



Strategies for interdisciplinary teaching and learning

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Programme

- Introduction
- Get to know each other
- Experiment: a shared vision for interdisciplinary education
- Break
- Snowballing
- Closing

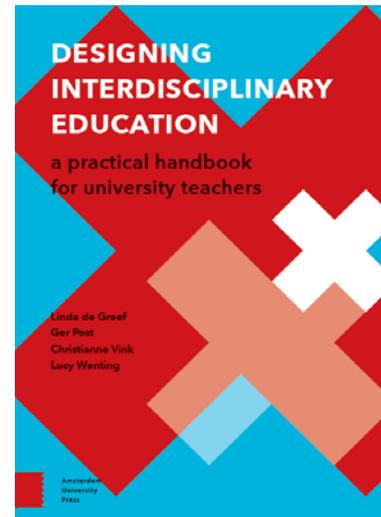
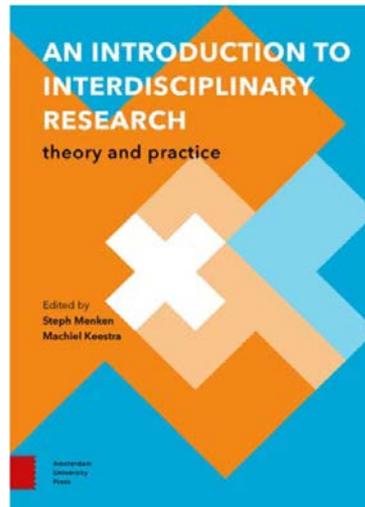




About the Institute for Interdisciplinary Studies

Initiate, promote and carry out interdisciplinary education within the University of Amsterdam.

Share the knowledge about interdisciplinary learning and teaching actively.





Towards a teaching philosophy

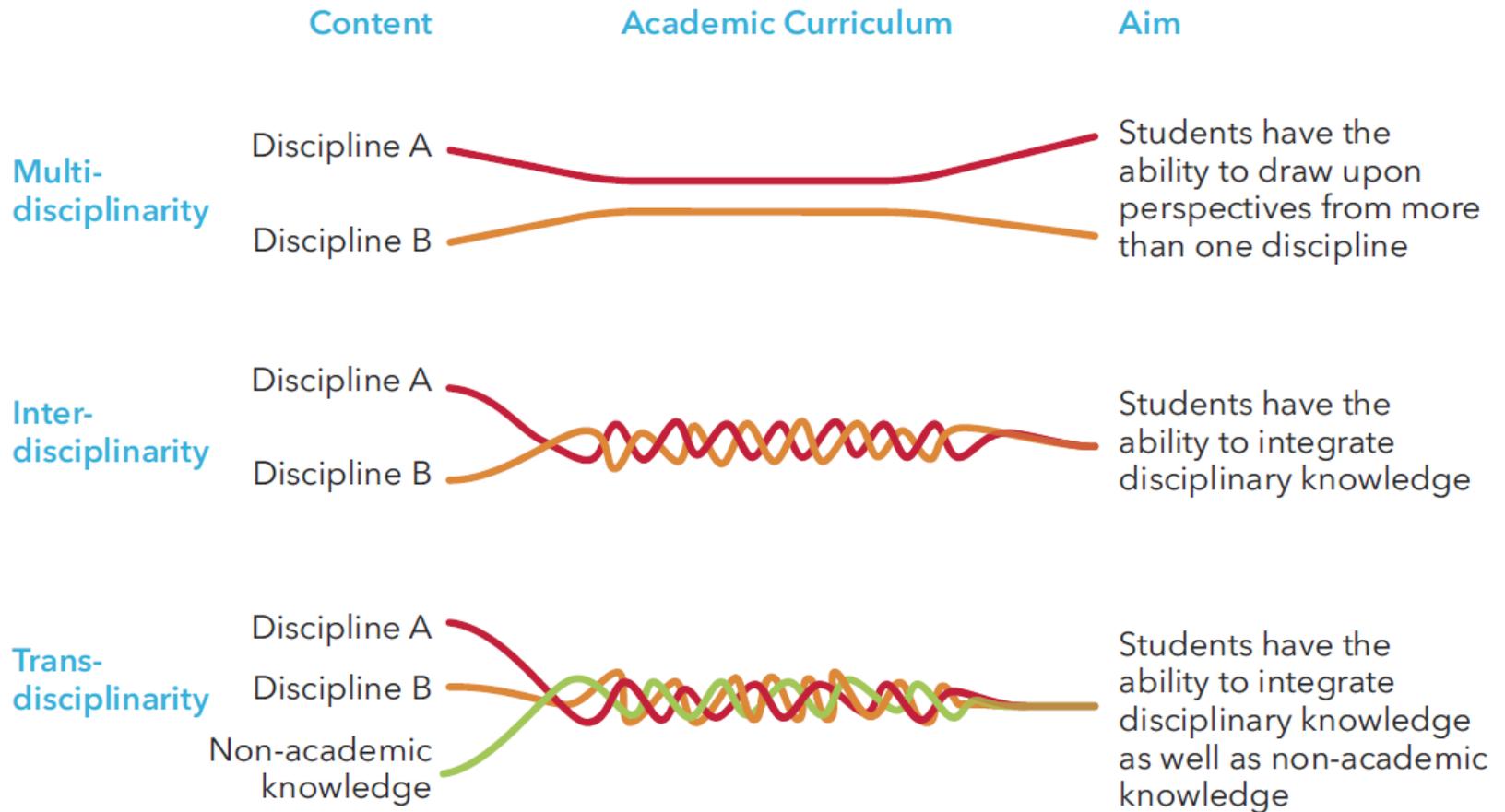
4 groups, 4 questions

- What do you want to accomplish with interdisciplinary education?
- What must be done to ensure that students actually integrate knowledge across disciplines?
- What does a student need from you, the teacher, to be successful during his or her interdisciplinary development?
- What do you consider to be essential for an effective interdisciplinary education environment?





The essence of interdisciplinarity





The essence of interdisciplinarity

‘ a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession and draws on disciplinary perspectives and **integrates** their insights through construction of a more comprehensive perspective ’

Klein & Newell, 1996

‘ The capacity to **integrate** knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement—such as explaining a phenomenon, solving a problem, or creating a product—in ways that would have been impossible or unlikely through single disciplinary means ’

Boix Mansilla, Miller & Gardner, 2000



The essence of interdisciplinarity

Encyclopaedic ID	Communication and comparison of ideas
Shared or cooperative ID	Exchange of data, methods and procedures
Composite ID	Applying complementary skills to achieve a shared goal
Contextualising ID	Applying knowledge from a discipline to contextualise another
Methodological ID	Adapting a method from another discipline
Theoretical ID	Developing a new theoretical perspective based on elements from different disciplines
Generalising ID	A single theoretical perspective is applied to a wide range of disciplines
Integrated ID	Concepts and insights of one discipline contribute to the problems and theories of another

A Taxonomy of interdisciplinarity
Klein (2010)



Unraveling interdisciplinary thinking

Interdisciplinary students are able to.....

Capacity to interact and collaborate with others effectively, including in teams, in the workplace, and in culturally or linguistically diverse contexts.

Students are able to work in complex, dynamic settings in which the information required is not always available or complete

be able to defend a well-considered viewpoint covering the relevant disciplines

be able to evaluate which disciplines are involved in the solution of complex issues

know which phenomena are being studied in the different disciplines and which research methods and theories are used.

Students are able to assess critically the relationships among the relevant disciplinary perspectives

Students are able to reflect on and evaluate their own thinking and the thinking of others in relation to an issue or problem

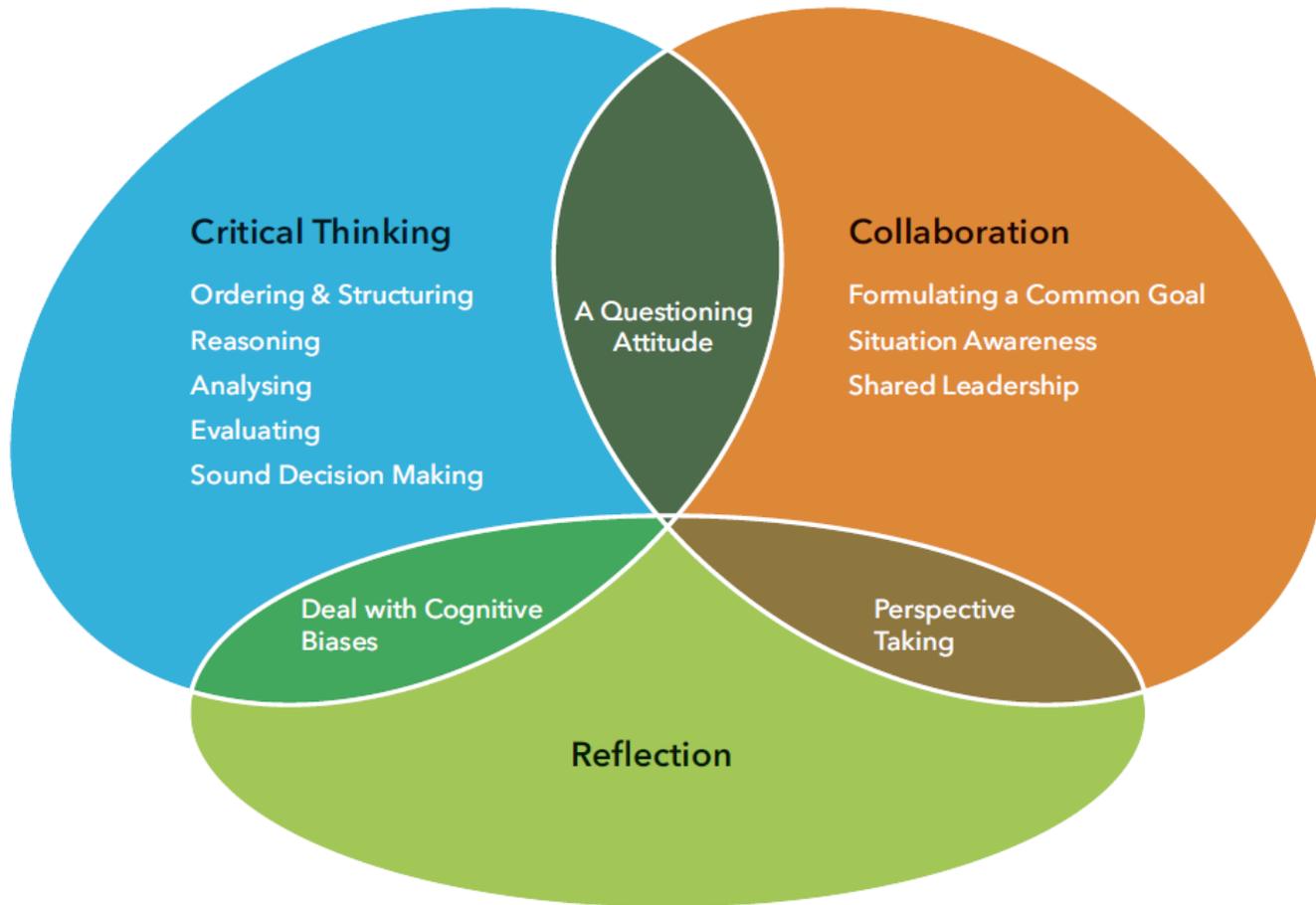
be able to assess which research methods are most suitable in a particular situation

consider alternative perspectives

Students are able to synthesize various points of views



Unraveling interdisciplinary thinking





What are the intended learning outcomes?

Reflection

Beginner	Students are able to reflect on their mental state in relation to their behaviour.
Intermediate	Students are able to reflect on their mental state and the mental state of others in relation to their behaviour.
Advanced	Students demonstrate reflective practice, actively seek out opportunities to grow professionally.

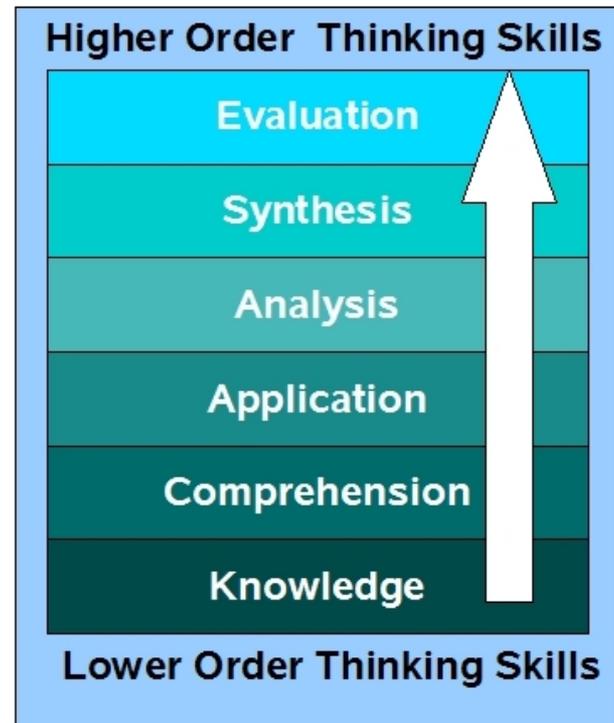
Integration

Beginner	Students acquire knowledge in several disciplines but do not integrate it.
Intermediate	Students are able to integrate knowledge from several disciplines around a central theme. Critical thinking skills are being developed as the learner becomes aware of the strengths and limitations of the perspectives offered by each discipline.
Advanced	Students are able to integrate interpretive tools, e.g. methodologies, theories, paradigms and concepts from multiple disciplines and can apply an interdisciplinary knowledge structure to new interdisciplinary problems or themes.



Blooms taxonomy

- Cognitive domain
- Affective domain
- Psychomotoric domain

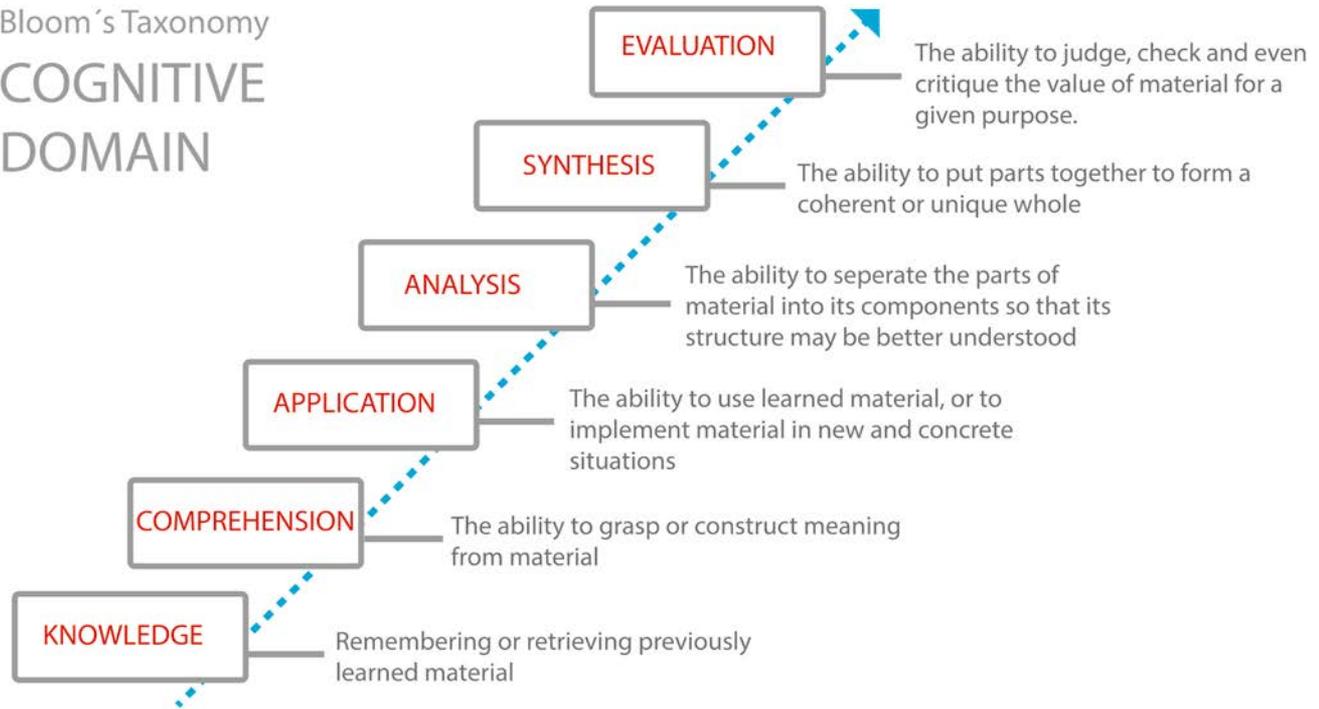




Interdisciplinary learning outcomes

- consider
- reflect
- contrast
- weigh
- judge
- criticize
- review
- integrate
- synthesize
- operationalize

Bloom's Taxonomy
COGNITIVE
DOMAIN





How to foster interdisciplinary understanding?

New insights arise by comparing, contrasting, linking, adding and adapting disciplinary concepts, theories and methods

- ❑ Educate students in different disciplines is not enough
- ❑ Focus on a repeated training of skills and characteristics of interdisciplinarity

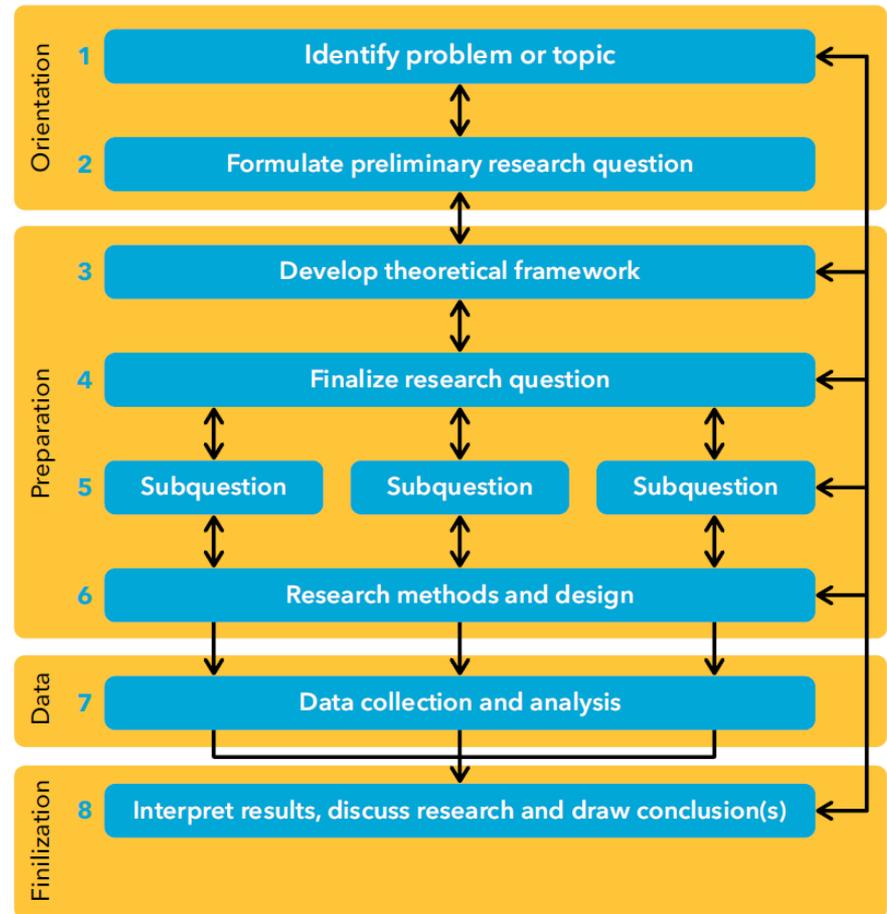
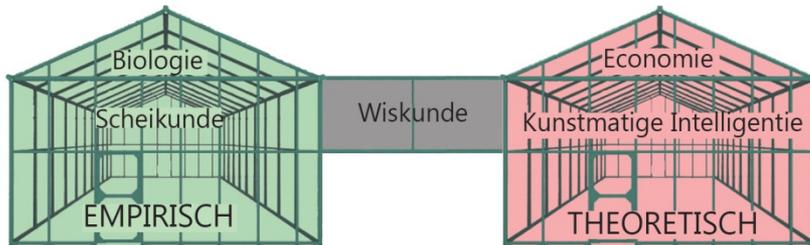


Didactic methods that nurture interdisciplinary understanding

- A coaching style in teaching and supervision
- Collaborative learning: problem based learning / team based teaching
- Working with authentic real life problems
- Team teaching



Collaborative and problem based learning





Working with authentic real life problems

Pressure cooker

Day 1	Day 2	Day 3
Team Building	Analysing	Solution
Explore your team's strengths and weaknesses	Evaluate and analyse question and search for solution	Search for solutions or product and engage and convince partners

Master Brain& Cognitive Sciences – ministry of Defense

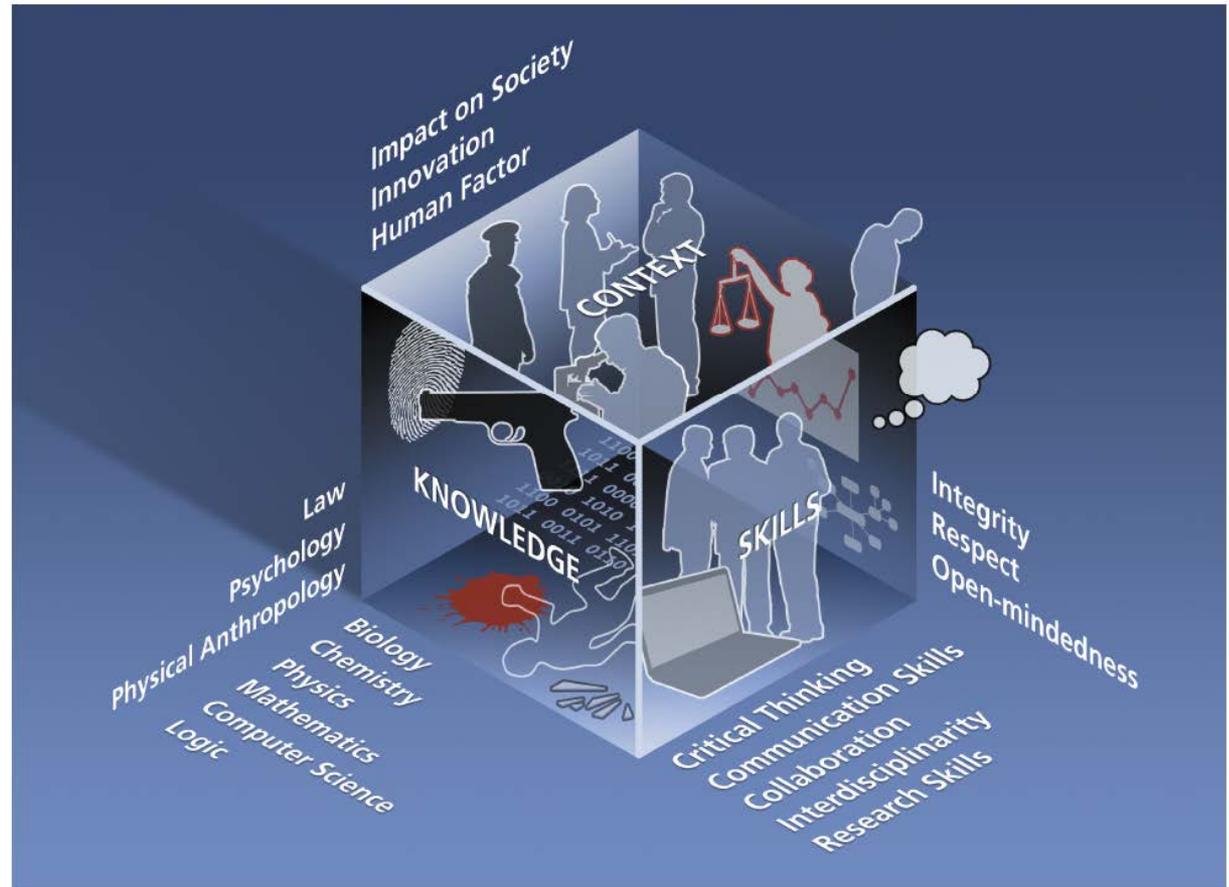
How do you prevent Post Traumatic Stress Syndrome in soldiers, or how can you screen the most resilient soldiers?

Tip: 'Try to avoid becoming completely immersed in the client's concerns. Students must sense that they have a certain degree of "academic freedom" and that the proposed solution is not biased in a direction favoured by the client.'





Team teaching





Coaching for teaching and learning

'The thoughtful use of questions is the quintessential activity of an effective teacher.'

Jon Mills

Golden rule: Confront without judgement

Silver question: What does this student need to take the next step?



Example Learning activity

Movies & Matter

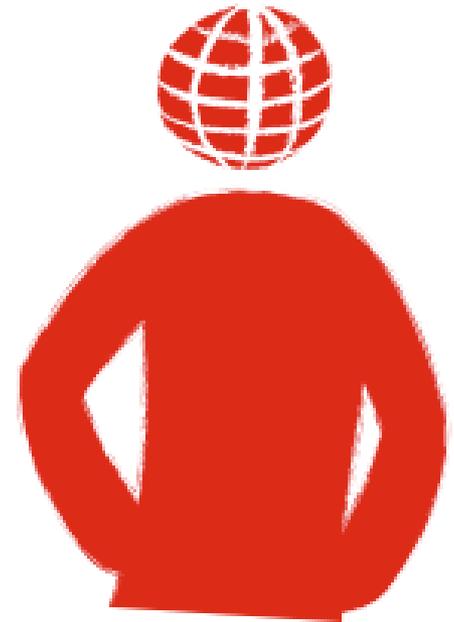
Physics	Biology	Chemistry
Galaxy	Cell membrane	Proteins
Entropy	Human anatomy	Water
Deuterium	Golgi apparatus	Conformation

Sociology	Economy	Political Science
Functionalism	Barter economy	nationalism
Civilization theory	Theory of the invisible hand	Liberalism
Social cohesion	Scarcity	Good governanc



Example Learning activity Perspective taking

Breaking news





Example Learning activity

Designing a research question

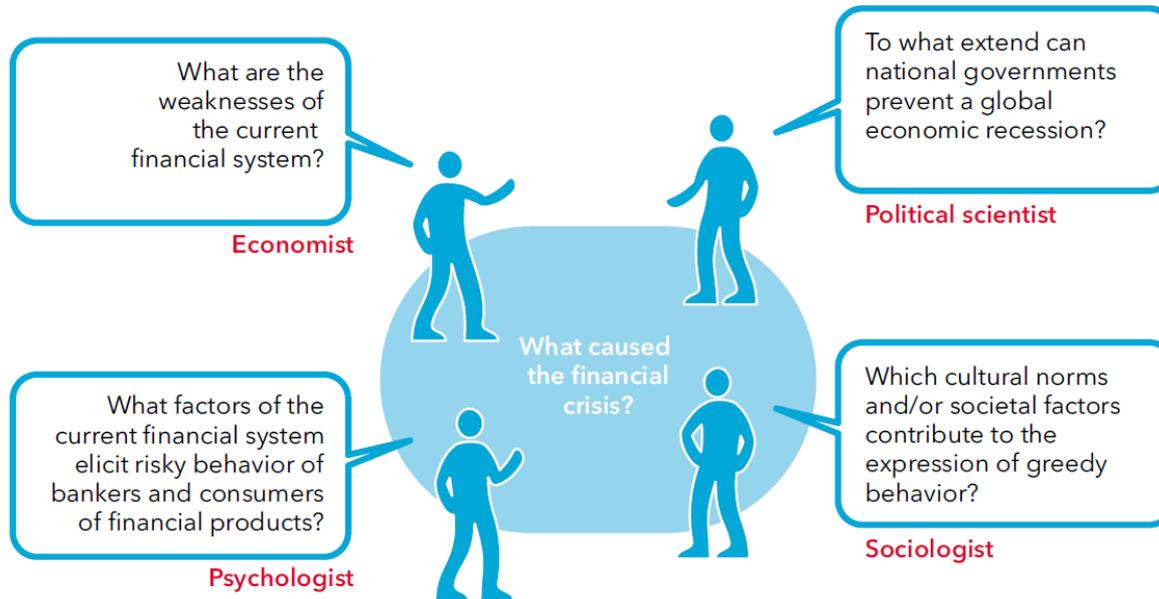


Figure 2 Different perspectives on the causes of the financial crisis

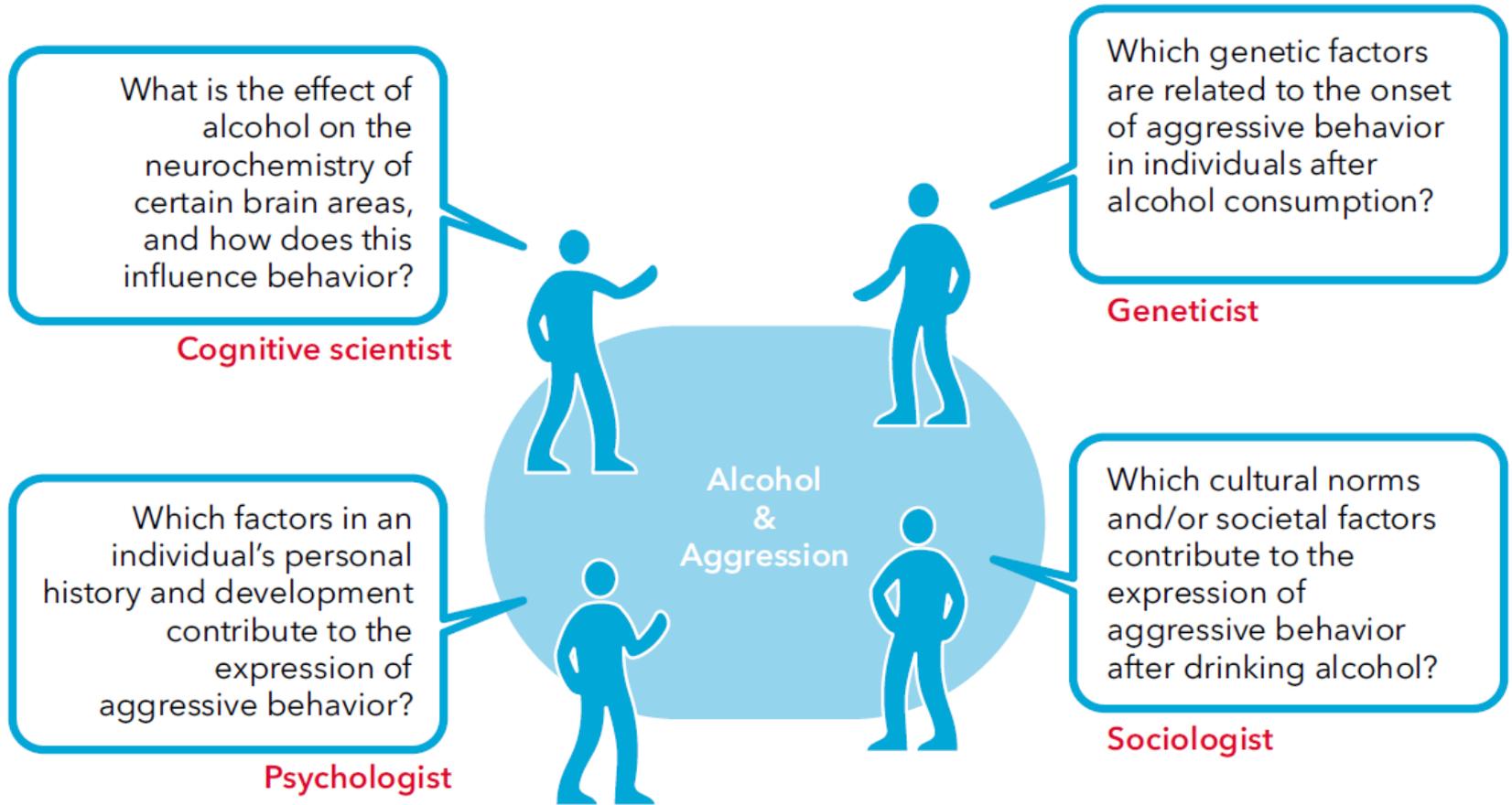
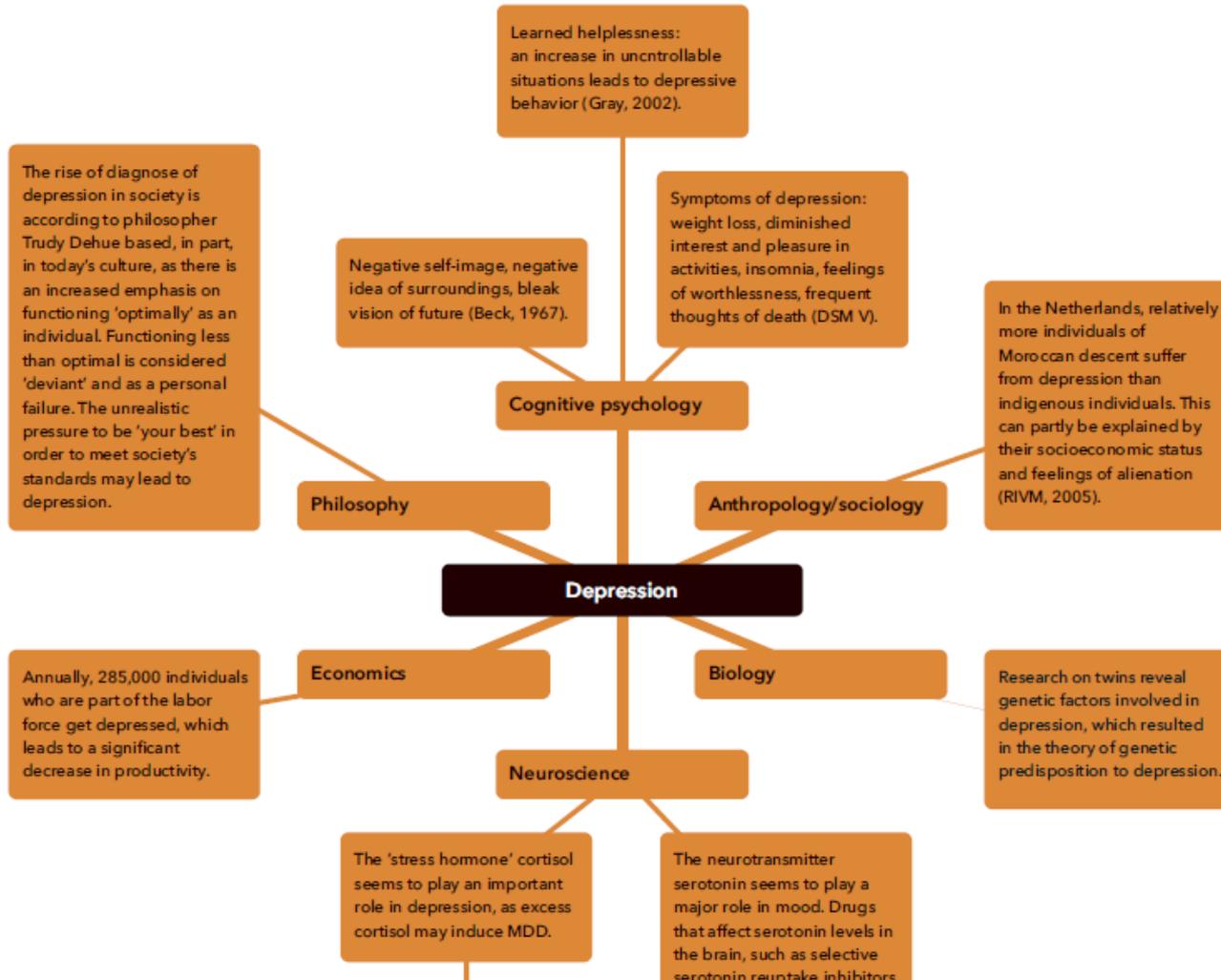


Figure 1 Different perspectives on the relationship between alcohol intake and aggression



Example of a mindmap





The six conceptions of learning

Van Rossum & Hamer (2010)

Level 1 **Increasing knowledge**

The goal is to know many facts. All knowledge is viewed as equally important. Facts can be true or untrue. Knowledge is not yet something you can reflect on.

Level 2 **Memorising**

a distinction between main points and side issues. One should be able to reproduce knowledge on a test.

Level 3 **Reproductive understanding/ application**

Usefulness is an added criterion here. There can be a multitude of opinions on a topic. An opinion is a reflection on the personal experiences somebody has had.

Level 4 **Learning as abstraction of meaning**

Learning is relating ideas to each other, researching things in depth, collecting different viewpoints and forging a helicopter view of a topic. Learning is viewed as a way of analytical, logical thinking.

Level 5 **Widening horizons**

Learning becomes a process that helps you to understand, interpret and make sense of the world around you, to support your personal development.

Level 6 **Growing self-awareness**

learning is a means of self-realisation



Conception of learning versus the teacher's role

Level 1	Increasing knowledge	?????
Level 2	Memorising	?????
Level 3	Reproductive understanding/ application	?????
Level 4	Learning as abstraction of meaning	?????
Level 5	Widening horizons	?????
Level 6	Growing self-awareness	?????

How do you recognise the conceptions of your students?