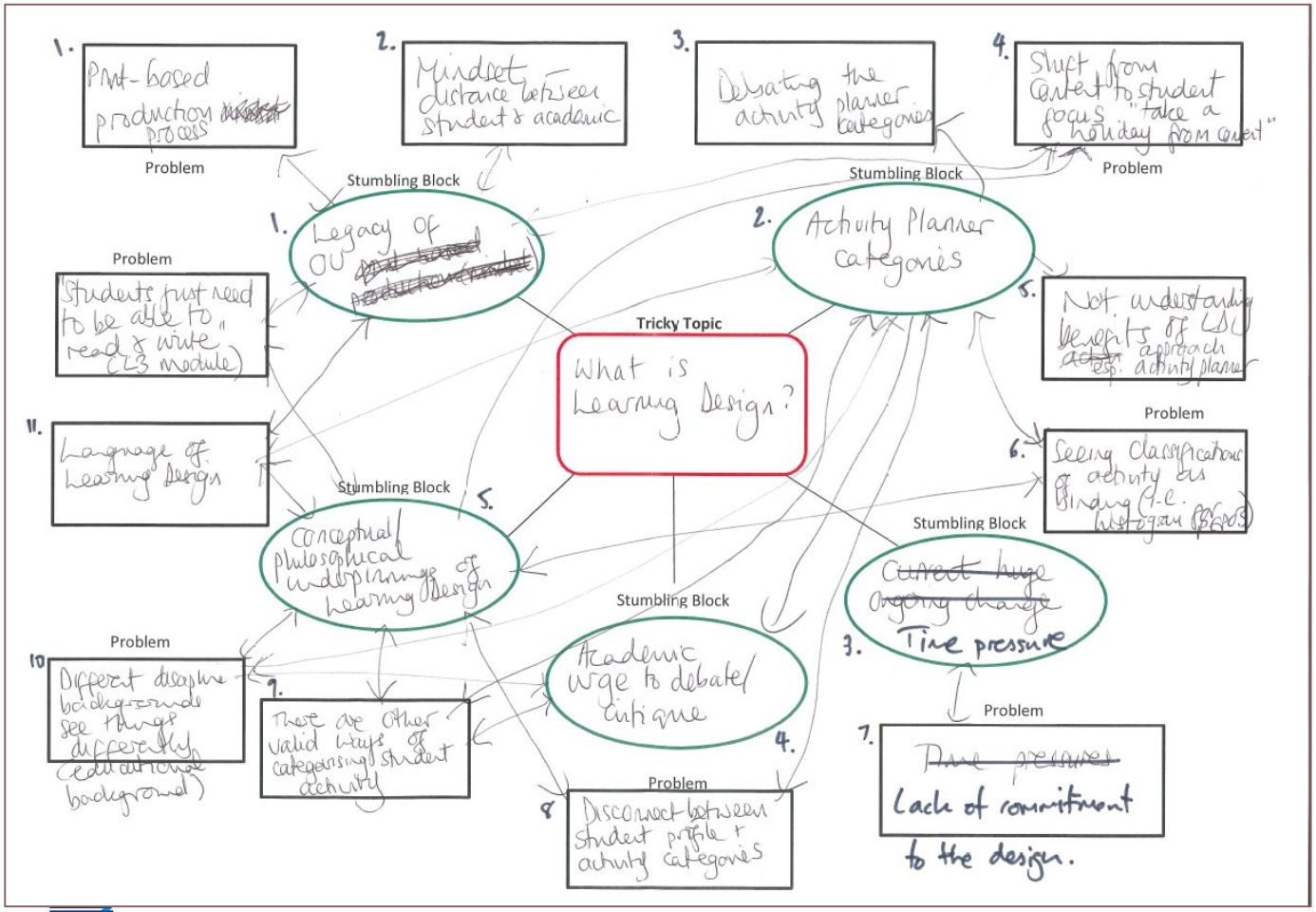
Theater studies



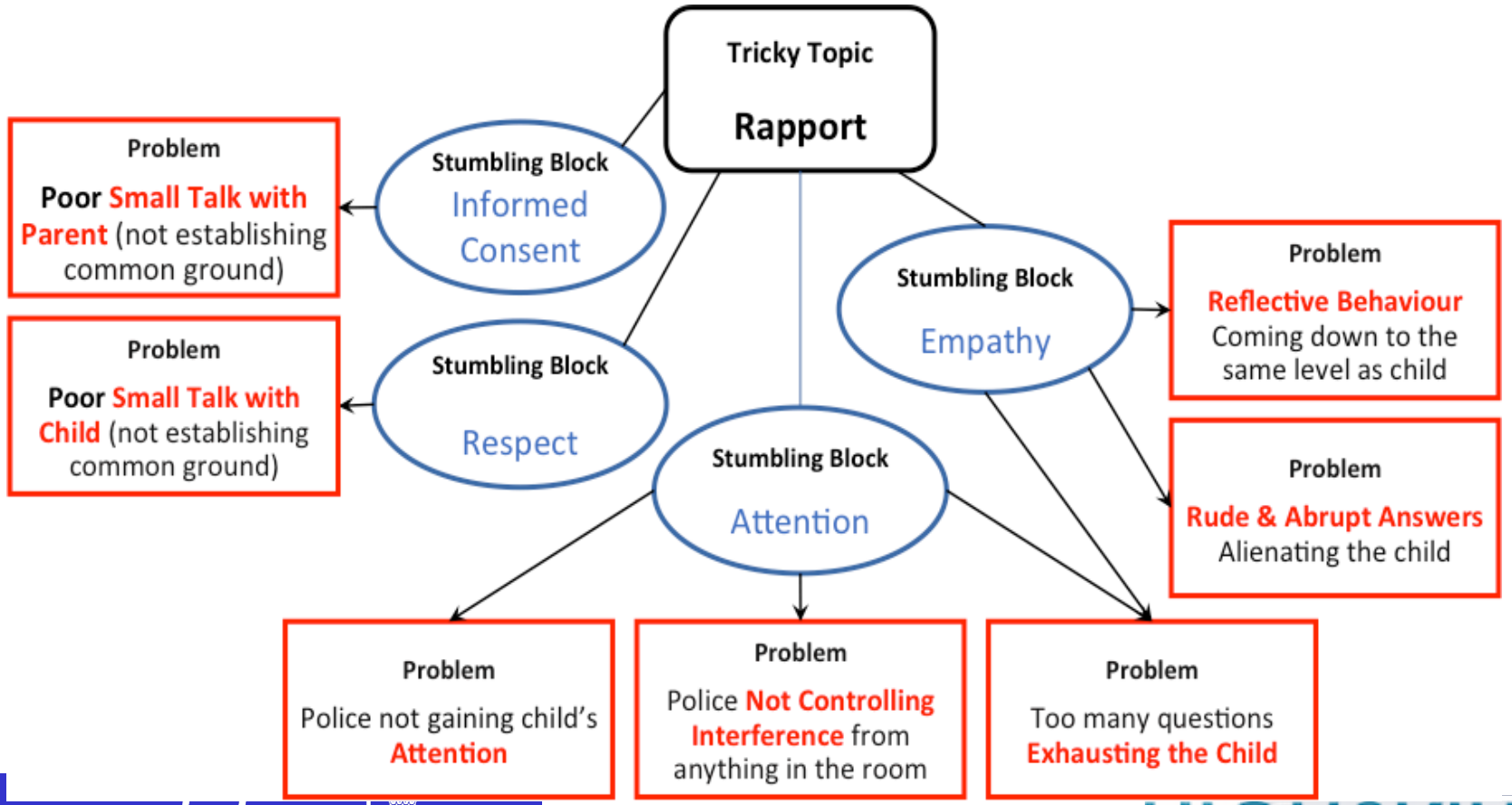
Tricky Topics – Appropriate Questions



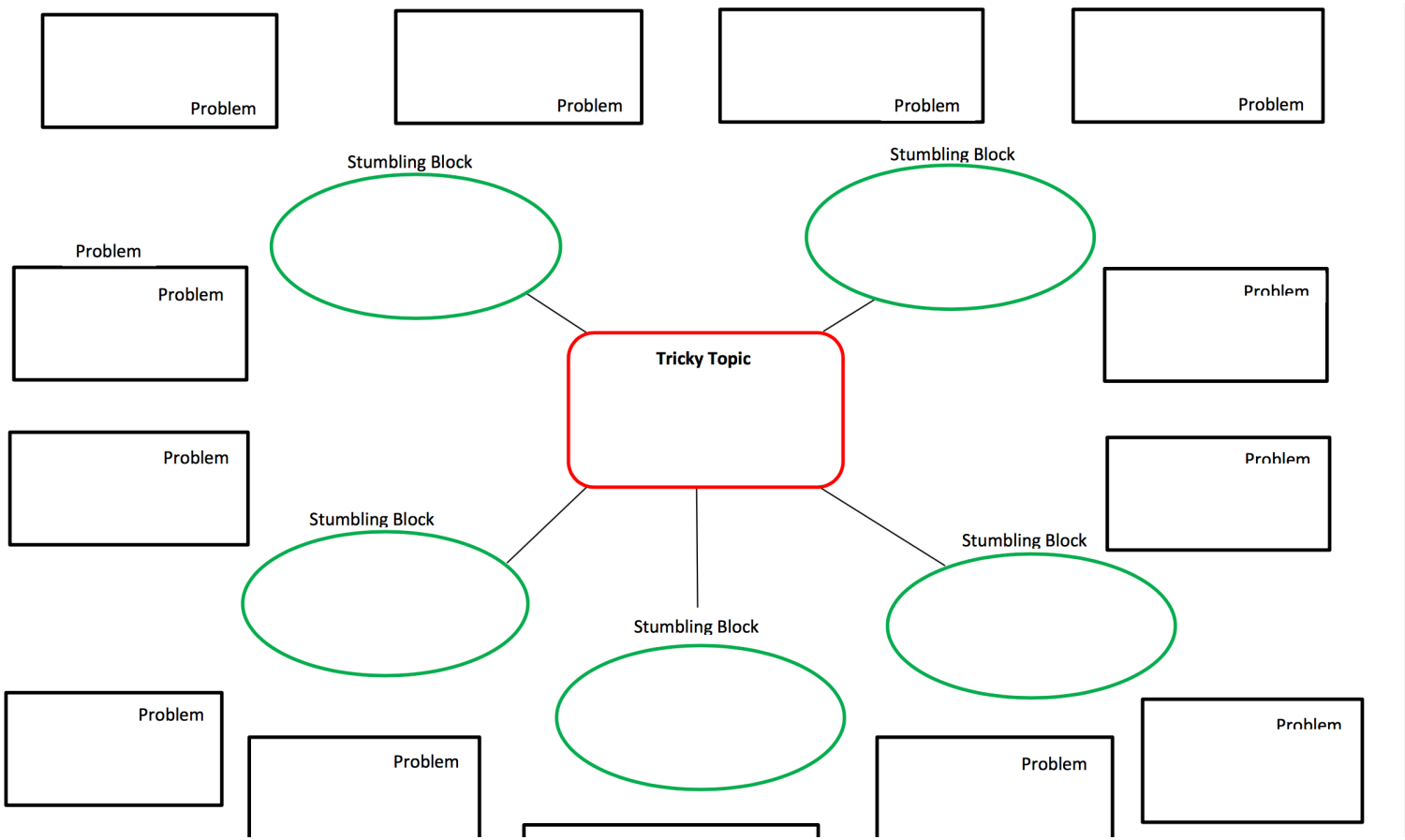
Tricky topics: identifying stumbling blocks



Game Tricky Topics - Rapport



Tricky Topic Mapping



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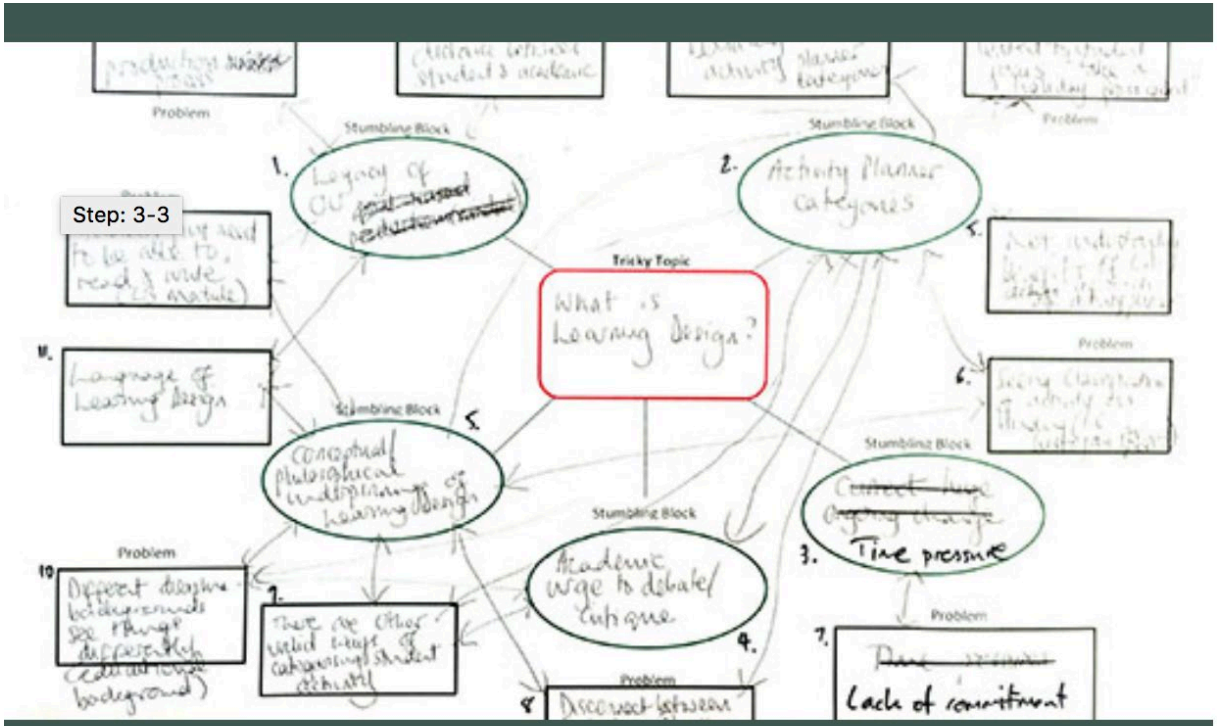

The Tricky Topic Mapping diagram, will then help your groups to structure their identified problems and form their 4-5 Stumbling Blocks.

The Stumbling Blocks will not be isolated from each other. Some groups may identify key stumbling blocks straight away. Other groups may struggle to see how the problems fit together. The facilitator is an important part of this process.

4. Plenary for the Identify stage

Once the Mapping diagrams are complete, the facilitator leads a whole group discussion in which each group shares their Stumbling Blocks and discusses why these are important.

This activity may include use of a whiteboard, flip charts and/or sticky notes.

Problem Distiller - WHY

1. Incomplete or flawed prior knowledge
2. lack of linked concepts
3. Terminology.
4. Other challenges e.g. Intuitive belief

Tricky Topic: Stumbling Blocks

Main challenge	Example (1)	Example (2)	Example (3)	Other examples
Incomplete pre-knowledge	Gaps in understanding	Poor prior learning	No relation between previous knowledge and new knowledge	
Incomplete linked understanding	Unable to give examples	No linking between content and real life	Gaps in understanding complementary knowledge	
Misunderstanding of terminology	Lack of understanding of meaning	Information is memorised	Modules are separate, no connection	
Other challenges				

Tricky Topic Focus

Activity 3a: Break-down your topic into – challenges and problems students encounter

Activity 3b: group these under headings (stumbling blocks).

Tricky Topics & Learning Design

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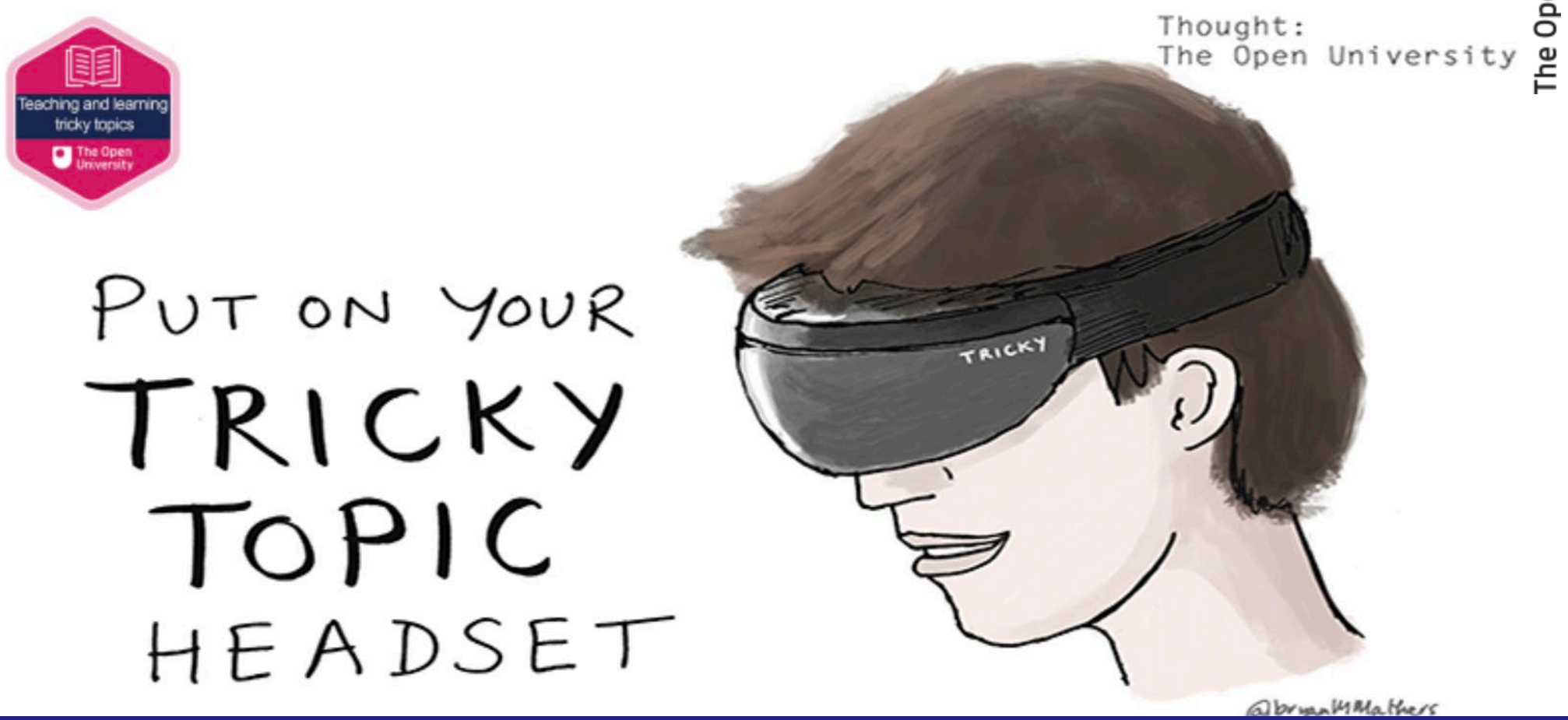

http://www.open.edu/openlearn/education-development/learning/teaching-and-learning-tricky-topics/content-section-0

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Tricky Topics and OERs

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TT focus for OER

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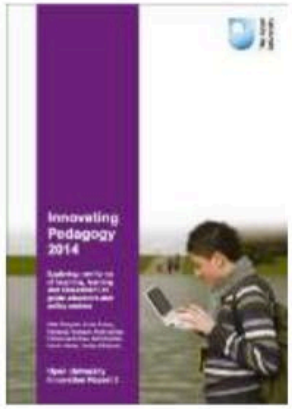
Flipped classroom



"the classroom becomes a space for dynamic, interactive learning where the teacher guides students to apply concepts they have learned online"

Bring your own devices

"Students can access their own devices to achieve goals set by their teachers and become more independent learners."

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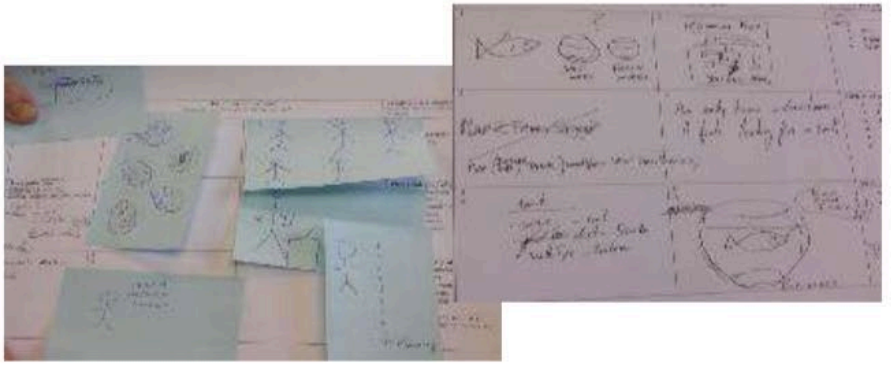
TT focus for Online Learning

Digital sequenced storytelling

Creative video making

Game based learning

Face to face storytelling



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TT for African Online Learning

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Formative Assessment

Step
1. Review Tricky Topic and choose stumbling blocks:
2. Label your question
3. Identify Mistakes:
4. Write Question To Trigger Mistake:
5. Write Responses That Are Identified Mistakes:
6. Review Questions & Answers:

Tricky Topics for OER learning Design

Activity 4: Discuss Tricky Topic focus for Designing OER in next session

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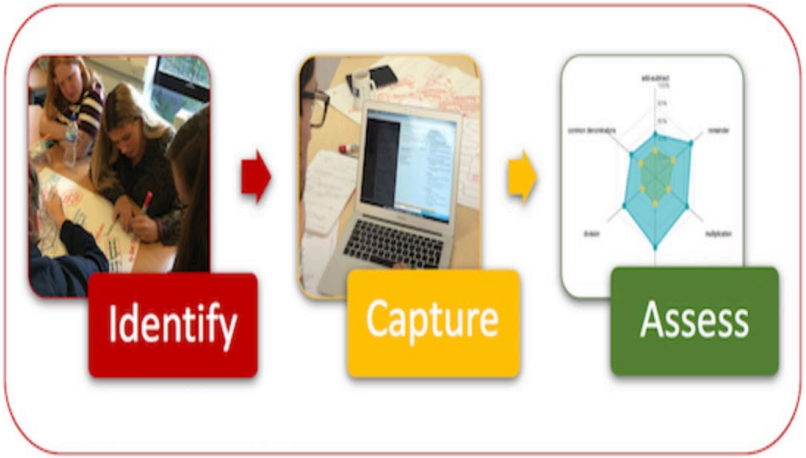

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http://tricky-topics-guide.ac.uk

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Thank You
QUESTIONS

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