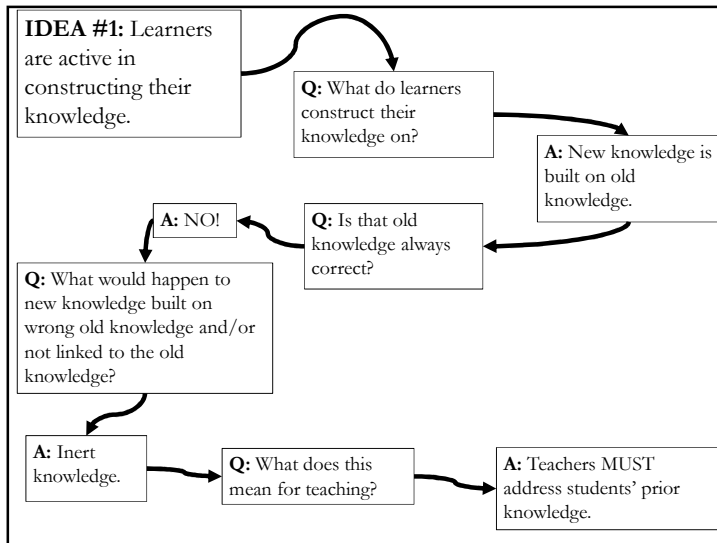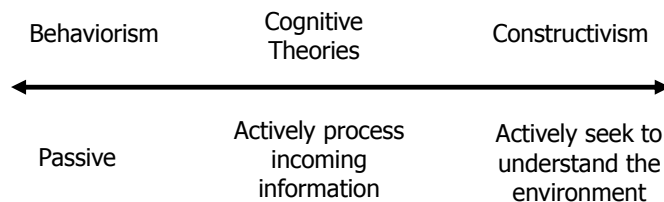# Constructivism: Schema Theory and Situated Cognition

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WATS

Learning Goals

- Explain the two main principles of constructivist theories of learning.
- Explain what a schema is and how it is useful for learning
- Explain three ways that schemas can be modified
- Explain the theory of situated cognition

Constructivism

- **Constructivism**: Learners construct their own meaning from information in the environment

Behaviorism	Cognitive Theories	Constructivism
Passive	Actively process incoming information	Actively seek to understand the environment

IDEA #1: Learners are active in constructing their knowledge.

Q: What do learners construct their knowledge on?

A: New knowledge is built on old knowledge.

Q: Is that old knowledge always correct?

A: NO!

Q: What would happen to new knowledge built on wrong old knowledge and/or not linked to the old knowledge?

A: Inert knowledge.

Q: What does this mean for teaching?

A: Teachers MUST address students' prior knowledge.

Types of Constructivism

- **Psychological Constructivism:** Learning as improving individual schemas
  - Schema Theory
  - Many cognitive theories of learning can also be classified as Psychological Constructivist theories
- **Social Constructivism:** Learning as increasing one's ability to participate with others in activities meaningful within the culture
  - Situated Cognition
  - Vygotsky's Theory

Schema Theory

- **Schema Theory**: Theory of how knowledge is represented and how the representation of knowledge guides the application of knowledge
  - Incoming information from the environment is organized around previously developed schema

Schema

- **Schema**: Mental structure for representing concepts
  - Schema: Structure for representing general concepts in memory
    - Contains generic/abstract knowledge – Gist
    - Reflects prototypical properties of experiences based on many occurrences of similar experiences
    - Schemas are developed without conscious awareness

Properties of Schemas

- Schemas are developed by prior knowledge and experience
- Schemas can be revised based on new information, though it is difficult
- Information from the environment is perceived depending on prior schemas

Properties of Schemas

- Schemas help people understand, interpret, and remember incoming information
- Schemas facilitate memory because it is easier to remember a schema than specific details
- Culture influences schemas
  - Memory for knowledge or an event is determined by the cultural context in which it takes place

Application of Schemas to Christian Education

- New Christians come to the faith with previous schemas of God, Jesus, Christianity, and the Christian faith
  - Those who disciple new Christians must address these schemas
- All Christians have schemas of what defines a "Good Christian"

Modifying Schemas

- **Accretion:** New information is remembered by an existing schema. Schema is <u>NOT changed</u>.
- **Tuning:** New information cannot be fully explained by an existing schema, so a new <u>schema changes</u> to reflect the new information
- **Restructuring:** New information cannot be stored by tuning a schema, so a <u>new schema is created</u>

Reply of the representatives of the Six Nations to an invitation by a Williamsburg College in Virginia, as cited by Benjamin Franklin, 1784

For we know, that you highly esteem the kind of learning taught in those colleges, and that the maintenance of our young men, while with you, would be very expensive to you. We are convinced, therefore, that you mean to do us good by your proposal; and we thank you heartily. But you, who are wise, must know that different nations have different conceptions of things; and you will therefore not take it amiss, if our ideas of this kind of education happen not to be the same with yours. We have had some experience of it; several of our young people were formerly brought up at the colleges of the northern provinces; they were instructed in all your sciences; but, when they came back to us, they were bad runners, ignorant of every means of living in the woods, unable to bear either cold or hunger, knew neither how to build a cabin, take a deer, or kill an enemy, spoke our language imperfectly, were therefore neither fit for hunters, warriors, nor counselors; they were totally good for nothing. We are however not the less obliged by your kind offer, though we decline accepting it; and, to show our grateful sense of it, if the gentlemen of Virginia will send us a dozen of their sons, we will take great care of their education, instruct them in all we know, and make *men* of them.
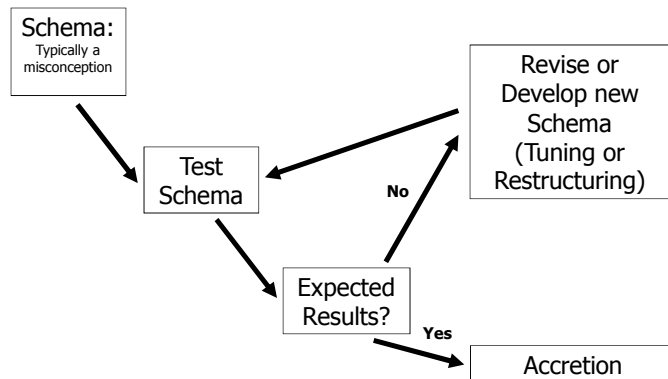
Modifying Schemas Examples

- **Accretion:** Attend a wedding, the wedding is exactly what you experienced before.
- **Tuning:** Attend an American wedding, where the bride does not dance down the aisle.
- **Restructuring:** Attend a wedding ceremony done while bicycling

Modifying Schemas Examples

- **Accretion:** You have already learnt about observational learning
- **Tuning:** Operant conditioning explains learning processes that you have experienced, so you add the concept to your previous schema
- **Restructuring:** Schema theory is unrelated to anything you have known before
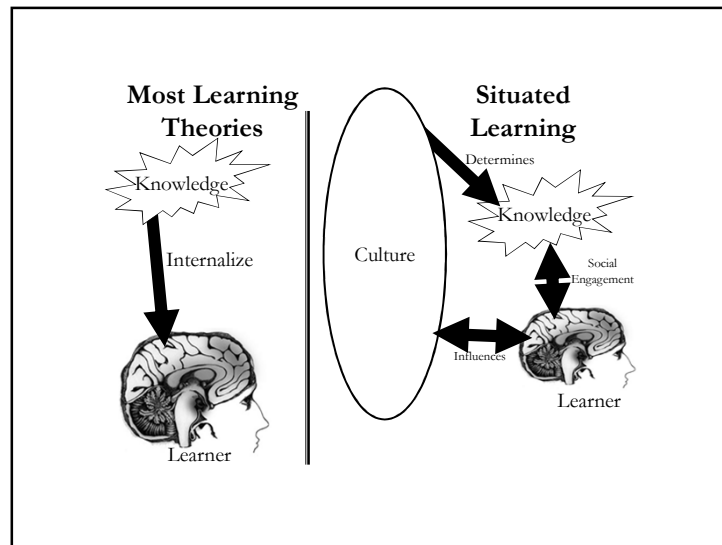
Constructivism: Process of Learning

Schema:
Typically a misconception

Test Schema

Expected Results?

Revise or Develop new Schema (Tuning or Restructuring)

No

Yes

Accretion

IDEA #2: Social interactions are important in the knowledge construction process.

Situated Learning

- **Situated Learning Theory**: Skills and knowledge are tied to the situation where they were learned
  - Knowledge needs to be presented in authentic contexts – settings and/or applications that normally involve that knowledge
  - Learning requires social interaction and collaboration with people in "communities of practice"
    - **Communities of practice**: Formed by people who collectively learn in a specific domain

Situated Learning Theory

- **Situated Learning**: Learning (thinking) is adapted to the environment
  - Learning develops in a social (cultural) context
- Other theories of learning assume that learning occurs within the learner
  - Individual person is on the learner
  - Learners internalize knowledge
- **Situated Learning Theory**: Learning is embedded within the culture
  - Knowledge: Effective living practices within the culture
  - Learning: Developing the ability to use the tools and skills valued by one's society

Most Learning Theories / Situated Learning diagram: Knowledge → Internalize → Learner; Culture: Determines → Knowledge ↔ Social Engagement, Influences → Learner

Principles of Situated Learning Theory

- Learning is social
  - Other learning theories assume knowledge is "out there" so learning is the process of internalizing knowledge
  - Situated Learning: Learning requires social participation.
    - Learning takes place in the social environment
    - Minds are not separate from the culture
- Knowledge is distributed across the cultural environment
  - Tools, books, and communities
- Knowledge is effective participation in socially valued endeavors
- Education should aim to help students to meaningfully engage with the environment

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Situated Learning

- Knowledge learned outside of a meaningful context is useless
- Focus on apprenticeships
  - Expert guides novice beginning with simple and increasing to complex

Summary:
Five Conditions for Learning from the Constructivist Perspective

- Embed learning in complex, realistic, and relevant learning experiences
- Provide for social interaction and shared responsibility in learning
- Support multiple perspectives and multiple representations of content
- Nurture an understanding that knowledge is constructed
- Encourage ownership in learning

Constructivist Learning Methods

- Cognitive Apprenticeships
- Instructional Conversations
- Cooperative Learning
- Inquiry and Problem-Based Learning
- Service Learning