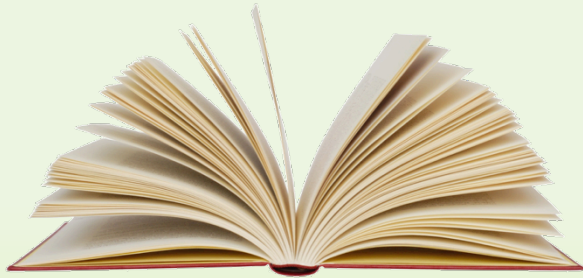# Threshold Concepts and Information Literacy: Theory into Practice

Elizabeth Lee & Cory Laverty
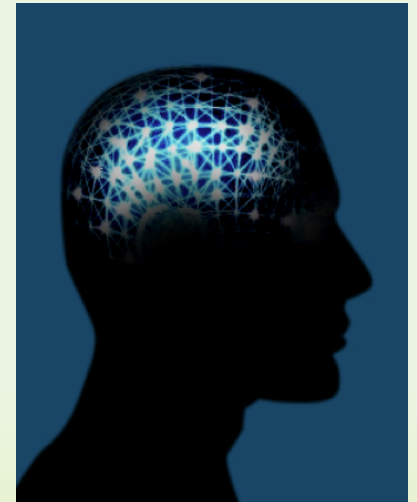Queen's University

# Learning



New information + Old information knowledge base (long-term memory) = Mental model (schema)

# To develop competence in an area of inquiry, students must:

a. have a deep foundation of factual knowledge

b. understand facts and ideas in the context of a conceptual framework

c. organize knowledge in ways that facilitate retrieval and application

d. demonstrate an intentional approach to learning through self-regulation: setting goals, practising, monitoring, and evaluating progress

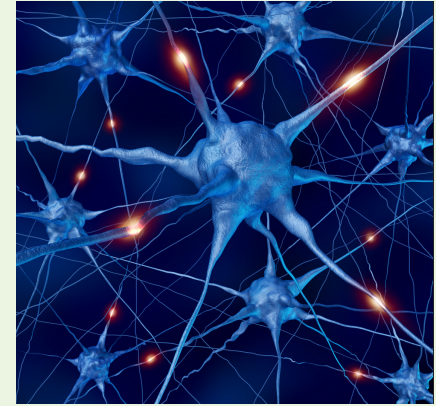# Long Term Memory

- Unlimited capacity

- Stores information over a long time, from minutes to decades

- Knowledge base
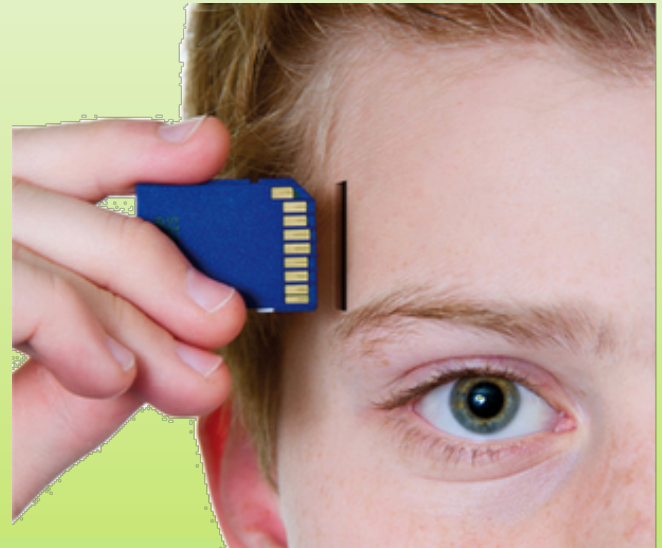
# Structure



• Memory has an associative structure (schemata)

• Chunks of information are represented symbolically and tied together by associative links into a network of related information

• Linked together so strongly that they can be retrieved and used as a single unit

# Structure

- Isolated facts or ideas

- Some relations between facts or ideas, some structure

- Overall structure, abstract meaning, concepts
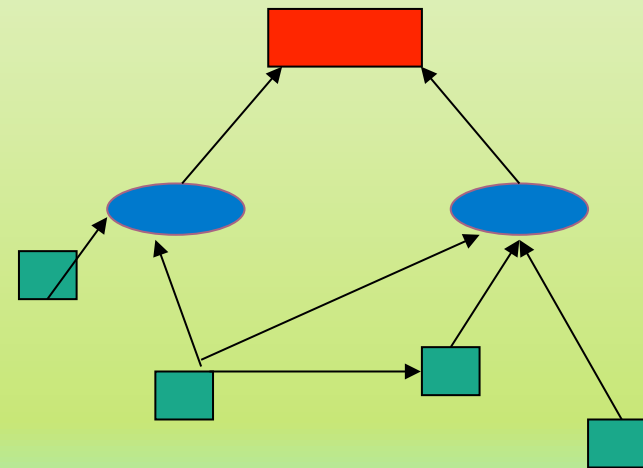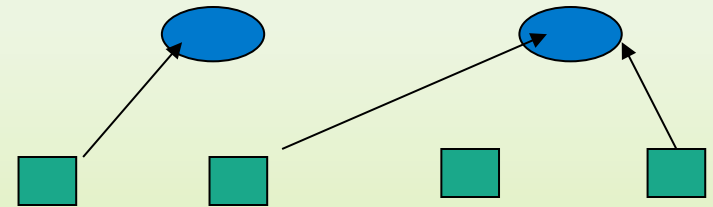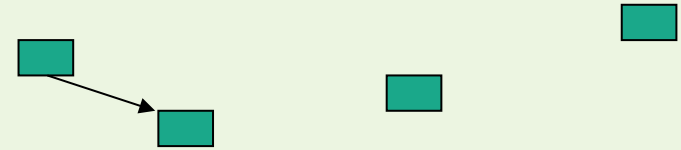
# Knowledge

- Domains of learning are based on a vast array of knowledge, some of which can be taught explicitly (arithmetic facts) and some of which usually aren't (how to deal with customers).

- Experts have a huge relevant **knowledge base**.

# Experts

- Large store of domain knowledge
- Excel only in their own domain!
- Quickly recognize patterns (process information in large units)
- Faster than novices in solving problems in domain (automaticity)
- Deeper causal theories (principle based vs. appearance)
- Spend more time analyzing a problem
- Better at monitoring their performance

# Novices

- Domain knowledge less structured
- May base new schema on misinformation (naïve/ intuitive conceptions)
- Intuitive ideas may be incorrect
- Need to "unlearn" common-sense ideas especially in science
- Requires time & practice (10,000 hours) to become an expert in a domain
- Much of the declarative & procedural knowledge acquired tacitly –requiring time & multiple learning situations

# Deliberate Practice

1. Knowledge acquisition

2. Skill proceduralization

3. Automated application

- Extended practice counts for more than initial ability.

- Quality of practice important.

- Informational feedback- knowledge of errors and how to improve.

- Deliberate practice requires self-regulation!

# Self-Regulation

- Self-generated thoughts, feelings and behaviours that are planned and adapted based on performance feedback to obtain self-set goals. (Zimmerman, 2000)

Process:

1. Goal setting

2. Strategic planning and selection of a learning strategy

e.g., self-questioning while reading/notetaking etc.

3. Self-monitoring

4. Self-evaluation, causal attributions and adaptive inferences

*Before the gates of excellence*
*The high gods have placed sweat…*

Hesiod  8th Century BCE

# Quick Questions about Learning

Fold your answer key!

# Instructional strategies may need to differ as a function of:

A. students' learning styles

B. students' expertise (novice vs. expert)

C. students' preference

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A. students' learning styles

B. students' expertise (novice vs. expert)

C. students' preference

# The most effective study techniques are:

A.  regular practice testing (i.e., quiz, flash cards).

B.  rereading and underlining.

C. explaining concepts to yourself and/or others.

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# Experts:

A. Are more rational thinkers.

B. Have experience across many fields.

C. Have a highly organized knowledge base.

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A.  self-regulation

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C. quality of educational institution (school, university)

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# How to apply this to the Framework?

# Knowledge Practices vs. Dispositions What's the Difference?

**Searching as Strategic Exploration**

Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops.

**Knowledge practices:**

Match appropriate search tools and strategies to specific information needs.

**Dispositions:**

Realize that information sources vary greatly in content and format and have varying relevance and value, depending on the needs and nature of the search.

# Knowledge Practices vs. Dispositions

Searching as Strategic Exploration

Knowledge practices: Back to the standards

Match appropriate search tools and strategies to specific information needs.

i.e. develop information strategy for your research topic – what type of information is needed, what perspectives; what types; which tools; which search techniques within a tool

Dispositions:

Realize that information sources vary greatly in content and format and have varying relevance and value.

i.e. We cannot teach this directly but dispositions arrived at when crossing thresholds. Happens when individual has reorganized schema to the extent that they can self-regulate

# From Novice to Expert

- We cross "thresholds" as our understanding develops; thresholds of understanding, of learning

- Threshold concepts involve <span style="color:red">conceptual reorganization</span> that comes with practice over time

- Thresholds are points at which there has been enough practice and awareness of learning that <span style="color:red">new schema</span> are internalized

- Must work from <span style="color:red">within the discipline</span> where information literacy conventions interwoven

# What this means in practice

- Ultimate goal is self-regulation but we cannot teach this directly but in relation to big ideas

- Build expertise though modelling and guided and repeated practice; build repertoire of patterns

- Teach what is needed for the task and the level

- Relate activities to big ideas and thresholds in ways that students at a specific learning level can understand

- Weave practice throughout a program

- Use assessment to provide feedback and self-reflection

# Enablers of Thresholds

- Theory underpinning the concept of information literacy

- Intentional approach to teaching

- Big picture context for information literacy

- Focus on student as learner developing their own awareness and self-regulation

- Focus on concepts rather than tools and techniques (Wiggins and McTighe focus on big ideas) e.g. strategic thinking in searching for information

- Opportunity to rethink our approach and how we learn

# Challenges of Thresholds

- Thresholds are not outcomes and do not address implementation
- Based on study of librarian perceptions and reflect the culture of the population who defined them
- Describe dispositions but does not address the importance of them in terms of learning process
- Single sessions cannot provide in-depth development of big ideas (schema result from reorganization of concepts and ideas)
- Design sessions and assessments that address student trouble spots and misconceptions

# Authority is constructed and contextual

Authority of information sources depends on their origins, the information need, and the context in which the information is used.

Assessment: Practice and Dicuss!

- Compare different types of sources on a single topic to determine how to evaluate the authority of the author.

- Compare the evidence in two film or book reviews with different conclusions.

# Information creation as a process

The format of information sources reflects the process by which they were created.

Assessment:

- Analyze how information in a specific format is created. (e.g. Wikipedia, scholarly article).

- Compare the information from divergent sources and its value given a specific information need.

# Information has value

Information is a commodity and information users have a responsibility as both consumers and creators to engage with it ethically and respectfully.

Assessment:

- Citation relay game to practice proper citation style for various resources.

- Review Creative Commons attribution rights and how to search for images licensed for reuse.

# Research as inquiry

Research is iterative and depends on asking increasingly complex questions.

Assessment:

- Develop a topic into a set of potential research questions. Deconstruct the process and compare it to established examples (e.g. Blaikie, 2010)

- Analyze individual class research logs to Identify which aspects help to narrow and focus the inquiry.

# Scholarship is a conversation

Idea of sustained discourse within a community with new ideas being developed over time from new perspectives and interpretations.

Assessment:

- Analyze a literature review in an article to determine how it informs a specific study or an area of research.

- Track a single citation for a set time period to reveal how an author's work informs others over time.

# Searching is strategic exploration

Experts use a strategic approach in selecting search tools, defining search vocabularies, designing searches, and analyzing search results. Information discovery is nonlinear and iterative.

Assessment:

- Map types of information that would help to answer a specific research question or topic.

- Compare strategies for searching Google Scholar and a subject database and rank usefulness of results, given the information need.

# Key Things to Remember

Threshold Concepts

- Are best thought of as "frames" based on an interconnected set of core concepts

- Informed by work of Wiggins and McTighe (Understanding by Design – teach from big ideas)

- Can be used in multiple contexts and disciplines;

- Can be scaffolded through multiple years within a discipline;

- Are not necessarily the content of what you teach but the way you approach the content

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Short online PDF re learning: http://www.deansforimpact.org/the_science_of_learning.html