Using concept mapping to develop theory in educational research.

Professor Ian Kinchin
University of Surrey, UK.

优秀的概念图

www.surrey.ac.uk

CONCEPT MAPPING

has been used to assess the

can be used to explore the

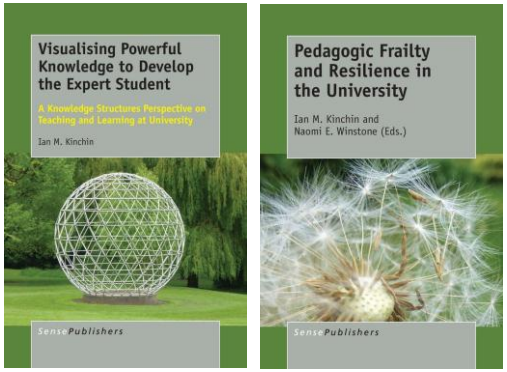
acquisition-of-the-known

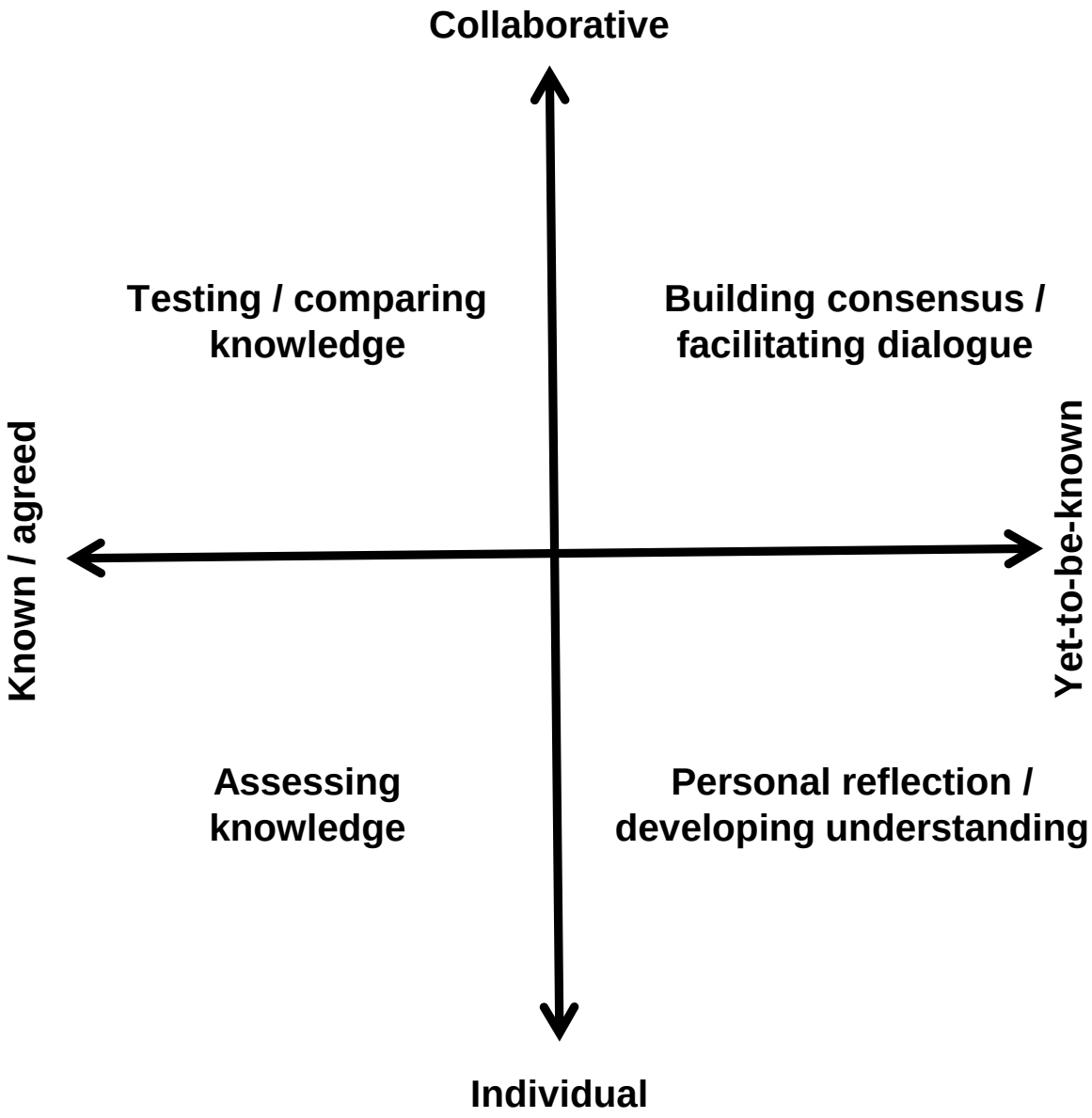
not the same as

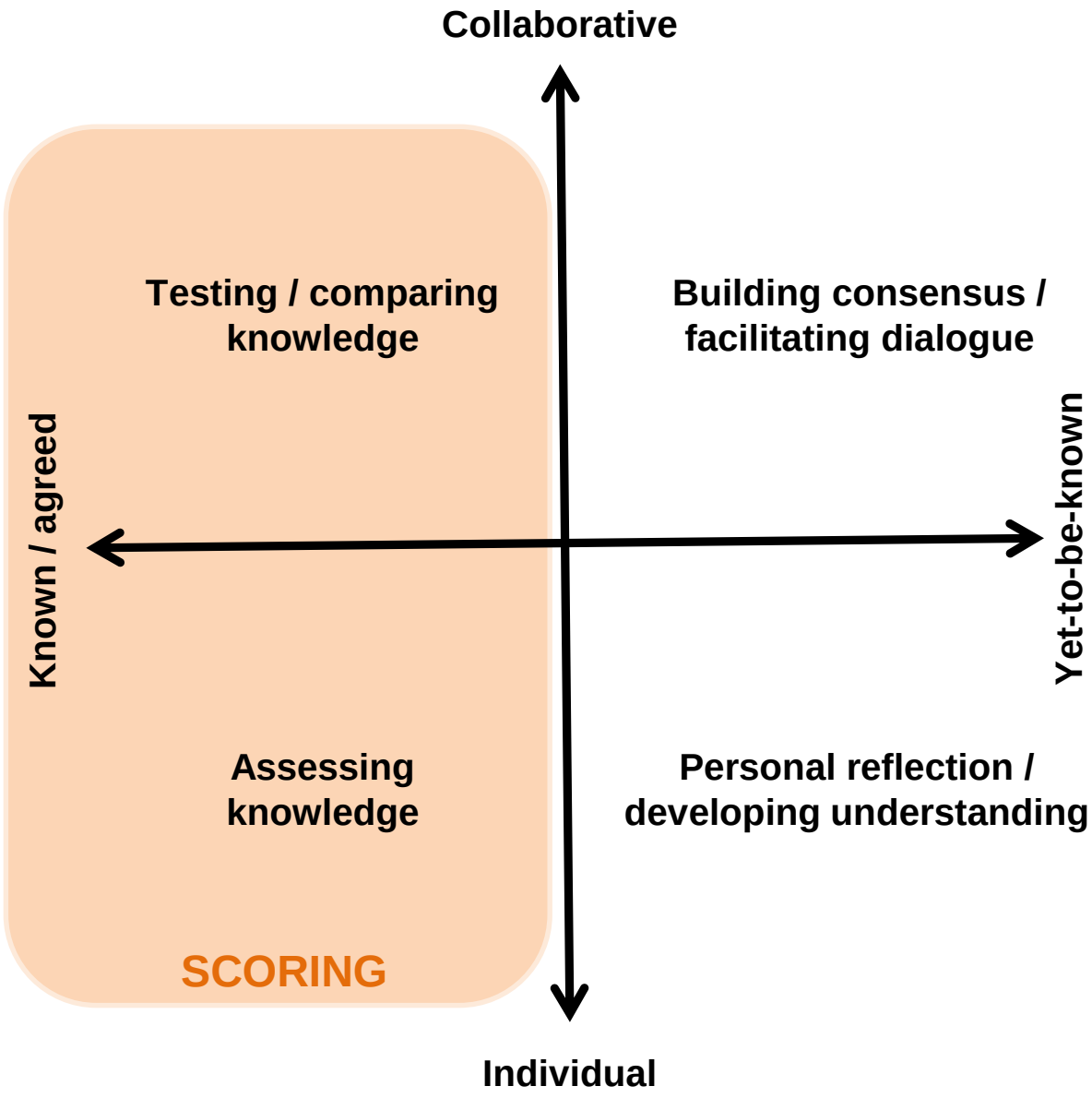
yet-to-be-known

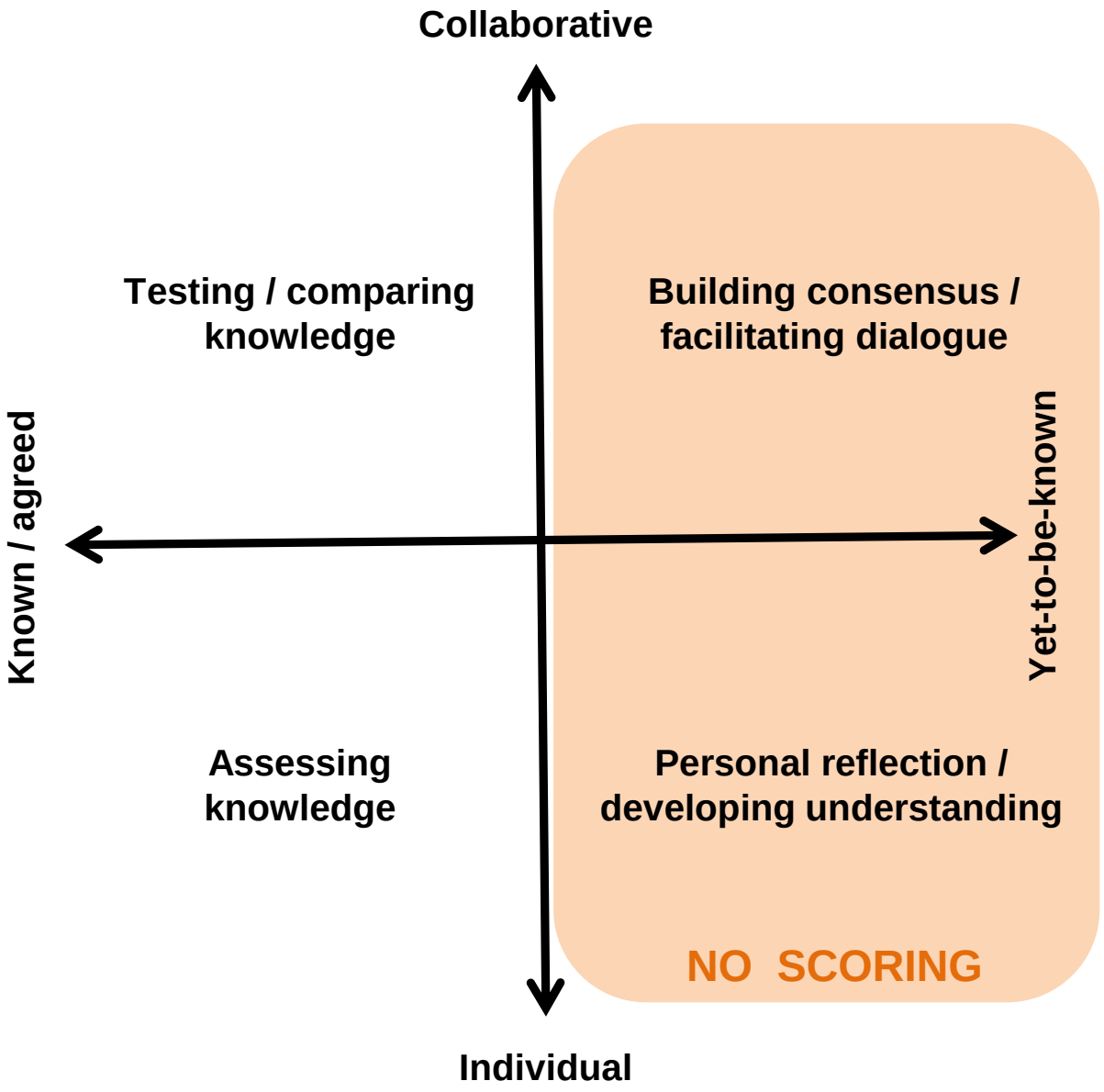
to develop

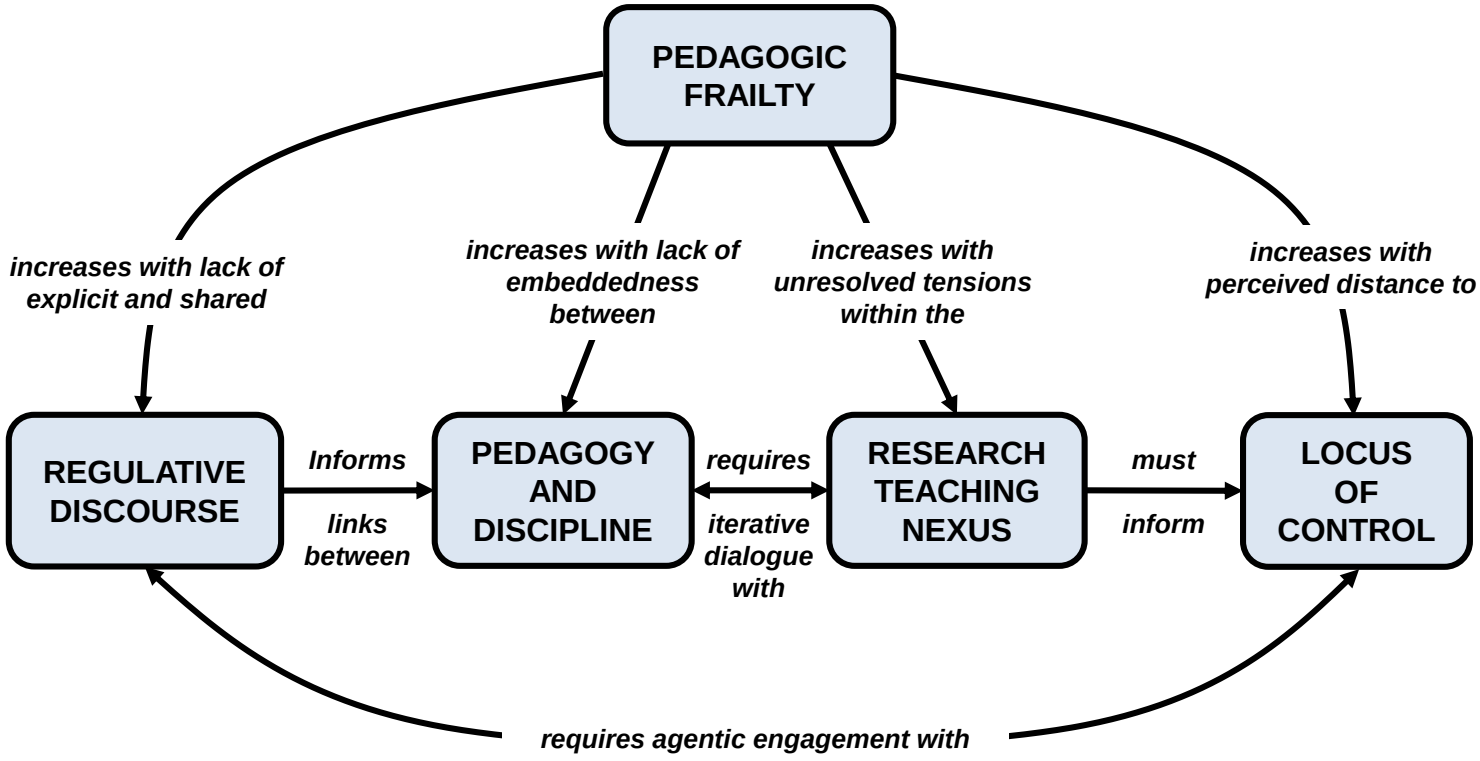
EDUCATIONAL THEORY

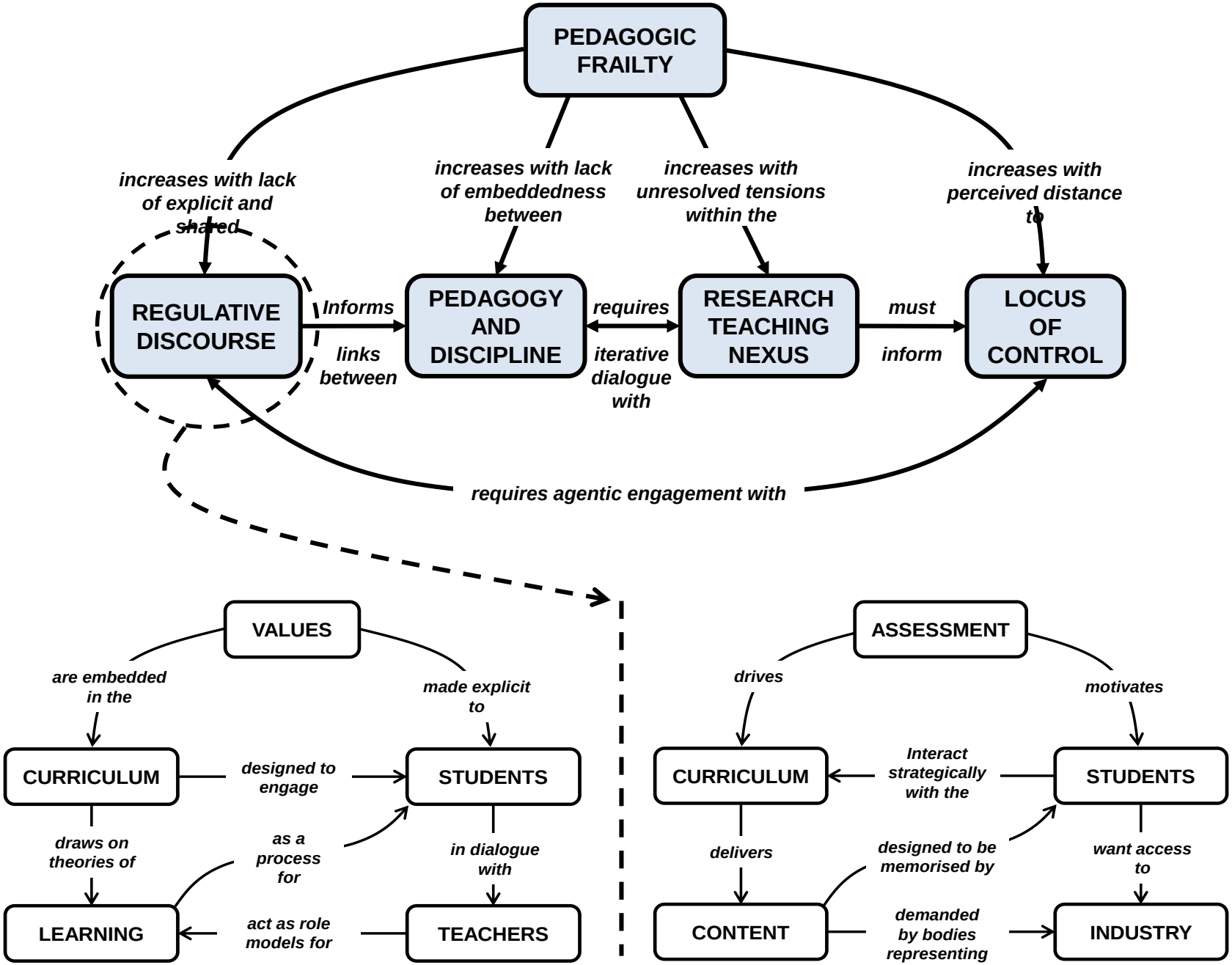



Collaborative
Testing / comparing knowledge
Building consensus / facilitating dialogue
Known / agreed
Yet-to-be-known
Assessing knowledge
Personal reflection / developing understanding
Individual

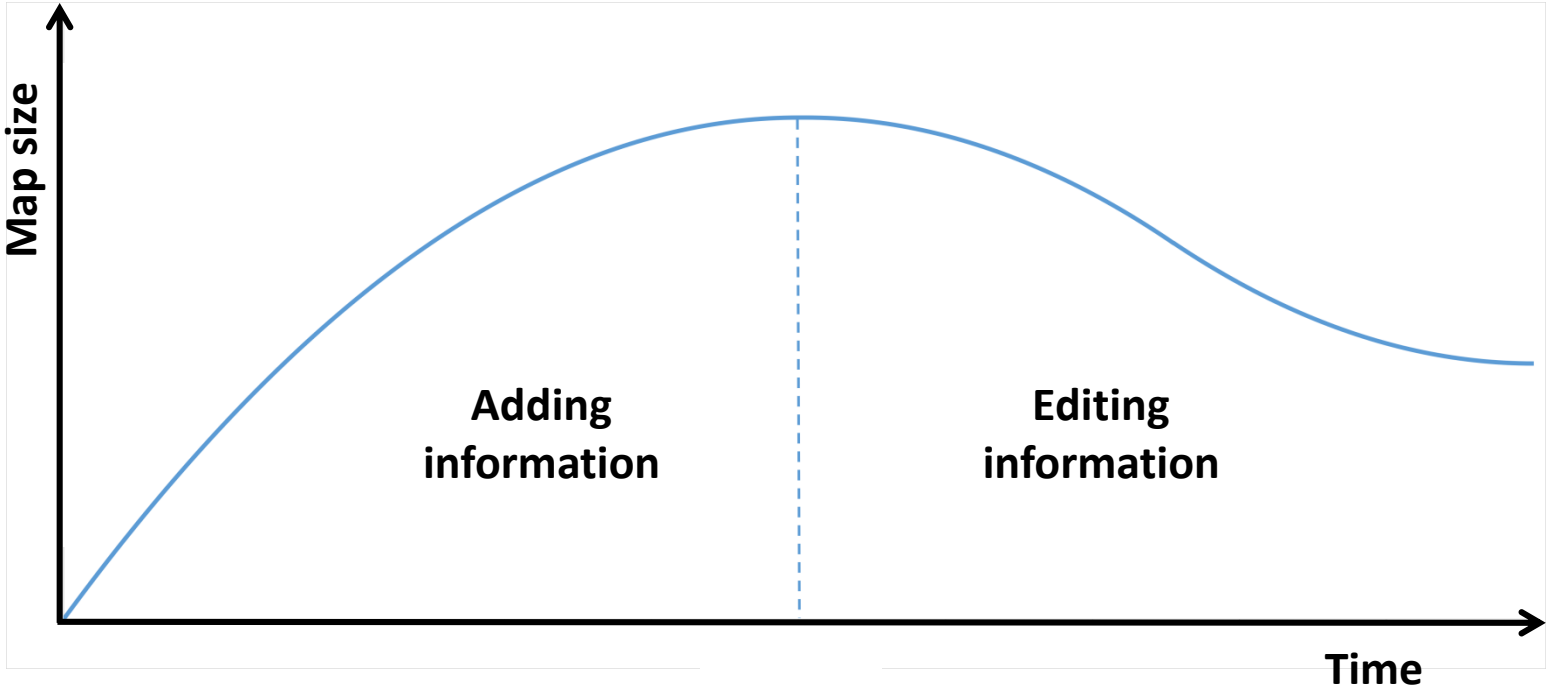

Collaborative
Testing / comparing knowledge
Building consensus / facilitating dialogue
Known / agreed
Yet-to-be-known
Assessing knowledge
Personal reflection / developing understanding
SCORING
Individual


Collaborative
Testing / comparing knowledge
Building consensus / facilitating dialogue
Known / agreed
Yet-to-be-known
Assessing knowledge
Personal reflection / developing understanding
NO SCORING
Individual


PEDAGOGIC FRAILTY
increases with lack of explicit and shared
increases with lack of embeddedness between
increases with unresolved tensions within the
increases with perceived distance to
REGULATIVE DISCOURSE
Informs
links between
PEDAGOGY AND DISCIPLINE
requires
iterative dialogue with
RESEARCH TEACHING NEXUS
must
inform
LOCUS OF CONTROL
requires agentic engagement with

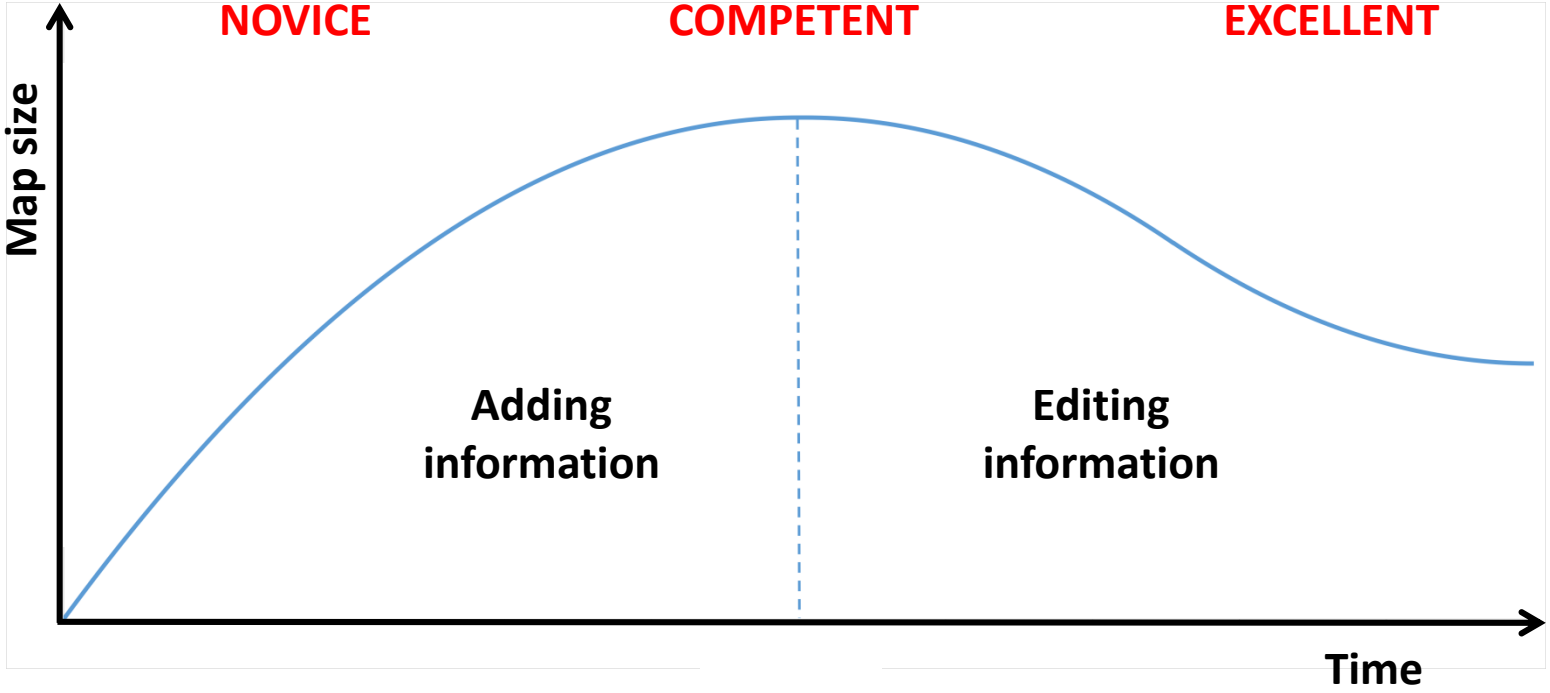

PEDAGOGIC FRAILTY
increases with lack of explicit and shared
increases with lack of embeddedness between
increases with unresolved tensions within the
increases with perceived distance to
REGULATIVE DISCOURSE
Informs
links between
PEDAGOGY AND DISCIPLINE
requires
iterative dialogue with
RESEARCH TEACHING NEXUS
must
inform
LOCUS OF CONTROL
requires agentic engagement with
VALUES
are embedded in the
made explicit to
CURRICULUM
designed to engage
STUDENTS
draws on theories of
as a process for
in dialogue with
LEARNING
act as role models for
TEACHERS
ASSESSMENT
drives
motivates
CURRICULUM
Interact strategically with the
STUDENTS
delivers
designed to be memorised by
want access to
CONTENT
demanded by bodies representing
INDUSTRY

Evolution of a cmapper's maps over time

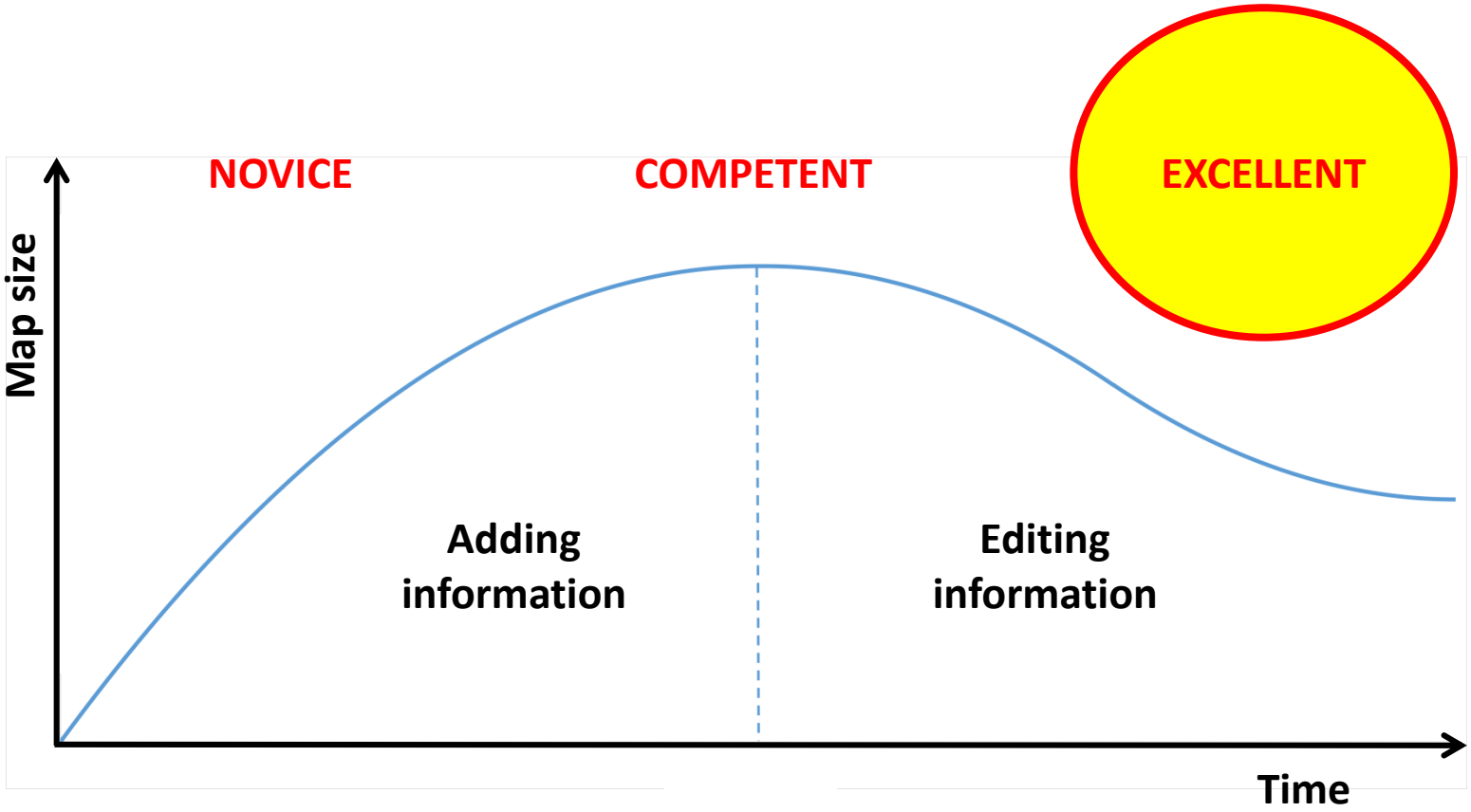


Adapted from Cañas et al 2017

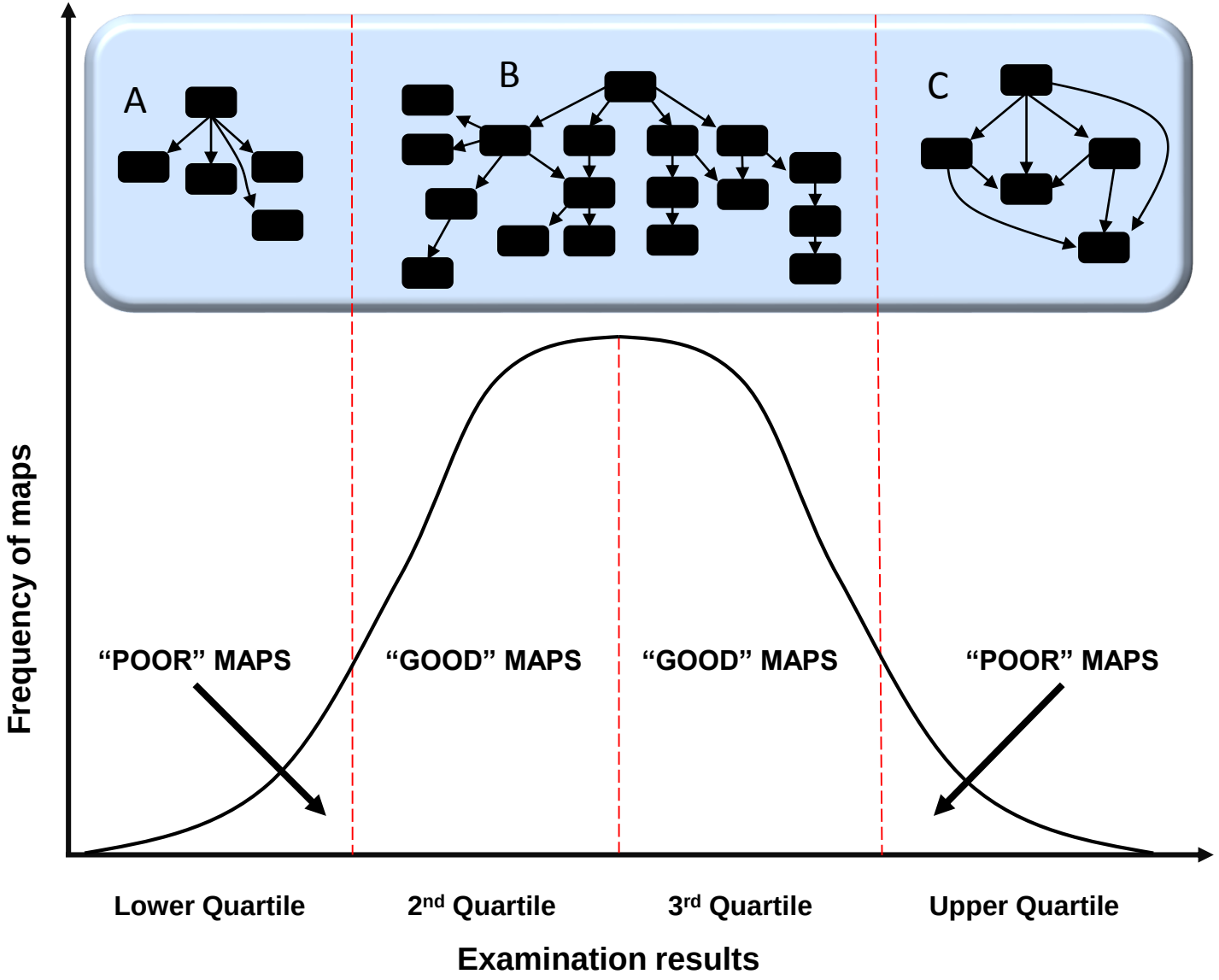
Evolution of a cmapper's maps over time

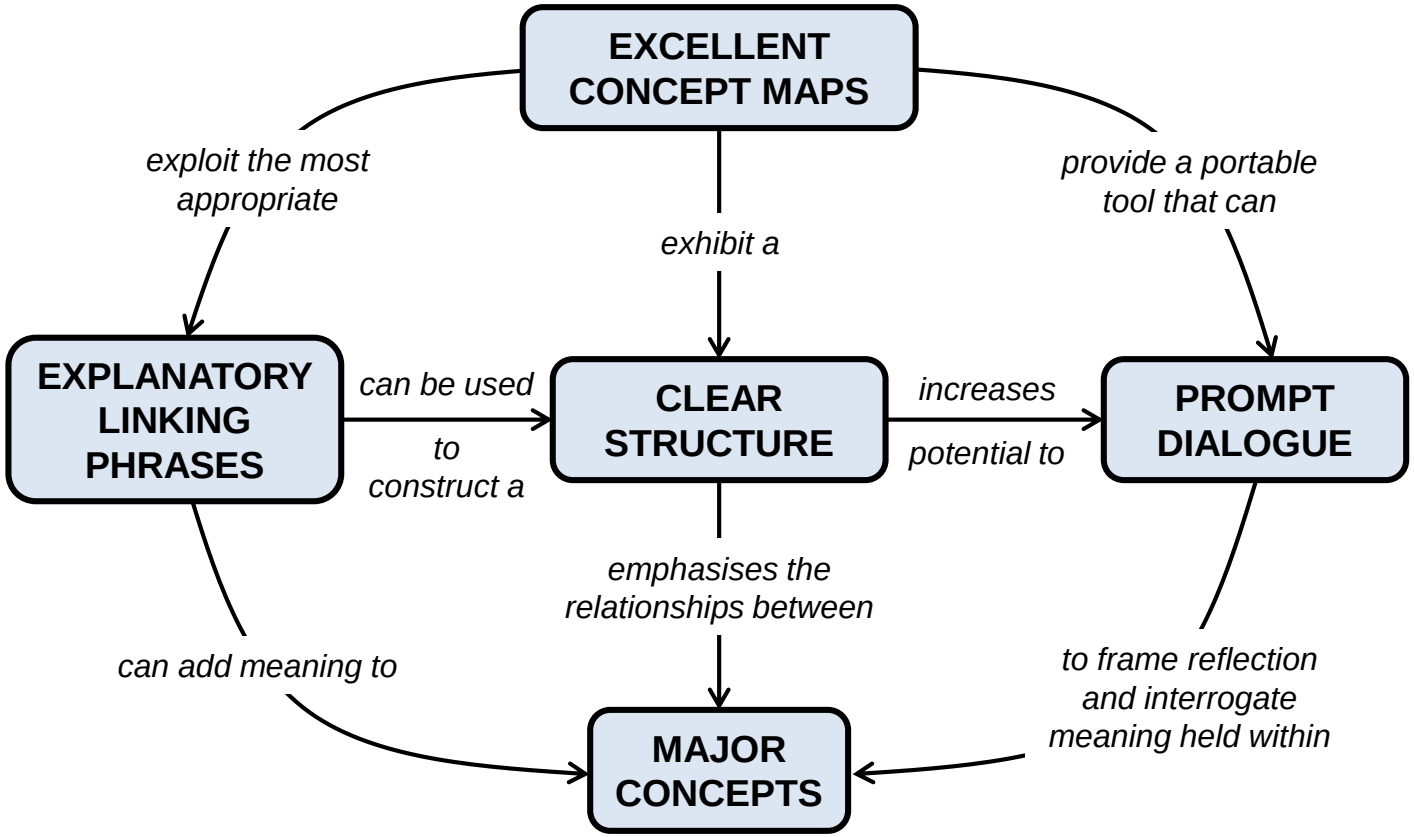


Evolution of a cmapper's maps over time

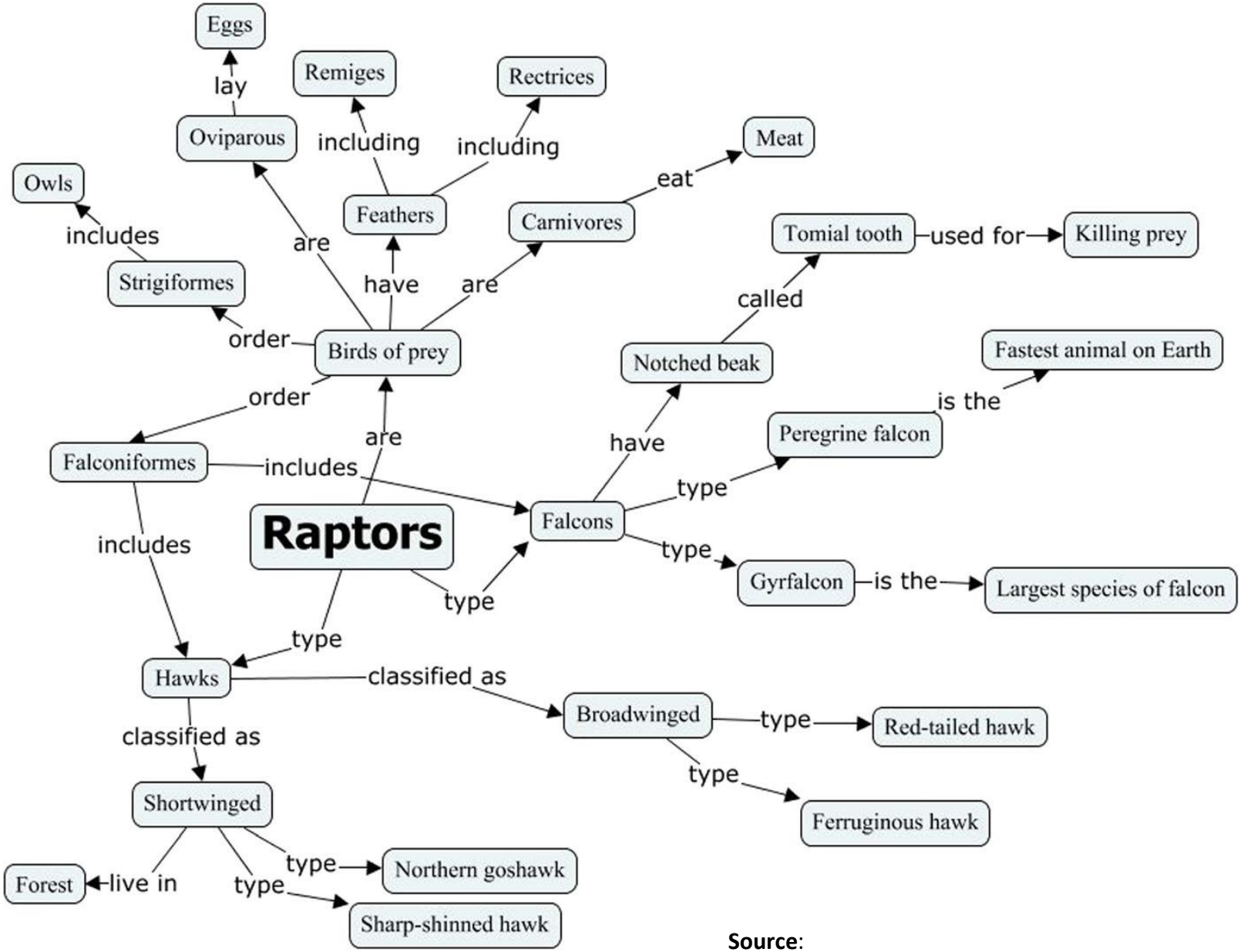


Distribution of maps across final exam results with exemplar map morphologies inset (redrawn and modified from Johnstone and Otis, 2006)

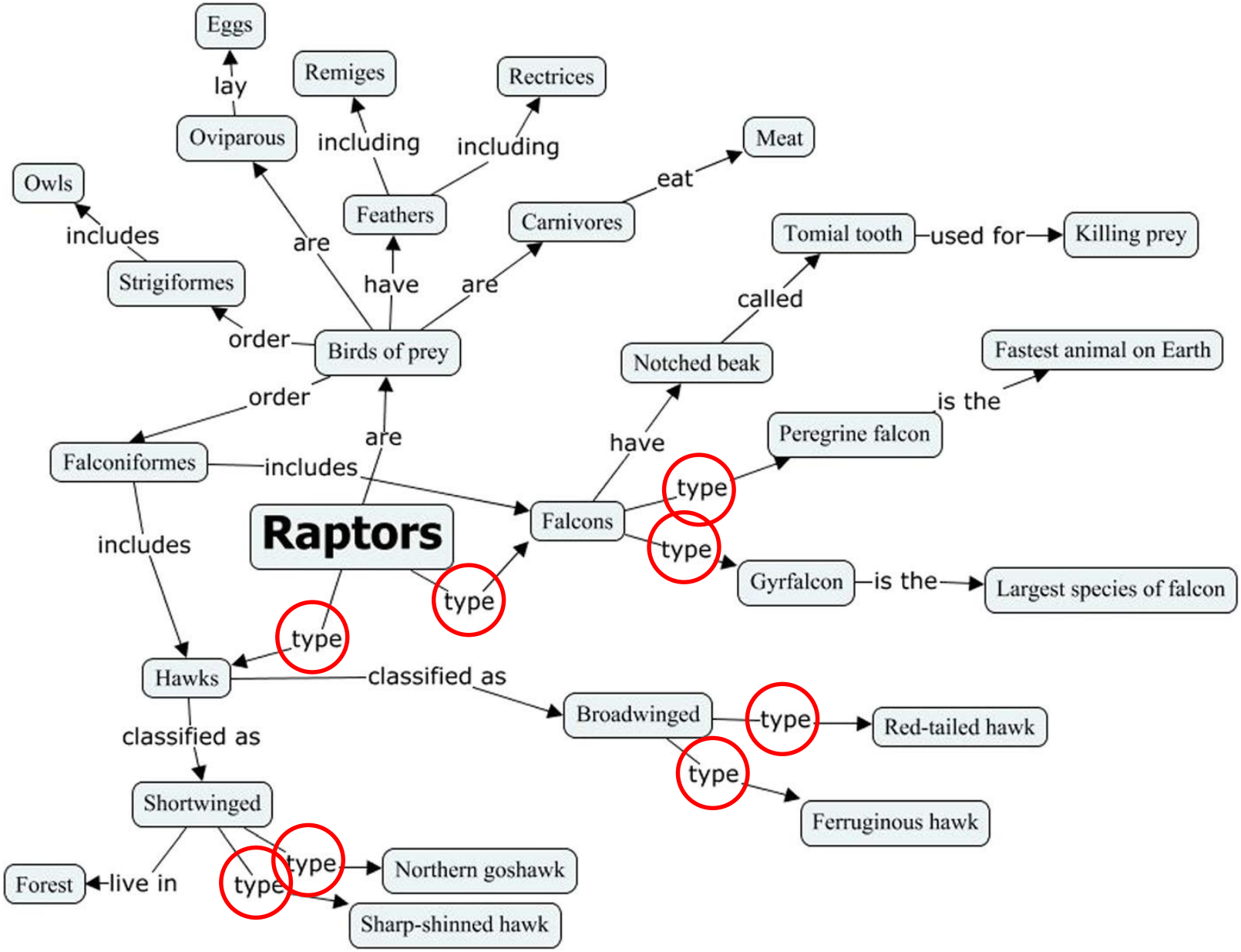


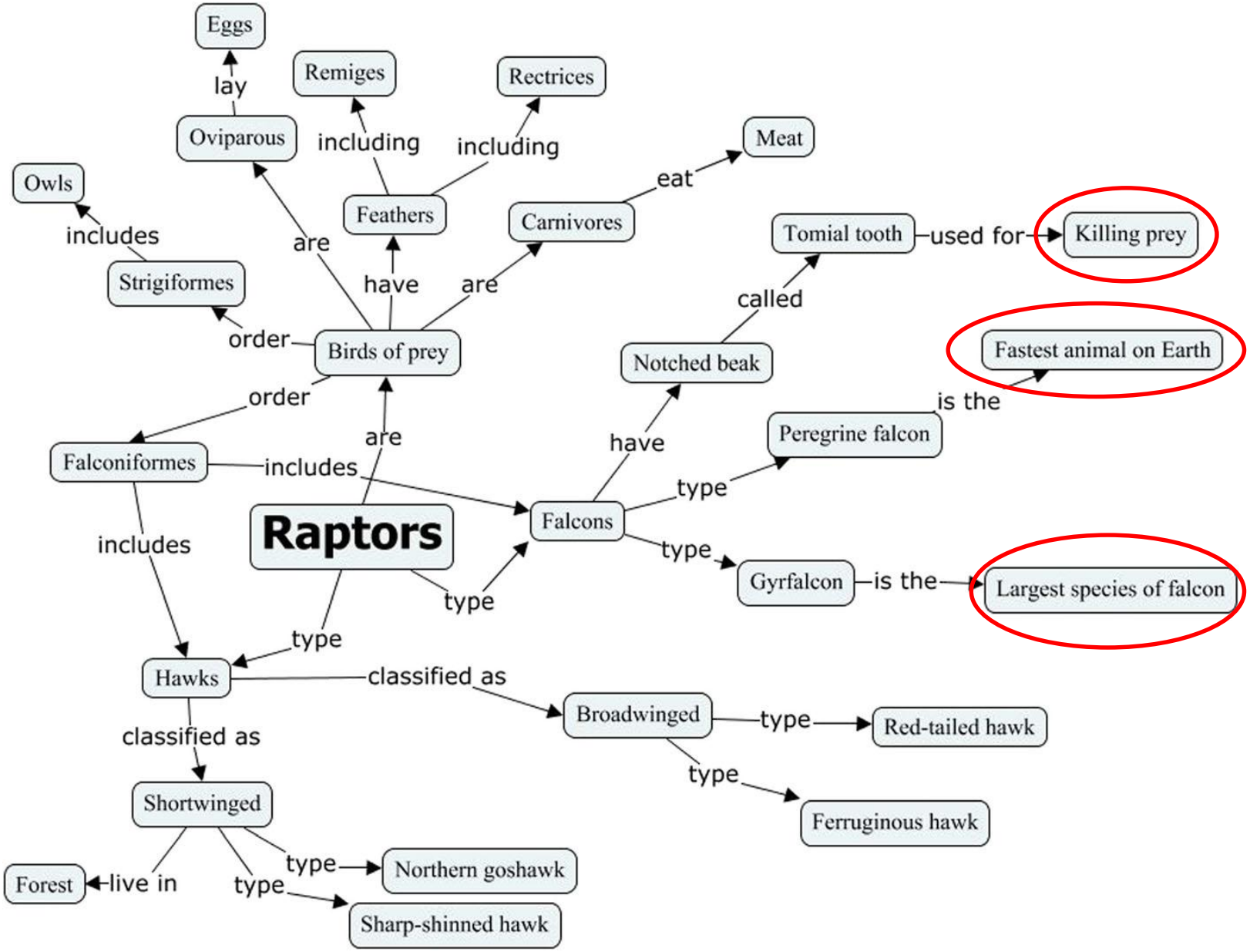


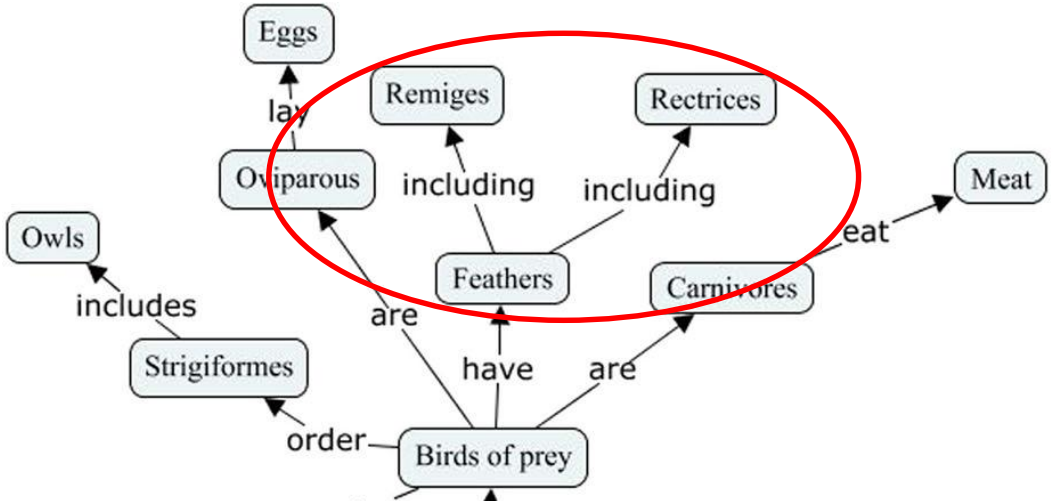
Expert map ≠ Expert's map



Source:
Schroeder, N., et al (2017)
Studying and constructing concept maps: a meta-analysis.
Educational Psychology Review,

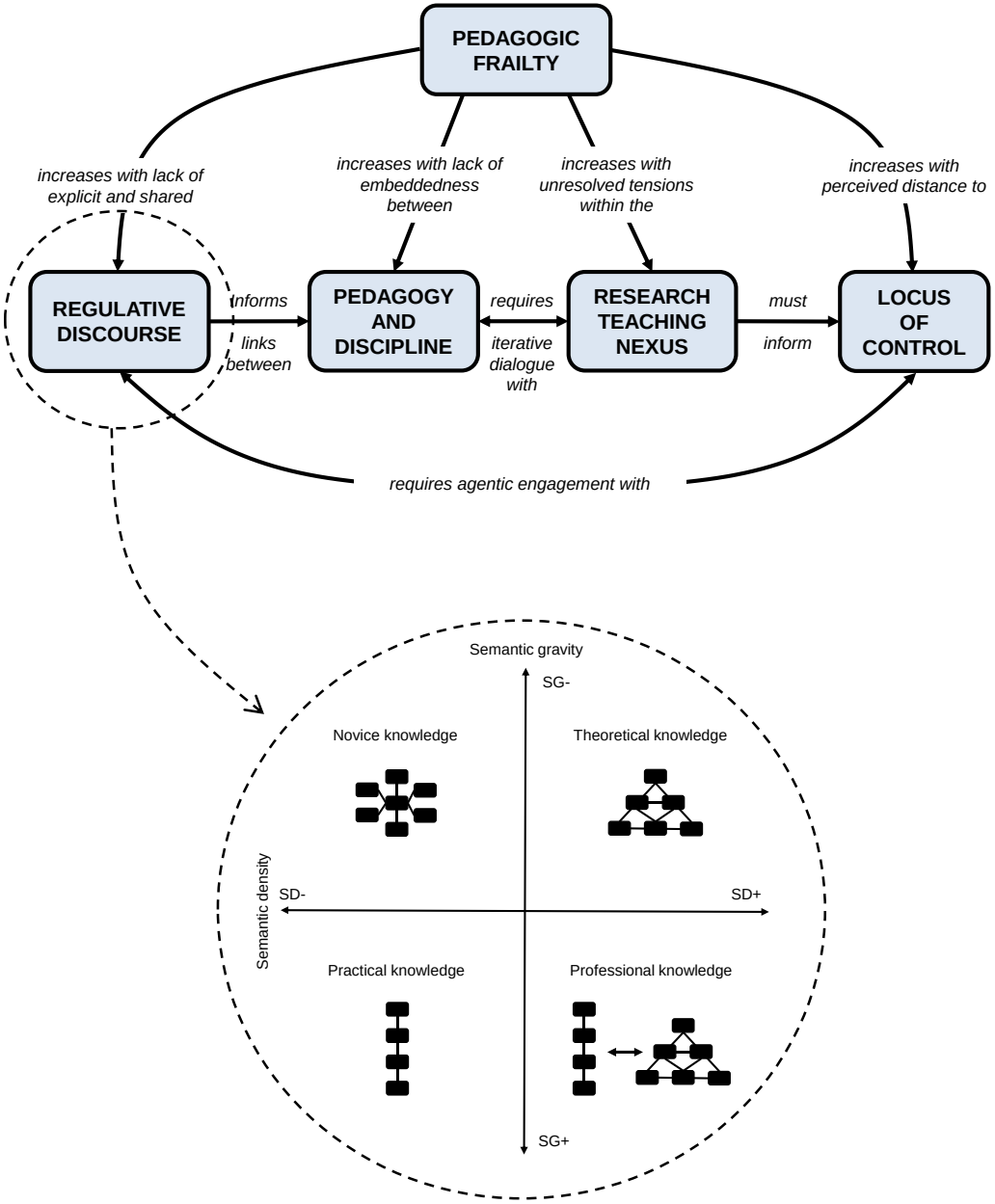

Raptors
Eggs
lay
Oviparous
Remiges
including
Rectrices
including
Owls
includes
Strigiformes
order
are
Feathers
have
Carnivores
eat
Meat
Birds of prey
order
Falconiformes
includes
are
Notched beak
called
Tomial tooth
used for
Killing prey
Fastest animal on Earth
is the
Peregrine falcon
have
Falcons
type
type
Gyrfalcon
is the
Largest species of falcon
includes
type
type
Hawks
classified as
Broadwinged
type
Red-tailed hawk
type
Ferruginous hawk
classified as
Shortwinged
Forest
live in
type
type
Northern goshawk
Sharp-shinned hawk

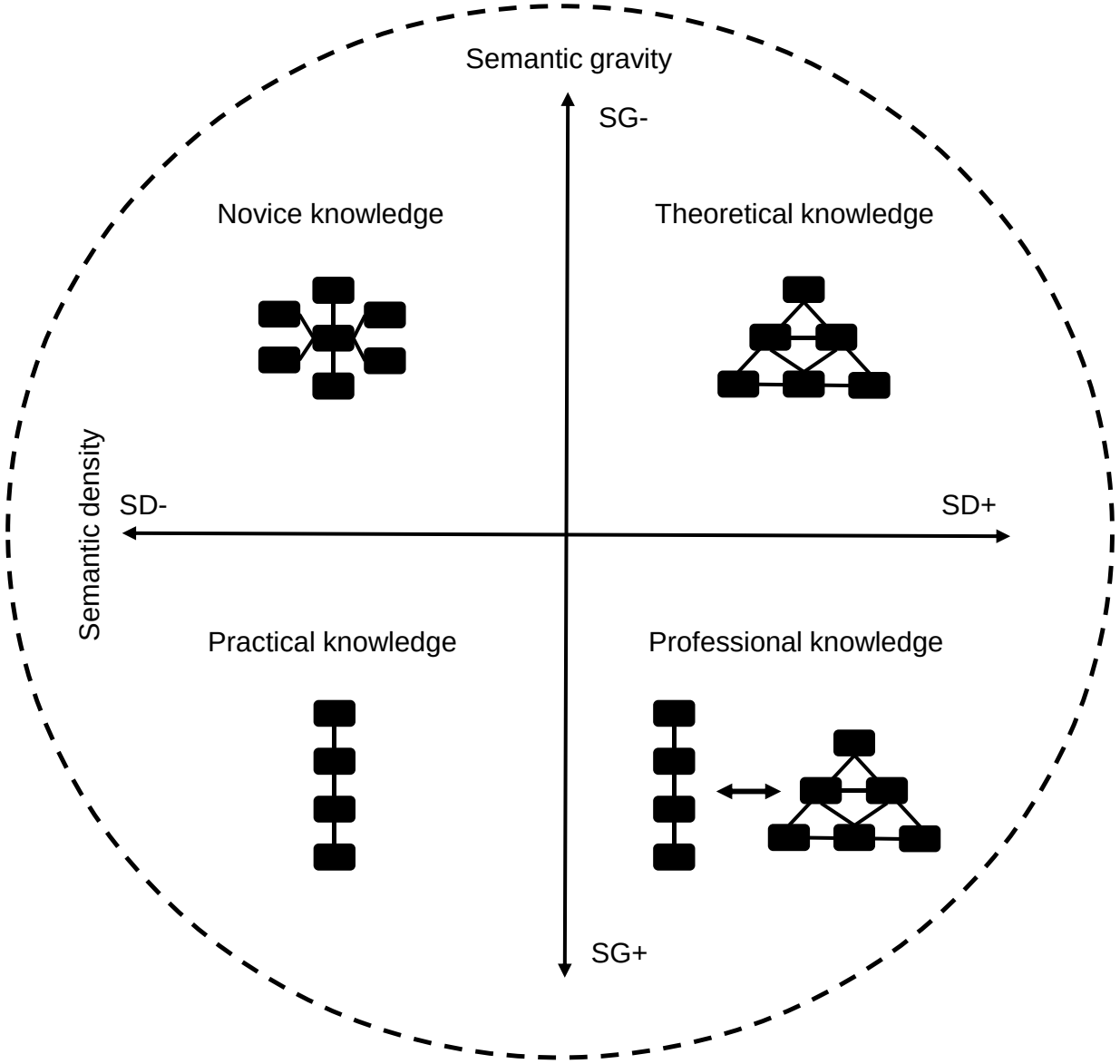

Raptors
Eggs
lay
Oviparous
Remiges
including
Rectrices
including
Feathers
Meat
eat
Carnivores
Owls
includes
Strigiformes
are
have
are
order
Birds of prey
Tomial tooth
used for
Killing prey
called
Notched beak
Fastest animal on Earth
is the
order
are
have
Peregrine falcon
type
Falconiformes
includes
Falcons
includes
type
Gyrfalcon
is the
Largest species of falcon
type
type
Hawks
classified as
Broadwinged
type
Red-tailed hawk
classified as
type
Ferruginous hawk
Shortwinged
Forest
live in
type
Northern goshawk
type
Sharp-shinned hawk

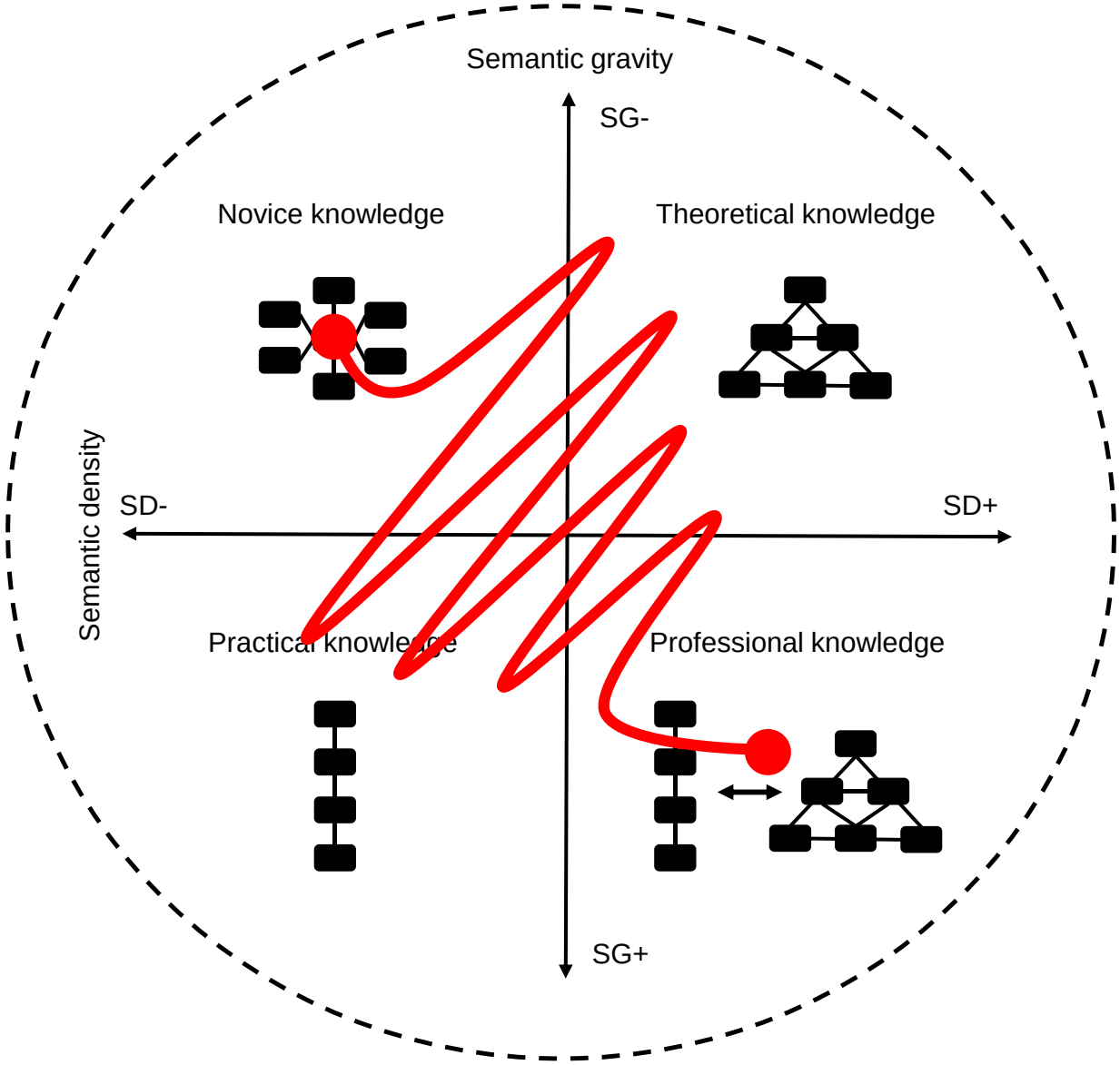


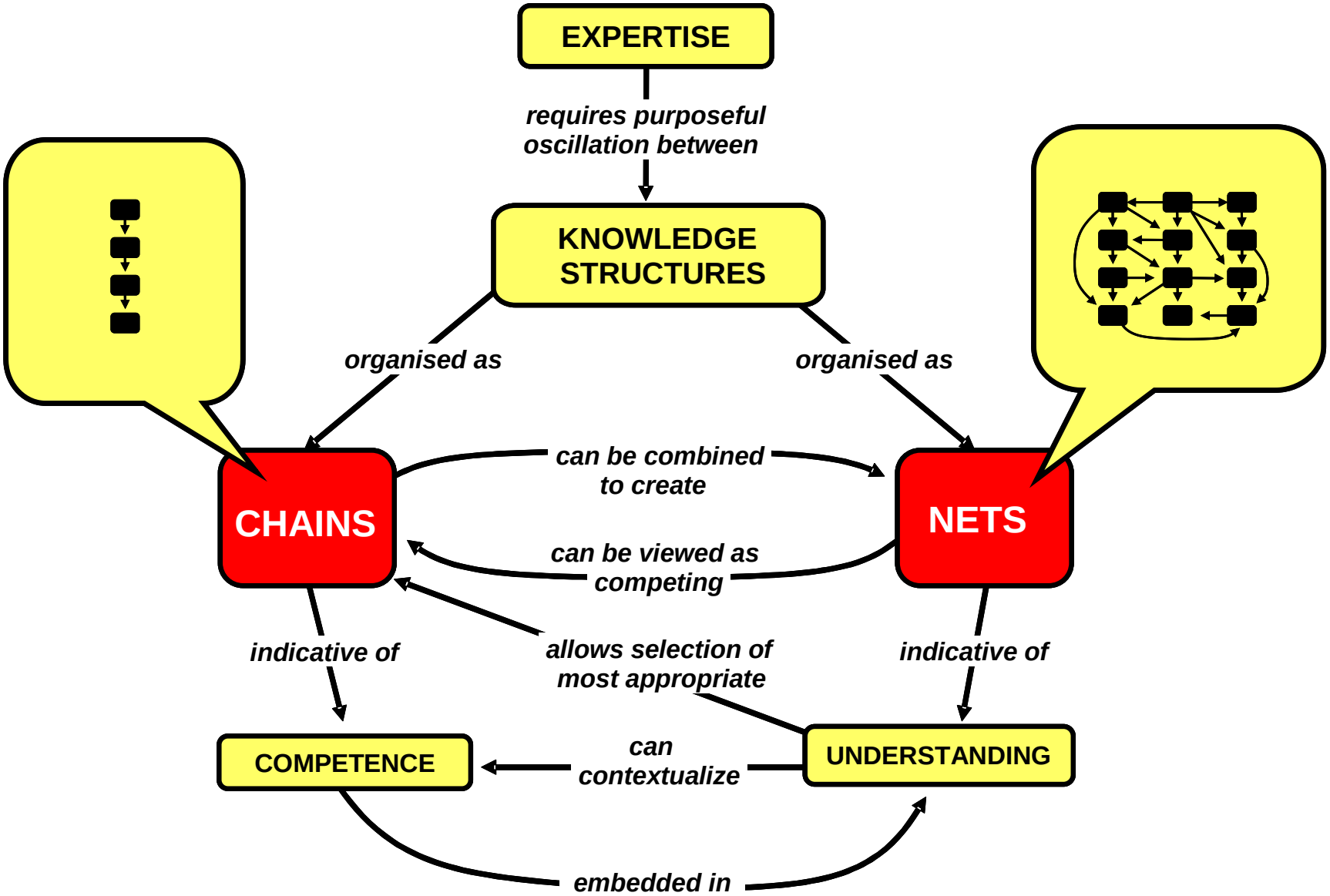
Remiges - wing feathers
Rectrices - tail feathers

Why do birds have feathers? - thermoregulation

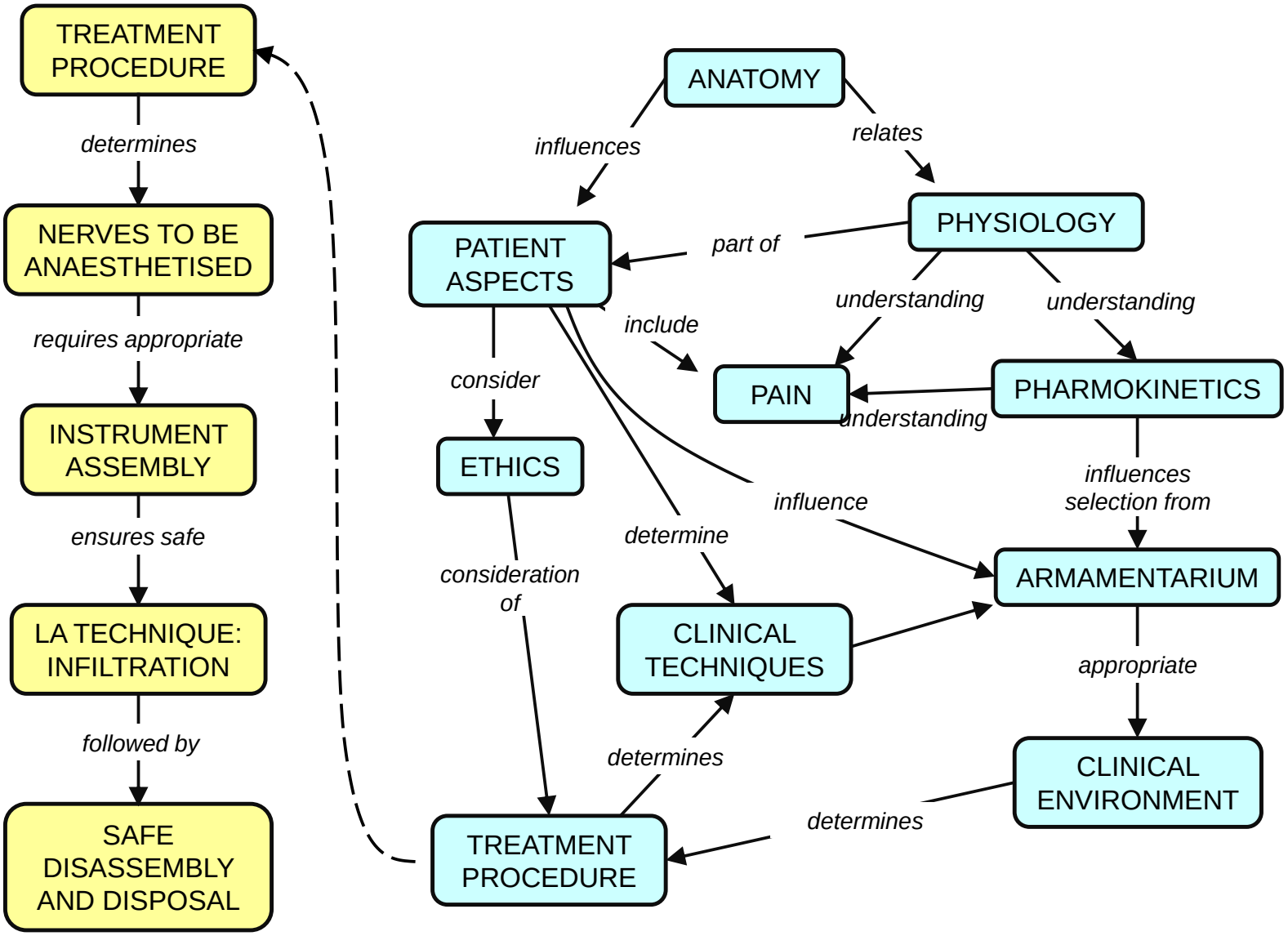

PEDAGOGIC FRAILTY
increases with lack of explicit and shared
increases with lack of embeddedness between
increases with unresolved tensions within the
increases with perceived distance to
REGULATIVE DISCOURSE
informs
links between
PEDAGOGY AND DISCIPLINE
requires
iterative dialogue with
RESEARCH TEACHING NEXUS
must
inform
LOCUS OF CONTROL
requires agentic engagement with
Semantic gravity
SG-
Novice knowledge
Theoretical knowledge
Semantic density
SD-
SD+
Practical knowledge
Professional knowledge
SG+

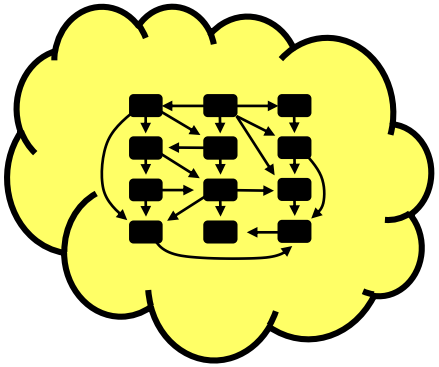

Semantic gravity
SG-
Novice knowledge
Theoretical knowledge
Semantic density
SD-
SD+
Practical knowledge
Professional knowledge
SG+

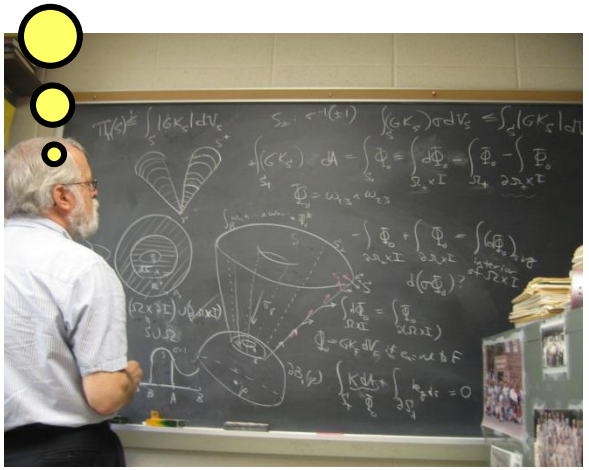

Semantic gravity
SG-
Novice knowledge
Theoretical knowledge
Semantic density
SD-
SD+
Practical knowledge
Professional knowledge
SG+

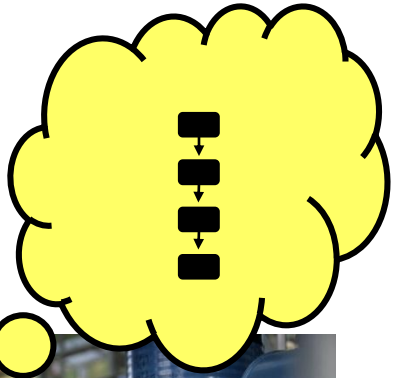


Source: Kinchin & Cabot (2010)
London Review of Education, 8(2): 153 – 166.


TREATMENT PROCEDURE
determines
NERVES TO BE ANAESTHETISED
requires appropriate
INSTRUMENT ASSEMBLY
ensures safe
LA TECHNIQUE: INFILTRATION
followed by
SAFE DISASSEMBLY AND DISPOSAL
ANATOMY
influences
relates
PHYSIOLOGY
PATIENT ASPECTS
part of
understanding
understanding
include
PAIN
PHARMOKINETICS
understanding
consider
ETHICS
influences selection from
influence
determine
consideration of
ARMAMENTARIUM
CLINICAL TECHNIQUES
appropriate
determines
CLINICAL ENVIRONMENT
determines
TREATMENT PROCEDURE

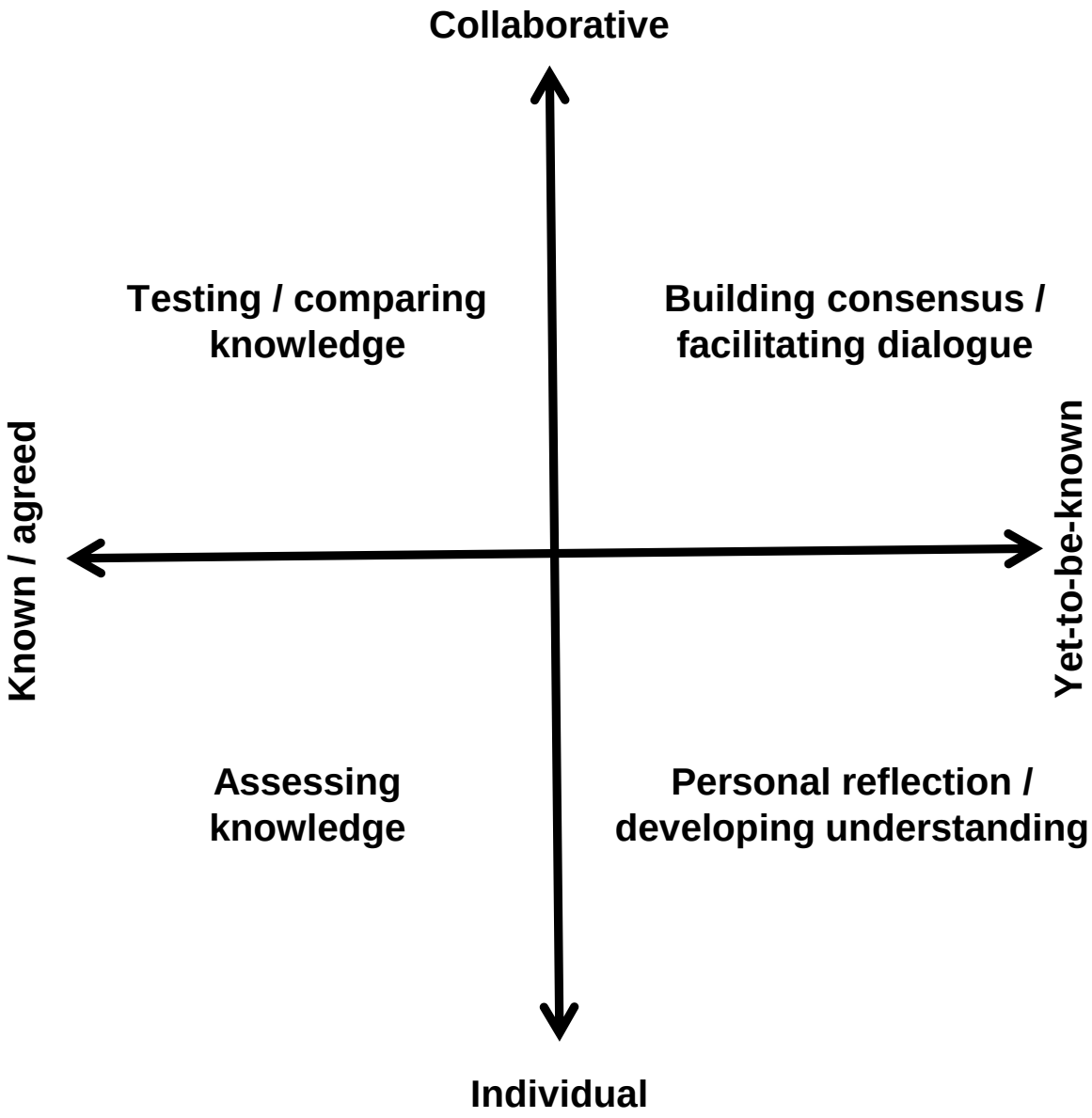


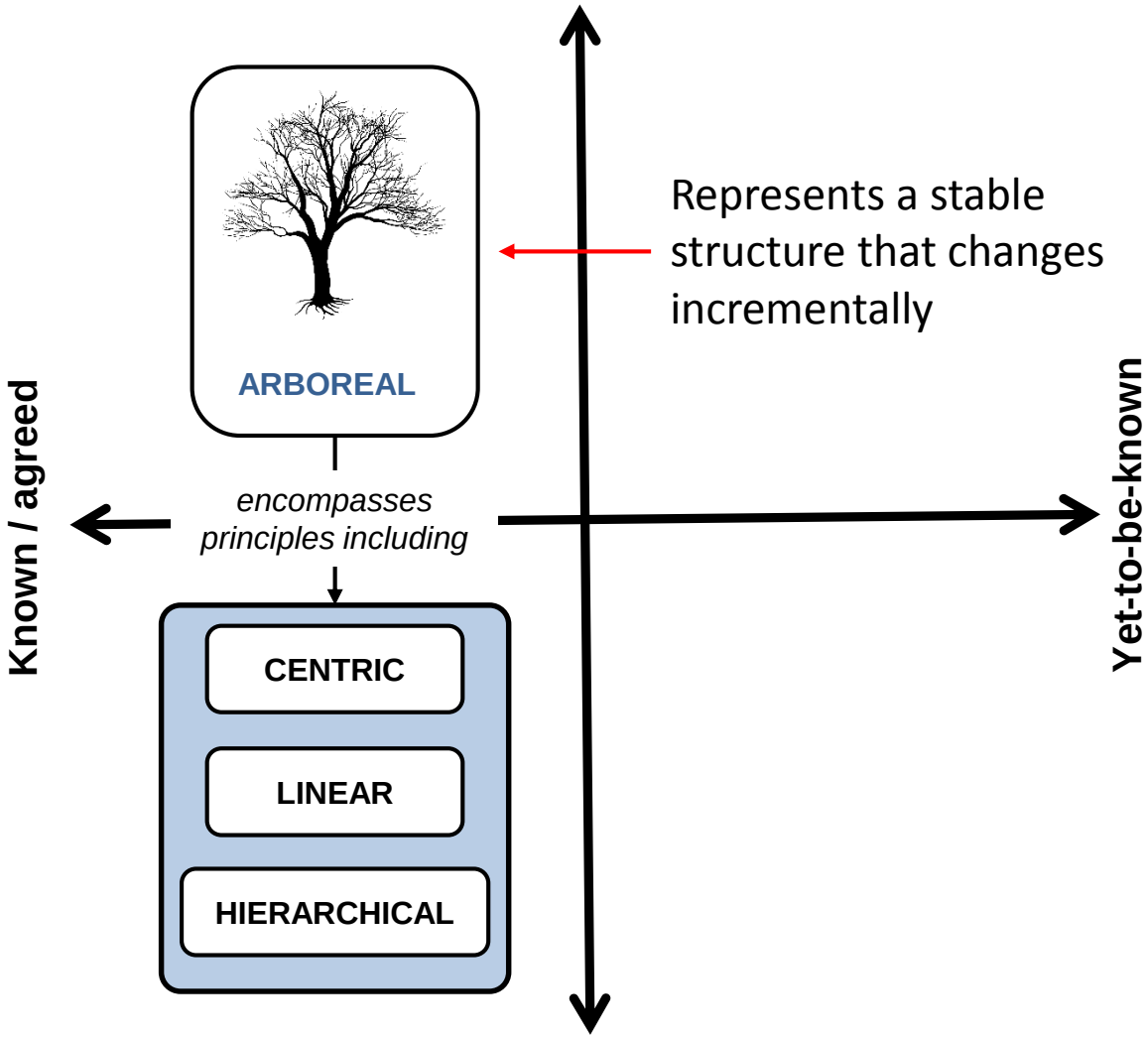




THEORY

PRACTICE


Collaborative
Testing / comparing knowledge
Building consensus / facilitating dialogue
Known / agreed
Yet-to-be-known
Assessing knowledge
Personal reflection / developing understanding
Individual


ARBOREAL
Represents a stable structure that changes incrementally
Known / agreed
Yet-to-be-known
encompasses principles including
CENTRIC
LINEAR
HIERARCHICAL

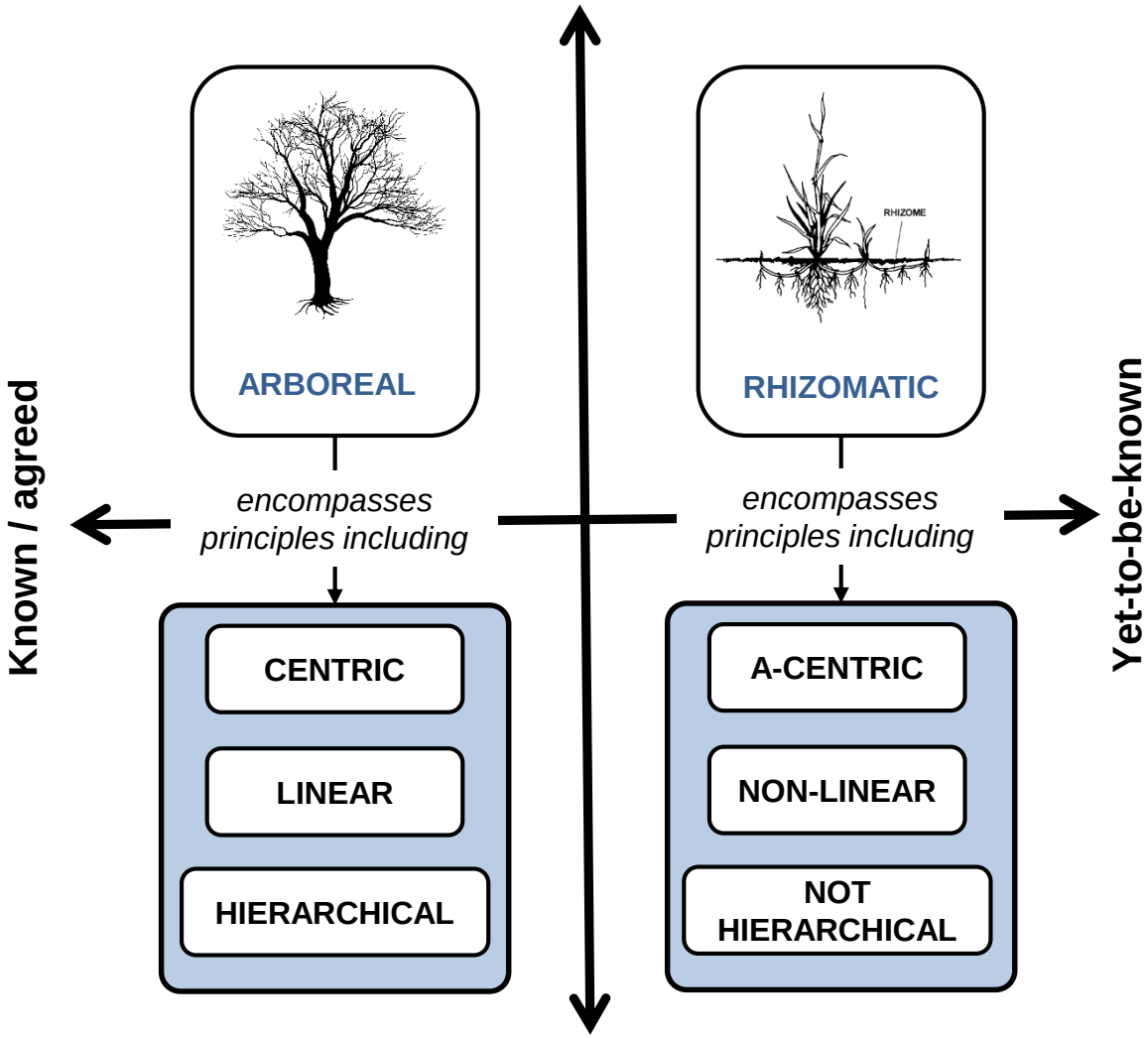
Rhizomatic learning

The map is open and connectable in all of its dimensions: it is detachable, reversible, susceptible to constant modification. It can be reworked by an individual, group or social formation.

Deleuze & Guattari (2004: 13)

[Learning] is an entangled, nonlinear, iterative and recursive process, in which [academics] travel in irregular ways through the various landscapes of their experience (university, family, work, social life) and bring those landscapes into relation with each other.

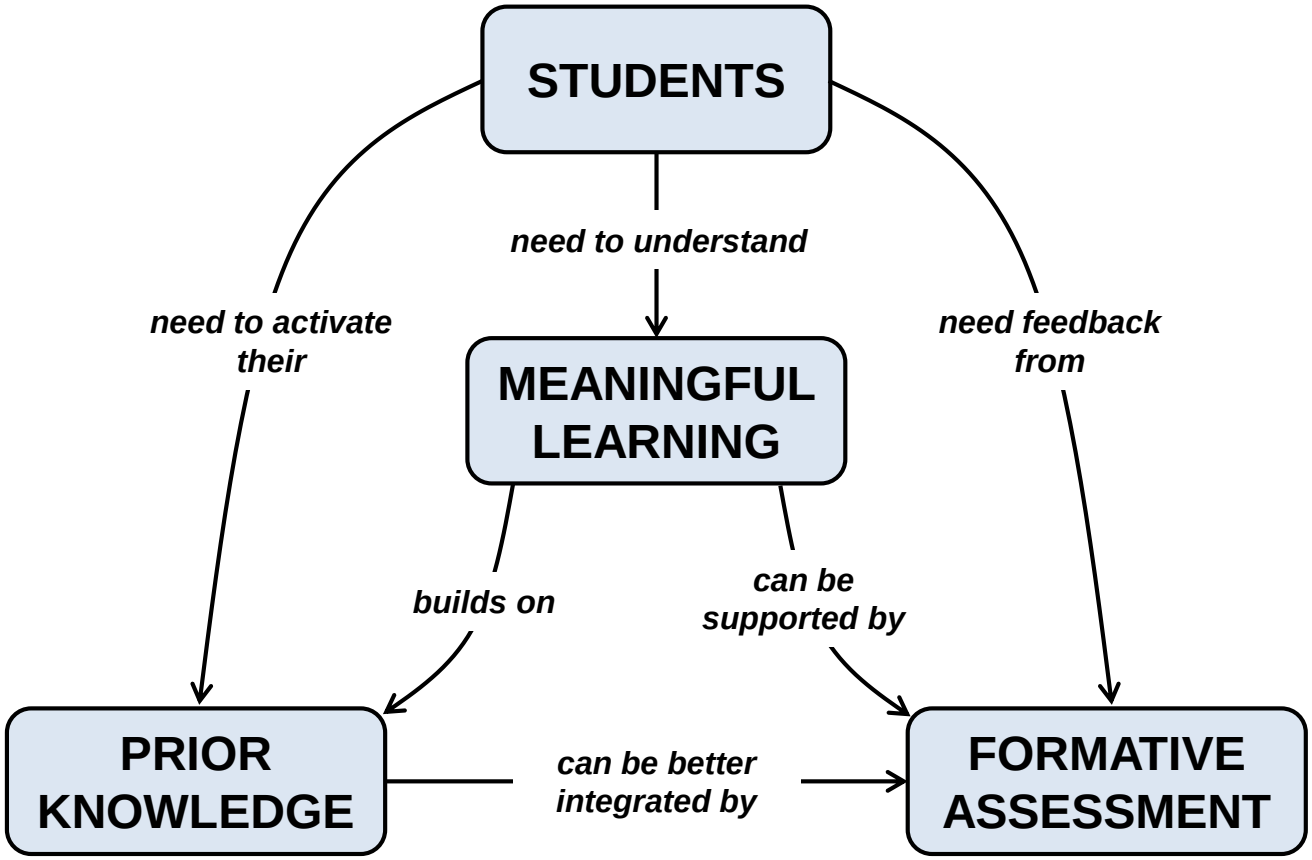
Taylor & Harris-Evans (2016: 3)


ARBOREAL
RHIZOMATIC
RHIZOME
Known / agreed
Yet-to-be-known
encompasses principles including
encompasses principles including
CENTRIC
LINEAR
HIERARCHICAL
A-CENTRIC
NON-LINEAR
NOT HIERARCHICAL

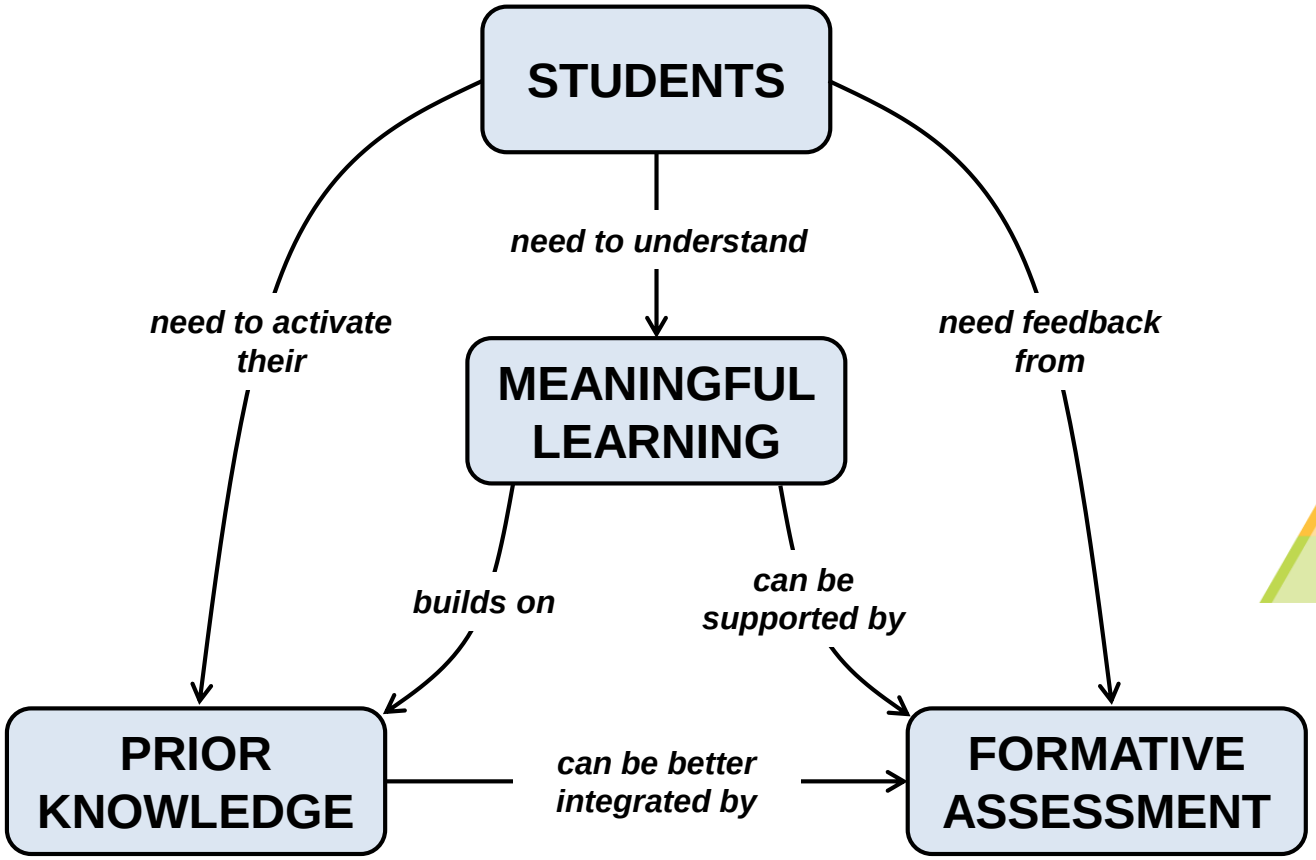
Values & Principles

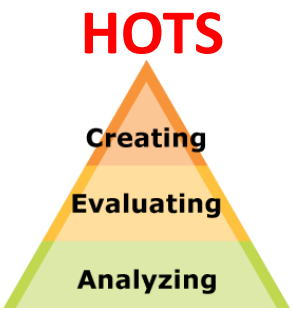
Values & Principles

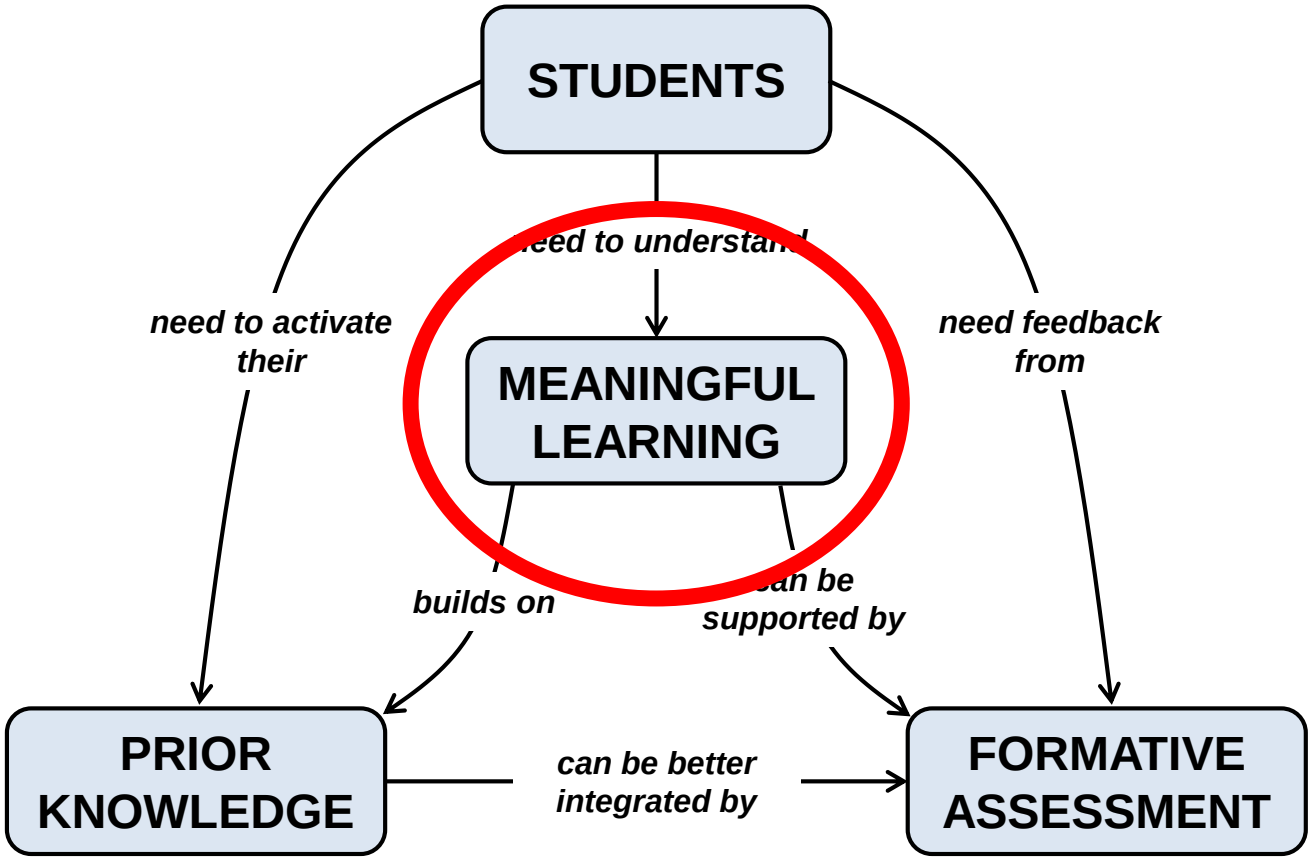
- **APPRECIATE STUDENT PRIOR KNOWLEDGE**
  Most important for students to activate their prior knowledge.
- **MEANINGFUL VS. ROTE LEARNING**
  Requires constructive alignment of curriculum.
- **FORMATIVE ASSESSMENT**
  Increase agentic engagement & student recipience.
- **STUDENT / TEACHER-CENTRED**
  Links to all of the above.

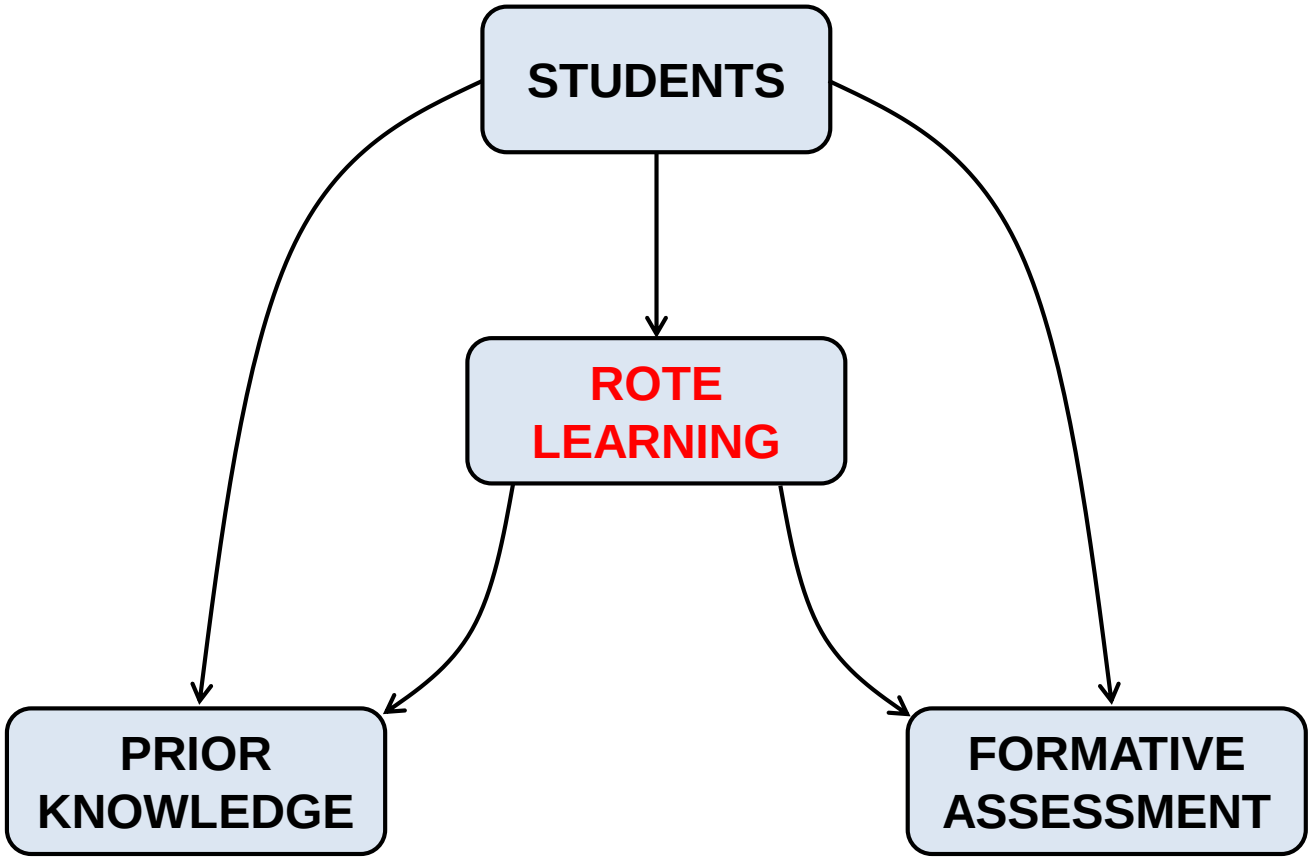

STUDENTS
need to understand
need to activate their
need feedback from
MEANINGFUL LEARNING
builds on
can be supported by
PRIOR KNOWLEDGE
can be better integrated by
FORMATIVE ASSESSMENT

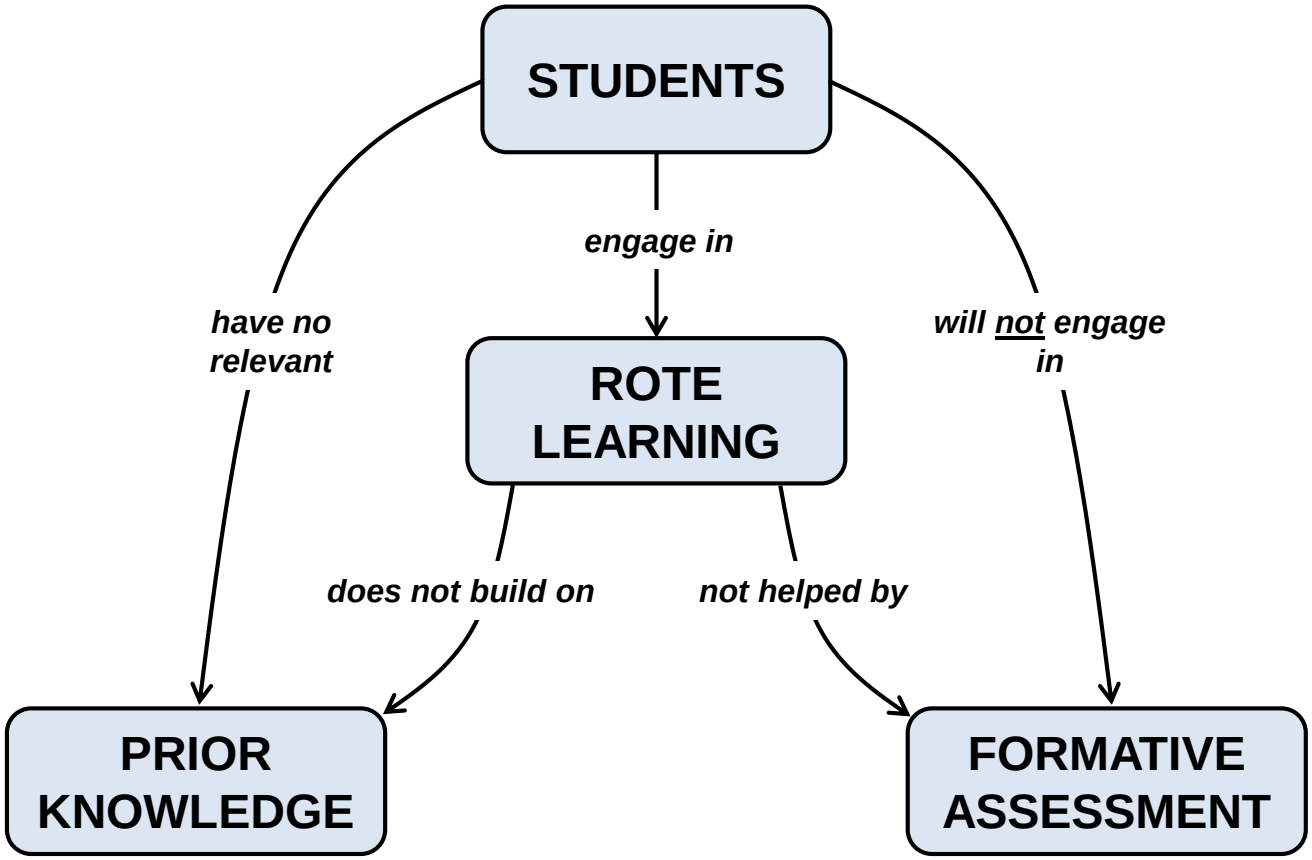
UNIVERSITY OF SURREY

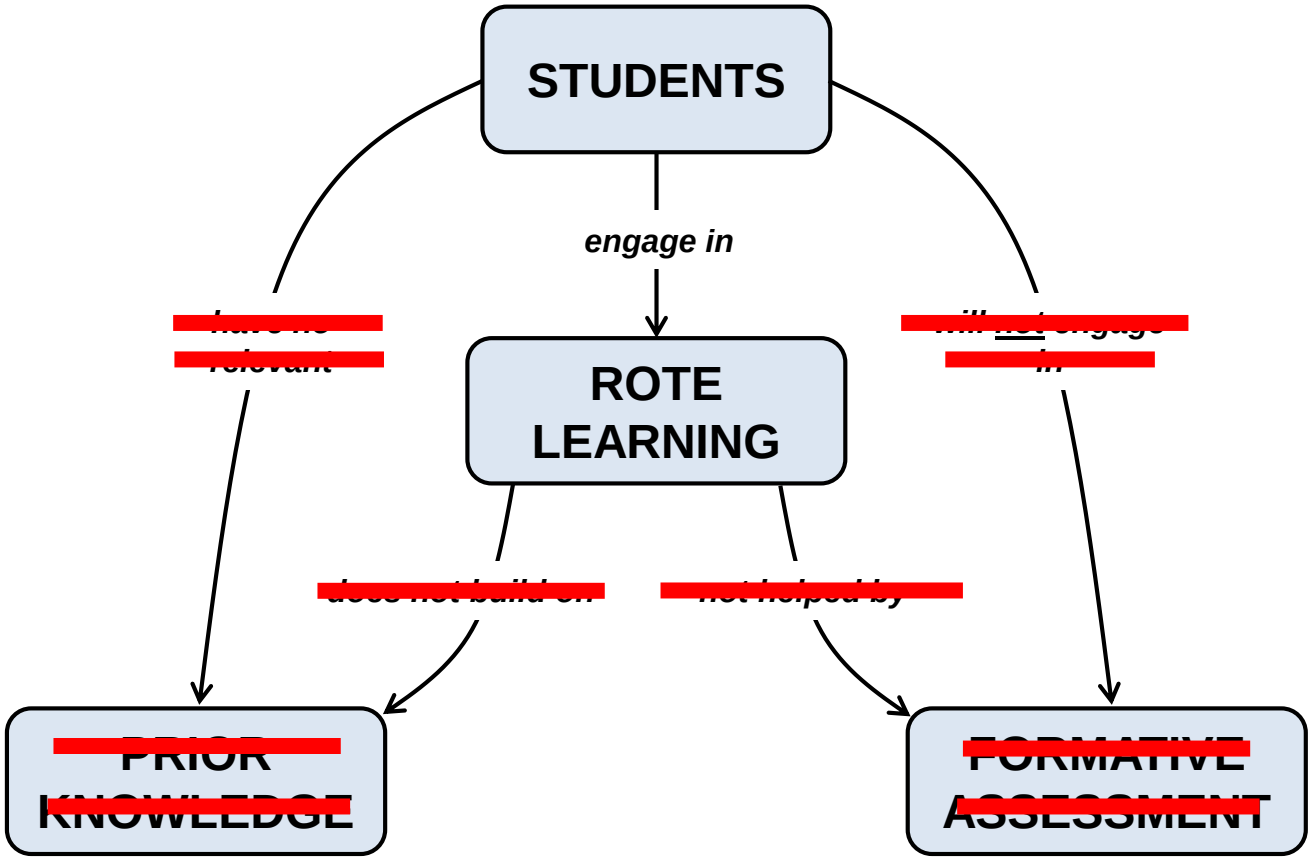


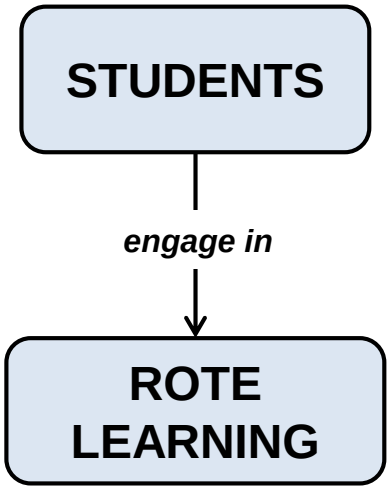



STUDENTS
need to activate their
need feedback from
MEANINGFUL LEARNING
builds on
supported by
PRIOR KNOWLEDGE
can be better integrated by
FORMATIVE ASSESSMENT


STUDENTS
ROTE LEARNING
PRIOR KNOWLEDGE
FORMATIVE ASSESSMENT


STUDENTS
engage in
have no relevant
will not engage in
ROTE LEARNING
does not build on
not helped by
PRIOR KNOWLEDGE
FORMATIVE ASSESSMENT

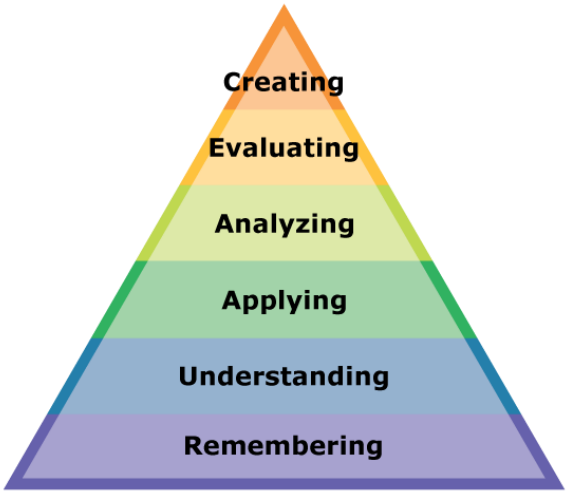

STUDENTS
engage in
ROTE LEARNING
PRIOR KNOWLEDGE
FORMATIVE ASSESSMENT

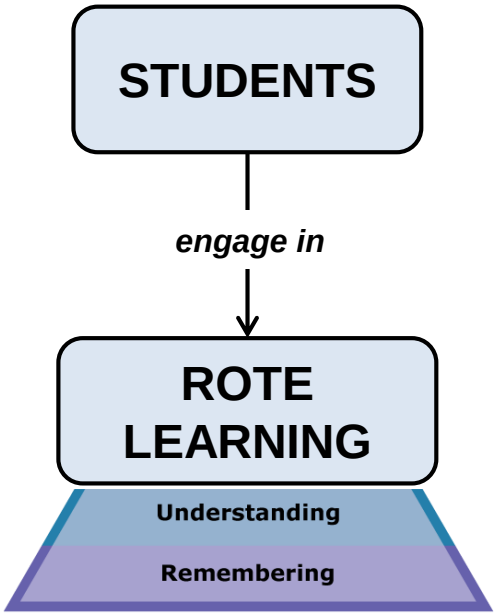

STUDENTS
engage in
ROTE LEARNING

STUDENTS

engage in

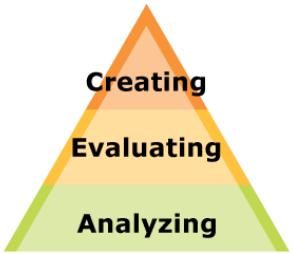
ROTE LEARNING




STUDENTS
engage in
ROTE LEARNING
Understanding
Remembering

LOTS

HOTS


Creating
Evaluating
Analyzing

Leads to:

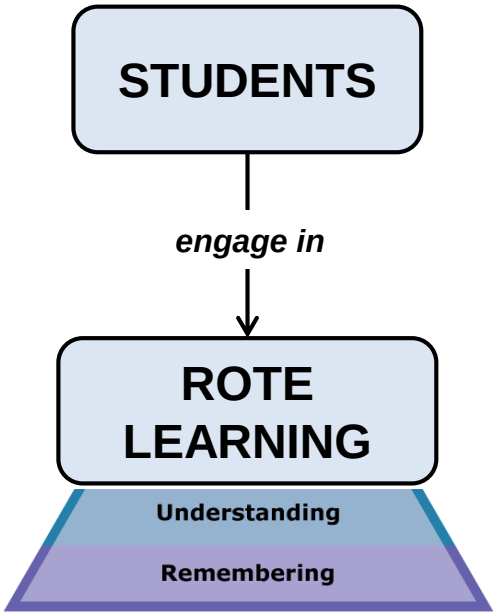
Teacher-centredness

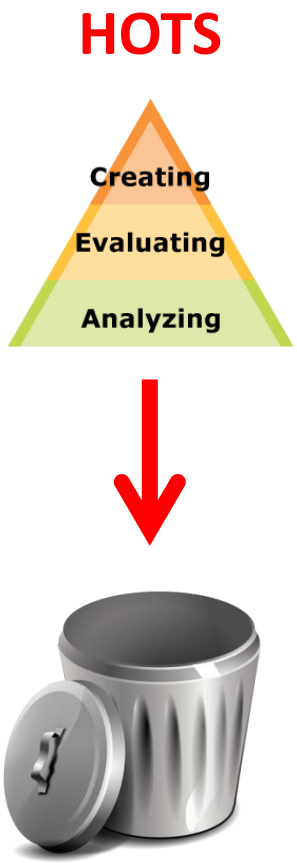
Passive students

Spoon-feeding

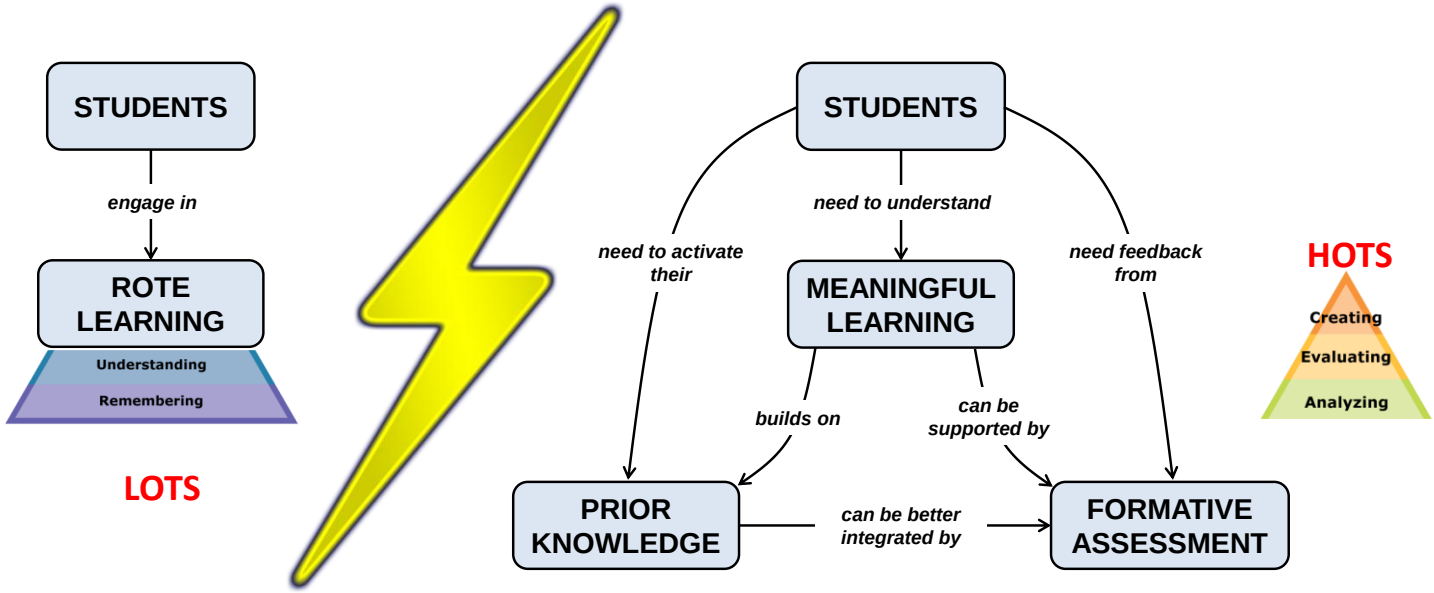
Pressure on teachers

Less rewarding experience

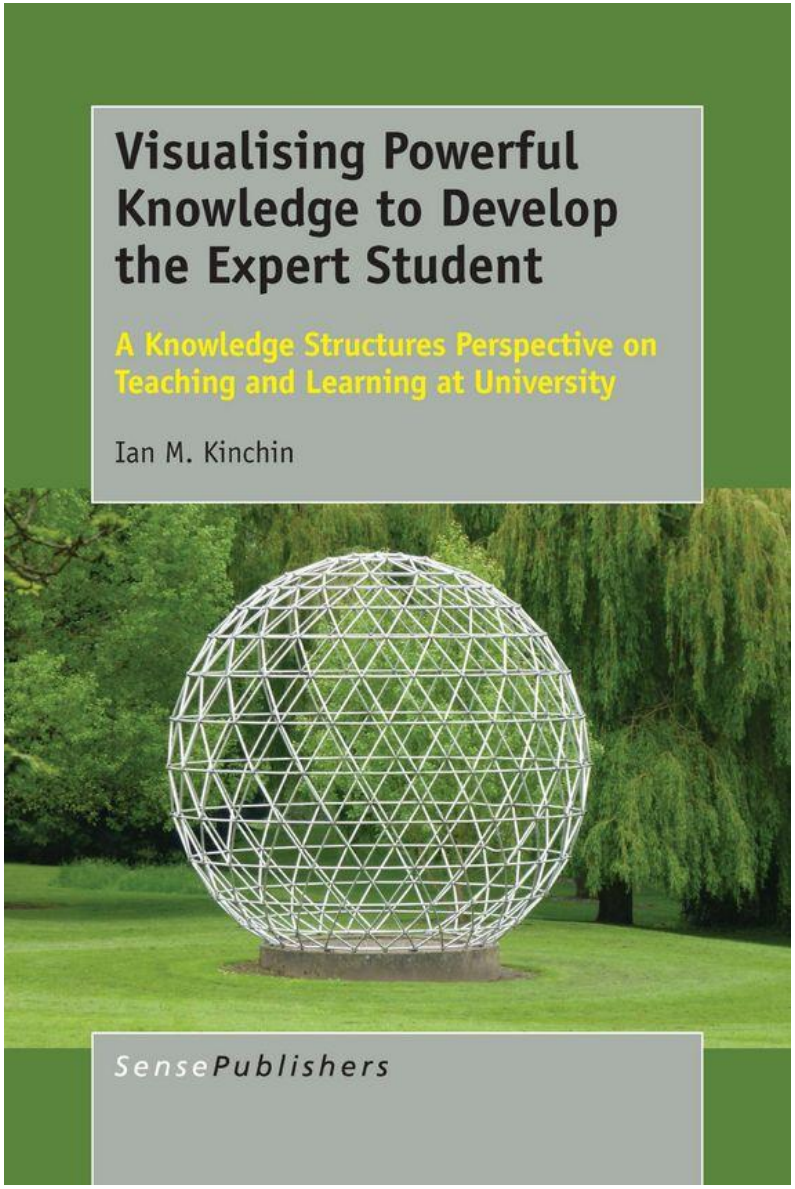




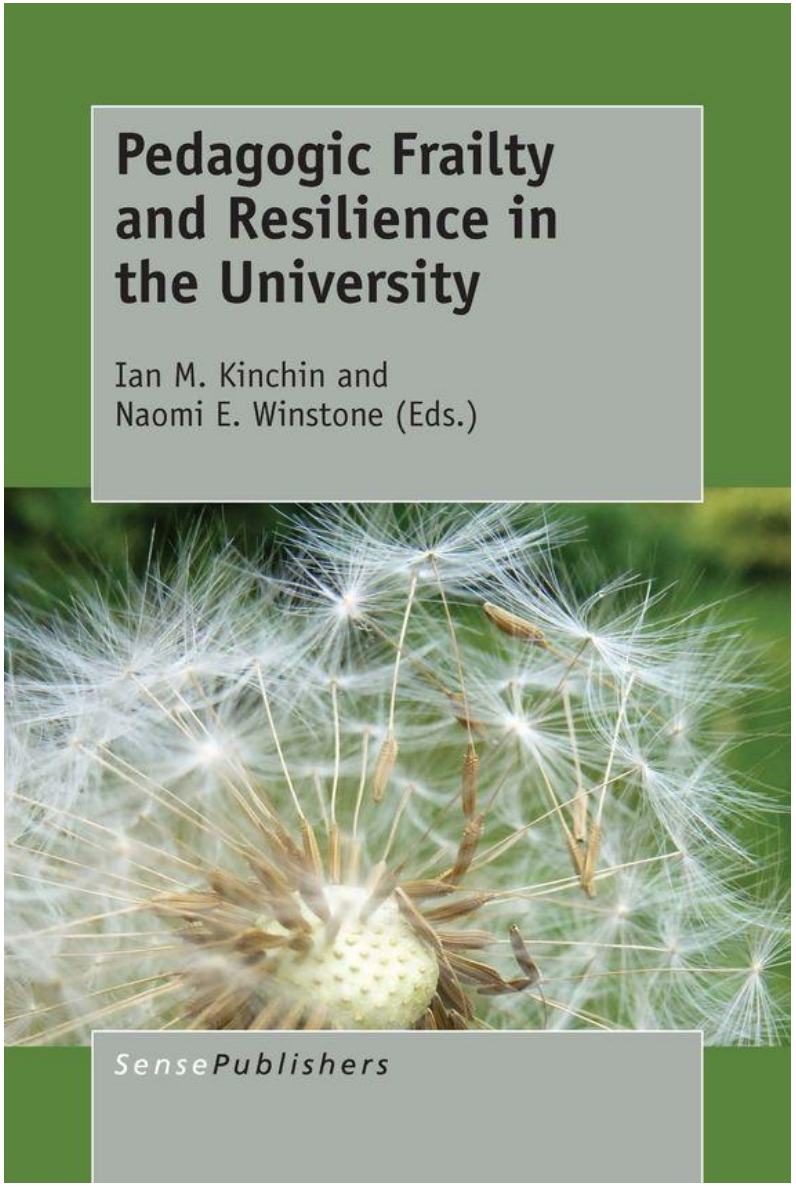
Conflicting Principles



If the underlying values of the curriculum are not explicitly shared across a faculty, there is a danger of the environment exhibiting *pedagogic frailty* and the typical outcome will be a retreat into conservative and 'safe' pedagogic practices.


Visualising Powerful Knowledge to Develop the Expert Student
A Knowledge Structures Perspective on Teaching and Learning at University
Ian M. Kinchin
SensePublishers

(2016)


Pedagogic Frailty and Resilience in the University
Ian M. Kinchin and
Naomi E. Winstone (Eds.)
SensePublishers

(2017)