LEARNING DESIGN TOOLKIT (M.ED. IN IDET)

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Learning Design Toolkit

Learning Theories

Module 1

Behaviorism

Behavioral theory focuses on the way humans learn through interaction with their environment. Behaviorism solidifies the fact that behaviors are learned through conditioning. Skinner mentioned that conditioning is a procedure that utilizes punishment and reinforcement. The behavioral model provides an organized approach to teaching, allowing educators to set clear expectations and provide consistent routines. Behavioral theorists believe there is a certain way to do tasks to cultivate a desired outcome, and the teacher determines what that looks like (Samoila et al., 2023).

Example

This theory can be applied to student behavior plans. Many students thrive with positive
They can better interact in school when their positive behaviors are rewarded (Bright, 2023). For example, if a young student struggles with speaking out inappropriately in class, they may have a positive behavior plan to encourage them when they appropriately follow classroom expectations. The plan could state that when the student does the desired task of raising their hand before asking questions, the teacher will thank them for raising their hand and waiting to be called on before speaking.

Reference(s)

Bright, K. (2023, September 21). *Behaviorism in education: How to foster learning environments.* LearnLever. https://learnlever.com/behaviorism-in-education/

Samoila, C., Ursutiu, D., & Munteanu, F. (2023). The remote experiment in the light of the learning theories. *International Journal of Online & Biomedical Engineering*, *19*(14), 26–44. https://doi.org/10.3991/ijoe.v19i14.43163

Cognitivism

Cognitivism is related to behaviorism in that both must start from a preexisting body of knowledge being broken down into smaller, more achievable objectives or tasks. However, Cognitivism differs from Behaviorism in that Cognitivism places internal mental processes at the center of learning, rather than the learner being a passive participant. Behaviorism emphasizes the importance of external stimuli. Cognitivism, however, looks at the internal processes that can occur during learning. These are:

- **Schema Theory**
- **Information Processing Theory**

Schema Theory

In Schema Theory, the learner acquires a structure or knowledge for making sense of their environment. An example would be a child experiencing a cat for the first time. The child would see a four-legged, furry animal, with a tail at one end and a head at the other. They would be able to hear the sound the animal made and may even touch the animal to get a sense of how the coat feels and the size of the animal. This child would be told that this creature is a cat. This initial experience would form a structure for identifying this type of animal, termed the initial structure. This initial structure would be stored in the child's brain for future reference.

The next step would be new input. The child would then be introduced to a new creature, a dog. Having come into contact with a furry, four-legged creature, the child would most likely refer to this creature based on their previous experience or schema as a cat. However, new input, like the sound the animal makes, and the general size and shape of the animal, would prove this initial schema to be insufficient. This new information must be assimilated or added to the existing schema and accommodated. The child would realize that although there were similarities, such as fur, number of legs, and orientation of the head and tail, there would also be significant enough differences, such as the sound the animal made, that the term "cat" would no longer fit. Having been given the term "dog", the child would now have an improved schema by which to operate or a constructed schema.

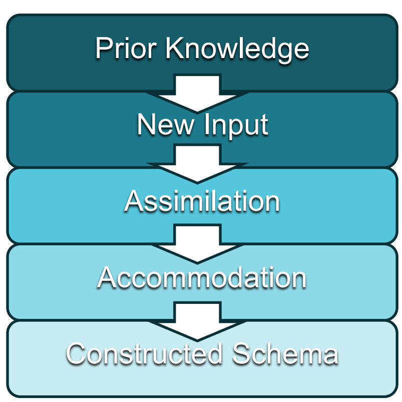


Figure 1: Diagram showing the stages of Schema construction

Information Processing Theory

The human mind is compared to a computer in its functions, where it receives, processes, stores, and eventually retrieves information.

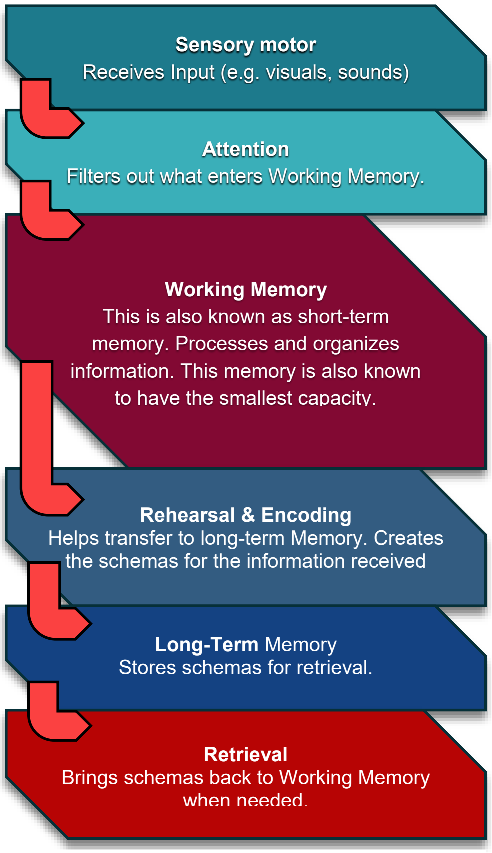


Figure 2: Diagram showing the stages of Information Processing Theory

Example

An example of this would be teaching subtraction to a pupil. The child would receive the input on how to subtract by visual and practical means, i.e., using bottle tops or covers or some other physical set to subtract from. Because it is an introduction, the numbers would be kept small. The child would have to filter out any other distractions, whether internal or external, to concentrate on the lesson at hand. The child would receive several examples worked by the teacher and then actively engage in subtraction themselves, while being monitored by the teacher. After several rehearsals, the student should be confident in subtracting without assistance. The teacher would then be able to assess the student to see if they have mastered that skill.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Constructivism

This learning theory emphasizes the value of unique learning experiences over a body of knowledge. Students acquire knowledge through prior experiences, social interactions, and contextual learning in this approach. In other words, practitioners of this learning theory do not start from a given body of knowledge to break down into learning objectives, but rather allow students to form their own learning experiences. In this learning theory, teachers are removed from being the repository of all knowledge to being a guide towards meaningful learning experiences. In this scenario, a teacher may learn as much from the student as the student learns from the teacher. It must also be noted that this type of learning model is cyclical, indicating that the learning process does not meet an endpoint but is ongoing.

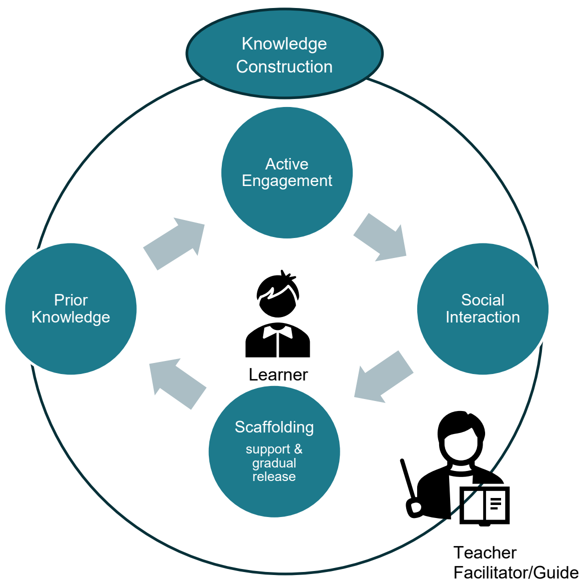


Figure 3: Diagram showing Constructivism.

The learner is at the center of the learning process in the above diagram. Knowledge construction begins with prior knowledge resident in the learner and then continues with a hands-on learning activity that causes the learner to question and adapt their previous knowledge. This is known as active engagement. This active engagement is strengthened by social interaction, as learners collaborate and discuss the activity. Finally, there is support and gradual release given by the facilitator/guide, offering poignant insights to the learners as they assimilate the new information and form new knowledge. In this, the teacher merely helps students to realize the information in front of them, rather than provide them with easy answers that they may learn by rote.

Example

Mrs. White, a Grade 3 science teacher, wants her students to understand how heat affects solids and liquids. Instead of starting with a lecture, she brings a tray of ice cubes to class. She divides the students into small groups and gives each group a tray, some spoons, a stopwatch, and a warm towel.

Mrs. White: "Your challenge: How can you melt your ice cube the fastest? Try different ideas and write down what happens!"

The students experiment with the ice. Some hold the ice in their hands, some use a warm towel, and others leave it in the sun. As they work, they discuss strategies and make predictions based on their knowledge ("My hands are warm, maybe it'll melt faster!").

After the activity, the groups share results. Mrs. White guides the discussion, asking:

- "What process worked faster? Using the towel or your hands?
- "What does this tell us about heat?"

Students will build new knowledge by connecting their current observations to their prior knowledge. (For example, remember that ice melts faster the hotter its surroundings are). Mrs. White would help link these ideas to the central scientific notion of heat transfer, providing enough information to support their discoveries while still allowing them to form their individual meanings from their observations.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Connectivism

Connectivism is a relatively modern learning theory that posits that learning occurs across networks of people, digital tools, and information sources. Knowledge is widely distributed, and learning is the process of creating connections and recognizing patterns within these networks. Connectivism emphasizes the significance of technology, social interaction, and the capacity to access and filter information in a rapidly evolving digital environment. Here is a diagram to further illustrate the point.

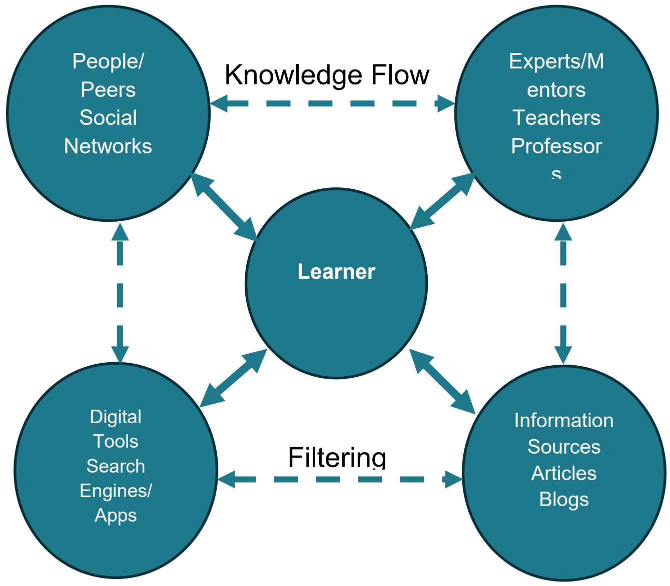


Figure 4: Diagram showing Connectivism: Learning is networked, dynamic, and ongoing.

Example

Jenna was tasked with designing a multimedia lesson on climate change as part of a graduate-level instructional design course. Instead of relying solely on her professor or a textbook, she created a shared Google Doc where classmates could. Contribute research articles, infographics, and open-source videos. She joined a climate science subreddit to ask experts questions and followed key researchers on X (formerly Twitter) to keep up with recent findings. Jenna also embedded a Padlet board into her lesson, allowing future students to post updates and fostering ongoing knowledge sharing even after the course ended. Through this networked, collaborative approach, Jenna wasn't just consuming content – she was curating, connecting, and contributing to a living knowledge network. This aligns perfectly with connectivist learning principles, where knowledge is fluid, learning is driven by diversity of opinion, and knowing how to find current information is more valuable than memorizing static facts.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Pedagogy vs. Andragogy

TPACK | Technological Pedagogical Content Knowledge

Technological Pedagogical Content Knowledge or TPACK seeks to define a Technological Instructor in a Technological Integrated Environment (ACE Module 1). It is best illustrated in the following diagram

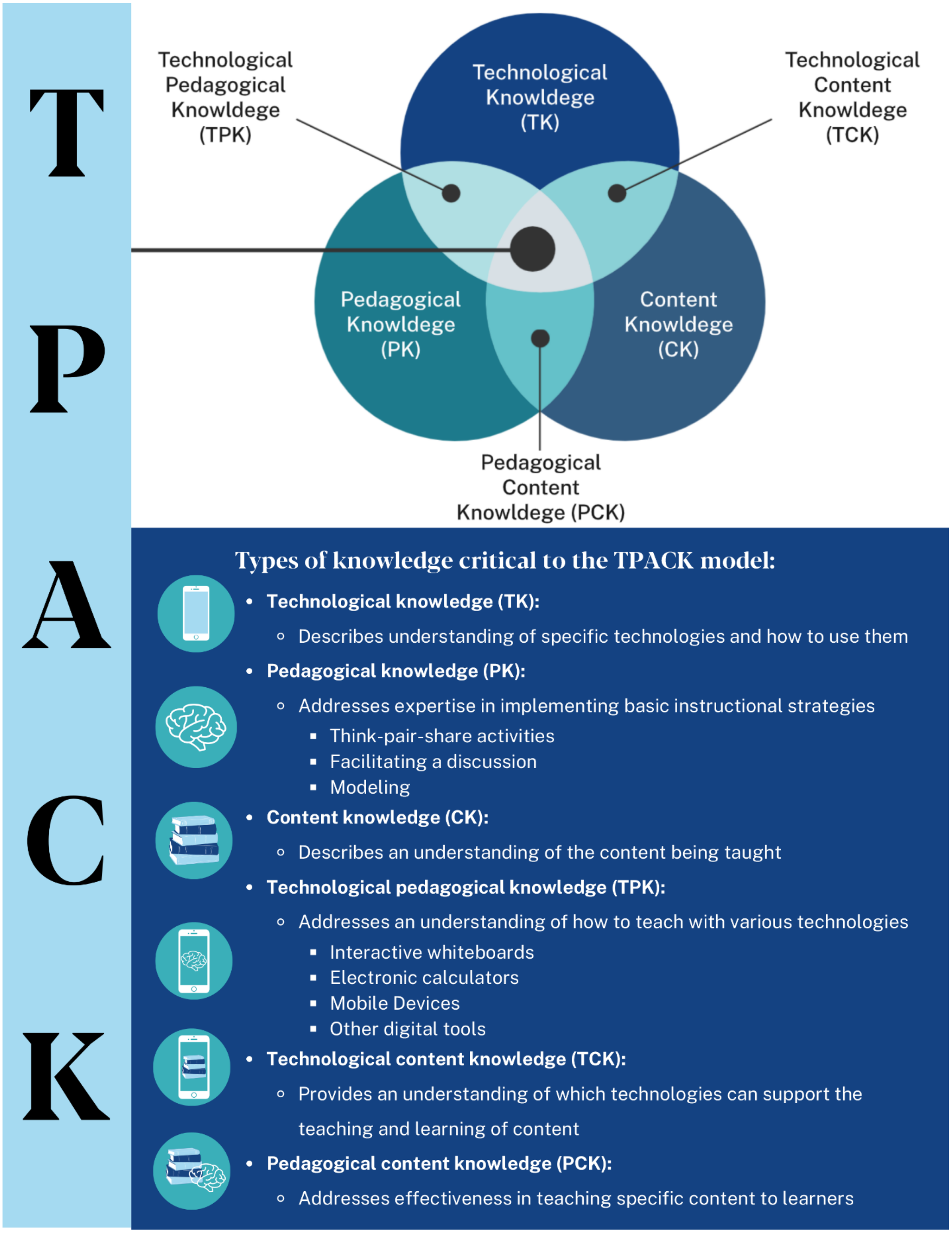


Figure 5: Diagram of TPACK

Example

This theory would apply to the following scenario.

Mr. Robbins is an instructional designer who wants to create a scientific unit on electricity for his grade 5 class. He spent the earlier part of his career working for the Electric company on their lines, so he acquired all the Content Knowledge required to teach the course. When he became interested in teaching, he attended classes that gave him the Pedagogical knowledge. He researched the available technology for his grade 5 class and recognized that he could gamify many of the content areas of the units he wanted to teach. First, he created a broad unit plan, outlining the areas of study for each week in the unit, and then he set about adapting the unit to the apps available (Kahoot! and Quizizz).

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

TAWOK | Technology Andragogy Work Content Knowledge

This model goes beyond the TPACK Learning model to focus on more adult learners. The following diagrams can best represent it.

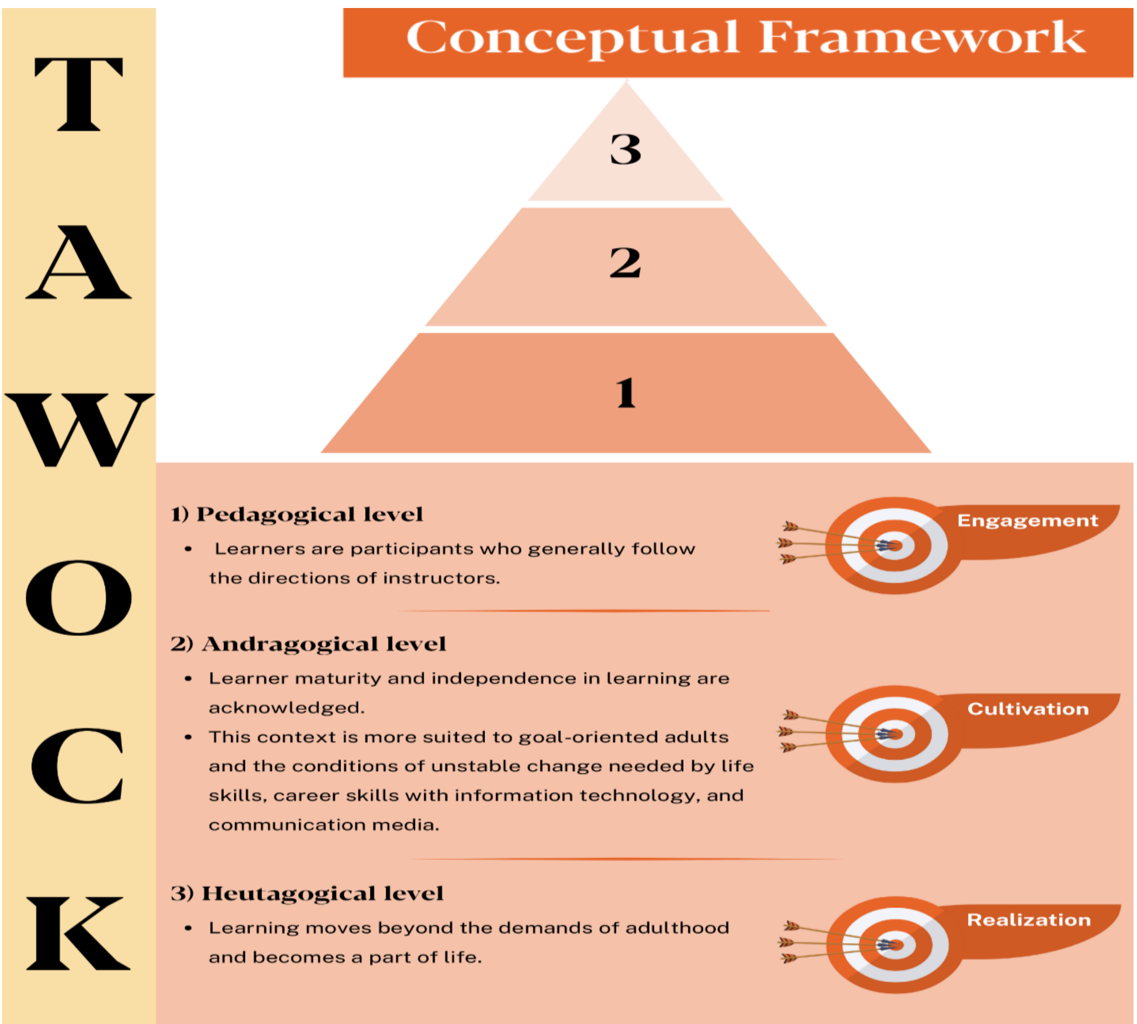


Figure 6: Diagram of TAWOCK

Example

Ms. Kim, an instructor at a community college, is developing a blended learning course for her adult students pursuing a certification in health information management. She applied the TAWOCK framework to design her course, ensuring that it covers academic content and prepares her students for their future workplace. She has already developed courses for this area but sees the need for innovation. She already has Technological Knowledge (TK), and Andragogical knowledge (AK), but her Work Knowledge (WK) and Content Knowledge (CK) must be improved

Work Knowledge (WK): Ms. Kim interviews local healthcare employers to understand the specific competencies needed in electronic health record management. She incorporates real-world scenarios and case studies into her lessons, ensuring students gain practical, workplace-ready skills.

Technology Work Knowledge

With her Technological knowledge, Ms. Kim knows that several industry-standard solutions can help her students. After consultation, she selected and integrated an electronic health record (EHR) system into the course. She ensures that all students have access to laptops and internet resources and provides tutorials for the software, recognizing that some adult learners may not be as tech-savvy as others.

Technology Andragogy Knowledge

As her students are adult learners, Ms. Kim pitches the technology at a level befitting adult students, while understanding that each student enters the technology area with a different technological experience. Learners can choose their entry point. In learning the supporting technology, they are given constant feedback on their progress.

Andragogy Content Knowledge

Understanding that her students are adults with diverse backgrounds, she employs adult learning principles, allowing learners autonomy in project selection and drawing on their existing healthcare experiences in class discussions. She encourages peer-to-peer teaching, fostering a collaborative environment.

Work Content Knowledge

Ms. Kim’s expertise in health information management allows her to curate up-to-date, relevant materials. She aligns the curriculum with national certification standards and the relevant needs of the health care providers she enlisted from the beginning, ensuring her students are prepared for both the final exam and the real-world application.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Learning Process Models

Kolb's Experiential Learning Theory

Kolb's Experiential Learning Theory posits that learning is a cyclical process grounded in experience. According to Kolb, effective learning occurs when a learner moves through four distinct stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In practical terms, learners first engage in a direct experience (participating in a hands-on activity), then reflect on what happened, develop theoretical understanding by connecting the experience to existing knowledge, and finally test these new ideas in practice. This would seem to be a continuation of the Constructivist and Connectivist Theories, where the social aspects of learning are integrated into the initial learning experience. By combining all four stages, Kolb's model ensures that learning is not just a transfer of information but a holistic, dynamic process that results in deeper understanding and the ability to apply knowledge in real-world situations.

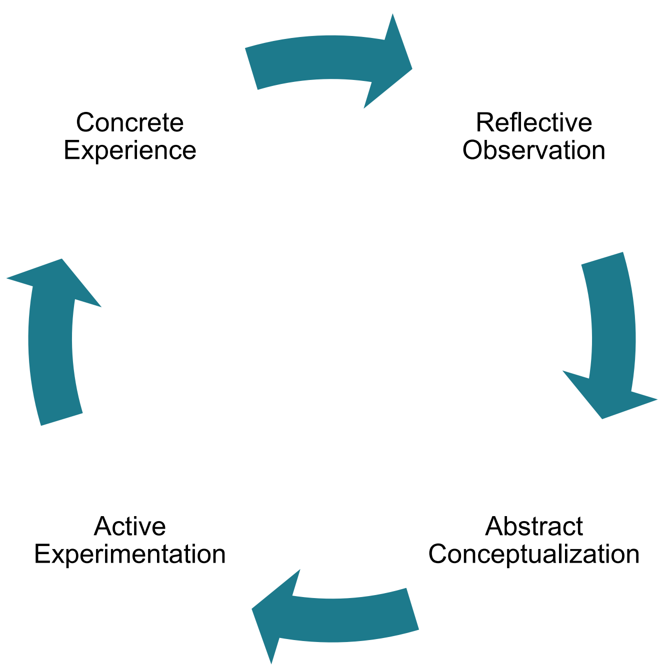


Figure 7:Kolb's Experiential Learning Model

Example

A personal example of Kolb's model was when I learnt to drive. I was learning to drive a manual, and the experience was mixed. I was able to steer the vehicle correctly and remain on my side, but I had real trouble coming to a stop. The vehicle cut out several times. I couldn't seem to get the clutch control right. When I got home, I thought about the experience. What was I doing wrong? Why did the car cut out when I pushed the brake all the way? As I thought about it, I concluded that I was giving the car conflicting commands. By pushing the brake, I was telling the car to stop, and by keeping the clutch up, I was telling it to go. So the car was "confused" and cut out. On my next outing, I tested my hypothesis. Before the vehicle came to a complete stop, I pushed the clutch in. The problem was solved.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1 Part 4 presentation*. Canvas.

https://ace.instructure.com/courses/2109810/external_tools/118428

Gagne's Nine Events of Instruction

Gagne's Nine Events of Instruction provide a systematic framework for designing effective teaching and learning experiences. According to Gagne, learning involves a sequence of cognitive processes that can be supported by specific instructional events (Gagne, Briggs & Wager, 1992). The nine events guide instructors in structuring their lessons to maximize student engagement and knowledge retention.

The sequence begins by gaining the learner's attention, usually with an intriguing question or demonstration. Next, instructors inform learners of the objectives to clarify expectations. The third event, stimulating recall of prior learning, activates existing knowledge relevant to the new content. Instructors then present the new content clearly and logically, providing learning guidance, such as hints, examples, or visual aids. This helps learners process and organize material. Eliciting performance allows students to practice what they learned, while providing feedback allows them to correct misunderstandings in real time. Afterward, instructors assess performance to evaluate learning outcomes. The final event, enhancing retention and transfer, supports learners in applying new knowledge to different contexts and situations.

As Bean (2014) and An (2021) point out, Gagne's model is foundational in instructional design. It offers practical steps for lesson planning and supports a wide range of learning goals. It ensures that instruction is purposeful, interactive, and geared toward long-term understanding and application.

Example

One such example is Mr. Chevalier, a Grade 5 science teacher, preparing a lesson on the water cycle.

1. **Gain Attention**
   Mr. Chevalier starts the lesson by playing a dramatic, slow-motion video of rain forming, clouds swirling, and water droplets evaporating, immediately capturing the students' attention.

2. **Inform Students of Objectives**
   He clearly states: "By the end of the lesson, you will be able to describe the stages of the water cycle and explain why it is essential for life on Earth.

3. **Stimulate Recall of Prior Learning**
   Mr. Chevalier asks students to recall what they already know about water and weather by having them share experiences of seeing puddles disappear after the rain falls or noticing dew in the morning.

4. **Present the Content**
   He then presents new vocabulary on the school display
   He introduces the stages of the water cycle -,evaporation, condensation precipitation and collection using a colorful diagram and real world examples

5. **Provide Learning Guidance**
   Mr. Chevalier gives helpful hints and uses mnemonics, like "Every Cat Plays Chess, " to help students remember the order of the stages. He also provides printed diagrams for note-taking.
6. **Elicit Performance**
   Students work in pairs to arrange cards depicting each stage of the water cycle in the correct sequence and explain their reasoning to each other.

7. **Provide Feedback**
   Mr. Chevalier circulates the room as students work, offering praise for correct explanations and gently correcting misconceptions with guiding questions.

8. **Assess Performance**
   At the end of the lesson, each student completes a short quiz where they label a diagram of the water cycle and answer a question about its importance.

9. **Enhance retention and Transfer:**
   Finally, Mr. Chevalier challenges students to relate the water cycle to something outside the classroom, such as predicting the evaporation rate for a puddle after it rains or understanding the water cycle's role in gardening and farming.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

An, Y. (2021). A history of instructional media, instructional design and theories. In M.J. Bishop, E. Boling, and J.Elen (Eds.), *Handbook of Research in Educational Communications and Technology* (pp. 37 – 54). Springer.

Bean, C. (2014). *The accidental instructional designer: Learning design for the digital age.* American Society for Training and Development.

Continuous Improvement

PDSA Cycle | Plan Do Study Act Cycle

The PDSA cycle—Plan, Do, Study, Act—is a continuous quality improvement model used to enhance teaching and learning, especially in instructional design. Frank's scenario illustrates that this cycle helps educators systematically refine their courses based on evidence and feedback.

- **Plan.** In this stage, instructional designers or educators set goals and plan course content, learning objectives, and assessments. If the course has already been launched, this step involves reviewing data (such as survey results or assessment scores) to identify areas for improvement. This phase should be grounded in learners' needs and aligned with clear objectives. (Bean, 2014)

- **Do:** Here, the plan changes are implemented. This may involve revising course materials, integrating interactive activities, or updating assessments. For example, Frank reduced the number of assignments and rewarded video scripts to be more engaging.

- **Study:** After implementing changes, educators review both quantitative (grades, completion rates) and qualitative (surveys, comments) data to evaluate their impact. This analysis gives a comprehensive view of how learners are experiencing the course. As Yunjo An (2021) points out, effective instructional design is informed by evidence from both numbers and personal feedback.

- **Act:** Finally, based on the data, decisions are made about which changes to keep, modify, or discard. The cycle then repeats, with each iteration leading to incremental improvements.

  The PDSA cycle encourages minor, regular adjustments, fostering a mindset of ongoing improvement. This iterative process is essential in instructional design, ensuring that learning experiences remain responsive and effective in meeting learner needs.

Example

Mrs. Rivera is a high school math teacher who wants to improve her students' performance and engagement with algebra. She applies the PDSA cycle to improve her teaching approach.

Plan:

Mrs. Rivera reviews last term's quiz scores and notices that many students struggled with solving equations. She reads through student surveys and sees feedback that the lessons felt rushed. To change this, Mrs. Rivera plans to introduce short, interactive problem-solving sessions at the end of each class to reinforce the day's lesson.

Do:

Over the next month, she implements her new plan. At the end of each class, students work in pairs to solve a challenging algebra problem and then discuss their strategies with the group.

Study:

After four weeks, Mrs. Rivera collects data by comparing quiz scores before and after the intervention. She also gives a quick survey to get students' opinions on the new activity. The quiz scores show improvement; many students report feeling more confident with equations.

Act:

Ms. Rivera continued the problem-solving sessions and, under further reflection, changed her teaching sequence to allocate more time to algebra. She plans to continue to evaluate herself and the course so that the overall quality of the course improves.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 1* Part 5 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Design Models

Module 2

Instructional Design (ID) vs. Learning Experience Design (LXD)

Instructional Design (ID) and Learning Experience Design (LXD) define an approach to creating a learning experience. Design includes understanding the audience's needs and goals to create learning activities and effective content delivery. The two methods are complementary and do not have to exist exclusively. ID emphasizes learning and supports a step-by-step process for developing instruction. Typically, instruction is driven by learning objectives, direct instruction, and uses traditional assessments to evaluate learning. LXD has an integrated approach with a heavier emphasis on emotional, social, and cognitive aspects of learning. In LXD, the focus is on integrating hands-on and collaborative instruction that often utilizes technology. According to Floor (2023), “A great way to explain the general difference between LXD and ID is by comparing a scientist to an artist” (para. 2). Like a scientist, the instructional designer follows a methodical process with clear objectives and measurable results. Meanwhile, the learning experience designer, like an artist, creates engaging, emotionally rich experiences that connect with learners on multiple levels beyond just transferring information.

Example

An example demonstrating the difference between ID and LXD can be illustrated in a professional development session with school staff. The staff will receive training on the new Assessment Feature in the school’s LMS.

Instructional Design (ID)	Learning Experience Design (LXD)
The staff is presented with the learning objective to learn the new online feature. Staff are required to use online assessments to collect data. ↓ The instructor demonstrates the skills and steps to complete the goals. ↓ The staff members try the step-by-step implementation as guided by the instructor. ↓ Staff have begun using the new online feature in their classrooms. Instructors and administration evaluate and hold staff accountable for carrying out the directive.	The staff is presented with a problem that needs to be solved. The administration needs a way to collect data as students complete formative work. The staff are given the new online assessment feature on the LMS as a possible option. ↓ The staff begins to explore the LMS and its features to experiment with how it works and what it can do. As they explore, they create lists of pros and cons. The staff notes items for which they need further training or exploration. ↓ Through collaboration, the staff determines that the online LMS is the best way to collect

	data. The staff begins using the assessment feature to collect data. ↓ As the data are collected, the administration and staff evaluate the effectiveness and adjust accordingly.

Reference(s)

Floor, N. (2023, November 9). *Learning experience design vs instructional design.* Learning Experience Design. https://lxd.org/news/learning-experience-design-vs-instructional-design/

First Principles of Instruction

Merrill's Principles of Instruction

David Merrill's First Principles of Instruction emphasizes the need for learners to engage with real-world problems in a structured and purposeful way (American College of Education, 2025). At its core, the model supports task-centered learning grounded in the belief that knowledge must be relevant, contextual, and actionable.

Merrill (American College of Education, 2025) outlines five foundational principles.

1. Problem-Centered: Instruction should begin with meaningful, real-world tasks. Learners are more motivated and retain knowledge for a longer period when the context is tied to scenarios they recognize or may encounter.
2. Activation: Effective design activates prior knowledge. This might involve revisiting familiar concepts through visual aids (e.g., a history lesson timeline or a science diagram) to create cognitive links to new material.
3. Demonstration: Abstract ideas become concrete when demonstrated clearly. Designers should illustrate key processes using multiple examples and contexts, showing – not just telling – learners what to do and how to do it.
4. Application: Learners must be allowed to apply new knowledge through practical, guided tasks. This active practice helps build confidence and identify areas that need further development.
5. Integration: Finally, knowledge must be incorporated into the learner's context. This can be assessed through reflective tasks, simulations, or real-life decision-making exercises that prompt learners to apply what they've learned in a meaningful way.

Example

While teaching an Environmental Science unit to his fourth form class, Mr. Sisnett, applied Merrill's First Principles of Instruction to create a more authentic, engaging, and problem-centered learning experience. Drawing inspiration from his coastal community, he anchored the unit around the current and growing issue of sargassum seaweed accumulation along the island's beaches – an environmental and economic concern familiar to many of his students as well as the country at large.

The unit began with a problem-centered task. Mr. Sisnett presented a multimedia case study detailing the impact of sargassum seaweed on marine ecosystems, tourism, and the fishing industry in Barbados. Students were tasked with developing practical solutions for managing or repurposing the seaweed. As this was a current matter, the students responded earnestly, with interest and curiosity.

To activate prior knowledge, Mr. Sisnett facilitated a class discussion where the students shared personal experiences with the seaweed - from beach outings disrupted by the smell and algae buildup - to family members employed in the hospitality industry, being laid off as bookings dropped at the various hotels and vacation areas. The conversations helped students build conceptual bridges between their lived experiences and the content to be learned.

In the demonstration phase, Mr. Sisnett introduced the students to many of the real-world solutions to the seaweed problem. This included satellite footage showing sargassum's transatlantic journey, news clips of regional and local clean-up efforts, and case studies of Caribbean countries converting the algae into fertilizer or biofuel. By showcasing multiple responses in different contexts, Mr. Sisnett helped students visualize the upscaling of their ideas from theory to action.

For the application phase, students worked in small teams to design their own sustainability initiatives involving the seaweed. Some groups proposed eco-enterprises that produced fertilizer from dried sargassum; others designed public awareness campaigns to educate tourists and locals alike on the issue. Each team presented their solution to the class, applying content knowledge to a real problem while honing their collaboration and critical thinking skills.

To ensure integration, Mr. Sisnett, asked students to write reflections on how they could address environmental issues within their own communities. Several students initiated small projects, including composting trials and social media campaigns. Others drafted letters to local environmental agencies proposing their ideas. These culminating tasks encouraged students to extend their learning beyond the classroom, demonstrating their ability to transfer and contextualize knowledge.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Merrill's Four-Phase Cycle of Instruction

Along with Merrill's outlined five foundational principles in Instructional Design, he proposed a four-phase instructional cycle. According to Merrill, each period of instruction must utilize these four phases to provide the learner with a meaningful, engaging, and practical experience. This cycle, therefore, not only reinforces the planning phase but operationalizes the concepts structuring the planning phase in a real-world, concrete manner.

These four phases are:

Activation: During this period of instruction, the instructor activates prior learning. This may occur through sensory cues or aids, or actions taken by the learner or instructor that activate recall of prior schemas.

Demonstration: In this phase, the instructor introduces new knowledge and demonstrates its application through modeling, examples, and multimedia representations. The focus is on illustrating tasks in context – moving beyond simple telling and showing. Demonstrations can be tailored to meet learners' readiness levels by offering multiple formats or allowing learners to choose when and how to access examples (American College of Education, 2025; Bean, 2014).

Application

Learners must now actively apply new information to complete tasks, solve problems, or engage in role-playing scenarios. Application helps solidify understanding through practice and feedback. According to Moodley et al. (2022), engagement in this phase is particularly crucial in digital learning environments, where autonomous problem-solving can enhance learner agency and retention.

Integration

The final phase emphasizes the transfer of knowledge to learners' real-world environments. Here, learners are encouraged to reflect, personalize, and demonstrate how the new knowledge can be applied in their own lives. This may involve completing authentic assessments, making predictions, or solving realistic problems relevant to their field or experience. (Heaster-Ekholm, 2021).

Example

While developing a blended learning module for a Form 4 Social Studies class, I decided to structure the lesson using Merrill's Four-Phase Instructional Cycle – Activation, Demonstration, Application, and Integration. My goal was to help students understand how government policies impact youth employment, a topic that often feels distant and abstract to learners at that level.

In the activation phase, I opened the session with a targeted but straightforward question: "How many of you know someone your age who has a part-time job or wants one?" Most of the hands went up. I then asked about what challenges they thought young people face when trying to get work. Their responses – no experience, limited opportunities, low pay – helped uncover their existing mental models. This discussion anchored the lesson in prior knowledge and experience, making it immediately relevant.

During the demonstration phase, I presented two brief case studies. One featured a Barbadian government youth employment initiative, and the other showcased a private-sector internship program in Jamaica. Both included videos and infographics outlining objectives, benefits, and challenges. Students were able to observe how the policies worked in real-life situations and compare their features. By alternating between local and regional examples, I aimed to make the content both relatable and more broadly applicable.

In the application phase, I grouped students and gave each team a fictional community profile with its own unique economic and social challenges. Their task was to design a youth employment policy tailored to their assigned community. They had to outline eligibility criteria, funding sources, implementation steps, and possible outcomes. Many of the students applied the concepts they'd seen to solve real-world problems and included the incentives for businesses or skill-building workshops that mirrored the examples from earlier.

In the integration phase, students reflected on how their proposed policies could affect their own lives. They shared who in their immediate social circle may benefit, and some began to question why similar programs weren't already in place. More than one student suggested starting a petition to introduce a youth internship program at the school. That moment confirmed that students were internalizing the unit content and considering real-life applications.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Project Management Models

Agile

Agile is a flexible, iterative framework designed to adapt to the changing needs and prioritize continuous improvement. Instructional design emphasizes collaboration, feedback loops, and responsive planning.

Key Features:

- Embraces change during the project lifecycle.
- Works in short development cycles or "sprints"

- Encourages ongoing collaboration and stakeholder input.
- Supports incremental builds and evolving content.

Heaster-Ekholm (2023) notes that the Agile methods align more with modern digital learning environments, especially where learner needs are dynamic and culturally diverse.

Example

In the online video example provided by the American College of Education, David applied Agile principles to iterate and refine training content quickly, adapting to employee feedback and industry shifts.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2077998/external_tools/118428

Heaster-Ekholm, K.L. (2023). Popular Instructional design models. Their theoretical roots and cultural considerations. *International Journal of Instructional Technology and Educational Studies*, 12(3), 45-59

SAM | Successive Approximation Model

SAM is an Agile-aligned instructional design model that emphasizes prototyping, collaboration, and revision through three phases: Preparation, Iterative design, and Iterative Development. Bean (2014) highlights how SAM encourages real-world responsiveness and breaks away from rigid ID traditions.

Phases:

1. Preparation: Information gathering and goal setting.
2. Iterative design: Rough drafts/prototypes reviewed and improved.
3. Iterative development: Refinement into a full solution using cycles of feedback.

Example

David builds a virtual onboarding course using SAM's iterative process. Each successive stakeholder session leads to a refined prototype, enhancing the course over time.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Bean, C. (2014). *The accidental instructional designer: Learning design for the digital age.* ASTD Press.

SAMR | Substitution, Augmentation, Modification, and Redefinition

SAMR is a technology integration model that helps evaluate how tech transforms learning practices. SAMR is not a project management model in the strictest terms, but it does complement models like SAM by showing how deeply technology reshapes instruction. Moodley et al. (2022) note that tech integration can enrich learner engagement and personalization in digital environments.

The levels of SAMR are:

- Substitution: Technology replaces a tool; there is no change to pedagogy.
- Augmentation: A task is enhanced by technology.
- Modification: A task is redesigned using technology
- Redefinition: New tasks that are only possible through technology.

Example

David transformed a static welcome video into an interactive virtual tour. This is an example of Redefinition.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Moodley, K.,Singh, R.J., & Naidoo, G. (2022). Exploring the education experience in online learning: A South African perspective. *Journal of Educational Technology Systems, 51(1), 55-72.*

Waterfall

The Waterfall model is a linear, sequential approach to project management. Each phase must be completed before moving on to the next. This method is most effective when goals are stable and clearly defined from the outset. Heaster-Ekholm (2023) notes that while the Waterfall approach can suit compliance-heavy or content-stable environments, it often struggles in rapidly evolving learning ecosystems.

The Waterfall model:

- Emphasizes upfront planning.
- Offers structured clarity and documentation.
- Less flexible; limited responsiveness to change

Example

David initially considers Waterfall but rejects it due to the project's dynamic nature and the need for flexibility.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Heaster-Ekholm, K. L. (2023). Popular instructional design models: Their theoretical roots and cultural considerations. *International Journal of Instructional Technology and Educational Studies,* 12(2), 45-49

ADDIE | Analysis, Design, Development, Implementation, and Evaluation

ADDIE is a classic waterfall-aligned instructional model. It organizes instructional design into five systematic phases, often executed linearly.

Phases

1. Analysis – Understand needs and audience
2. Design – Plan instructional goals, content, and strategy
3. Development – Create instructional materials
4. Implementation – Deliver the course or program
5. Evaluation – Measure effectiveness and revise

Example

Paul has been tasked with implementing a new educational management information system in his district. Using computers to measure everyday school activity is a new concept to his district, and Paul knows he will face significant resistance to the shifting paradigm. He chooses the ADDIE instructional model to guide his implementation and sets about a needs assessment of the school district. After analyzing the district's needs, he then designs an EMIS tailored to the needs he ascertained during the initial evaluation. At this point, he also plans the rollout of the application. He then develops supporting documentation for the application and proceeds to implement the rollout of the EMIS. After a predetermined length of time, Paul canvases his district to gather data on the application's effectiveness and makes the necessary revisions.

Reference(s)

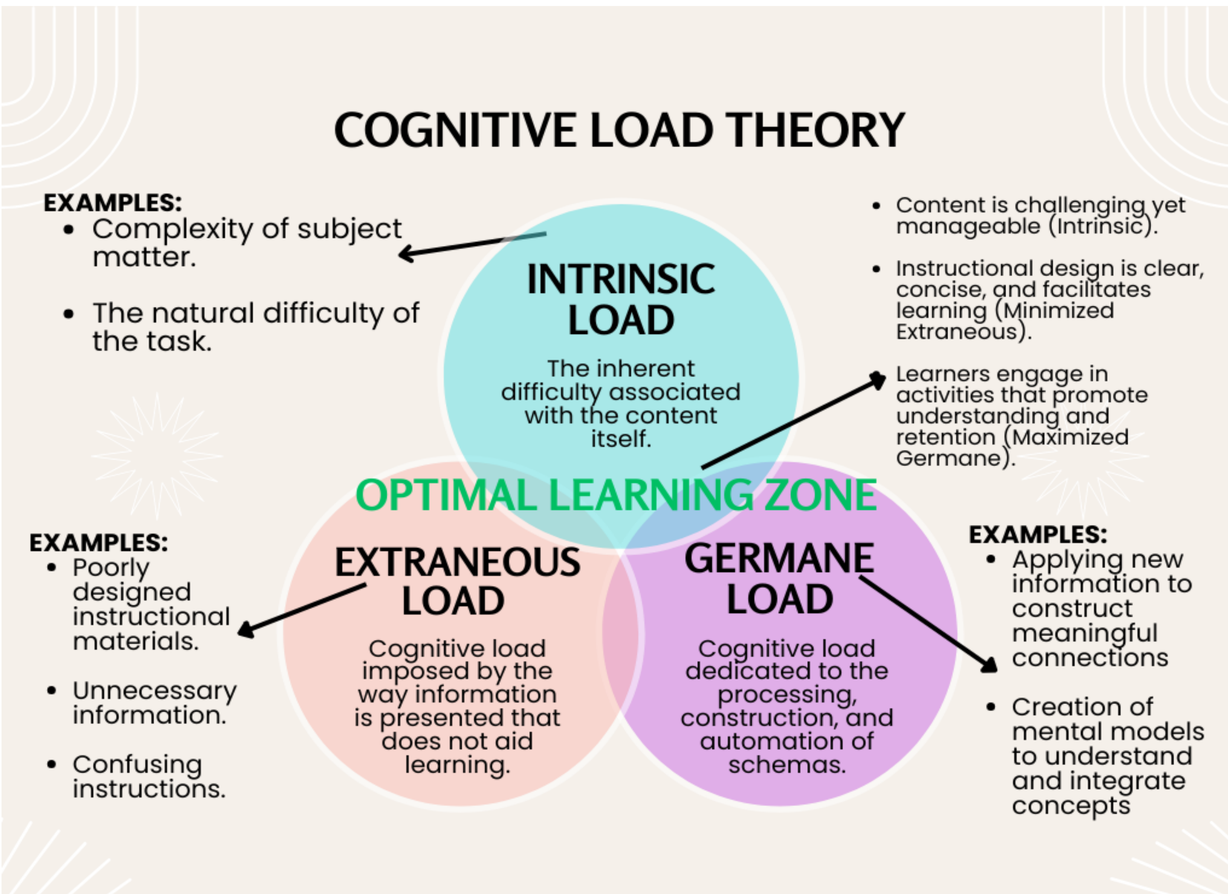
American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 2* Part 4 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Cognitive Load

Module 3

Cognitive Load Theory

Cognitive load theory provides a framework for understanding the mental processes involved in learning and the limitations of our working memory. Clark and Mayer (2024) define learning as a change in knowledge caused by experience. Cognitive load theory builds on this by examining how our brains process, store, and manage information during learning.



At its core, the theory recognizes that our working memory has limited capacity. When these limits are exceeded, learning becomes ineffective. The theory identifies three distinct types of cognitive load:

Intrinsic load represents the inherent complexity of the material being learned. This load varies based on the learner's prior knowledge and the complexity of the content itself. Effective instruction carefully manages this essential processing to enhance learning (Clark & Mayer, 2024).

Extraneous load is the unnecessary mental effort caused by poor instructional design. This includes confusing layouts, irrelevant information, or unnecessarily complex explanations. As Clark and Mayer (2024) emphasize, well-designed courses minimize extraneous processing through thoughtful design strategies.

Germane load is the productive mental effort that contributes to deeper understanding. This includes activities that help learners construct schemas and apply knowledge. Courses should intentionally foster this generative processing to maximize learning and create lasting memories (Clark & Mayer, 2024).

In simple terms, cognitive load can be understood as the total mental effort required by a learner's brain when processing new information. Instructional designers must carefully balance these three types of cognitive load—reducing extraneous load, managing intrinsic load, and optimizing germane load—to create effective learning experiences.

Example

Cognitive load theory would apply during any instructional design project. If instructors were designing online professional development for training on new gradebook software at a school, they would minimize unnecessary cognitive burdens because learners have limited working memory capacity (Sweller, 2020). The designer would manage the intrinsic load by referring to what the staff currently uses for a gradebook. The course would refer to terms and names that the staff knows and break each component into smaller bits of information. The designer would minimize extraneous load by using a variety of learning experiences. The necessary content would be concise, include well-organized images, highlight important steps, and show each step necessary. Staff could easily follow the steps needed to learn the new gradebook. The training would maximize germane load by asking staff to work in groups and practice what they are learning during the training. The professional development would include scenarios asking the staff to solve problems using the new gradebook.

Reference(s)

Clark, R. C., & Mayer, R. E. (2024). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. John Wiley & Sons, Inc.

Sweller, J. (2020). Cognitive load theory and educational technology. *Educational Technology Research and Development*, *68*(1), 116.

Managing Cognitive Load

Multimedia Principle

The Multimedia principle posits that learners learn more deeply from words and graphics combined than from words alone because dual channels (visual and auditory) are being engaged simultaneously. By distributing information across channels, intrinsic and extraneous loads are managed, freeing capacity for germane processing.

Example

Dr. Elena Torres was tasked with converting a university lab-safety handbook into an online orientation. Her first draft uploaded the 20-page PDF and an accompanying audio recording of her reading aloud. Trainees reported that they nodded off during the monotone narration and still struggled to recall which chemicals required which protective gear.

Determined to improve comprehension, Dr. Torres applied the Multimedia Principle. She made the following changes:

1. **Concise Narration & Graphics:**
   Instead of reading every line, she recorded short conversational voice-overs explaining one safety rule at a time. Simultaneously, simple animated icons (a glove for “wear gloves,” goggles for “wear eye protection”) appeared on the screen exactly as she spoke.

2. **Dual-Channel Engagement:**
   By pairing spoken cues (“Always don your safety goggles before handling acids”) with relevant visuals, trainees could process the rule through both auditory and visual channels.

3. **Minimal On-Screen Text**:
   Key phrases like “Safety goggles = Must” were shown in large, bold text only when they reinforced a graphic, rather than placing whole paragraphs on the screen.

After these changes, new lab assistants reported:

“Seeing the goggles pop up while hearing Dr. Torres explain why they’re essential made the rule stick. I remember to grab mine before starting any experiment!”

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Clark, R.C., & Mayer, R.E. (2023). Chapter 2: How People Learn from e-Courses. In *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (2nd ed., pp. 19 – 37). Wiley.

Signaling

Signaling (cueing) leverages visual or auditory markers – such as arrows, highlighting, or changes in font – to draw attention to essential material. By guiding perceptual processes, signaling minimizes search-related extraneous load and helps learners allocate working memory to meaningful content (America College of Education, 2025).

Example

When Sara Browne was developing an online tutorial on Agile project management for new team leads, her vision featured slides densely packed with bullet points and no visual cues. Learners frequently messaged her and said:

"I keep reading the same slide, but I can't tell which step we're discussing."

Recognizing the problem, Sara applied the Signaling Principle to direct attention:

1. Visual Callouts on Slides
    - For each process step (e.g., "Sprint Planning" or "Daily Response"), she added a bold colored box around the corresponding bullet as she narrated. This immediate highlight showed learners exactly which point was under discussion, eliminating guesswork.
2. Animated Arrows in Diagrams
    - In her Kanban-board graphic, small animated arrows guided viewers' eyes from "To Do" to "In Progress" to "Done" in sync with her voiceover. Seeing that movement reinforced the flow of tasks, without requiring learners to scan the entire chart.
3. Sequential Numbering and Emphasis
    - Complex lists were broken into numbered steps, with the current step enlarged or underlined. As Sara said, "Now, let's discuss Step 3: Hold the Review Meeting," the number "3" pulsed subtly to. Reinforce the connection between audio and text.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Clark, R.C., & Mayer, R.E. (2023). Chapter 2: How People Learn from e-Courses. In *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (2nd ed., pp. 19 – 37). Wiley.

Chunking

Chunking, or segmenting, involves breaking complex instructional content into smaller, self-contained units that learners control one at a time. By aligning each segment with a discrete learning objective, this approach respects working-memory limits and prevents learners from being overwhelmed by high-element interactivity (Clark & Mayer, 2023). Empirical studies show that when a continuous multimedia presentation is divided into learner-paced clips, retention and transfer improve markedly, as learners can process one “chunk” fully before progressing (Clark & Mayer, 2023). In online courses, chunking is often implemented by placing a clear “Next” button at the end of each segment and embedding formative checks immediately afterward – practices shown to reduce perceived effort and boost comprehension (American College of Education, 2025)

Example

Harrison College rolled out a 75-minute online revision session for the fifth-form students covering Caribbean History, English Literature and Mathematics all in one continuous video. By the second week, students reported feeling inundated and exhausted. Mr. Simpson, the Head of the Social Studies Department, restructured the revision using chunking:

1. Segment 1 – Emancipation Overview (12 minutes):
    - A concise animated presentation of key dates and figures, ending with a “Recall Check” button.
2. Segment 2 – Literature Themes (10 minutes)
    - A narrated slide deck on themes in “Heart of Darkness,” with each theme introduced on an individual slide and a quick reflection prompt.
3. Segment 3 – Mathematics Refresher (8 minutes):
    - A screencast solving two past-paper problems step by step, followed by a “Try It Yourself” link.
4. Segment 4 – Quick Quiz (5 minutes)
    - A short Google Forms quiz with three questions – one per subject – to reinforce learning before the next live session
    - Between each segment, students clicked a clear “Proceed to Next Topic” button, allowing them time to review notes or ask questions in the chat.

Chunking this once-overwhelming revision into bite-sized modules transformed the online session into a focused, confidence-building experience for its fifth-formers.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Clark, R.C., & Mayer, R.E. (2023). Chapter 2: How People Learn from e-Courses. In *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (2nd ed., pp. 19 – 37). Wiley.

Visual Cognitive Load/C-R-A-P

Visual cognitive load refers to the mental effort required to perceive and make sense of visual information. Poor visual design increases extraneous load, forcing learners to expend cognitive resources on deciphering layout rather than learning content. The C.R.A.P. framework – Contrast, Repetition, Alignment, and Proximity – offers concrete guidelines to minimize this load.

- **Contrast**
  Use a clear difference in color, size, or weight to distinguish headings from body text and highlight key elements. High contrast directs learners' attention immediately to important information, reducing search time and perceptual effort (American College of Education, 2025).

- **Repetition**
  Apply consistent visual styles—fonts, icons, and buttons—across pages. When learners recognize familiar patterns, they expend less effort reorienting themselves, thereby reducing extraneous processing (American College of Education, 2025).

- **Alignment**
  Align related items along shared axes (e.g., left-justify bullet lists, center captions under images). Proper alignment leverages Gestalt principles, enabling learners to perceive grouped elements as single units, thereby simplifying visual parsing (Clark & Mayer, 2023).
- **Proximity**

  Place related text and graphics close to each other. By minimizing the distance between explanatory text and its corresponding image or chart, split-attention effects are reduced, freeing working-memory capacity for genuine schema construction (American College of Education, 2025; Caskurlu et al., 2023).

  When applied systematically, C.R.A.P. transforms cluttered interfaces into clean, intuitive designs that direct learners' focus to the content itself, thereby reducing extraneous load and enhancing the overall quality of online courses.

Example

At Oistins High School, Mr. Allen's 11th grade history class groaned when he displayed a slide on the French Revolution. The screen showed:

- A pale-yellow background with white text, all in a small font size,
- A small, unlabeled map in the top corner,
- Bullet points crammed together with no visual hierarchy,
- Decorative flourishes (stock images of guillotines) bordering the slide.

By the end of the lesson, the students whispered:

"I can't figure out what's more important, my eyes or learning. My eyes, when they are focused. Keep darting around the Slide instead of learning about the Revolution."

Realizing the slide's poor design was imposing excessive visual cognitive load (students' attention split between content and layout), Mr. Allen applied C.R.A.P. principles:

1. **Contrast**
   He switched to a white background with dark blue headings and bold red for key dates ("1789", "1793"), instantly drawing students' eyes to the pivotal moments of the Revolution (American College of Education, 2025).

2. **Repetition**
   Each slide adopted the same header style and icon set (a stylized tricolor flag for "Political Causes," a wheat sheaf for "Economic Causes"). Hence, students no longer had to relearn visual cues on every slide (American College of Education, 2025).

3. **Alignment**
   Text blocks were left-justified and aligned with the map, centered directly beneath the "Geography" heading, leveraging Gestalt grouping so that learners processed related elements as a single unit rather than as scattered items (Clark & Mayer, 2023).

4. **Proximity**
   Explanatory labels for the map's regions were placed immediately adjacent to their corresponding areas, eliminating split attention and allowing students to integrate visual and verbal information without requiring extra eye movements (Caskurlu et al., 2023).

After the redesign, student feedback was unanimous:

"Mr. Allen's slides are so clear now – everything is where it belongs, and I can focus on understanding why those events mattered."

By systematically applying Contrast, Repetition, Alignment, and Proximity, Mr. Allen transformed a visually overwhelming slide into an intuitive and cognitively efficient learning tool for his high school students.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Caskurlu, S., et al. (2023). *Cognitive Load and Online Course Quality: Insights From Instructional Designers in Higher Education Context.* Journal of Educational Technology, 10(2), 45 – 62.

Clark, R.C., & Mayer, R.E. (2023). Chapter 2: How People Learn from e-Courses. In *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (2nd ed., pp. 19 – 37). Wiley.

Strategies for Student Learning

Scaffolding

Scaffolding provides learners with temporary supports, such as worked examples, guiding questions, or step-by-step templates, that are gradually withdrawn as competence grows. By structuring initial guidance around core tasks, scaffolding reduces extraneous load, allowing learners to focus cognitive resources on understanding key principles, and then transitions that effort into germane processing as supports fade (American College of Education, 2025).

Empirical and practitioner reports highlight its effectiveness: Caskurlu et al. (2023) note that modules incorporating worked examples with progressive removal of steps yielded higher learner satisfaction and deeper problem-solving skills. Likewise, the CLT and Online Learning transcript describes how early module templates guide novices through complex procedures – but by mid-course, learners apply those procedures independently, indicating successful schema construction (American College of Education, 2025).

In online environments, effective scaffolding might include:

- Worked-Example Sequences: Present full solutions first, then partial solutions, then problems alone.
- Prompted Reflection: Frame questions that lead learners to articulate reasoning before attempting tasks.
- Adaptive Hints: Offer context-sensitive hints that learners can request, rather than fixed pop-ups.

By aligning support with learners' evolving expertise, scaffolding both manages cognitive load and fosters the transition from guided practice to autonomous mastery.

Example

When Ms. Patel introduced first-year college students to writing formal lab reports, she first provided a fully worked example – a completed report annotated with comments explaining each section's purpose and structure. As students practiced, she next offered a template where they filled in the data and conclusions but left the introductions and discussions blank. By the third assignment, only an outline remained, and students drafted complete reports independently.

Through gradually withdrawing supports, from a complete example to an outline, Ms. Patel's scaffolding reduced extraneous processing and channeled effort into building robust writing schemas, ensuring that students transitioned smoothly from guided practice to autonomy (American College of Education, 2025).

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 1 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Caskurlu, S., et al. (2023). *Cognitive Load and Online Course Quality: Insights From Instructional Designers in Higher Education Context.* Journal of Educational Technology, 10(2), 45 – 62.

Levels of Challenge

Levels of Challenge refer to calibrating task difficulty so that learners encounter material that is neither too simple (leading to boredom and under-engagement) nor too complex (causing overload and frustration). Optimal challenge aligns with learners' existing schemas, promoting germane load by engaging them in effortful processing without exceeding working-memory capacity (Caskurlu et al., 2023). Modern pedagogical thought emphasizes using pre-assessments to gauge prior knowledge and then sequencing activities from guided practice to independent tasks, ensuring each new challenge builds on mastered skills (American College of Education, 2025). When levels of challenge are well-matched, learners have an experience that maximizes motivation, deepens schema construction, and enhances transfer.

Example

When Mrs. Clarke introduced a new online module on quadratic equations for her fourth-form students, she first administered a brief diagnostic quiz to assess each learner's algebra readiness. Based on the results, she then provided:

- Level 1 Problems: Simple "plug-in" exercises requiring direct substitution into the quadratic formula.
- Level 2 Problems: Tasks combining factorization with formula use (medium complexity).
- Level 3 Problems: Real-World scenarios – e.g., optimizing areas under a parabola – with minimal scaffolding.

Students chose the set matching their comfort level. As they demonstrated mastery (by scoring 80% or more on quizzes), they were prompted to advance to the next tier. By calibrating task difficulty to each learner's schema and allowing self-paced progression, Mrs. Clarke ensured that each student experienced the optimal level of challenge, strengthening germane processing without risking overload or boredom. (American College of Education, 2025; Caskurlu et al., 2023).

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 1 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Caskurlu, S., et al. (2023). *Cognitive Load and Online Course Quality: Insights From Instructional Designers in Higher Education Context.* Journal of Educational Technology, 10(2), 45 – 62.

Active Learning

Active learning engages the learner in tasks, such as problem-solving, discussion, or case analysis, that require them to construct and apply knowledge rather than passively receive information. By involving the learner in meaningful activities, active learning channels cognitive resources into germane processing, strengthening schema formation and transfer (Caskurlu et al., 2023).

Practitioner reports highlight that embedding scenario-based exercises, peer collaboration, and low-stakes polls increases engagement and comprehension (American College of Education, 2025). Courses with regular interactive checkpoints, such as reflective prompts or group debates, show higher learner satisfaction and deeper understanding compared to lecture-only formats (American College of Education, 2025)

Example

In Ms. Browne's online mathematics lesson for Class 2 students at St. Michael's Primary, she paused her explanation of fractions and presented a real-world scenario. "Imagine that you are preparing sorrel juice for the Christmas party. You have eight cups of juice, and you want to share it equally among four friends."

She then divided the class into small "family groups" in breakout rooms. Each group used virtual manipulatives to model the juice portions, discussed how to represent the division as a fraction, and decided on a fair way to measure each share. After 10 minutes, groups posted their solutions in the shared chat and explained their reasoning to the whole class.

One pupil reflected:

"Working with my group to split the juice made fractions make sense. I could see why we needed to divide and even showed my mum how we did it!"

By involving young learners in a relatable, hands-on problem and encouraging peer discussion, Ms. Browne shifted the focus from passive listening to active problem solving, maximizing germane cognitive load, and helping students internalize fraction concepts. (Caskerlu et al., 2023) American College of Education, 2025)

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 2 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 3 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

Caskurlu, S., et al. (2023). *Cognitive Load and Online Course Quality: Insights From Instructional Designers in Higher Education Context.* Journal of Educational Technology, 10(2), 45 – 62.

Problem-Solving Tasks

Problem-solving tasks engage learners in applying concepts to novel, realistic scenarios, thereby directing cognitive resources toward germane processing and schema construction (Caskurlu et al., 2023). By confronting authentic challenges rather than memorizing facts, learners must retrieve relevant knowledge, plan solutions, and evaluate outcomes, all activities that deepen understanding and promote transfer (American College of Education, 2025).

However, poorly constructed problem-solving can impose excessive intrinsic load if the task complexity exceeds the learners' current schemas. Modern pedagogical theory emphasizes the value of fading guidance, initially providing worked examples or guiding questions and gradually withdrawing support as learners gain competence (American College of Education, 2025). When well-designed, problem-solving tasks not only bolster motivation through meaningful engagement but also solidify long-term retention by embedding new information within practical contexts (American College of Education, 2025).

Example

This emphasized the importance of the apprenticeship system. Both my father and I had the benefit of undergoing the apprenticeship system in two very different disciplines but with the same outcomes. My father was a career mechanic and often recounted how he first really learned the trade. He was placed with an older and more experienced mechanic, who showed him how to perform his duties in the most efficient and practical way. For example, he was shown how to change drum brakes on a vehicle. At first the older gentleman dis the job while he watched (First worked example). After watching a few times, my father was allowed to work on some of the vehicles' brakes, while the older gentleman observed, offering advice and help when needed. Eventually, he withdrew his presence altogether, allowing my father to work unaided.

When I first became a teacher, I was placed under the guidance of an older teacher. She patiently showed me how to approach my lessons, from the planning stage to the execution stage, and what to do when the lessons went suddenly sideways! Everything, from classroom management to class registers, she showed me. I didn't recognize when she started to withdraw her assistance until one day I realized that I no longer saw her as often. When I sought her out, she just smiled and informed me that I had achieved all that she wanted me to achieve and had gained confidence in my execution. She was no longer needed. While the theory in teacher college provided a nice foundation and introduction to the art of teaching, I can confidently say that I learned more about teaching by being her apprentice.

Reference(s)

American College of Education. (2025). *TECH5203 Fundamentals of Learning Design and Technology: Module 3* Part 1 presentation. Canvas. https://ace.instructure.com/courses/2109810/external_tools/118428

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Caskurlu, S., et al. (2023). *Cognitive Load and Online Course Quality: Insights From Instructional Designers in Higher Education Context.* Journal of Educational Technology, 10(2), 45 – 62.

Knowing the Learner

Module 4

Learner and Context Analysis

Dick and Carey Model

The Dick and Carey model, also known as the Systems Approach Model, represents a comprehensive and systematic framework for instructional design first introduced in 1978 in "The Systematic Design of Instruction" (Instructional Designers of Penn State, 2018). This influential model stands apart from earlier linear approaches by emphasizing the interconnections between all design elements and incorporating crucial feedback loops throughout the process.

This model's iterative nature makes it particularly effective—instructional designers can continuously refine and modify components based on evaluation data, ensuring the entire instructional system evolves to better meet learner needs. Rather than viewing instruction as simply delivering content, the Dick and Carey model conceptualizes instruction as a complete system aimed at helping learners achieve specific outcomes (Dick & Carey, 2015).

Steps	Definition/Description
1. Identify Instructional Goals	Determine what learners should be able to do after completing instruction by analyzing needs, examining existing goals, or conducting needs assessments.
2. Conduct Instructional Analysis	Break down the instructional goal into specific component skills and knowledge required for successful performance.
3. Analyze Learners and Contexts	Identify characteristics of target learners, including prior knowledge, skills, attitudes, and the learning environment where skills will be used.
4. Write Performance Objectives	Specify exactly what learners can do, under what conditions, and to what standard after instruction.
5. Develop Assessment Instruments	Create assessments directly tied to performance objectives that measure learner achievement of each objective.
6. Develop Instructional Strategy	Plan the specific instructional activities, including pre-instructional activities, content presentation, learner participation, assessment, and follow-through.
7. Develop and Select Instructional Materials	Create or select instructional materials based on the instructional strategy, including instructor guides, student materials, and media.
8. Design and Conduct Formative Evaluation	Test instructional materials with representative learners to identify areas for improvement before full implementation.
9. Revise Instruction	Use data from formative evaluation to improve the effectiveness of instruction through targeted revisions.

This comprehensive understanding of learners, including their academic motivation, learning preferences, and contextual needs, enables instructional designers to create targeted, effective learning experiences that align with performance objectives while accommodating the specific characteristics of the learner population.

Example

As an instructional designer at a mid-sized university, I was tasked with developing a new online graduate course in educational leadership. Rather than diving straight into content creation, I employed the Dick and Carey model to ensure a systematic approach.

I met with the subject matter expert to identify the core instructional goal: preparing students to develop data-driven school improvement plans. Through careful analysis, we determined the essential skills students would need and examined the unique characteristics of our working professional student population.

With established, clear performance objectives, I developed authentic assessments that measure students' ability to analyze school data and create implementation plans. These assessments directly informed my instructional strategy, which balanced theoretical foundations with practical applications relevant to the students' professional contexts.

As I developed the course materials, I maintained focus on the interconnected nature of the Dick and Carey model. When initial testing with a small student group revealed confusion around data analysis procedures, I quickly revised those specific modules while ensuring the changes aligned with the established objectives and assessments.

This systematic, iterative approach allowed me to create a cohesive learning experience that addressed the specific needs of the graduate students while maintaining rigorous academic standards—demonstrating the practical value of the Dick and Carey model in higher education instructional design.

Reference(s)

Dick, W., & Carey, L. (2015). *The systematic design of instruction* (8th ed.). Pearson.

Instructional Designers of Penn State. (2018). Dick and Carey model of design. *Pressbooks*. https://psu.pb.unizin.org/idhandbook/chapter/dick-carey/

Sociocultural Factors

Sociocultural Theory

Sociocultural theory, originally articulated by Lev Vygotsky, posits that cognition develops through social interaction and within a cultural context. Learning is inherently **socially mediated**, occurring when learners engage with more knowledgeable peers or mentors and employ cultural tools such as language and symbols (American College of Education, 2005, *Sociocultural Factors*). A central concept is the **Zone of Proximal Development** (ZPD), where learners perform tasks with guidance that they could not complete independently; scaffolding within the ZPD accelerates skill acquisition and fosters autonomy (American College of Education, 2025, *The Learner*).

Instructional designers applying sociocultural principles should conduct **cultural and community analyses** during needs assessment, identifying learners' backgrounds, values, and prior experiences. This ensures that content, examples, and activities resonate with learners' lived realities (Gurjar & Bai, 2023). Collaborative learning structures—such as peer tutoring, group problem solving, and discussion forums—leverage social interaction to co-construct knowledge and internalize concepts (Gunawardena, 2020). Designers must also guard against "cultural neutrality." As Gurjar and Bai (2023) argue, courses that ignore cultural diversity risk disengaging marginalized learners; instead, **culturally responsive design** integrates diverse perspectives and allows learners to contribute their own cultural knowledge.

Recent empirical studies reinforce the impact of sociocultural design on online learning. For example, **Allami, Najari, and Tajeddin (2025)** found that integrating culturally relevant prompts into writing tasks significantly improved EFL learners' coherence and vocabulary use, highlighting the importance of situating instruction within learners' sociocultural contexts. By embedding local artifacts, community practices, and collaborative supports, instructional designers create learning environments that are both inclusive and effective.

Tailoring instruction in this way not only respects cultural identity but also mitigates potential barriers, promoting engagement and retention across diverse learner populations. (American College of Education, 2025). Sociocultural Theory, therefore, asks Instructional Designers to create:

- **Community-Embedded Content.** Incorporate real-world symbols and practices familiar to learners (e.g., local signage, family rituals) to activate background knowledge and enhance relevance.
- **Differentiated Supports.** Design scaffolds, such as glossaries of culturally specific terms or varied representation modes, to address disparities in prior knowledge linked to socioeconomic factors.
- **Collaborative Learning Structures.** Create opportunities for peer interaction and mentorship, leveraging more knowledgeable peers to guide novices through the Zone of Proximal Development.

Example

In Mrs. Clarke's Infants' A classroom at a Barbadian Primary school, the walls are decorated not only with alphabet charts, but also with familiar local symbols: the logo if the Barbados Light and Power company on students' utility bills, posters from the annual crop Over Festival, and colorful advertisements for the Oistins Friday Night Fish Fry. One morning, Mrs. Clarke holds up a torn piece of an old bill featuring the power company's logo and asks, "Who has seen this at home?"

Several children immediately recognize the symbol and explain how their families receive similar bills. Using that shared community experience, Mrs. Clarke introduces the letter "P" for "Power". As students trace the "P" in their notebooks, she encourages them to recall how the electricity meter clicks when the power is on, connecting the abstract letter to a concrete sociocultural artifact.

Next, she pairs students of differing familiarity, some whose families handle household accounts and others who don't, with the question: "How does the electricity help our community?" As they discuss, more knowledgeable peers scaffold explanations for classmates less familiar with utility concepts, guiding them through the Zone of Proximal Development.

By embedding environmental print and community practices into the lesson, Mrs. Clarke honors learners' backgrounds, activates their prior knowledge, and fosters meaningful engagement, exemplifying sociocultural theory in action. (American College of Education, 2025).

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Universal Design for Learning

Universal Design for Learning is a **proactive framework** that addresses learner variability by embedding flexibility into curriculum from the outset (Ewe & Galvin, 2023). UDL's three core principles correspond to neural networks engaged in learning:

1. **Multiple Means of Engagement** (the "why" of learning) – foster motivation by offering choices, relevance, and supportive feedback. For instance, allowing learners to select project topics that align with their interests nurtures intrinsic motivation and persistence (American College of Education, n.d., *Universal Design for Learning*).
2. **Multiple Means of Representation** (the "what" of learning) – present content in varied formats (text, audio, visuals, interactive media) so that learners with diverse perceptual and cognitive strengths can access information (American College of Education, n.d., *Universal Design for Learning*).
3. **Multiple Means of Action and Expression** (the "how" of learning) – permit alternative demonstration of knowledge, such as written reports, oral presentations, or concept maps, accommodating different motor and communication abilities (American College of Education, n.d., *Universal Design for Learning*).

UDL has been shown to improve both **accessibility** and **academic performance**. A meta-analysis by **King-Sears et al. (2023)** reported significant gains in learner achievement when UDL principles were systematically implemented. Similarly, **Almeqdad et al. (2023)** demonstrated that UDL-informed instruction enhances engagement and self-confidence across diverse student populations.

In practice, UDL calls for early identification of potential barriers (e.g., language, sensory differences, prior knowledge gaps) and the incorporation of technology-based and non-technology-based solutions – such as closed captions, adjustable text size, scaffolded graphic organizers, and culturally relevant examples – to overcome them (American College of Education, 2025). This proactive, flexible approach not only improves equity but also supports deeper engagement and retention, making UDL an essential cornerstone for designing compelling, 21st-century learning experiences. However, UDL is fundamentally about **instructional choices**, not just technology (Rogers-Shaw, Carr-Chellman, & Choi, 2018). Designers are encouraged to begin with a few UDL strategies and iteratively refine their approach based on learner feedback and performance data (Cook & Rao, 2018).

By planning for variability and reducing barriers up front, UDL fosters **expert learners**—individuals who are strategic, resourceful, and motivated to direct their own learning (Fan, 2022). By integrating UDL, instructional designers move beyond retrofitting accommodations to designing with all potential learners in mind from the outset. Bastoni et al. further demonstrate that applying UDL principles in professional development contexts enhances instructors' capacity to meet the diverse needs of adult learners by embedding relevance and accessibility into every phase of training. Ultimately, UDL provides a research-grounded roadmap for creating equitable, engaging, and effective learning environments in both physical and virtual classrooms.

Example

In a blended graduate course on instructional design, Dr. Singh notices that students vary widely in how they process complex readings. To address this, he redesigns the unit on cognitive load by applying UDL principles:

- Multiple means of Representation: alongside the textbook chapter, Dr. Singh provides an audio-recorded summary and an infographic that visualizes the key concepts of extraneous, intrinsic, and germane load. These varied formats help students with different learning preferences grasp the material.

- Multiple Means of Action and Expression: For the summative assessment, students choose whether to write a traditional paper, record a short podcast explaining how they might reduce extraneous load in a lesson, or develop a brief slide deck with speaker notes. This flexibility lets each student demonstrate understanding in a mode that matches their strengths.

- Multiple Means of Engagement: To foster motivation, Dr. Singh allows learners to select real-world scenarios that interest them – such as a math lesson, or a workplace safety training module – and apply cognitive load strategies to that context. She also organizes small "focus groups" so peers can support one another and share insights, tapping both intrinsic curiosity and the social motivation of collaborative learning (Fan, 2022).

By proactively embedding these UDL principles, Dr. Singh ensured that all students could access, interact with and remain motivated by the content.

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