

LEARNING DESIGN TOOLKIT (M.ED. IN IDET)

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Table of Contents

Learning Theories	3
Behaviorism.....	3
Cognitivism.....	3
Constructivism.....	4
Connectivism.....	5
Pedagogy vs. Andragogy	5
TPACK Technological Pedagogical Content Knowledge	6
TAWOK Technology Andragogy Work Content Knowledge.....	6
Learning Process Models.....	7
Kolb's Experiential Learning Theory	7
Gagne's Nine Events of Instruction	8
Continuous Improvement	9
PDSA Cycle Plan Do Study Act Cycle.....	9
Design Models	11
Instructional Design (ID) vs. Learning Experience Design (LXD).....	11
First Principles of Instruction	12
Merrill's Principles of Instruction	12
Merrill's Four-Phase Cycle of Instruction	12
Project Management Models.....	13
Agile.....	13
SAM Successive Approximation Model	14
SAMR Substitution, Augmentation, Modification, and Redefinition	15
Waterfall.....	15
ADDIE Analysis, Design, Development, Implementation, and Evaluation	16
Cognitive Load	18
Cognitive Load Theory	18
Managing Cognitive Load.....	19
Multimedia Principle.....	19
Signaling	20
Chunking.....	21
Visual Cognitive Load/C-R-A-P	21
Strategies for Student Learning.....	22

Scaffolding	22
Levels of Challenge	23
Active Learning	23
Problem-Solving Tasks.....	24
Knowing the Learner.....	25
Learner and Context Analysis	25
Dick and Carey Model	25
Sociocultural Factors.....	26
Sociocultural Theory	26
Universal Design for Learning	27

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 reinforcement. 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)

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Cognitivism

Cognitivism focuses on what humans are thinking while actively learning. Basically, this theory relates to the study of the mind and how it learns. Cognitivism aims to study what learners know and how they learned it (American College of Education). Teaching is presented in an organized way for the learner while also relating concepts to prior knowledge so that learners can be successful. Clark notes that “Learning, instruction, and memory all play vital roles in cognitivism” (Clark, K. 2018). While students are engaged in active learning, cognitivism is

teacher-centered because the learning must be presented in an organized way to achieve the best results.

Example

This theory can be applied by having students utilize a KWL chart where they note what they know, want to know, and learned about a topic. The teacher guides the student through a lesson teaching them about a topic such as the Revolutionary War. This graphic organizer is a great strategy because it takes into consideration the students' prior knowledge as well as shows what the students' learn. It links prior knowledge to new information. Finally, learning can be verified by the student utilizing the "L" column where they note what they have learned. The teacher can check the students' learning to verify if the lesson was a success.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.

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Clark, K. R. (2018). Learning theories: Cognitivism. *Radiologic Technology*, 90(2), 176–179.

<https://research.ebsco.com/c/36ffkw/viewer/pdf/gjava5zkwj>

Constructivism

Constructivism is sometimes called the "theory of knowing" (Kretchmar, J., 2026). At the beginning of the learning there is not structure, no goals, no objectives. The teacher and student act as a team creating learning goals. It does not tell teachers what to teach but acts as more of a guide allowing for endless possibilities in teaching. Kretchmar notes Prioux's emphasis on the necessity of mistakes in learning (Kretchmar, J., 2026). Mistakes are a natural part of the learning process, and an opportunity to enhance learning and create a better understanding of material. This promotes a growth mindset in students. At its core, constructivism allows students to take ownership of their learning, explore what's possible with their learning, reflect on mistakes and learning. With less emphasis on grades and tests students and teachers can work together to create progress and success in learning ((Kretchmar, J., 2026).

Example

This theory can be applied with the use of socratic seminars. The teacher acts as a facilitator giving students a reading related to a specific topic and an open-ended question to start the discussion. Students sit in a circle to professionally and respectfully discuss the question given along with its relation to the reading. A Socratic discussion allows students to learn through questioning, discussion, prior knowledge, and interaction with their peers. Students connect new ideas to prior learning, learn from others, question and examine their own assumptions, create their own understanding, and reflect on and potentially revise their own thinking (Neuschafer, T., 2026).

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
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<https://research.ebsco.com/c/36ffkw/viewer/pdf/qcckgj4xwn>

Connectivism

Connectivism relies on the belief that knowledge is an internal and external process (Corbett). This theory is defined as a networked group effort “where learning is a process of connecting people and information sources” (Corbett, F., Spinello, E. 2020). Within the network there are nodes which can be anything that holds information like people or data. It is also known simply as networked learning. Knowledge is dispersed across the network promoting various connections. This theory has a framework that contains “four foundations for learning: autonomy, connectedness, diversity, and openness” (Corbett, F., Spinello, E. 2020). With these foundations students have freedom and flexibility, promoting self-directed learning. Connectivism promotes diversity, which allows the learner to have the opportunity to connect and share ideas, resources, etc. across the network. With the teacher as a facilitator, students can learn at their own pace and take part in the process in whatever way works best for them. Because there is an active network one person doesn’t hold all the knowledge. Teams or groups can manage knowledge, learning, and decision making (Corbett, F., Spinello, E. 2020).

Example

Massive Open Online Courses (MOOCS) are great examples of the connectivism theory because students don’t learn from one source. MOOCS like ones found through the Coursera website allow learners to be independent with technology and learn across a network. Using technology students take responsibility for their learning and have access to a wide array of knowledge sources. MOOCS like the ones found through Coursera offer learners the opportunity to make connections with information and people, taking their learning further by building a network over time.

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
https://ace.instructure.com/courses/2206330/external_tools/118428
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Pedagogy vs. Andragogy

TPACK / Technological Pedagogical Content Knowledge

The Technological Pedagogical Content Knowledge (TPACK) model focuses on pedagogy, which is primarily concentrated on how children learn. This model consists of three levels: technology knowledge, pedagogical knowledge and content knowledge (American College of Education). Teachers need technology knowledge which consists of knowing how to use the technology. They need pedagogical knowledge which aids in understanding how to teach (Valtonen et al., 2022). Finally, instructors must have content knowledge or know the subject being taught. Simply, the TPACK framework helps teachers utilize technology, teaching methods, and subject knowledge to create meaningful learning experiences for children.

Example

An example of the TPACK model can be understood with an elementary school teacher using the Story Jumper website to have students create and share their own digital stories. The technological knowledge consists of the students learning how to use the Story Jumper website and sharing their stories with each other online. The pedagogical knowledge would be students showing their understanding through the art of storytelling. Finally, the content knowledge comes from the teacher's knowledge of elements of a story as well as knowledge of the writing process. Combined, these three create a meaningful learning experience for the students.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
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TAWOK / Technology Andragogy Work Content Knowledge

The Technological Andragogical Content Knowledge (TAWOK) model focuses on andragogy, which is primarily concentrated on how adults learn and the world of work. Learners are goal oriented. This model is made up of three levels, pedagogy, andragogy, and heutagogy. First, pedagogy focuses on engagement in learning. Second, Andragogy promotes a love of learning. Third, heutagogy is revolves around the value of learning where the student takes ownership of their learning. The TAWOK model provides a framework for adult learners that takes into

consideration specific learning strategies that revolve around work circumstances, the content provided, the technology needed, and the learning strategy being utilized (American College of Education).

Example

An example of the TAWOK model would be teacher training for the IXL online platform. IXL offers teachers a way to monitor student progress, set goals, and much more. This is in line with the TAWOK model as it takes into consideration teachers as goal-oriented learners and how the IXL program impacts their work. Training would activate their prior knowledge as well as guide them in setting goals for teaching, and give them further inspiration for how to use the platform to enhance learning in their classroom.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.

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Learning Process Models

Kolb's Experiential Learning Theory

Kolb's Experiential Learning Theory was created by David A. Kolb and is based on the idea that learning is constant and shaped by our experiences. This framework has 4 stages: 1. Concrete experience, 2. Reflective observation, 3. Abstract conceptualization, and 4. Active experimentation (American College of Education). In the first stage, concrete experience, the student uses their senses and perceptions to start learning. Second, the learner reflects thinking about their feelings and ideas regarding their experience. In the third stage students think critically to form conclusions, theories, insights, etc. about what they have learned. Finally, the student can test their theories and apply what they have learned (Institute for Experiential Learning). Learners can repeat these stages but not necessarily one after the other, but rather revisit one or more steps to deepen learning (Küçükersen, F., Özemir, P., Dinçer, D., Demirebilek, O. 2026).

Example

Kolb's theory of experiential learning applies well to a teacher internship. When I went to university I completed a teacher internship where I got experience practicing teaching middle school students. I created and implemented the lesson plans. Artifacts from my experience were entered into a portfolio along with my evaluations from my mentor teacher. Additionally, I reflected after every lesson and evaluation noting what went well and what I could improve upon or do differently in the future. This experience allowed me take what I had been learning from textbooks at university and directly apply them into a classroom. The experience was so valuable that even after I graduated and started working as a teacher I continued to learn from each teaching experience, each lesson I taught. In this example of my teacher internship all four of Kolb's stages are present making it a quality example of experiential learning.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*. Module one theories of learning. Canvas.
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Institute for Experiential Learning. What is Experiential Learning?. *Institute for Experiential Learning*. <https://experientiallearninginstitute.org/what-is-experiential-learning/>

Küçükersen, F., Özemir, P., Dinçer, D., & Demirbilek, O. (2026). Beyond Kolb: Constructing a design learning cycle for the foundation studio. *Journal of Experiential Education*, 49(1), 158–191. <https://doi.org/10.1177/10538259251362141>

Gagne's Nine Events of Instruction

Gagne's Nine Events of Instruction was created by Robert Gagne who believed that the learning process was made up of specific mental conditions, or stages. These stages start with gaining students' attention. From there the next eight stages are inform students of the objectives, activate prior learning, present the content, provide guidance, practice, provide feedback, assess performance, and enhance retention (American College of Education). Gagne's theory is structured and the stages are listed in sequential order. Each stage is meant to lead to the next one. Every stage is meant to provoke a cognitive response. The purpose of the nine stages is for students to be able to apply their knowledge beyond the classroom (Zhu, P., St.Amant, K. 2010)

Example

Cardio pulmonary resuscitation (CPR) training is an example of how Gage's nine events of instruction are used to teach learners. CPR training is a structured course that intends to teach concepts starting with basic awareness to lifesaving muscle memory. The instructor gains your attention by stating some statistics about emergencies dealing with cardiac arrest. The objective is clearly stated so that the learners know by the end of the session what they will know. The instructor activates prior knowledge by asking students what they already know about

emergency situations. Next, the instructor delivers the content stating the steps to doing CPR. Then, the instructor offers guidance on how to remember all the steps. Afterwards, the students have the opportunity perform CPR on a mannequin and receive feedback from the instructor. Finally, students are assessed and instructor can discuss possible emergency situations to enhance learning. Through this training the learners are then able to apply their learning beyond the classroom.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.

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Zhu, P., & St. Amant, K. (2010). An application of Robert Gagné's nine events of instruction to the teaching of website localization. *Journal of Technical Writing and Communication*, 40(3), 337–362. <https://doi.org/10.2190/TW.40.3.f>

Continuous Improvement

PDSA Cycle / Plan Do Study Act Cycle

The Plan Do Study Act (PDSA) cycle is a framework that helps instructors make ongoing improvement through small changes. The instructor adapts to the learners' needs by listening to their feedback and analyzing data. This method is a way to test and improve a change made to instructional design. It involves four steps: planning the change, doing or trying it, studying the results, and taking action by making improvements before testing it again (American College of Education).

Example

One example of the PDSA cycle can be understood through a scenario where an instructor designs a thirty-minute training to help employees learn a new customer service system (Plan). The training is implemented with a small group of employees (Do). The instructor reviews the employees' feedback and notices that most of them are still confused about how the system works (Study). They are unable to locate specific information about customers and don't fully understand how to process a request. The instructor increases the training from thirty minutes to sixty minutes and adds a short video as well as a practice activity allowing employees to practice taking a request. (Act). The instructor tests the revised training on a new group of employees and they do much better.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.

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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.
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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 established five basic principles of instruction, which he believed need to be present for learning to occur. First, learners are engaged in tasks related to real life and understand how those tasks are relevant. Second, prior knowledge needs to be activated in the learners. Third, new knowledge is demonstrated. Learners need to be shown how to do something, not told. Fourth, learners apply new knowledge. Finally, integration is the fifth principle where learners transfer new knowledge and skills into their real lives. Opportunities are provided for the learner to complete tasks and apply it to their life in a meaningful way. Overall, the goal of instruction is to incorporate knowledge into the daily lives of the learners (American College of Education).

Example

For example, these principles could be applied to training employees to use a new task management system, like Asana. The training could begin with a real-life situation like a missed deadline. Then, activate prior knowledge by asking learners how they currently manage tasks. Next, the instructor could demonstrate how to use the system, allow the employees time to practice creating tasks and deadlines, and finally having them use the system to manage an actual current task.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas. https://ace.instructure.com/courses/2206330/external_tools/118428

Kurt, S. (2022, April 9). *Merrill's principles of instruction*. Education Library. <https://educationlibrary.org/merrills-principles-of-instruction/>

Merrill's Four-Phase Cycle of Instruction

David Merrill introduced a four-phase cycle of instruction to guide how the principles of instruction should be taught. The four phases are activation, demonstration, application, and integration. This cycle acts as a guide for implementing Merrill's principles of instruction. Merrill advises starting with simple task and forward to harder ones (American College of Education).

Example

For example, if an instructor was trying to design a training for teachers to learn a new instructional technology, they would first activate prior knowledge by asking the teachers what technology tools they currently use and what challenges they have with them. Next, the instructor would show teachers how to use the new instructional technology, such as a new quiz platform, with a brief demonstration. Then, teachers can apply what they have learned by using the new tool to create a quiz themselves. Finally, teachers can incorporate the new tool into an upcoming lesson by creating a relevant quiz and reflecting on how it will benefit their students.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.

https://ace.instructure.com/courses/2206330/external_tools/118428

Kurt, S. (2022, April 9). *Merrill's principles of instruction*. Education Library.

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Project Management Models

Agile

The agile project management model uses "learning sprints", which are short, focused periods in which learners complete, evaluate, and reflect on activities (Šmitienė, G., Paulauskienė, L. 2025). The sprints are usually made up of five steps:

1. Set goals: Identify the main goal and split it into smaller, manageable objectives.
2. Plan: Determine the responsibilities, activities, and timeline.
3. Discuss: Meet briefly to discuss progress and give updates.
4. Evaluate: Review and assess completed work.
5. Reflect: Analyze what went well and what could be improved upon.

This flexible approach is iterative and well-structured as well as allows learners to be independent. With the agile project management model there is no direct supervisor, but rather teams work together utilizing individual strengths. Leadership can then naturally come out from within the teams (Ashad, R. et. al. 2026). Its iterative approach allows for rapid improvements promoting efficiency, organization, and success.

Example

An example for the use of the agile project management model would be designing an online course for employees to learn how to effectively communicate with customers. The designer would use short, agile sprints to design and test each module. The instructional designer would

communicate with subject-matter experts, managers, and employees throughout each sprint. Everyone meets regularly to discuss progress, identify issues, and decide on changes for the next sprint. For example, the designer might first create an active listening module, review it with the team, gather feedback, and make revisions. The process would then be repeated for other modules dealing with things like handling difficult conversations, problem solving, and de-escalation techniques.

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
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<https://doi.org/10.1016/j.sftr.2026.101764>
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<https://doi.org/10.15181/rfds.v46i2.2737>

SAM / Successive Approximation Model

The successive approximation model (SAM) is an iterative, cyclical instructional design model that is made up of three phases: preparation, iterative design, iterative development (American College of Education). In the preparation phase the designer gathers information and start planning the project. With the iterative design phase, the designer creates and design and improves it usually over several cycles. Finally, in the iterative development phase the designer builds the learning experience. This model allows for “flexibility, collaboration, and continuous improvement” (American College of Education).

Example

An example that fits with the SAM is an instructional designer who is tasked with creating a course that teaches teachers how to use a new learning management software (LMS). The designer could start by developing a prototype of one module. Next, the instructor could meet with teachers to get feedback, make revisions, and continue testing and making the course. This iterative approach reflects the features of the SAM such as “flexibility, collaboration, and continuous improvement” (American College of Education).

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
https://ace.instructure.com/courses/2206330/external_tools/118428
- Wolverton, C., & Guidry Hollier, B. (2022). Guidelines for incorporating active learning into the design of online management courses utilizing the Successive Approximation Model (SAM). *International Journal of Education and Development using Information and Communication Technology*, 18(1), 264–274.
<https://research.ebsco.com/c/36ffkw/viewer/pdf/aei2gjmzqf>

SAMR / Substitution, Augmentation, Modification, and Redefinition

The substitution, augmentation, modification, and reflection (SAMR) model describes four levels of incorporating technology into instructional design. At the substitution level traditional content or materials are converted into a digital format. Augmentation is similar but provides small improvements to the learning experience. Modification involves making big changes to how teaching and learning occur. Redefinition happens when technology transforms traditional teaching methods and creates new learning opportunities (Seifert, T., 2026).

Example

As a basic example an instructional designer who is tasked with creating a college course could decide to substitute any paper content with digital content. Moving reading materials from a paper format to digital format. At the augmentation level the instructor creates digital lessons as well as online quizzes and links to additional resources. At the modification level students could collaborate online giving each other feedback and exchanging ideas. Finally, at the redefinition level students could create their own digital resource using videos, etc. to share. This example shows how technology can progress and create new learning experiences.

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
https://ace.instructure.com/courses/2206330/external_tools/118428
- Seifert, T. (2026). Exploring online assessment strategies through the SAMR model: Insights from higher education lecturers. *Journal of Educators Online*.
<https://research.ebsco.com/c/36ffkw/viewer/pdf/jbrorygvj>

Waterfall

The waterfall model is organized and linear with a step-by-step process. This model has six phases: needs analysis, knowledge analysis, identify limitations, content development, prototyping, and deployment (Pappas, C., 2026). First, learners' needs, goals, and areas for improvement are identified. Second, the knowledge or performance gaps that need to be addressed are identified. Third, constraints or limitations such as budget, learners' schedule, and technology are considered. Fourth, appropriate learning activities, resources, and instructional strategies are selected. Fifth, the prototype course is tested to gather feedback and

identify problems. Finally, in the sixth phase the completed course is deployed or launched. Results are evaluated and final adjustments are made. Revisions should be minimal considering the great deal of planning and research with using the waterfall model (Pappas, C., 2026).

Example

An example of the waterfall method and its six phases can be seen in pilot project in the Democratic Republic of the Congo where they attempted to improve teaching and learning in mathematics and English in elementary school. In the needs analysis phase it was determined that there needed to be a curriculum shift. In the knowledge phase experts came together to discuss content for the course, design the prototype, and discuss limitations. The curriculum was deployed when a national group of experts trained principals, inspectors, and school board consultants. Then, those individuals went back to their regions and trained their teachers in the new curriculum (Savard and Cyr, 2018). Trained teachers were able to implement the new learning experiences, follow the teacher's guide, as well as create their own learning experiences for their classrooms. This is a meaningful example of the waterfall model because it shows the tiered approach as well as how data was collected and learning was measured. The authors note the things that went well and the things that didn't go well.

Reference(s)

- American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas. https://ace.instructure.com/courses/2206330/external_tools/118428
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ADDIE | Analysis, Design, Development, Implementation, and Evaluation

The analysis, design, development, implementation, and evaluation (ADDIE) is a structured instructional design framework. In the first phase, analysis, based on what needs to be taught the instructor formulates goals, objectives, and tasks. The instructor may consult experts or may be the expert. The second phase, design, is where assessments and materials are blended with the objectives and tasks, and in the third phase, development, those materials and assessments are used to put the course together. In the next phase, implementation, the learners engage in the course materials and start the course. Finally, the sixth phase, evaluation, is when a formative and summative assessment is conducted. The formative assessment shows how learners did throughout the course, whereas the summative assessment measures overall learning (American College of Education). ADDIE is a linear approach to instructional design. The phases may be repeated but must be done so in order.

Example

Alaoui (2025) used ADDIE to redesign an undergraduate course adding AI and remote work content. In the analysis phase feedback from students indicated a need to cover AI tools and remote work practices. In the design phase her objectives were ten weekly modules and decided to use a universal design for learning model (UDL) model to guide format as well as her use of materials. In the development phase she created videos, reading, and assessments. She implemented her course in 2023 in the university's LMS with four tabs per module. For the evaluation phase she received positive feedback from students, but some stated they would like more live sessions and simpler AI terminology (Alaoui, 2025).

Reference(s)

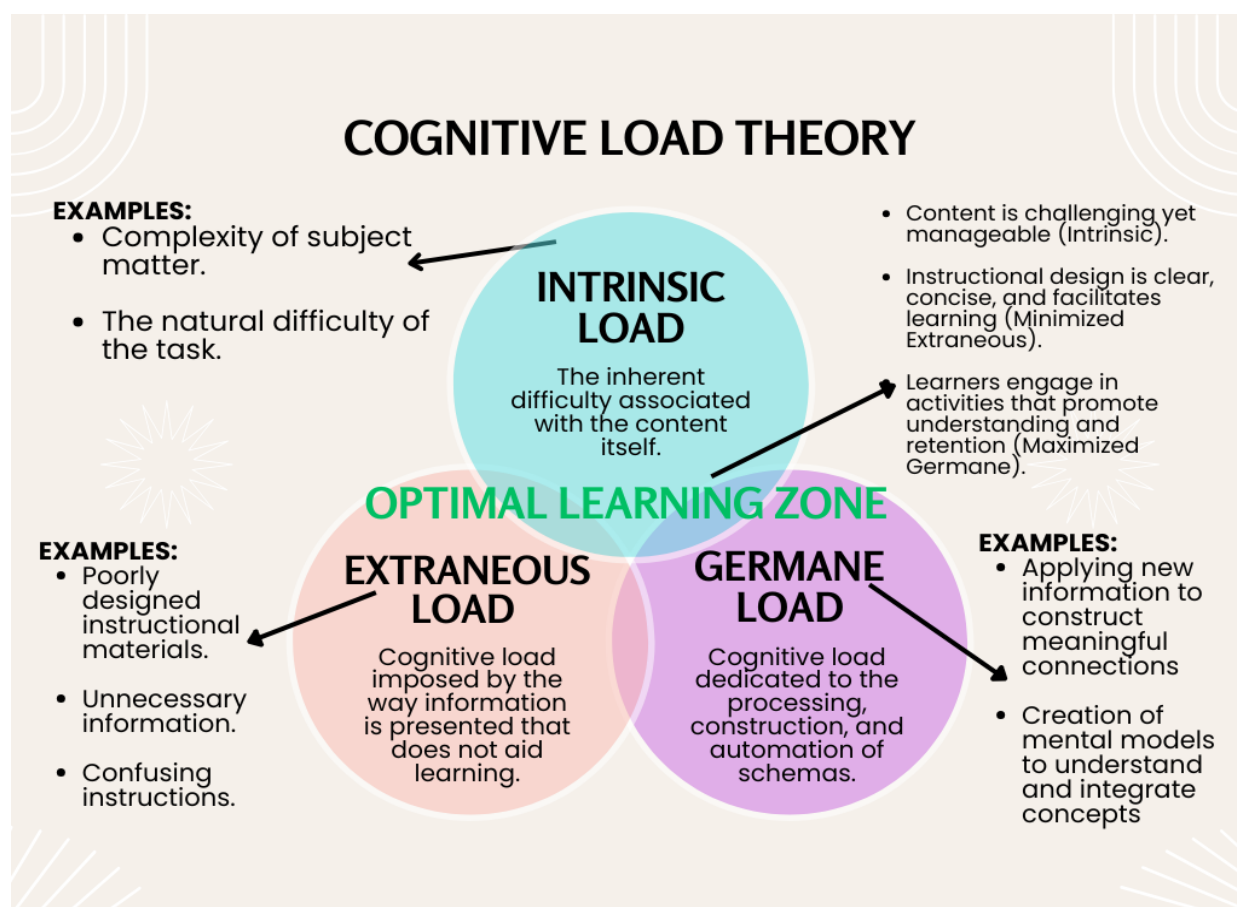
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Cognitive Load

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.

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Managing Cognitive Load

Multimedia Principle

Richard Mayer's multimedia principle contends that people learn best from words as well as pictures rather than only words or only visuals (American College of Education). Therefore, it's a good idea for instructional designers to combine text and use a variety of media in instructional design to maximize learning outcomes. Multiple types of media like videos, pictures, animations, etc. successfully aid learners in retention and implementation of content. Visuals need to be double checked to ensure they relate to the learning goals by clarifying meaning and enhancing comprehension of the learning material (The Digital Learning Institute).

Example

Grech gives an example of using the multimedia principle with training in the medical field (2018). The article recommends using two-dimensional graphs to present medical data because they are easier for an audience to understand than complicated graphs. This is a good example of the multimedia principle because the presenter is combining words and visual information rather than relying on words alone. Mayer's multimedia principle states that people learn better when words and visual information are combined to teach topics. In this situation, the audience can listen to the presenter explain the medical information while also looking at the graph, which gives both verbal and visual ways to understand the information.

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Signaling

Signaling is an instructional design principle strategy that's used to direct learners' attention to specific information (American College of Education). Also known as, cuing, signaling helps learners form a deeper understanding of material and "minimizes the processing of extraneous information, or that irrelevant to learning" (Sun, Y. and Nembhard, D., page 2, 2025). Signaling is represented in various forms from text to pictures or both. Signaling in text is separated into three categories: 1. A sentence before the learning material that explains how it is organized, 2. A sentence that directs the learner's attention towards the image, 3. Using colored text to emphasize an important word or specific detail in the material (Sun, Y. and Nembhard, D., 2025). Signaling with pictures can come in the form of arrows, icons, buttons, or flashy elements highlighting important information (Sun, Y. and Nembhard, D., 2025).

Example

An example of signaling in instructional design could be training employees on a new standard operating procedure (SOP) for filing customer complaints. Rather than the information being a paragraph of dense information and instruction, signaling can be incorporated. A bolded header can be added like, "Four Steps to File a Complaint." Additionally, including numbered steps listing how to file complaints as well as a flow diagram would help the learners understand the process. Perhaps the most important step could be highlighted. The signaling tells learners' brains and eyes what's important so their effort towards understanding rather than searching maximizes learning outcomes.

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Chunking

Chunking, or segmenting, is a cognitive load management strategy that consists of breaking down complex information into smaller chunks because our working memory has a limited capacity (American College of Education). When the content being taught is separated into segments it increases comprehension and reduce cognitive load. A helpful process to follow for chunking starts with prioritizing learning outcomes. Then, going forward with organizing content, sequencing the content, formatting it, and finally, reinforcing it. Chunking has three levels. At the course level the course is organized and structured for the learner. At the module level the learner is prompted to explore specific topics, resources, activities, and assessments. At the screen level each page or individual screen is designed with signaling to help the learner understand the material.

Example

For example, chunking would be helpful in designing an online course on public speaking. At the course level the learner can easily see each module and a its description. At the module level the course could be divided into small lessons like selecting a topic, organizing ideas, creating slides, and speaking with confidence. At the screen level the learner can easily view a brief description of each topic as well as an example, which may include images, videos, icons, or headings. Breaking the course into small lessons reduces cognitive load and maximizes learning.

Reference(s)

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Visual Cognitive Load/C-R-A-P

The CRAP principle helps instructional designers manage cognitive load and maximize learning. It stands for contrast, repetition, alignment, and proximity. This principle aids instructional designers in developing learning materials that are effective, clear, and engaging (American College of Education). Contrast refers to color, sizes, and style. Contrasting elements reduce cognitive overload (Digital Learning Institute). Repetition is about using the same elements throughout the design. For example, using the same color scheme. Alignment in the design

refers to spacing and how elements are arranged. For example, deciding whether to center something or align it to the left. Finally, proximity refers to how elements are grouped together on the screen. For example, grouping specific information and colors together may enhance learning (Digital Learning Institute).

Example

The CRAP principle can be applied to a scenario where a classroom management training is being created for middle school teachers. The training could teach three strategies: proximity, non verbal cues, and private redirection. Contrast could be used making each strategy heading bold and using a different color to highlight important tips. Repetition could be used by giving each strategy the same format, such as Strategy, Why It Works, Classroom Example, and Try It. Alignment could be used to keep the text, videos, and activities organized consistently on each page. Proximity could be used by placing a video next to the strategy it demonstrates.

Reference(s)

American College of Education. (2026). *Tech 5203 fundamentals of learning design and technology*: Module one theories of learning. Canvas.
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Strategies for Student Learning

Scaffolding

With the scaffolding strategy the learner starts out with full support in the learning process. Gradually support decreases and the student becomes more independent. Chunking, modeling, giving feedback, and giving guidance are four ways to scaffold instruction (American College of Education). Ulfa, S. et. al. states “Instructional scaffolding was developed to attract interest in learning and maintain student engagement” (page 2, 2024).

Example

In the article by Ulfa, S. et. al. (2024), a good example of scaffolding in online education is provided. The researchers created a tool for a MOOC discussion forum that gives students personalized article recommendations based on what they write in their discussion posts. The students receive additional support based on their individual needs and interests. By giving students the right resources at the right time, the system helps guide their learning without giving them the answer directly. Other examples that can provide scaffolding in online courses are live chat, online discussion forms, and video conferencing (Ulfa, S. et. al., 2024). Through these examples asynchronous and synchronous learning is combined to maximize learning.

Reference(s)

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Levels of Challenge

The levels of challenge strategy is about giving learners tasks that are not too challenging and at the same time not too easy either. This helps build confidence and motivate the learner. The goal is not to overwhelm them and give them a sense of achievement (American College of Education). The right challenge is a task that the learner cannot do alone yet but can do with some help.

Example

A levels of challenge example can be applied to a scenario where teachers are learning a new technology tool. A teacher may be unable to create an online assessment independently but can successfully complete the task with a demonstration, step-by-step instructions, and feedback from the instructor. As the teacher gains confidence, these supports are slowly removed allowing the teacher to eventually create not just one but multiple assessments independently.

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Active Learning

Active learning involves learners engaging in meaningful tasks promoting analysis, collaboration, and reflection (University of South Carolina). This approach increases critical thinking as well as creativity (American College of Education). It's imperative that projects or activities related to active learning are designed with clear learning outcomes.

Example

An example of active learning could be using virtual breakout rooms during a corporate training in customer service. Employees are taught expectations for customer care. Then, employees are paired up and given real life scenarios where one person behaves like the customer and the

other behaves like the employee. They can switch roles giving each person the opportunity to practice both sides of the situation. Afterwards, everyone joins back together for a whole group discussion reflecting on the experience.

Reference(s)

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Problem-Solving Tasks

Problem solving tasks involve challenging learners to apply what they know with projects, activities, or tasks related to real life and having them come up with a viable solution (American College of Education). This method requires learners to apply knowledge, practice critical thinking, and practice decision making.

Example

The article by Abdalla, R. (2026) describes a great example of problem-solving tasks. The author explains the use of problem-based learning used in educating nurses. Nursing students were given real or simulated clinical scenarios where decisions or assessments had to be made regarding patients. They worked through the cases in small groups analyzing each one and making decisions. They had to identify what they didn't know, research it themselves, and apply what they knew to propose a course of action. They discussed these cases with their peers, while the instructor acted more like a facilitator. Abdalla, R. (2026) notes that this built skills like clinical reasoning, evaluation, and self-directed learning that are directly transferrable to real life nursing work.

Reference(s)

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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)

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Pressbooks. <https://psu.pb.unizin.org/idhandbook/chapter/dick-carey/>

Sociocultural Factors

Sociocultural Theory

Developed by Lev Vygotsky sociocultural theory is about understanding the effect of culture and community on the learning environment. This theory can be applied to all age groups from those individuals in grade school to adults in various work environments. One of the most important elements of sociocultural theory pertains to the family as well as the immediate community's role in the learning experience (American College of Education). Learners' socioeconomic backgrounds influence how they experience and approach learning, but individual differences

can be factors in learning too such as where they live, family beliefs and values, peers, and their surrounding community (American College of Education).

Example

With instructional design there are two things to consider when thinking of an example of sociocultural theory. First, is in person learning and second is online learning. With in person learning through group activities and discussions is helpful and creates an inclusive learning environment for learners of various backgrounds. One example that comes to mind is from the Advancement Via Individual Determination (AVID) program I worked in where students collaborate in small study groups called “tutorials” using inquiry and Socratic questioning to help their peers solve “points of confusion” from their classes. On the other hand, an example in online learning would be important considering the constant increase in the amount of online learning options. Another example of sociocultural theory in instructional design to consider is a new employee training program that includes an online chat with a manager as well as a forum to get support from peers. Both examples maintain learning as a social process creating a learning environment for people of various backgrounds the opportunity to succeed.

Reference(s)

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Universal Design for Learning

Universal design for learning (UDL) is a framework for instructional design that intentionally considers the needs of all learners by following three main principles: engagement, representation, and action and expression (American College of Education). Instructional designers can practice using the UDL framework by considering learner diversity and needs, removing barriers, providing support, and creating inclusive learning experiences (Rao et al., 2024). Identifying learner variability requires acknowledgement of individual characteristics such as abilities and strengths, support needs, backgrounds and experiences, and preferences and

interests (Rao et al., 2024). Rao et al. (2024) states “a key premise of UDL is that barriers exist in the curricula not in the individual” (p.6). UDL is a proactive approach to instructional design where the instructor must consider what learners bring into the learning experience (Rao et al., 2024).

Example

An example of UDL in teacher training is a professional development workshop that gives teachers multiple ways to participate in learning activities. Rodriguez-Meehan et al. (2026) describe a workshop in which educators experienced UDL through engagement, representation, and action and expression. Engagement was supported by allowing teachers to choose activities that interested them and participate individually or in groups. Representation was supported by providing different types of activities and experiences, including hands-on play, discussion, reflection, and outdoor exploration. Action and expression were supported by allowing participants to demonstrate their learning through different activities and reflections. By experiencing these UDL principles as learners, teachers could better understand how to provide choice, remove barriers, and create more inclusive learning experiences for their own students.

Reference(s)

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