

Supplemental Material: “Concept Maps Used to Rehearse & Assess Students’ Synthesis of Course Content”

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Background - why use concept maps in 9.01/9.00

During Fall 2020 when all courses were virtual, the assessment structure of 9.01 included only multiple choice and short answer questions. This structure made it challenging for the course team to monitor for cheating and keep up with grading/feedback. During Fall 2021, quizzes were composed of only multiple-choice-like questions. However, students expressed that this left limited room for them to express their understanding. Laura Frawley therefore decided to experiment with using concept maps as an assessment tool during Fall 2022.

List of key terms for concept map on neural systems in 9.01

Note: We've included 2 subtopics that can be direct branches from your topic. We've placed terms related to each subtopic under the given subtopic.

Topic: Neural Systems

Terms

Somatic sensation (subtopic)

A-beta
A-delta
Afferent regulation
Brodmann's area 3B
C fibers
Descending regulation
Dorsal column medial lemniscal pathway
Endorphins
Gate theory of pain
Homunculus
Hyperalgesia
Mechanoreceptors
Nociception
Nociceptors
Opioid receptors
Pain
Primary afferent axons
Spinothalamic pathway
Temperature
Thermoreceptors
Touch
Trigeminal Nerve pathway

Motor system (subtopic)

Alpha motor neurons
Basal ganglia
Golgi tendon organs
Lateral pathways
Lower motor neurons
Motor cortex
Motor unit
Muscle spindles
Proprioception
Reciprocal inhibition
Ventromedial pathways

List of key terms for concept map on learning in 9.00

Topic: Learning

Terms

Classical conditioning

Contingency

EL Thorndike

Extinction

Extrinsic motivation

Fear conditioning

Generalization

Intrinsic motivation

Latent learning

Law of Effect

Operant conditioning

Pavlov

Reward value

Second order conditioning

Skinner

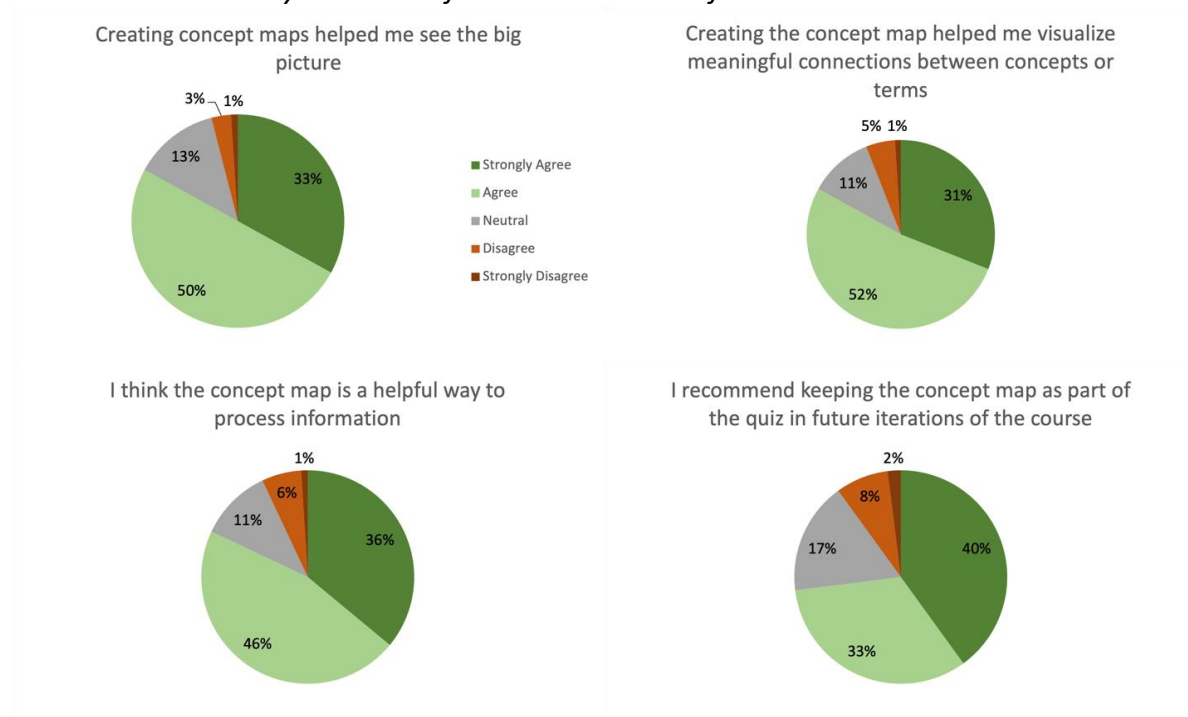
Examples of feedback given on concept map links, linking phrases, directionality, and accuracy

Examples of Concept Map Errors	Examples of TA Feedback
<p>Cognitive Development ————— Kohlberg’s Theory of Moral Development</p>	<p>“-0.5: no linking phrase between “cognitive development” and “Kohlberg’s theory of moral development”.</p> <p>“-0.5: I’m not fully convinced that “Kohlberg’s theory of moral development” and “cognitive development” should be linked together, though it’s reasonable moral judgements rely on cognitive development. Kohlberg’s theory of moral development is a psychological theory proposed by Lawrence Kohlberg in the 1950s and 1960s. They theory posits that people develop moral reasoning skills over time through a series of stages. Kohlberg’s theory is based on the idea that moral reasoning is an internal process that people go through as they try to make sense of moral issues and dilemmas.</p> <p>Alternatively, you could link Kohlberg’s theory of moral development directly to central term.”</p>
<p>Nurture —————> Child Development <----- Nature</p> <p><i>is a factor that affects</i></p> <p><i>is a factor that affects</i></p>	<p>“-0.5: Linking phrases between “nature”, “nurture” and “child development” are vague. Instead, nature refers to the genetic and biological factors that a child inherits from their parents. Nurture refers to the environmental factors that influence a child’s development, including parenting styles, culture, education, socio-economic status, and life experiences.”</p>

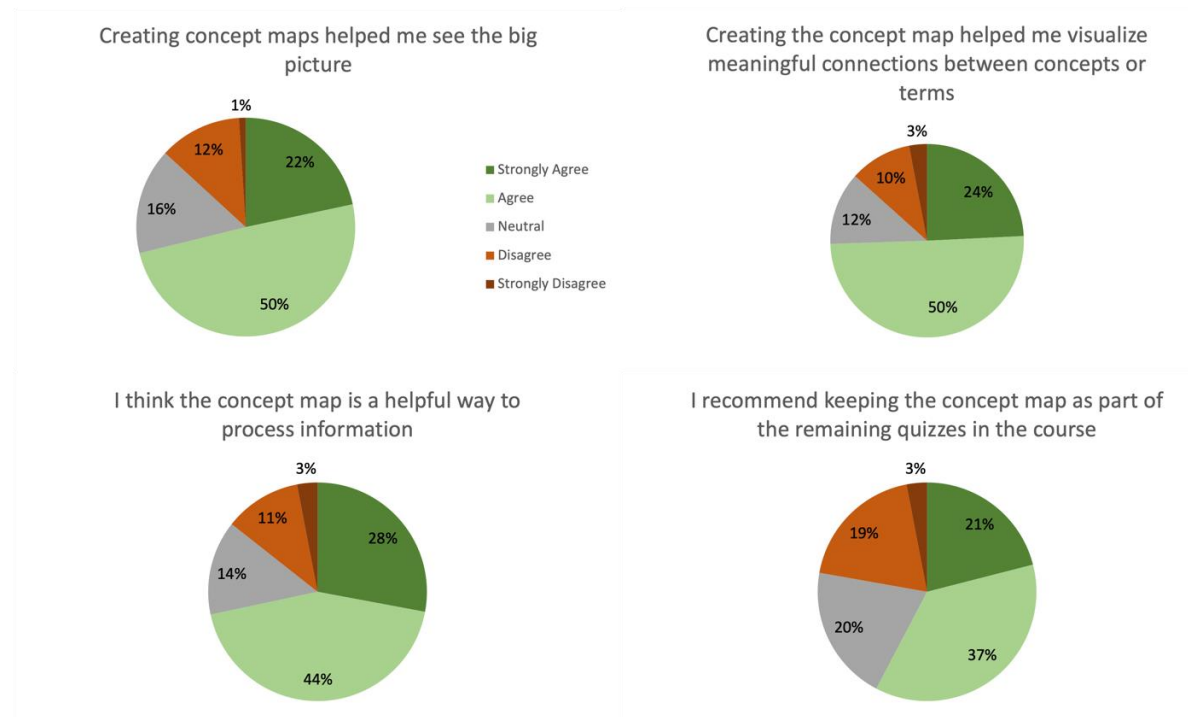
Examples of Concept Map Errors	Examples of TA Feedback
<p>Brain → Synaptic Pruning <i>Death of weak, useless neurons</i></p>	<p>“-0.5 minor mistake (synaptic pruning refers to elimination of weak connections between neurons rather than the actual neurons themselves)”</p>
<p>Classical conditioning → Skinner <i>Studied by</i></p> <p>Pavlov → Second Order Conditioning <i>Scientist who trained dogs to salivate due to a tone through</i></p>	<p>“-1 Classical conditioning was studied by Pavlov, not skinner -1 Pavlov didn’t use second order conditioning (since the conditioned stimulus was directly paired with the unconditioned stimulus)”</p>

Results from student surveys in 9.01 and 9.00

From a student survey conducted for 9.01 at the end of Fall 2022:



From a student survey conducted for 9.00 at the end of Spring 2023:



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