

The Design and Sequencing of eLearning Interactions

2022 L&D Talks

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What the Difference?



Conventional
Classroom



Modern Online
& Hybrid

What's the Difference?

Spontaneity of Interactions

- interpret verbal and non-verbal cues
- clarify expectations
- address individual needs/concerns
 - provide insights & elaborations
 - give directions
 - facilitate discussions
 - present immediate feedback



What's the Difference?

- PPT and text-based materials focus on the transmission of information
- Limited interactions result in feelings of isolation and anonymity
- Limited interactions to interpret and construct knowledge
- Based on speaking and listening
 - Not always engaging
 - Fail to use potential of technology



What's the Difference?

- Limited spontaneous real-time (synchronous) interactions



- Interactive technologies do not ensure meaning interactions
- Interactions must be planned and sequenced as integral part of elearning

What do we know?

- Enables communications necessary to address individual needs and interests
- Reduces feelings of isolation & anonymity
- Tool for transforming teacher-directed to learner-centered methods
- Defining characteristic & vital to DE (Moore, 1989)
- Single most important element (Kearsley, 1998)

What do we know?

Without interactions, instruction may simply become "passing on content as if it were dogmatic truth, and the cycle of knowledge acquisition, critical evaluation and knowledge validation, that is important for the development of higher-order thinking skills, is nonexistent."

(Shale & Garrison, 1990, p. 29)

Frameworks (Communication-based)

- Student-Teacher
- Student-Student
- Student-Content

(Moore, 1989)

- Student-Interface

(Hillman, et. al., 1994)

- Student-Instructional
- Student-Social

(Carlson & Repman, 1999)

- Instructor-Support Staff
- Instructor-Peers
- Instructor-Organization

(Montera & Murphy, 2000)

Frameworks (Purpose-based)

- Asynchronous communications
- Synchronous communications
- Browse and click
- Branch
- Track

- Coach
- Help
- Practice
- Feedback

(breakthebarrier.com, 2010)

- Interact with content
- Monitor and regulate
- Support performance

- Collaborate
- Converse

(Northrup, 2001)

- Information Gathering
- Information Sharing
- Collaborative Problem Solving

(Harris, 1995)

Frameworks (Activity-based)

Level 1 - Passive

Level 2 - Limited participation

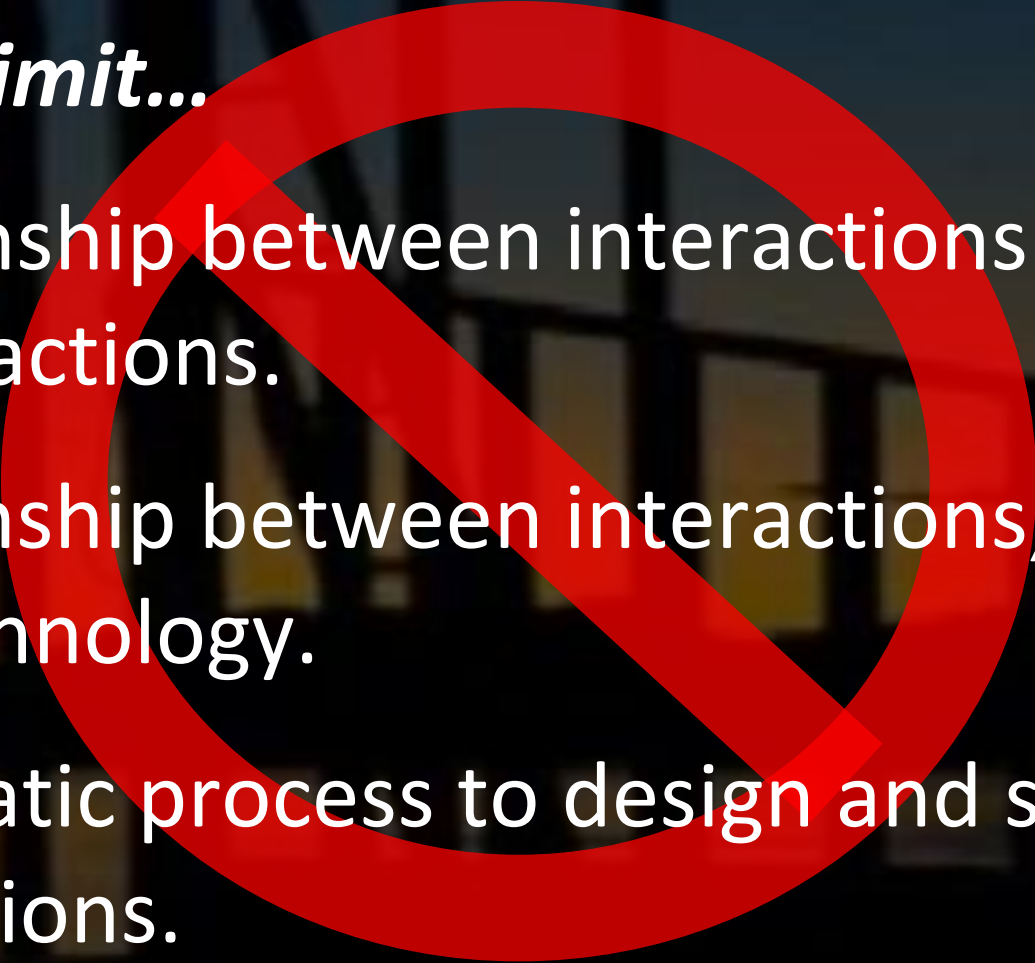
Level 3 - Complex participation

Level 4 - Real-time participation

(US Department of Defense, 2001)

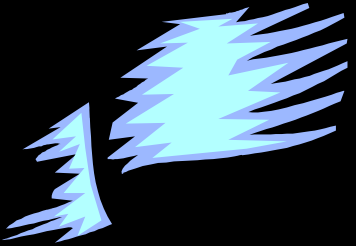
Frameworks

Fail to delimit...

- Relationship between interactions and types of interactions.
 - Relationship between interactions, strategies, and technology.
 - Systematic process to design and sequence interactions.
- 

Goals

- I. Posit framework that delimits relationship between interactions, strategies & technology
- II. Delineate steps for applying the framework to design & sequence meaningful interactions
- III. Situate framework in context of ensuring quality learning experiences



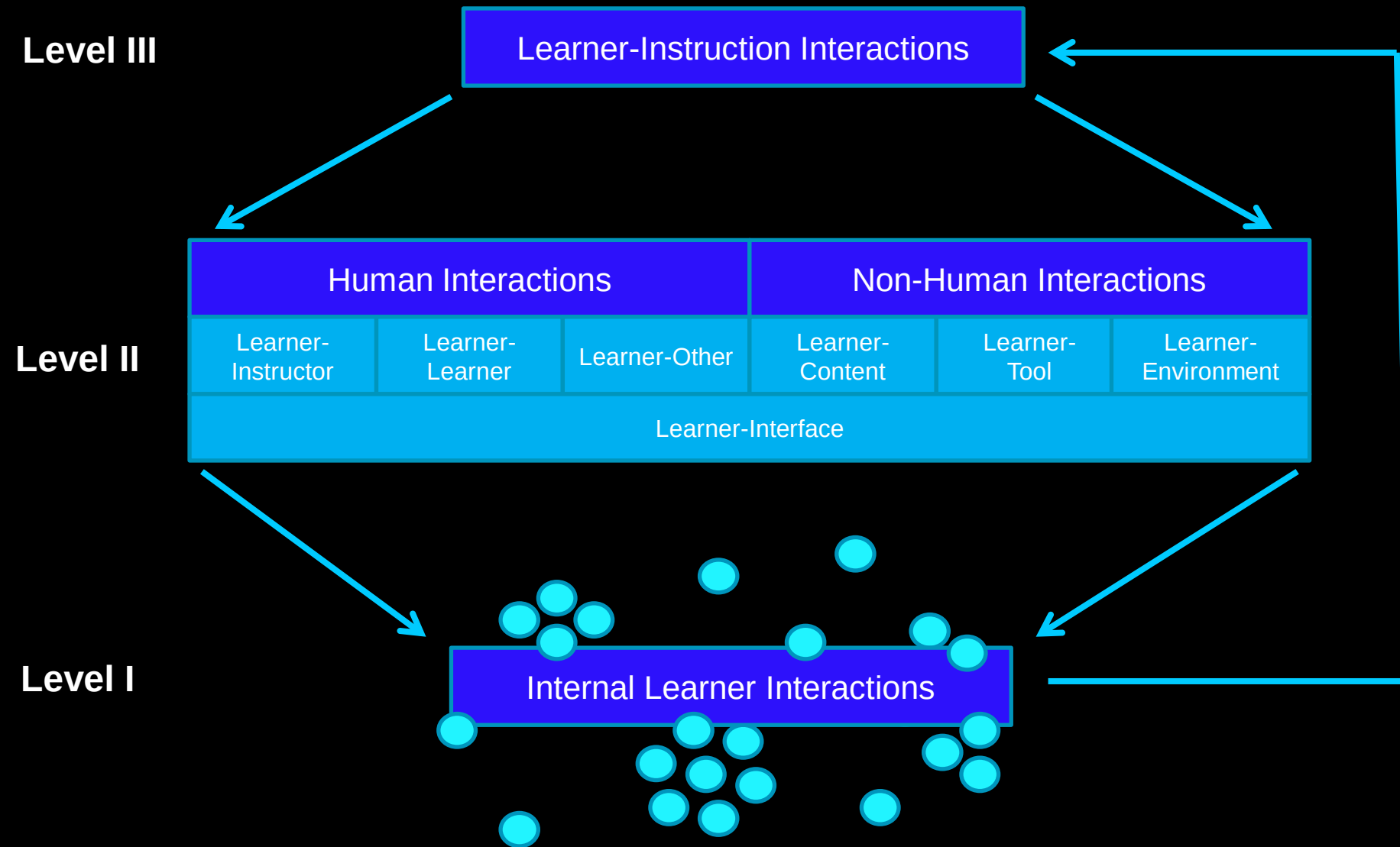
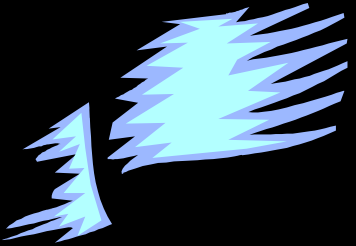


Figure 1. Three level framework for designing and sequencing meaningful elearning interactions grounded in research, theory, and documented best practices (Hirumi, 2013, 2002)

Goals

- I. Posit framework that delimits relationship between interactions, strategies & technology
- II. Delineate steps for applying the framework to design & sequence meaningful interactions
- III. Situate framework in context of ensuring quality learning experiences



Information vs. Education?



**Information vs.
Education?**

**Craft-Based (SME)
vs. Grounded Design?**



Information

Multimedia communicates message from sender to receiver

Education

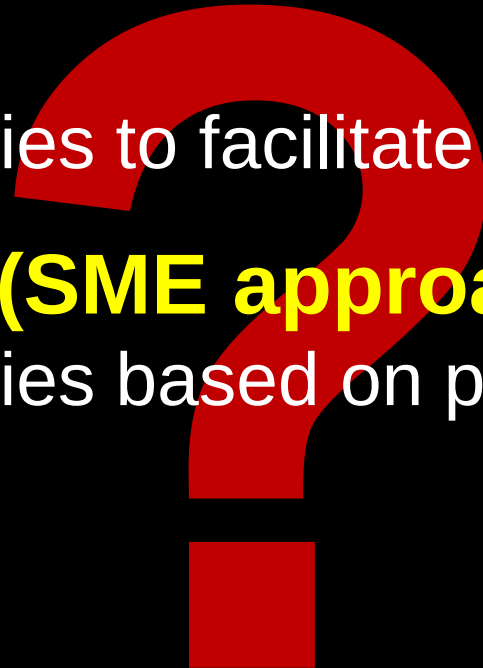
Series of events & activities to facilitate learning

Craft-Based Design (SME approach)

Series of events & activities based on past practices, opinions, fads, politics, etc. (N=1)

Grounded Design

Series of events & activities based on research, theory & documented best practice



Grounded (aka. Evidence-Based) Design

“The systematic implementation of processes and procedures that are rooted in established theory and research in human learning.”

(Hannafin, Hannafin, Land, & Oliver, 1997, p.102)

Grounded (aka. Evidence-Based) Design

Conditions

- Rooted in defensible theoretical framework
- Consistent with research findings
- Generalizable beyond unique conditions
- Validated with successive implementations
- Based on desired outcomes

(Hannafin, Hannafin, Land, & Oliver, 1997, p.102)

Grounded (aka. Evidence-Based) Design

Significance

- Aligns research, theory, and practice
- Explains and predicts results
- Allows systematic study, continuous improvement, and effective use across context
- Provides pedagogical, evidence-based foundation for designing interactions and integrating technology

Five (5) Steps for Grounding Interactions

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze interactions

Step 1: Select Strategy

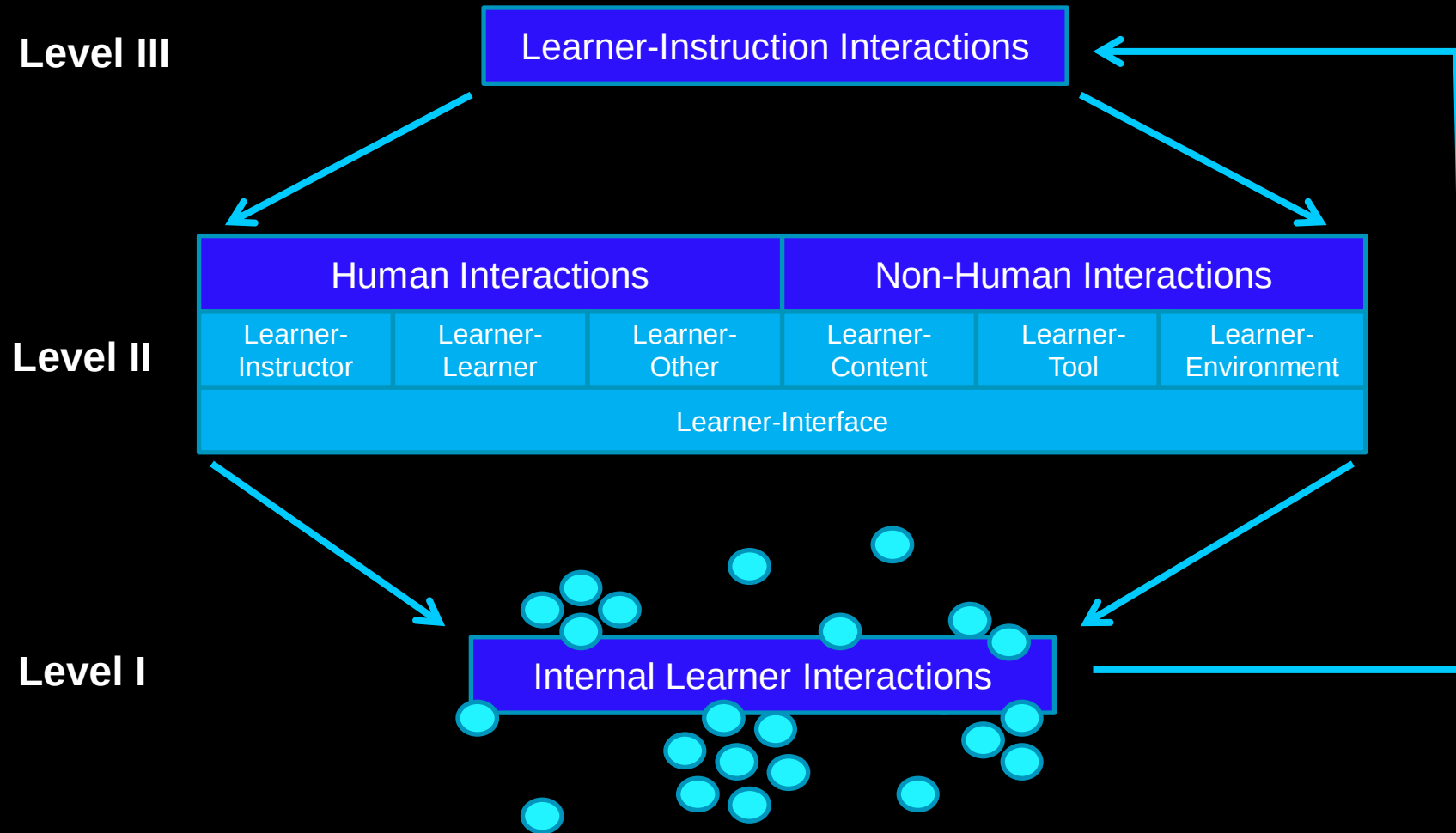


Figure 1. Three level framework for designing and sequencing elearning interactions (Hirumi, 2013, 2002)

Step 1: Select Strategy

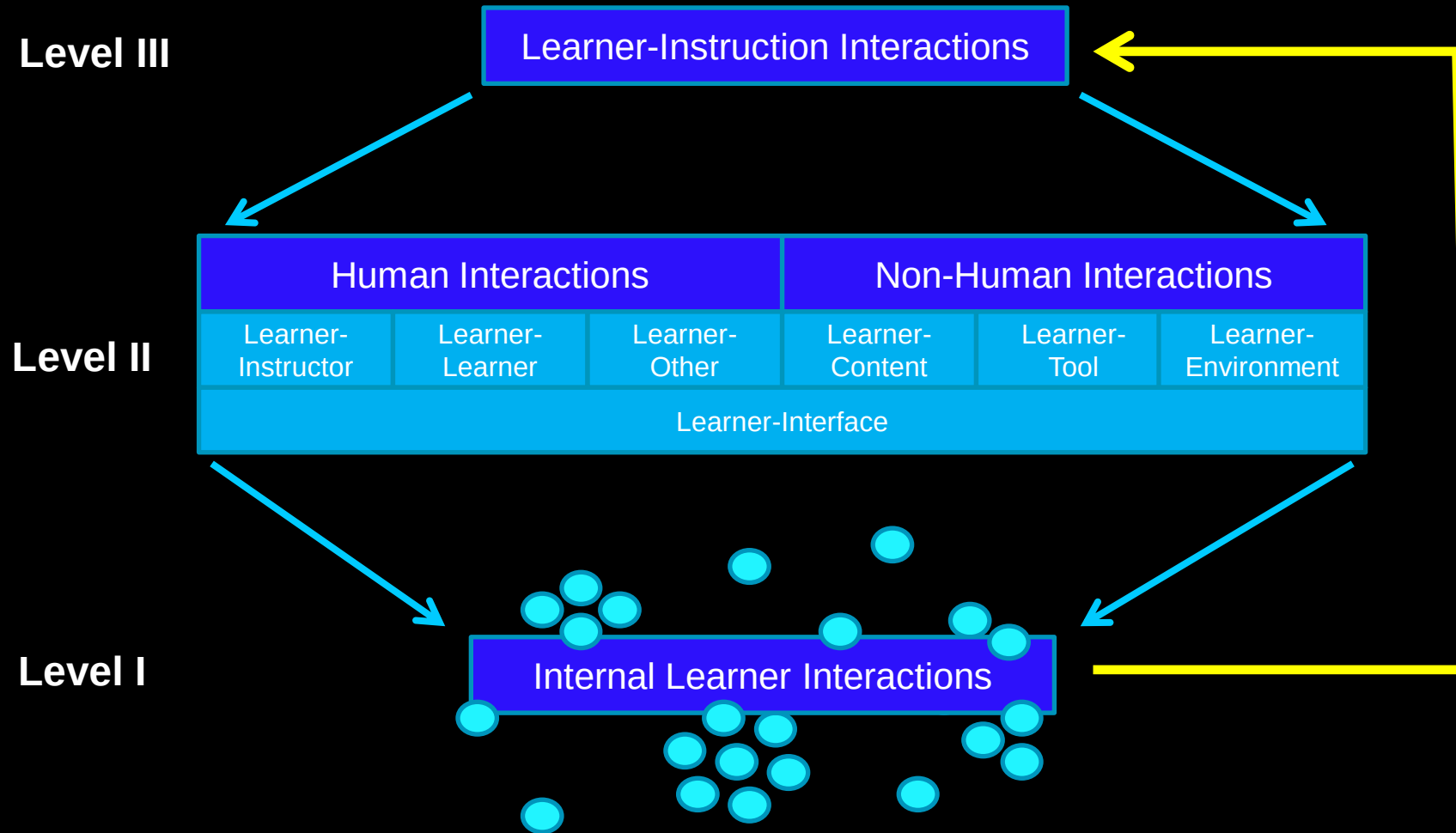


Figure 1. Three level framework for designing and sequencing elearning interactions (Hirumi, 2013, 2002)

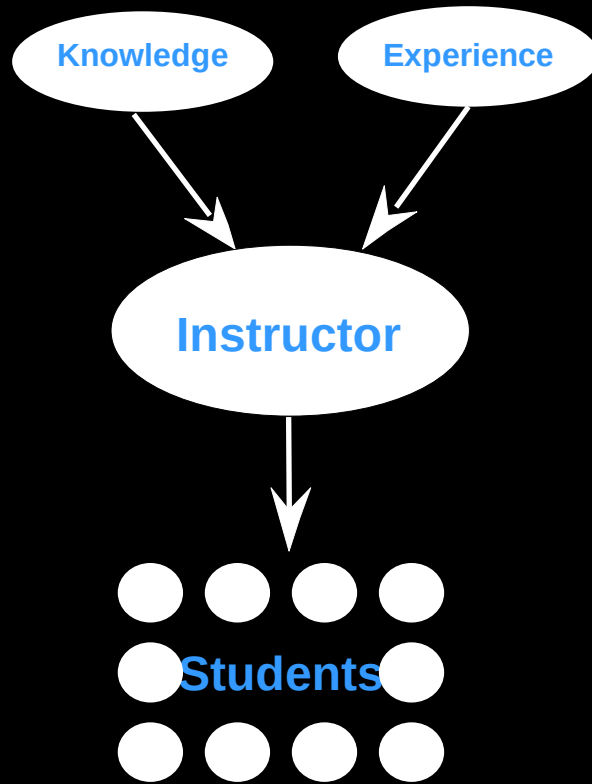
Step 1: Select Strategy



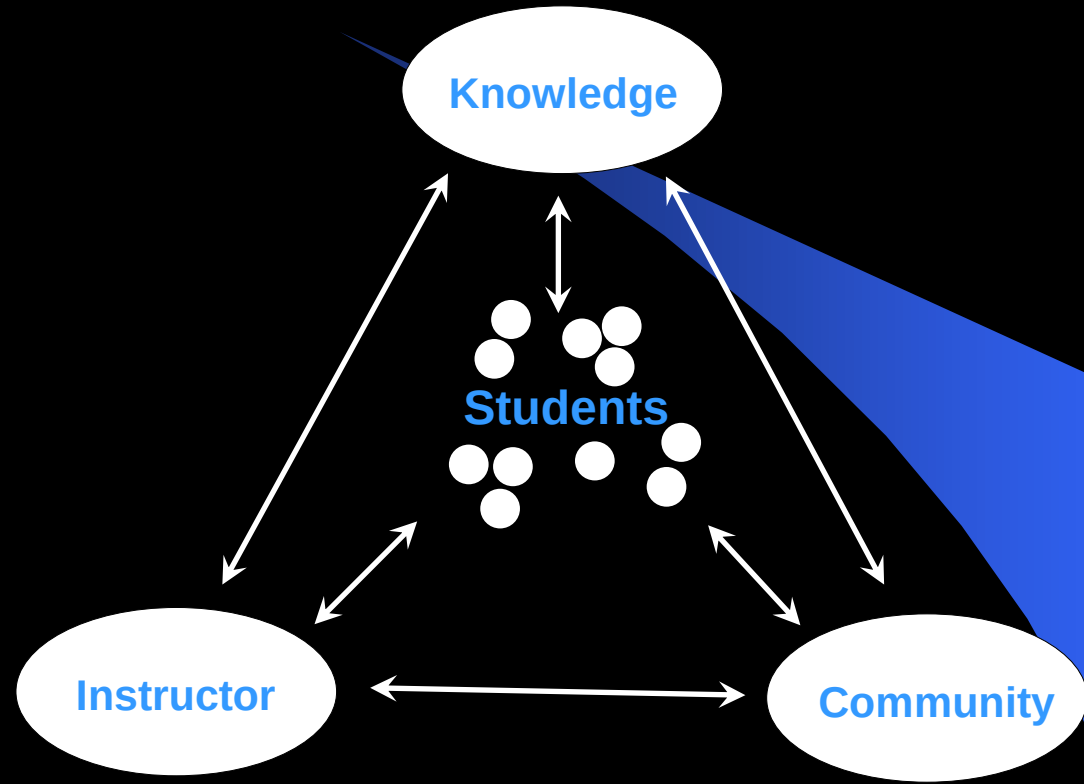
- Knowledge of Strategies
- Educational Philosophy
- Goals and Objectives



Educational Philosophy



Teacher-Directed



Learner-Centered

Figure 2. Comparison of teacher-directed versus learner-centered educational philosophies (Hirumi, 2018, 2002)

Educational Philosophy

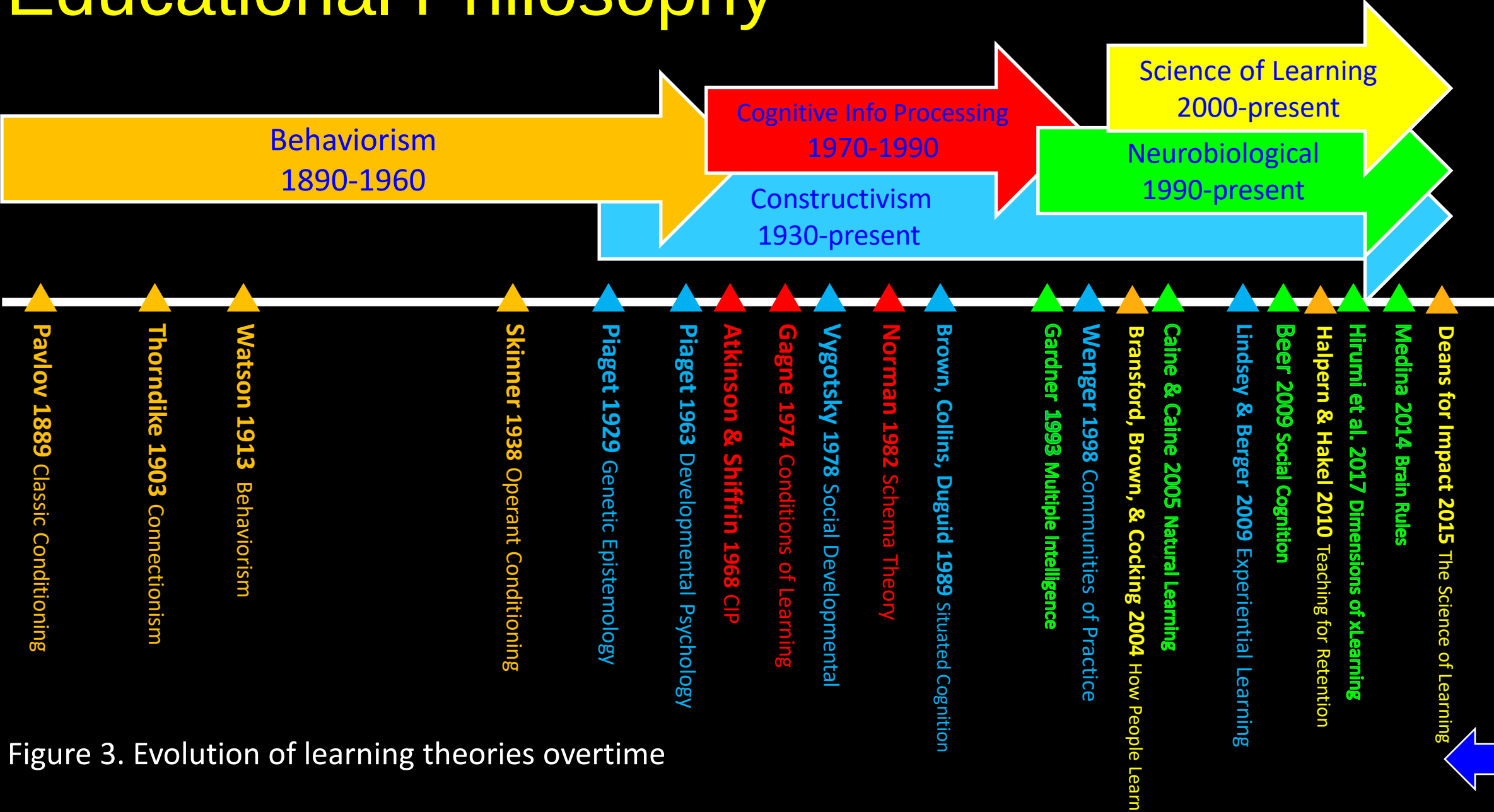
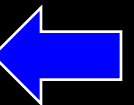


Figure 3. Evolution of learning theories overtime

Goals and Objectives

Table 1. Comparison of learning taxonomies

Tripartite (Hilgard, 1980)	Gagne (1985)	Bloom (1956)	Revised Bloom Anderson & Krathwohl (2001)		Anderson (1981)	Merrill (1983)	Reigeluth & Moore (1999)	Krathwohl, Bloom & Masia (1964)	Simpson (1972)
Cognitive	Verbal Information	Knowledge	Factual Knowledge Conceptual Knowledge Procedural Knowledge Meta-Cognitive Knowledge	Remember	Declarative Knowledge	Kinds of	Memorize Information		
	Concepts	Compre- hension		Understand			Understand Relationships		
	Rules	Application		Apply	Procedural Knowledge	How to	Apply Skills		
		Analysis		Analyze			Apply Generic Skills		
	Problem Solving	Synthesis		Evaluate		What Happens			
	Cognitive Strategies	Evaluation		Create					
	Affective	Attitudes							
Psychomotor	Motor Skills							Perception Guided Response Mechanism Complex Response Adaptation Origination	





Select Instructional Strategy

Step 1: Select Strategy

Table 2a. Sample Instructional Treatment Plan applying WebQuest

Event	Description	Interaction(s)	Tools
Introduction			
Task			
Process			
Resources			
Evaluation			
Conclusion			

Five (5) Steps for Grounding Interactions

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze interactions

Step 2: Operationalize Strategy

Table 2b. Sample Instructional Treatment Plan applying WebQuest

Event	Description	Interaction(s)	Tools
Introduction			
Task			
Process			
Resources			
Evaluation			
Conclusion			

Step 2: Operationalize Strategy

(Handouts: [Grounded Instructional Events](#) | [Interactive Technologies](#))

Alternative Learning Experiences

- o Listen to instructor/trainer
- o Read articles and books
- o Complete handouts/worksheets
- o Conduct observations
- o Conduct experiments
- o Participate in class discussion
- o Analyze cases
- o Interview others
- o Visit community resource centers
- o Conduct library research
- o Visit places of interest
- o Participate in Q&A sessions
- o Watch demonstrations
- o Examine and/or assess other work
- o Conduct surveys
- o Watch film or slide show
- o Attend guest lecture
- o Handle manipulatives
- o Complete individual or group
- o Analyze current events
- o Reflect on experience
- o Participate in a debate
- o Participate in a panel discussion
- o Interact with computer simulation
- o Manipulate a spreadsheet
- o Make oral/graphic presentation
- o Write paper
- o Interact with educational software

Step 2: Operationalize Strategy

Table 2b. Sample Instructional Treatment Plan

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task completion. Ask learners to post prior experiences.		
Task	• Generate a feasibility report • Facilitate oral debriefing report		
Process	1. Identify <u>topic</u>		
	2. Perform <u>research</u>		
	3. Generate <u>problem statement</u>		
	4. Identify <u>options</u>		
	5. Select <u>criteria</u>		
	6. Draft <u>report</u>		
	7. Conduct <u>peer reviews</u>		
	8. Write final <u>report</u>		
	9. Present <u>debriefing</u>		
Resources	• <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u>		
Evaluation	• <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u>		
Conclusion	Learners to submit reflective journal entry		

Five (5) Steps for Grounding Interactions

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze interactions

Step 3: Determine Interactions

Table 2c. Sample Instructional Treatment Plan

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task completion. Ask learners to post prior experiences.		
Task	• Generate a feasibility report • Facilitate oral debriefing report		
Process	1. Identify <u>topic</u>		
	2. Perform <u>research</u>		
	3. Generate <u>problem statement</u>		
	4. Identify <u>options</u>		
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	6. Draft <u>report</u>		
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	8. Write final <u>report</u>		
	9. Present <u>debriefing</u>		
Resources	• <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u>		
Evaluation	• <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u>		
Conclusion	Learners to submit reflective journal entry		

Step 3: Determine Interactions

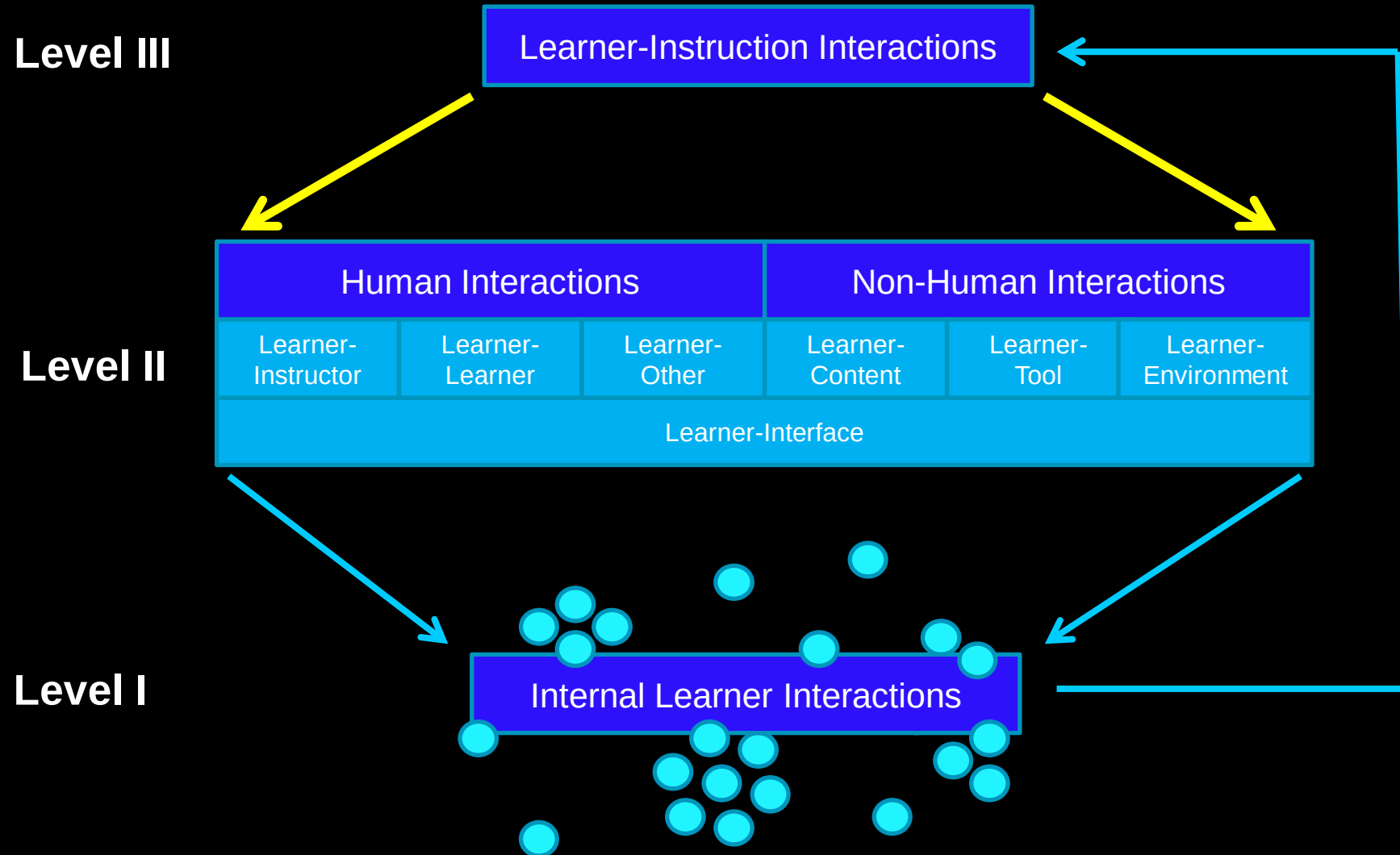


Figure 1. Three level framework for designing and sequencing elearning interactions (Hirumi, 2013, 2002)

Step 3: Determine Interactions

Table 2c. Sample Instructional Treatment Plan

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task completion. Ask learners to post prior experiences.	• Learner-Instructor • Learner-Learner	
Task	• Generate a feasibility report • Facilitate oral debriefing report	• Learner-Content • Learner-Instructor	
Process	1. Identify <u>topic</u>	• Learner-Content • Learner Instructor	
	2. Perform <u>research</u>	• Learner-Content • Learner-Environment • Learner-Other	
	3. Generate <u>problem statement</u>	• Learner-Learner • Learner-Instructor	
	4. Identify <u>options</u>	• Learner-Content	
	5. Select <u>criteria</u>	• Learner-Content	
	6. Draft <u>report</u>	• Learner-Content	
	7. Conduct <u>peer reviews</u>	• Learner-Learner	
	8. Write final <u>report</u>	• Learner-Content • Learner-Instructor	
	9. Present <u>debriefing</u>	• Learner-Learner • Learner-Instructor	
Resources	• <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u>	• Learner-Content • Learner-Other • Learner-Environment	
Evaluation	• <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u>	• Learner-Content • Learner-Instructor	
Conclusion	Learners to submit reflective journal entry	• Learner-Instructor	

Five (5) Steps for Grounding Interactions

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze interactions

Step 4: Map Tools

Table 2d. Sample Instructional Treatment Plan

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task completion. Ask learners to post prior experiences.	• Learner-Instructor • Learner-Learner	
Task	• Generate a feasibility report • Facilitate oral debriefing report	• Learner-Content	
Process	1. Identify <u>topic</u>	• Learner-Content • Learner Instructor	
	2. Perform <u>research</u>	• Learner-Content • Learner-Environment • Learner-Other	
	3. Generate <u>problem statement</u>	• Learner-Learner • Learner-Instructor	
	4. Identify <u>options</u>	• Learner-Content	
	5. Select <u>criteria</u>	• Learner-Content	
	6. Draft <u>report</u>	• Learner-Content	
	7. Conduct <u>peer reviews</u>	• Learner-Learner	
	8. Write final <u>report</u>	• Learner-Content • Learner-Instructor	
	9. Present <u>debriefing</u>	• Learner-Learner • Learner-Instructor	
Resources	• <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u>	• Learner-Content • Learner-Other • Learner-Environment	
Evaluation	• <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u>	• Learner-Content • Learner-Instructor	
Conclusion	Learners to submit reflective journal entry	• Learner-Instructor	

Step 4: Map Tools

Educational Media (1970s)

- Handouts
- Film/Strips
- Overhead Trans.
- Books, Articles, Papers
- Slides
- Radio
- Educational Television
- Audio/Video Cassettes

Personal Computers (1980s)

- Drill and Practice
- Games
- Tutorials/Simulations
- Productivity Tools

Electronic Networks (1990s)

- Email
- Listservs
- Newsgroups
- World-Wide-Web
- Interactive Television
- Desktop Conferences

Merging Digital Technologies (2000s)

- Web 2.0
- “Serious” Games
- Mobile
- Wikis, Blogs, Twitter
- Virtual Worlds (MUVE)

Step 4: Map Tools

- Media requirements (audio, video, text, still or motion graphics)
- Interaction requirements (synchronous or asynchronous)
- Instructor/learner configuration (1-1, 1-some, 1-many)
- Accessibility, stability and budget
- Human support

Step 4: Map Tools

Table 2d. Sample Instructional Treatment Plan

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task completion. Ask learners to post prior experiences.	• Learner-Instructor • Learner-Learner	• WWW • BBS
Task	• Generate a feasibility report • Facilitate oral debriefing report	• Learner-Content	• WWW
Process	1. Identify <u>topic</u>	• Learner-Content • Learner Instructor	• WWW • Email/BBS
	2. Perform <u>research</u>	• Learner-Content • Learner-Environment • Learner-Other	• WWW • Go to Library • Online Library
	3. Generate <u>problem statement</u>	• Learner-Learner • Learner-Instructor	• WWW • BBS
	4. Identify <u>options</u>	• Learner-Content	• WWW
	5. Select <u>criteria</u>	• Learner-Content	• WWW
	6. Draft <u>report</u>	• Learner-Content	• WWW
	7. Conduct <u>peer reviews</u>	• Learner-Learner	• BBS/Email
	8. Write final <u>report</u>	• Learner-Content • Learner-Instructor	• WWW • BBS/Email
	9. Present <u>debriefing</u>	• Learner-Learner • Learner-Instructor	• WWW • Desktop Conf.
Resources	• <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u>	• Learner-Content • Learner-Other • Learner-Environment	• WWW • F2F, • Email, phone
Evaluation	• <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u>	• Learner-Content • Learner-Instructor	• WWW • Email (templates)
Conclusion	Learners to submit reflective journal entry	• Learner-Instructor	• Email

Five (5) Steps for Grounding Interactions

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze interactions

Step 5: Analyze Interactions

Table 3. Sample Instructional Treatment Plan

Interaction	Quan	Description	Design Decision
Learner-Instructor	8	• Ask learner to post message • Review and provide feedback on topic • Review and provide feedback on problem • Provide guidance on preparing report and briefing • Assess and provide feedback on report and briefing • Review and provide feedback on journal entries.	Far too many interactions to manage. Need to review and revise by grouping two or more interactions, grouping students, eliminating or further automating interactions.
Learner-Learner	5	• Share description of seen or written reports. • Share and discuss problem statements. • Share and discuss purpose statements • Conduct peer reviews of reports • Participate and share comments on debriefings	Maybe too much, need review and pay particular attention during testing
Learner-Other	2	• Contact Librarian • Contact other Engineers	Need to ensure access to Librarian and Engineers
Learner-Content	21	• 1 lesson overview page covering all events. • Details on how to complete each step in process • Links to 7 resources • 2 Detailed evaluation rubrics • Description of journal entry.	Test usability of interface and web pages prior to official course delivery.
Learner-Environment	3	• Go to Library • Acquire and read Textbook • Acquire and read journal articles	Need to ensure ready access to library resource and textbook
Learner-Tool	2	• Use word processor to prepare feasibility report. • Use PowerPoint to prepare presentation.	Ensure access too word processor and PowerPoint.

What Next?

Design (Instructional Treatment Plan)

- Goals & Objectives
- Assessment Method
- Instructional Strategies
- Media Selection

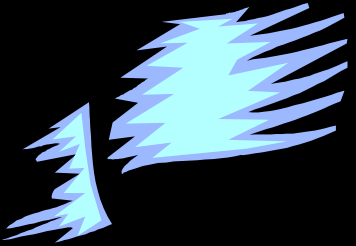
Development

- Flowcharts, Storyboards & Prototypes
- Formative Evaluation & Usability Tests



Goals

- I. Posit framework that delimits relationship between interactions, strategies & technology.
- II. Delineate steps for applying the framework to design & sequence meaningful interactions.
- III. Situate framework in context of ensuring quality learning experiences



Emerging Trends & Technology

- Global Health
- Telehealth & Telemedicine
- Interprofessional Education
- Health Systems Science
- Symptoms-based Curriculum
- Longitudinally Integrated Clinical Experiences
- Health Disparities, Diversity, and Professional Wellness
- Blended, Active and Mobile Learning
- Artificial, Virtual and Mixed Reality
- Big Data Analytics, AI, Machine Learning





Trends and technology may increase access,
productivity, and affordances...

But cannot guarantee the
quality of the learning
experience



What can you do to
ensure quality?



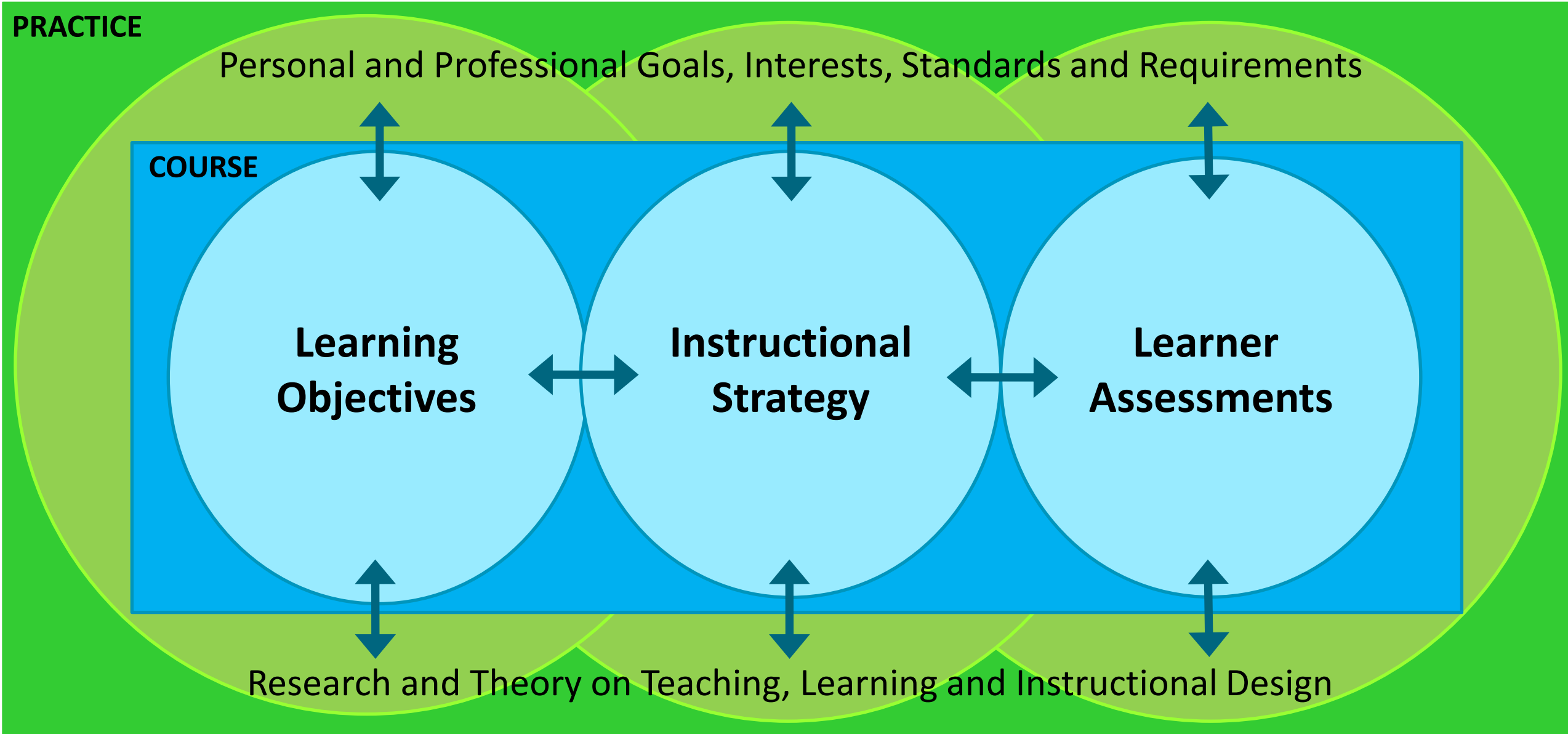


Figure 4. Vertical and horizontal alignment of instructional elements characteristic of high quality (effective, efficient, and engaging) learning experiences

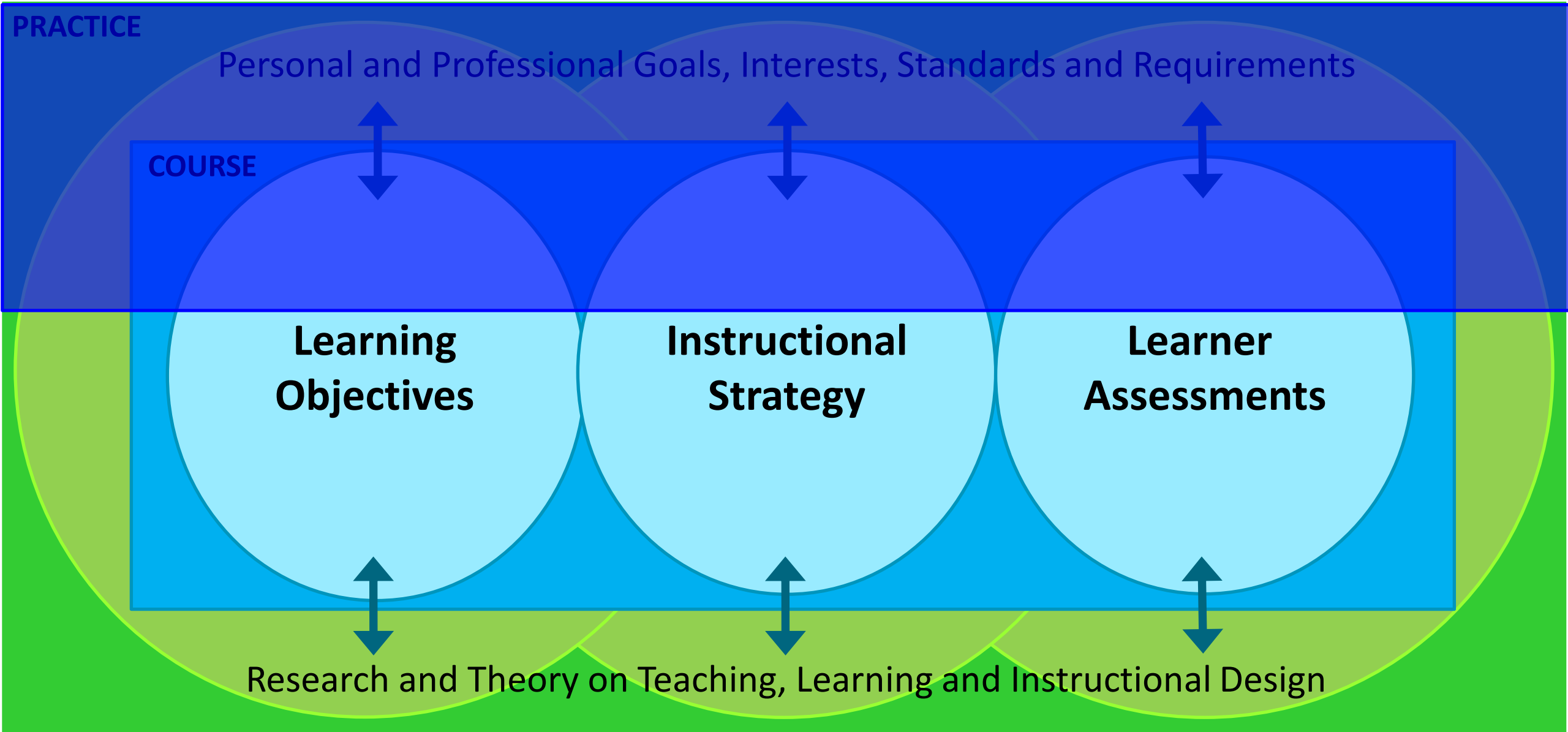
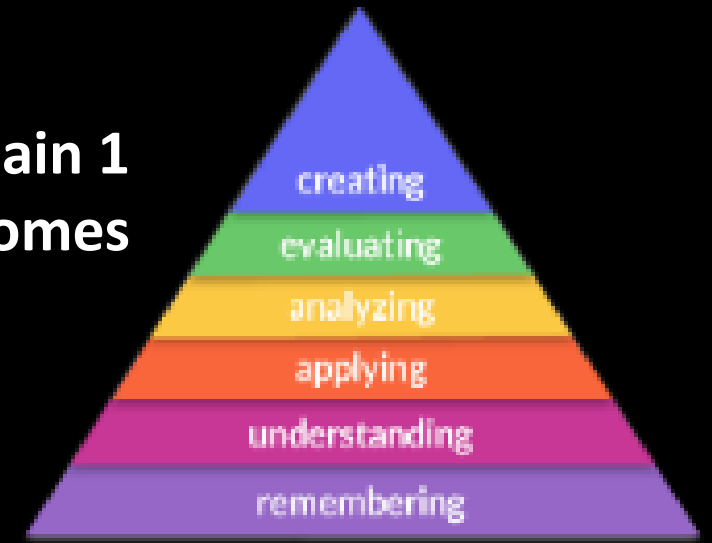


Figure 4a. Highly **effective** learning is grounded in research and theory/evidence-based) to ensure achievement of objectives and return on investment (replicable methods and materials) (**vertical alignment**).

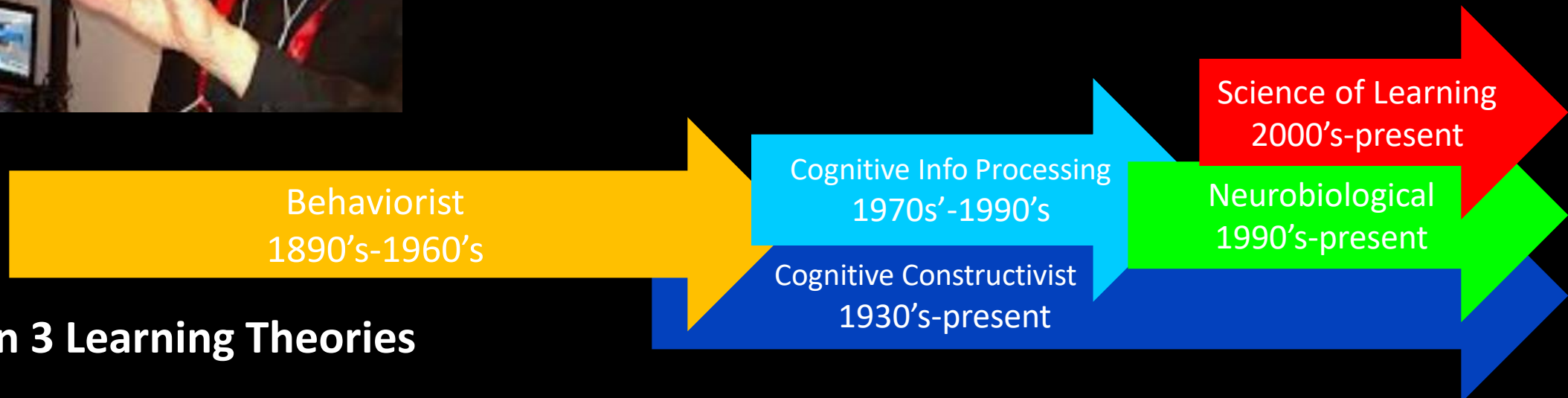
Domains of Evidence

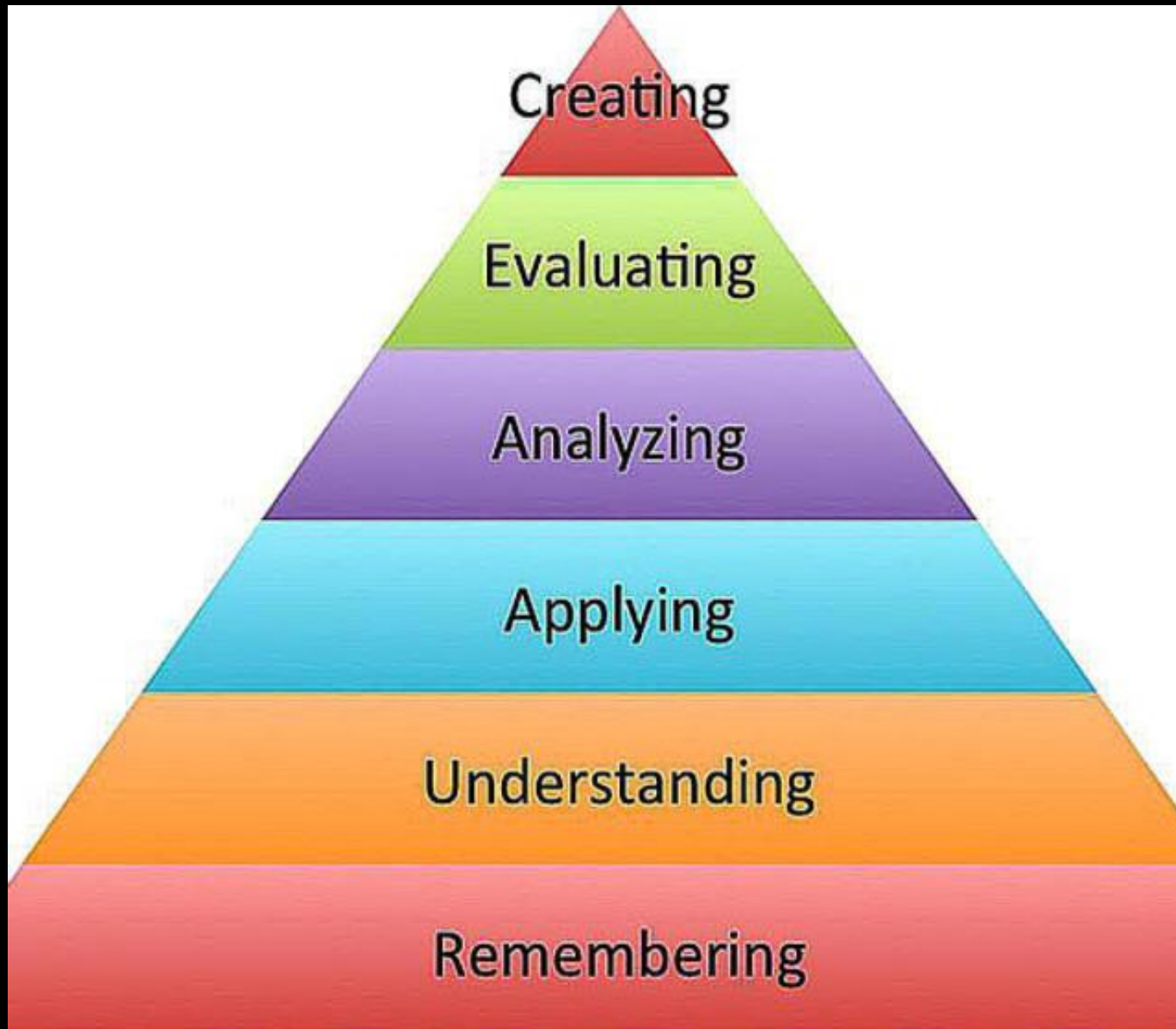
Domain 1 Learning Outcomes



Domain 2 Instructional Approaches

Domain 3 Learning Theories





Domain 1

Learning Outcomes

What does research say about achieving your specified educational goal?

- Aspegren K. BEME Guide No. 2: Teaching and learning communication skills in medicine - a review with quality grading of articles. *MEDICAL TEACHER*. 1999;21(6):563-570.
- O'Dunn-Orto A, Hartling L, Campbell S, Oswald AE (2012). Teaching musculoskeletal clinical skills to medical trainees and physicians: A Best Evidence in Medical Education systematic review of strategies and their effectiveness: BEME Guide No. 18. *Medical Teacher*.;34(2):93-102.



Domain 2 Instructional Approaches

What does research say about your planned methods (e.g., self, experiential, problem-based learning) or means (e.g., simulations, online, blended)?

- Bernard RM, Abrami PC, Borokhovski E, Wade CA, Tamim RM, Surkes MA, and Bethel EC. A Meta-Analysis of Three Types of Interaction Treatments in Distance Education. *Review of Educational Research*, 2009;79(3): 1,243–89.
- Cook DA, Erwin PJ, Triola MM. Computerized virtual patients in health professions education: A systematic review and meta-analysis. *Academic Medicine*, 2010;(85):1602–15890.

Domain 3 Learning Theories

What does research and theory say about how and why people learn?

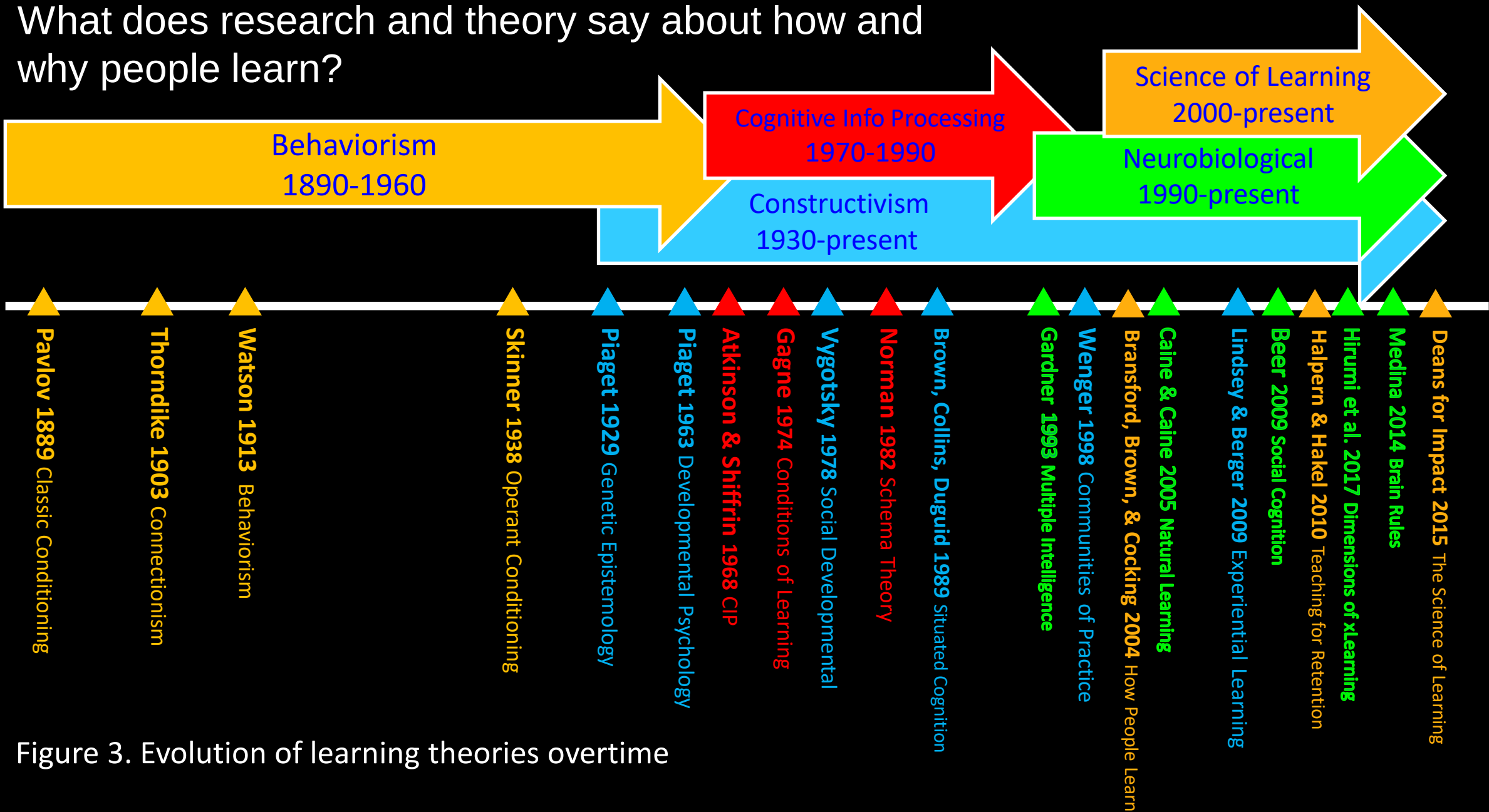


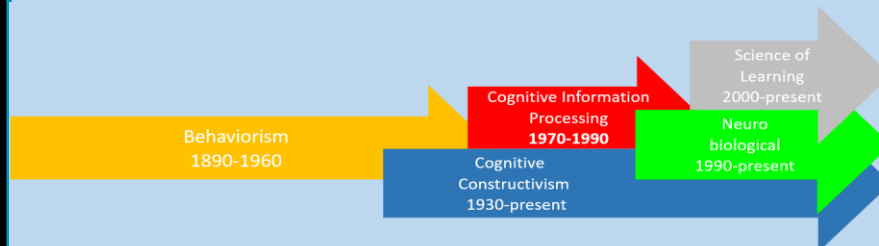
Figure 3. Evolution of learning theories overtime

Findings from
Steps 1 & 2 of
EBME process



Domain 1 Learning Outcomes

Domain 2 Instructional Approaches



Domain 3 Learning Theories

Step 3b – Appraise

Evidence

Table 1. Dimensions for appraising evidence

Scale	Factors
Quality of Evidence Ranging from 1—2—3 low---high	Are the sample sizes, sampling methods, data collection procedures, data analysis methods, and conclusions appropriate? Are the instruments reliable and valid?
Strength of Evidence Ranging from 1—2—3 low---high	Is the evidence based on a meta-analysis or systematic review of research, or experimental and quasi-experimental studies, or case studies and ethnographies, or professional judgement and anecdotal reports?
Relevance of Evidence Ranging from 1—2—3 low---high	Do the reported methods (including subjects, intervention, and measured outcomes) match the target learner population, intervention, outcomes, and context?



Design
requirements
informing Step 3

Step 3a – Acquire Evidence

Step 3 Acquire & Appraise Evidence

(Handouts: [ID Principles](#) | [AVIDesign Infographics](#))

- **Level 3 – Time and interest**

Let's go fishing

- **Level 2 – Some time and interest**

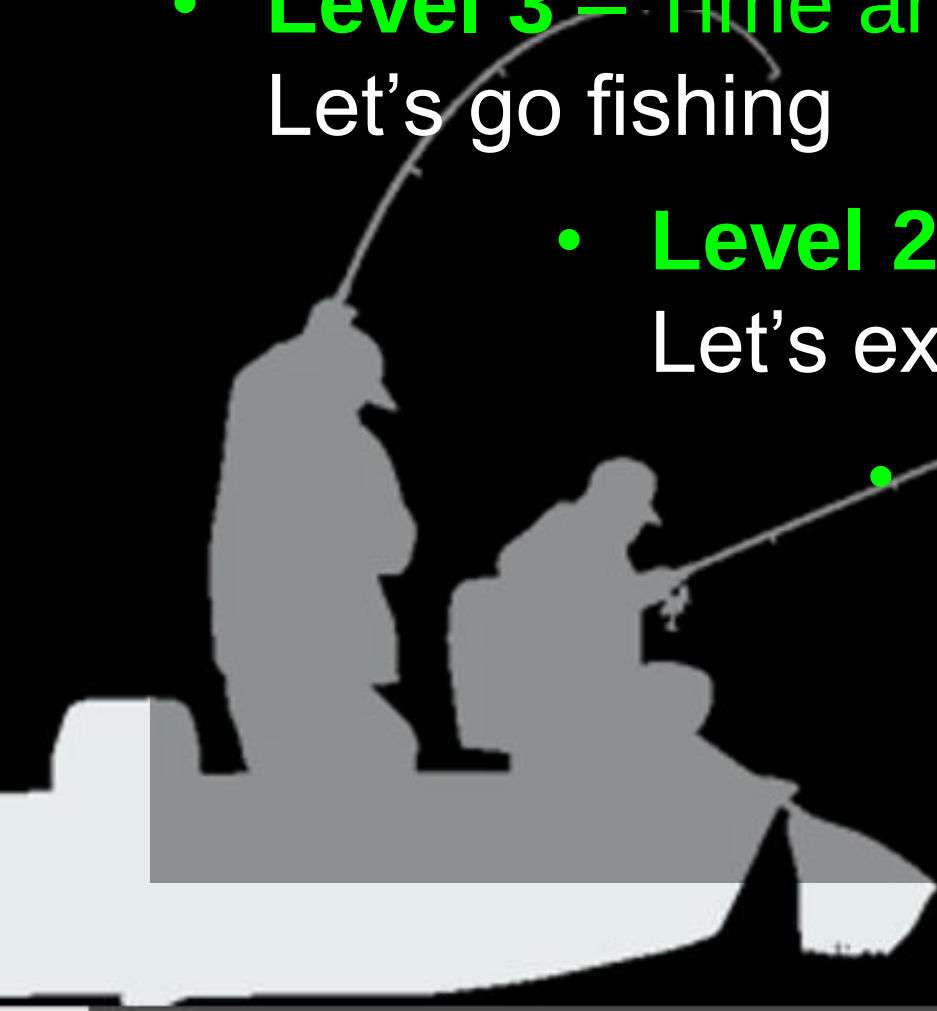
Let's examine the menu

- **Level 1 – Little time but some interest**

Please serve me fish

- **Level 0 – No time or interest**

No fish please



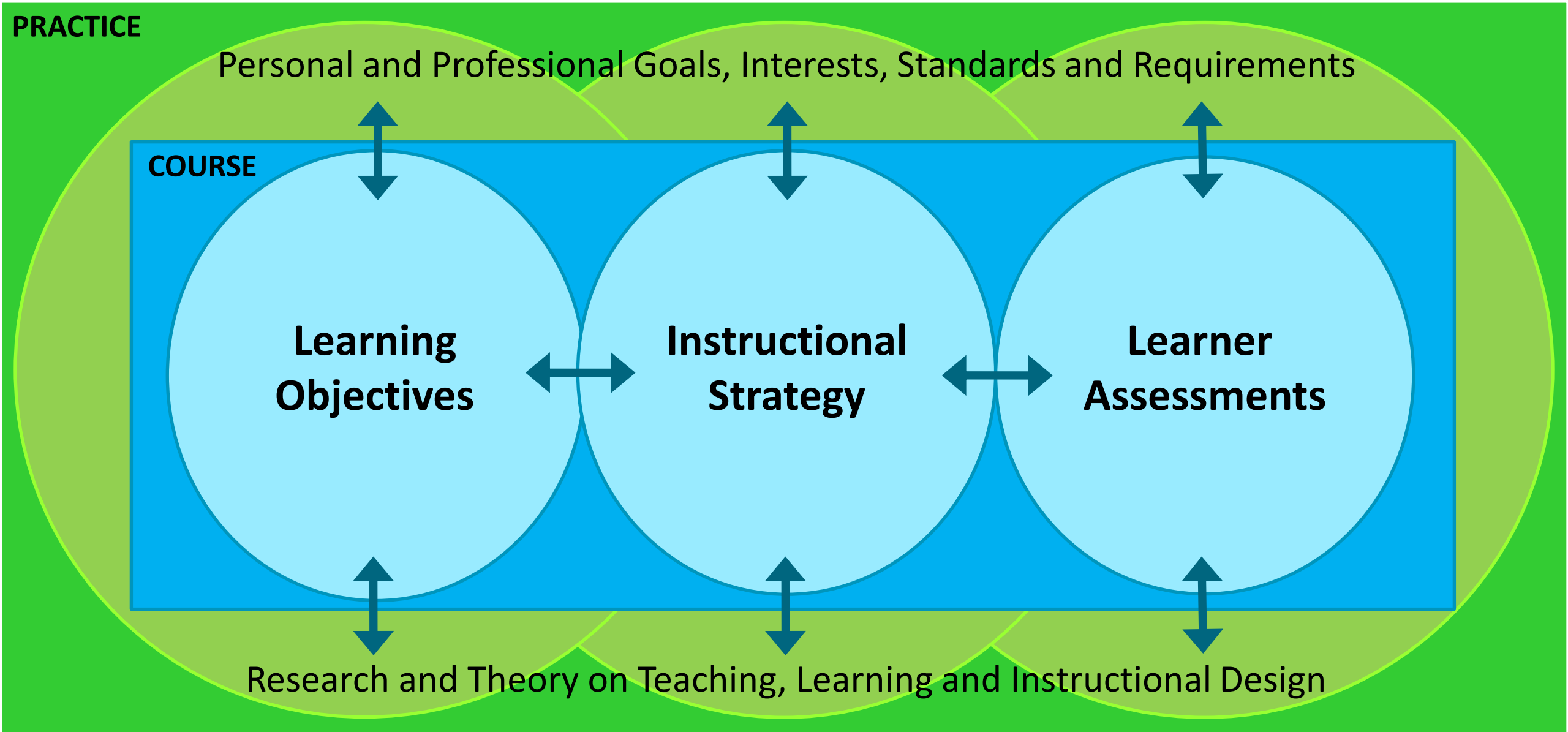


Figure 4a. Vertical and horizontal alignment of instructional elements characteristic of high quality (*effective*, *efficient*, and *engaging*) learning experiences⁴

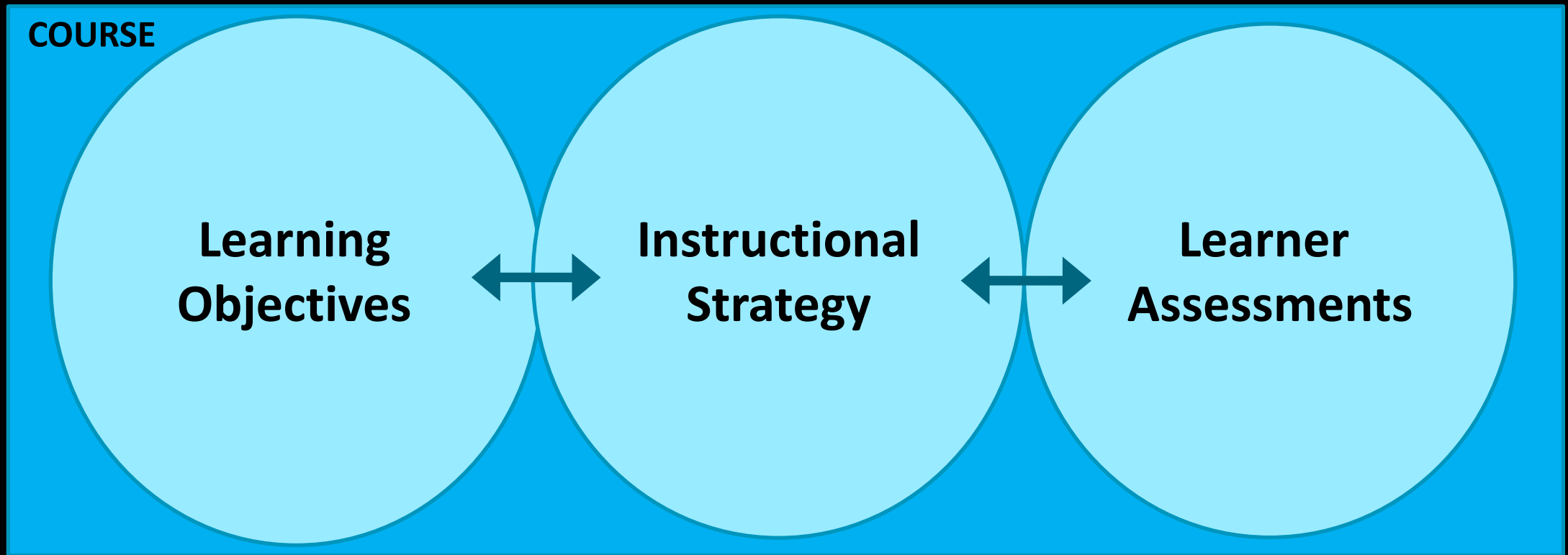


Figure 4b. Alignment of instructional elements. To ensure *efficient* (high-yield) learning, instruction must: (a) clearly communicate expectations (by defining and depicting the relationship between measurable outcomes, and (b) meet or exceed expectations (by aligning learner assessments and instructional strategy).

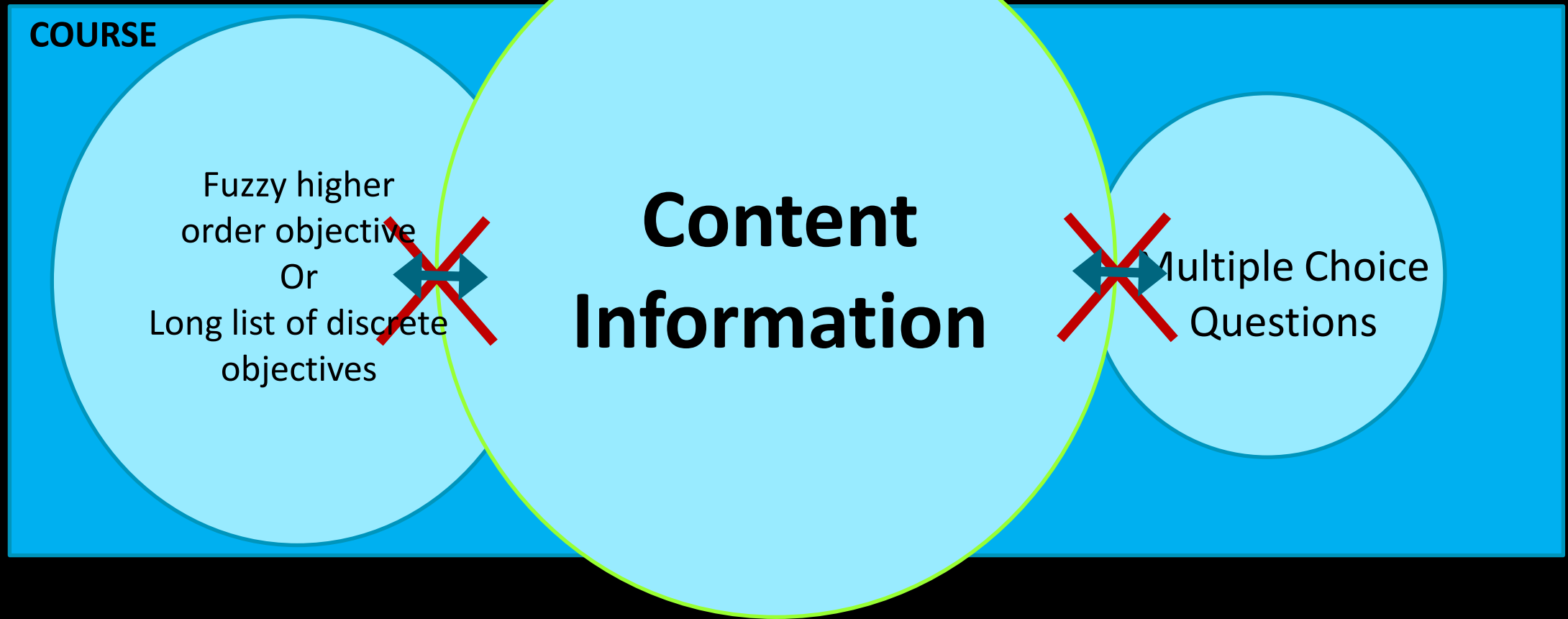


Figure 4c. Common design flaws and misalignments found in education, training, and professional development across disciplines

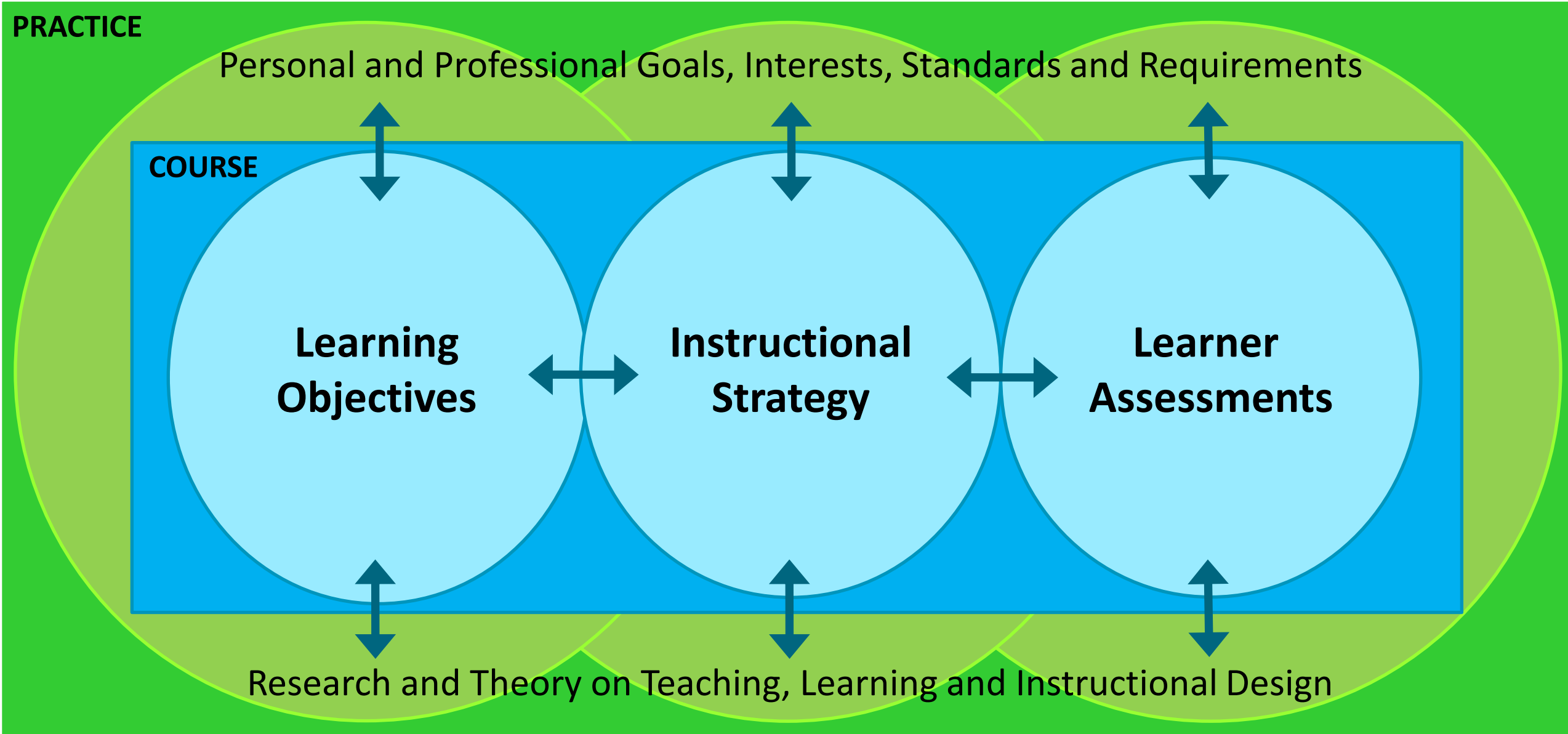


Figure 4a. Vertical and horizontal alignment of instructional elements characteristic of high quality (*effective, efficient, and engaging*) learning experiences

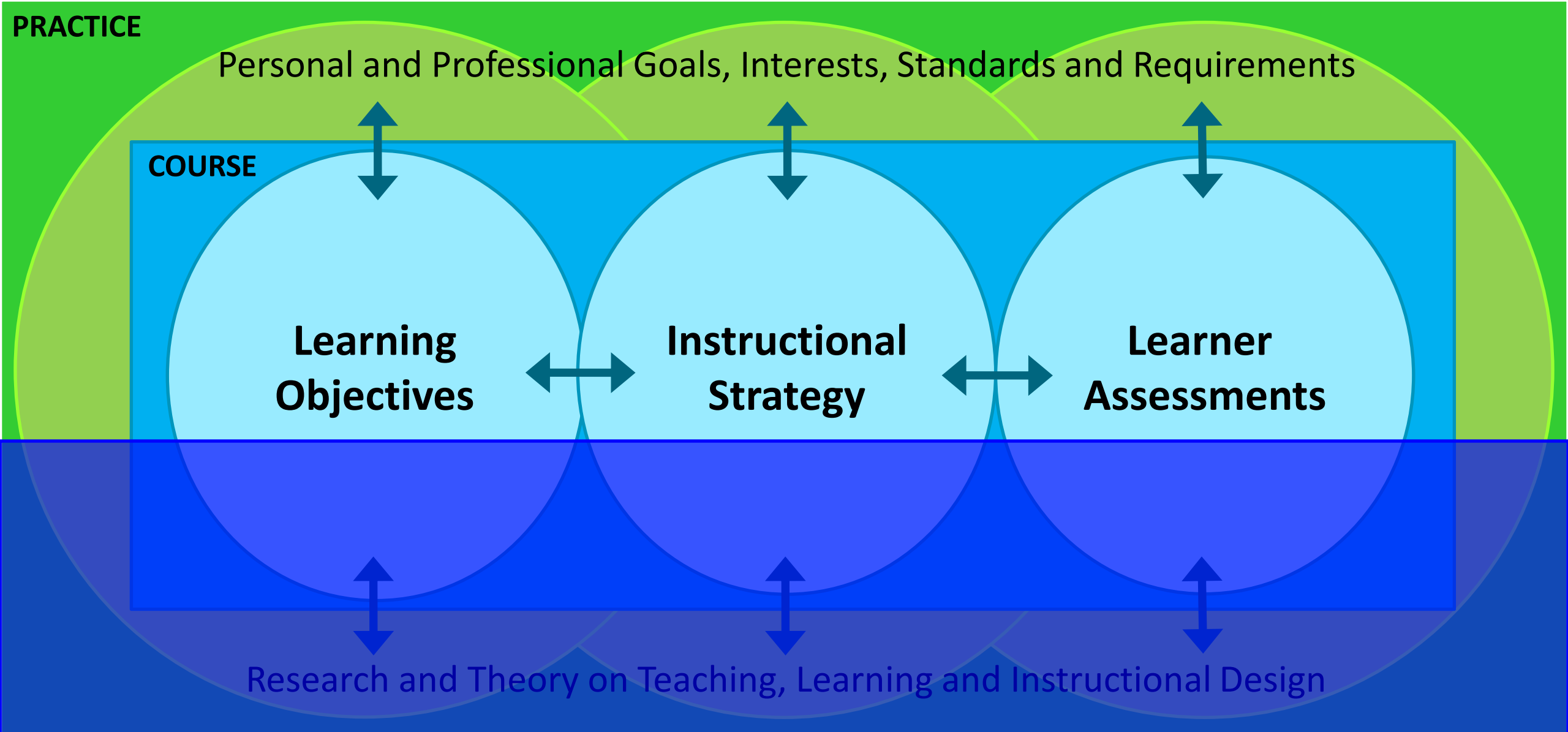


Figure 4d. **Engaging** learning experiences motivate students by (a) gaining and sustaining their **A**ttention, (b) demonstrating personal and professional **R**elevance, (d) fostering **C**onfidence in meeting professional standards and requirements, and (d) **S**atisfying (and exceeding) expectations (**ARCS**)

ARCS Model of Motivational Design^{16,17}

To motivate students to learn, instruction must...

- Gain **A**ttention
- **R**elevant to Needs
- Foster **C**onfidence
- **S**atisfy Expectations

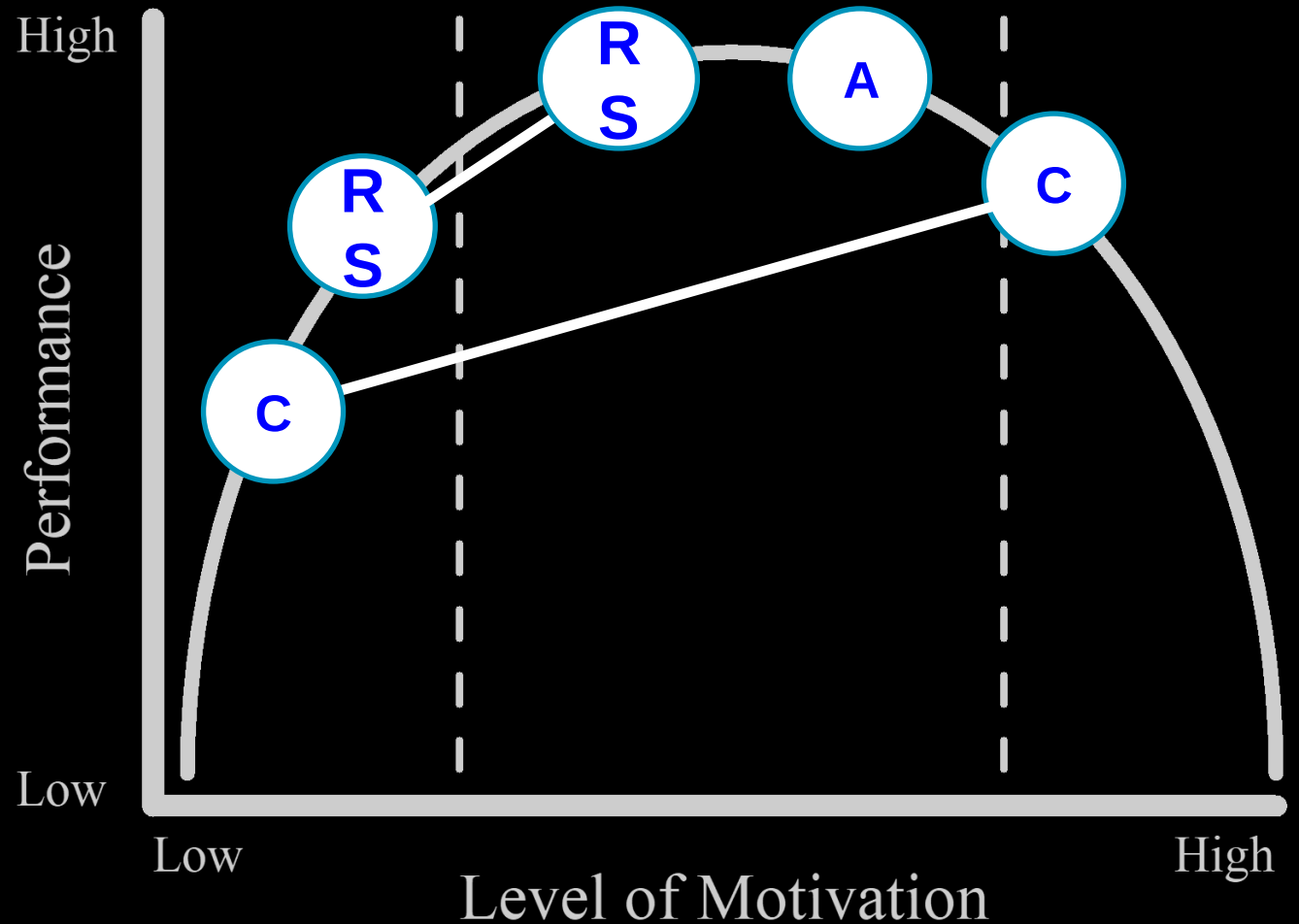


Figure 5. Sample Analysis of Perceived ARCS

Attention getting tactics

A1. *Perceptual Arousal* - Stimulate senses

- Sensory effects, provoking pictures/sounds/videos/objects
- Absence of distraction

A2. *Inquiry Arousal* - Stimulate curiosity.

- Active responding, brainstorming
- Create, explore, investigate
- Unusual, counter-intuitive content or events, sense of mystery

A3. *Variability* - Maintain interest.

- Brief instructional segments
- Interplay information and response, Q&A
- Format variation, free writing





Relevance generating tactics

- R1. *Goal Orientation* - Meet learners' needs.
 - Importance or utility
 - Built in goals
 - Goal creation & type options
- R2. *Motive Matching* - Appropriate choices, responsibilities, and influences.
 - Goal level options
 - Scoring system or non-competitive options
 - Multiple participant opportunities
- R3. *Familiarity* - Tie to learners' experiences?
 - Human interest language and graphics
 - Demonstrations/Illustrations
 - Familiar examples and contexts

Confidence building tactics

C1. *Learning Requirements* - Positive expectation for success.

- Objective and structure
- Criteria and feedback
- Prerequisites & Test conditions

C2. *Success Opportunities* - Enhance beliefs in competence.

- Easy to difficult
- Appropriate and variable difficulty level
- Multiple entry points

C3. *Personal Control* - Success based on their efforts/abilities?

- Exit and pacing control
- Quick access & menu structure
- Attributional language





Satisfaction producing tactics

- S1. *Natural Consequences* - Meaningful opportunities for learners to use their newly acquired knowledge/skills.
 - Application exercises
 - Transfer to subsequent tasks
 - Simulated applications, observe natural events
- S2. *Positive Consequences* - Reinforce learners' successes?
 - Appropriate, meaningful reinforcement schedule
 - Judicious rewards for correct responses
 - Optional rewards, including rewards for risk-taking
- S3. *Equity* - Positive feeling about accomplishments.
 - Purpose and content consistency
 - Exercise and test consistency
 - Reward consistency

Table 4. Levels of evaluation and related measures

Levels	Measures
Use	• LMS/Computer Logs
Reactions	Perceived Levels of Motivation (ARCS) • Attention • Relevance • Confidence • Satisfaction
Learning	Course • Assignments • Quizzes • Exams
Transfer	• Concurrent Coursework • Proceeding Coursework
Impact	• Clerkships • Residencies

(Adapted from Kirkpatrick & Kirkpatrick, 2016; Kirkpatrick, 1956a, 1956b, 1956c, 1956d)

Summary

- Limitations with teacher-directed
 - Challenges with online/hybrid learning
 - Existing frameworks for classifying interactions
 - Grounded (evidence-based) design
 - Three level framework and 5 steps process
 - Trends and technology increasing access, productivity, and affordances but...
 - Horizontal and vertical alignment for ensuring effectiveness, efficiency, and engagement

