

Learning Theories

❖ WHAT IS THIS RESOURCE?

An overview of fundamental aspects of the leading learning theories. University instructors use these theories to inform the decisions they make about their teaching/instruction with the goal of making it more effective.

❖ HOW DO I USE IT?

Review the learning theories before planning course activities, and/or identify a certain course activity already in use and improve its effectiveness by incorporating more theory-based aspects.

Learning Theories

The four leading theories of learning, Behaviorism, Cognitivism, Constructivism, Andragogy, Connectivism, Gamification, Cooperative Learning, Project-Based Learning, and Brain-based Learning are well-supported by empirical research and form the basis of best practices in teaching.

Behaviorism

According to Behaviorism, humans (and other animals) act in response to environmental influences, or stimuli. Just as dogs can be trained to sit for a treat, humans can be trained to exhibit desired behaviors to gain stimuli such as rewards (grades, salary, awards, praise) or avoid punishments (pain, fines, incarceration, condemnation).

Some conclusions of Behaviorism relevant to university teaching:

- Specific behaviors can be reinforced or discouraged by rewards and punishments.
 - Students are more likely to work on an assignment if there is course credit attached.
- Rewards are more effective at altering behavior than punishments.
 - Students are motivated more by praise than by criticism.
- Stimuli on an unpredictable time schedule are more effective than those on a predictable schedule.
 - Pop quizzes build better study skills than scheduled exams.
- Behaviors are more strongly reinforced if the reward closely follows the behavior.
 - Feedback on assignments is most effective when delivered to the student soon after they complete the work.

- Learning can be lost with time, in a process called extinction. It can be prevented by additional exposure to the stimulus.
 - Students benefit from frequent practice.

Cognitivism

According to Cognitivism, human learning is controlled by specific characteristics of the human brain. Behaviorism is an incomplete theory because human behavior is more complex than simple thoughtless reactions to external stimuli. The human learning process involves multiple steps, which must all be successful in order to achieve long-term learning.

Some conclusions of Cognitivism relevant to university teaching:

- Humans are conscious of only a small fraction of the sensory inputs they experience. Most of what we see or hear is not consciously recognized.
 - Effective presentation slides for a lecture contain only necessary items, as extraneous images distract from essential content.
- Sensory inputs that are recognized are stored in short-term memory for only a short time and must be transferred to long-term memory quickly or be lost.
 - Short lectures are much more effective at promoting learning than longer lectures. Students should have an opportunity to engage with new information frequently.
- Short-term memory can only hold approximately seven new pieces of information. Attempting to add more new information results in cognitive overload.
 - Students benefit from learning activities after a few bits of new information have been introduced.
- Transfer of new knowledge into long-term memory is encouraged by linking the new knowledge to other knowledge already stored in long-term memory.
 - Effective instruction connects new information to information, theories, models, and paradigms that with which students are already familiar. It is also very effective to connect new information to students' remembered experiences.
- Learning is an active process, rather than passive. Learning is made to happen by the learner, not the teacher.
 - Effective instruction involves active-learning experiences for students.
- Humans can learn through observation of others.
 - Students learn by watching a teacher modeling a new skill or behavior.

Constructivism

According to Cognitivism, humans learn by creating meaning from the experiences and knowledge to which they are exposed. Contrary to Behaviorism and Cognitivism, Constructivism maintains that each learner creates their own understanding of the world based on their experiences and their individual interpretation of their experiences. Since knowledge and experience are inextricably

entwined, learning cannot happen effectively in the abstract. Learning should be situated, or occurring in a relevant context.

Some conclusions of Cognitivism relevant to university teaching:

- Students learn best when they are provided context, such as realistic situations where the learning would be relevant.
 - Realistic assignments such as case studies or real-world applications are effective strategies for situating learning.
- Real-world experience produces effective learning.
 - Experiences such as internships, apprenticeships, and field trips can promote real-world learning.
- Learning is the product of students' engagement with the learning experience.
 - The teacher's role is to design productive learning experiences, and guide learners through them.
- Humans, as social beings, construct meaning within a social context.
 - Group work is an effective strategy at improving long-term learning.

Andragogy

According to Andragogy, adult humans learn differently from children, as a consequence of their greater lived experience. More specifically, in contrast to children, adult learners tend to be autonomous and self-driven, intrinsically motivated to learn, focused on practical applications, and more knowledgeable about the world. We consider university students, undergraduates and up, to be adult learners.

Some conclusions of Andragogy relevant to university teaching:

- Adults want to understand the practical value of what they are learning.
 - Adults learn better from assignments involving authentic tasks that mirror tasks that might be done in the workplace.
- Adults are accustomed to making decisions about their lives.
 - Adult students can make some decisions about classroom policies, their assignments, and assessment practices. For example, the instructor can collaborate with students to produce classroom norms or an assignment rubric.
- Adults have work experience.
 - Adult students can be asked to produce original case studies based on their own experiences.

Connectivism

Connectivism is defined as, “a theory of learning that acknowledges the shifts in society where learning is no longer an internal, individualistic activity. How people work and function is altered when new tools (internet) are utilized” (Siemens, 2005).

The field of education has been slow to recognize both the impact of new learning tools and the environmental changes in what it means to learn. Connectivism provides insight into learning skills and tasks needed for learners to flourish in a digital era (Siemens, 2005).

- With connectivism, what we learn with has changed.
 - Learners use digital tools (Web 3.0) to create content; they are not only passive consumers of knowledge.
- How we learn has changed. It is not an individual activity.
 - Learning takes place through collaborating with other people (network, this class is a network of learners).
- Where we learn has changed.
 - The digital learner can learn anywhere, anytime, 24/7.

Gamification

Gamification is the application of game elements and digital game design techniques to non-game environments, such as educational institutions, schools, or student learning. Gamification uses the mechanisms you find in games (rewards, leaderboards, points, immediate feedback) and using them very systematically to get students to compete and (in some instances) cooperate towards some end. The idea in gamification is that the whole learning experience is gamified.

- The educator may give students rewards for cooperating or achieving new levels or status in the game.
 - The educator may reward students for cooperating.
- Students may work in teams and compete against each other.
- Game mechanics can be used to make the learning experience more exciting.
- Gamification makes learning enticing because of emotional engagement, opportunities to problem-solve, changes for immediate feedback, and the element of uncertainty.

Cooperative Learning

Cooperative Learning is defined as students working together to “attain group goals that cannot be obtained by working alone or competitively.” (Johnson, Johnson, & Holubec, 1986).

- Students work in small groups to achieve a common goal through an active involvement of understanding, analyzing, and applying the subject in real-life learning.
- The success of cooperative learning can be determined through motivational and cognitive perspectives, by encouraging other group members and acquiring critical thinking skills in discussions to find the best problem solution.
- The benefits of cooperative learning are that it enhances social interactions, reasoning skills, and oral communication skills through group discussion.
 - It also develops positive attitudes and self-efficacy by learner's receiving encouragement from the instructor and peers in a cooperative environment.

Project-Based Learning (PBL)

Project-Based Learning (PBL) is a pedagogical approach and curriculum design methodology. In general, the term "project" refers to assignments, or sets of assignments, that are long-term (often two weeks or more) and product-oriented (from small to large scale). Process is important as well, especially in student-driven group projects, where the primary goal may be cooperative learning. However, the reality is that most school projects culminate in a demonstration or exhibition to a large audience, so the final product becomes critical. A typical school project may ask students to research a topic over the course of a few weeks and to produce a written paper, a visual, a skit, a song, a video, an oral presentation, or even a combination. Other projects might involve creating larger-scale products, such as museum exhibits, murals, full plays, or learning fairs. (from EBSCO Research Starters, 2015)

Brain-Based Learning

Brain-Based Learning is considered a comprehensive approach to instruction. Brain-based education offers a biologically driven classroom structure that corresponds to the functions of the human brain. The practice engages the entire body to enhance the learning process. The Universal Design for Learning (UDL) framework by the Center for Applied Special Technology (CAST) (2011) is an example of brain based learning which focuses on three broad brain networks:

Recognition Networks

The "what" of learning

How we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks.



Present information and content in different ways

Strategic Networks

The "how" of learning

Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks.



Differentiate the ways that students can express what they know

Affective Networks

The "why" of learning

How learners get engaged and stay motivated. How they are challenged, excited, or interested. These are affective dimensions.



Stimulate interest and motivation for learning

The UDL illustrations and descriptions are from the CAST (2011) website. <http://www.cast.org>

Further Reading

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