TCSL-70130 Lecture 04: Digital Technologies for Modern Instructional Design
數位科技與當代教學設計

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Lecture Topics

- What is instructional design?
- Modern instructional design models
- Tools for instructional design
- Learning technologies
- Emerging technologies for modern instructional design and learning

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What is Instructional Design?

- Instructional design (ID), also known as instructional systems design (ISD), is the practice of systematically **designing**, **developing** and **delivering** instructional **products** and **experiences**, both digital and physical, in a consistent and reliable fashion toward an efficient, effective, appealing, engaging and inspiring acquisition of knowledge.

— Wikipedia

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What is Instructional Design?

- In short, instructional design is the process by which learning products and experiences are designed, developed, and delivered.

— Instructional Design Central

- Instructional design is the creation of learning experiences and materials in a manner that results in the acquisition *and* application of knowledge and skills.

— Association for Talent Development

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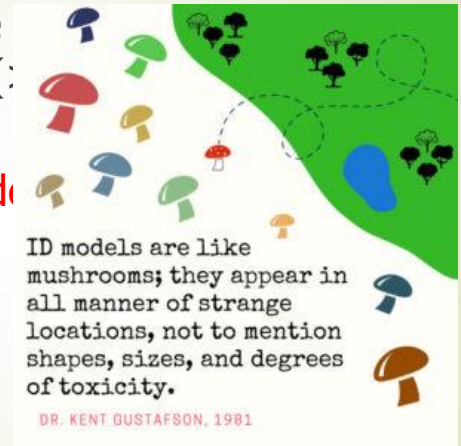
Instructional Design Models

- To define and create
  improve instruction (
- But generalizing any
  potentially be hazard
  disastrous at worst.



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The ID Surveys Book

- Branch, Robert & Dousay, Tonia. (2015). *Survey of Instructional Design Models, 5th Ed*. Association for Educational Communications & Technology(AECT).
  - Brief overviews of instructional design models
  - Classification within the context of classroom product- and process-oriented instructional problems.
  - A concise summary to help beginning instructional designers visualize the different design approaches
  - Assist more advanced instructional designers.
  - https://aect.org/docs/SurveyofInstructionalDesignModels.pdf?pdf=SurveyofInstructionalDesignModels

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Models in the ID Survey Book

Model Name	1st Ed 1981	2nd Ed 1991	3rd Ed 1997	4th Ed 2002	5th Ed 2015
Banathy (1968)	x				
DeCecco (1968)	x				
Blake & Mouton (1971)	x				
Briggs (1970)	x				
Baker & Schutz (1971)	x				
Gerlach & Ely (1971)	x	x	x	x	x
Instructional Development Institute (Twelker et al., 1972)	x	x	x		
Learning Systems Design (Davis, Alexander, & Yelon, 1974)	x				
IPISD (Branson, Rayner, Cox, Furman, & King, 1975)	x	x	x	x	x
Blondin (1977)	x				
Morrison, Ross, Kemp, & Kalman (Kemp, 1977)	x	x	x	x	x
Dick, Carey, & Carey (Dick & Carey, 1978)		x	x	x	x
Gilbert (1978) Front End Analysis	x				
Courseware Development Process (Control Data Corporation, 1979)	x				

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Models in the ID Survey Book

Model Name	1st Ed 1981	2nd Ed 1991	3rd Ed 1997	4th Ed 2002	5th Ed 2015
ASSURE (Heinich, Molenda, & Russell, 1982)		x	x	x	x
Diamond (1989)		x	x	x	x
Dick & Reiser (1989)		x	x		
Van Patten (1989)		x	x		
Bergman & Moore (1990)		x	x	x	x
Leshin, Pollock, & Reigeluth, (1992)		x	x		
IPDM (Gentry, 1993)			x	x	x
Smith & Ragan (1993)			x	x	x
de Hoog, de Jong, & de Vries (1994)				x	x
Bates (1995)				x	x
PIE (Newby et al., 1996)				x	x
4C/ID (van Merriënboer, 1997)					x
ISD Model 2 (Seels & Glasgow, 1997)		x		x	x

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Models in the ID Survey Book

Model Name	1st Ed 1981	2nd Ed 1991	3rd Ed 1997	4th Ed 2002	5th Ed 2015
CASCADE (Nieveen, 1997)				x	x
Rapid Collaborative Prototyping (Dorsey, Goodrum, & Schwen, 1997)				x	x
UbD (Wiggins & McTigue, 2000)					x
Agile (Beck et al., 2001)					x
3PD (Sims & Jones, 2002)					x
Pebble in the Pond (Merrill, 2002)					x
ILDF (Dabbagh & Bannan-Ritland, 2004)					x
TOTAL	13	12	13	15	21

Note. All references refer to the original or first edition of a model; however, the current name of the model as well as current scholars affiliated with the model may vary from the original iteration.

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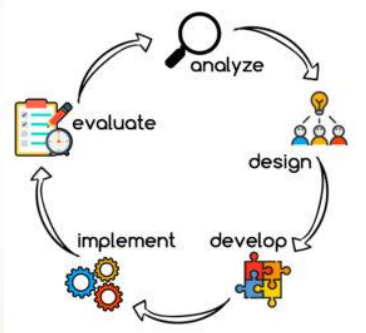
The ADDIE Model

- First created for the U.S. Military during the 1970s by Florida State University.

1. **Analyze** – identify the probable causes for a performance gap,
2. **Design** – verify the desired performances and appropriate testing methods,
3. **Develop** – generate and validate the learning resources,
4. **Implement** – prepare the learning environment and engage the students,
5. **Evaluate** – assess the quality of the instructional products and processes, both before and after implementation



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The SAM Model

- Addresses the performance need through iterations, repeated small steps.
  - **Preparation**: gather information and get all the background knowledge (a quick phase)
  - **Iterative Design**: begin with the Savvy Start (the initial collaborative brainstorming kickoff meeting), then iterate through design, prototype, and review.
  - **Iterative Development**: iterate through develop, implement, and evaluate. From design proof, to Alpha, Beta, and rolling out the Gold

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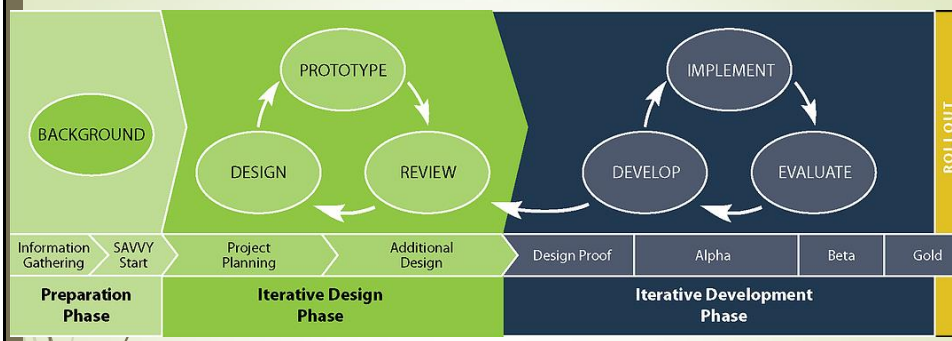
The SAM Model



http://www.alleninteractions.com/sam-process

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Learning Circle Framework

- Proposed by the Instructional Design Dentral (IDC)

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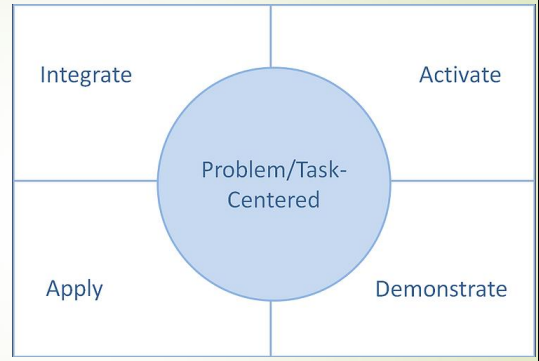
Merrill's First Principles of Instruction

- Problem-based model with 4 phases: (1) activation of prior experience, (2) demonstration of skills, (3) application of skills, and (4) integration or these skills into real world activities.



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First Principles

- Learning is facilitated when learners are engaged in solving real-world problems.
- Learning is facilitated when existing knowledge is activated as a foundation for new knowledge.
- Learning is facilitated when new knowledge is demonstrated to the learner.
- Learning is facilitated when new knowledge is applied by the learner
- Learning is facilitated when new knowledge is integrated into the learner's world.

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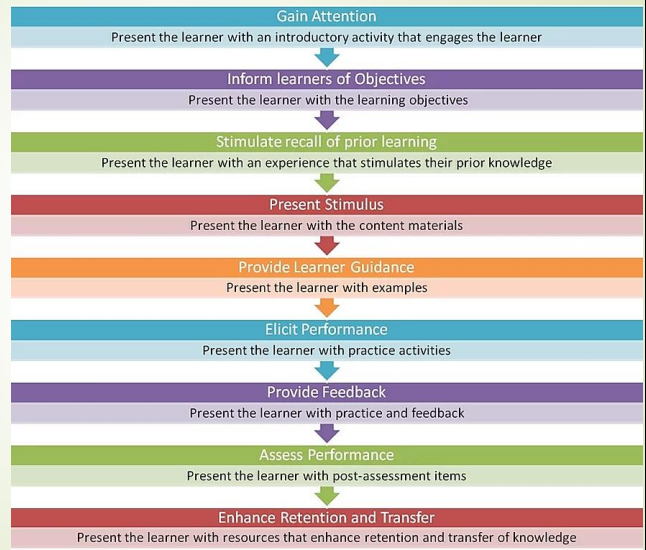
Gagne's 9 Events of Instruction

- Behaviorist Robert Gagné focused on the outcomes (behaviors) resulting from learning.



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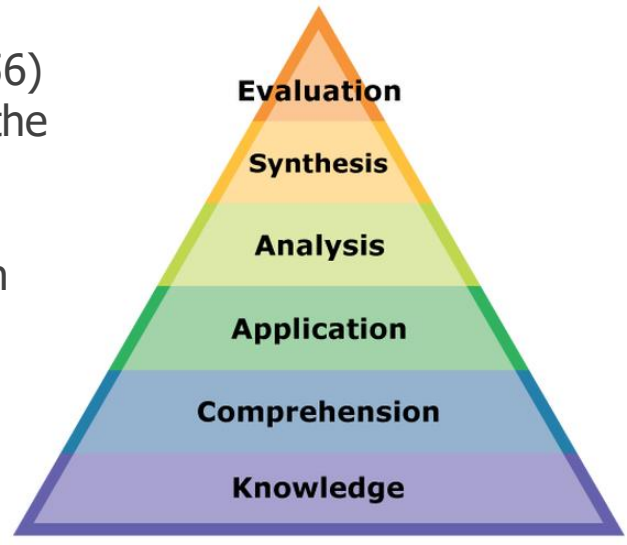
Bloom's Taxonomy

- Benjamin Bloom(1956) proposed the levels of intellectual behavior in learning.



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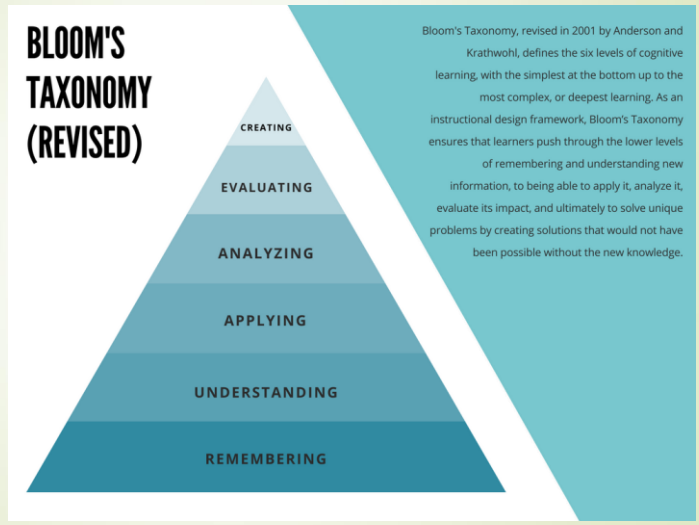
Revised Bloom's Taxonomy

- Revised by Anderson and Krathwohl (2001)



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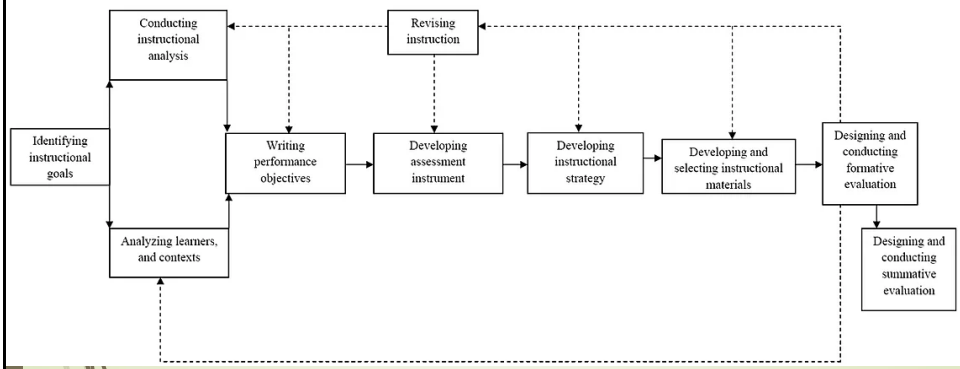
Dick and Carey Model

- The Dick and Carey Systems Approach Model was published in 1978 by Walter Dick and Lou Carey.



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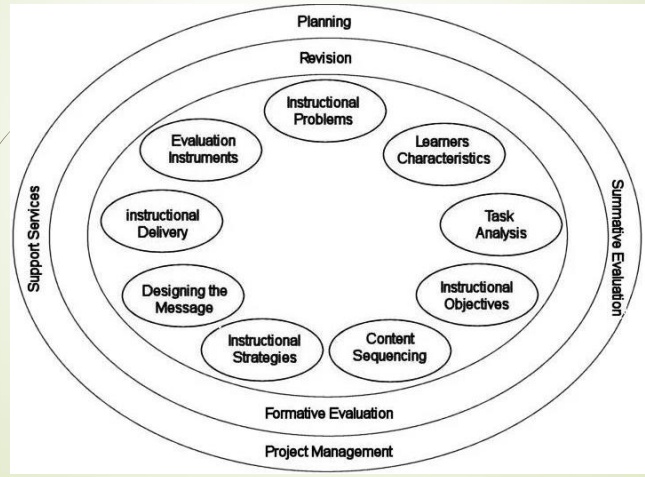
Kemp's Design Model

- Jerold Kemp defines 9 components and a continuous implementation/evaluation model.



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Kirkpatrick's 4 Levels of Training Evaluation

- The Kirkpatrick Model is the worldwide standard for evaluating the effectiveness of training.

Response | actually learned | use learned on job | positive impact

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Cathy Moore's Action Mapping

- A quick, effective, and visual way to design compelling learning experiences

The ASSURE Model

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- An ID model for more effective teaching and learning.

A	• Analyze Learners
S	• State Objectives
S	• Select Methods, Media and Materials
U	• Utilize Technology, Media and Materials
R	• Require Learner Participation
E	• Evaluate and Revise

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Tools for Instructional Design

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Many tools are available for instructional designers to carry their ID plan.

1. eLearning Authoring Tools: iSpring Suite, Articulate 360, Adobe Captivate, …
2. eLearning Templates: eLearing Brothers, Faster Course, eLearning.net, …
3. Mind Mapping Tools: XMind, iMindMap, …
4. Presentation Tools: PowerPoint, Prezi, …
5. Graphics and Infographics Tools: Canva, Paint.net, Infogram, …

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Tools for Instructional Design

6. Image & Photo Sharing Platforms: Unsplash, Microsoft Clipart Library, Google Fonts, …
7. Video Tools: Free Cam, iSpring Cam Pro, …
8. Audio Tools and Samples: Audacity, BBC Sound Effects, …
9. Interactive Learning Tools: Kahoot, QuizGame, …
10. Survey Tools: Surveymonkey, …

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Tools for Instructional Design

11. Writing Tools: Grammarly, Google Docs, …
12. Project Management Tools: Trello, Google Calendar, …
13. Communication & Sharing Tools: Skype, Google Drive, GoToMeeting, …
14. Online Resources: eLearning Industry, The eLearning Guild, …

Learning Technologies

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- Learning technology is the application of technology for the enhancement of teaching, learning and assessment.
- Many related terms:
  - **CAI** (Computer Aided Instruction)
  - **CAL** (Computer Aided Learning)
  - **CBL** (Computer Based Learning)
  - **CBT** (Computer Based Training)
  - **CAA** (Computer Aided Assessment)
  - **CMC** (Computer Mediated Communications)
  - **HCI** (Human-Computer Interface)

Emerging Technologies for ID

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Many technologies emerge as promising tech for ID and learning:

1. AI & ML(Artificial Intelligence & Machine Learning): Chatbots, recommenders, deep learning, …
2. Mobile Learning: learning through wireless, smartphone, LBS, …
3. Gamification: learning through gaming
4. Storytelling: using narratives to elicit creativity and transfer knowledge

Emerging Technologies for ID

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5. Multimedia: audio, video, HCI, …
6. VR/AR/MR: Virtual/Augmented/Mixed Reality
7. Cloud Computing: SAAS, PAAS, IAAS, …
8. Big Data: processing, analyzing, visualizing, …
9. Hybrid Learning: allows participants to access learning in a variety of formats
10. Learning Management Systems(LMS): systems to put them all together

Lectures to Come

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- We will select a set of emerging technologies
- For each technology, we will:
  - Provide an overview of the technology
  - Discuss the application of the tech in learning
  - Case studies
- To have hands on experience, we will use the open-source learning platform Moodle for practicing ID with modern tools.