

21st Century Designs for Facilitating elearning

A Grounded Approach

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April 4, 2013
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Context

- With insufficient time, training, tools or incentives, educators rely on past practices (instructor-led methods & materials)
- eLearning continues to mimic correspondence mail models of DE

Instructor-Led Methods

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

Key Differences?

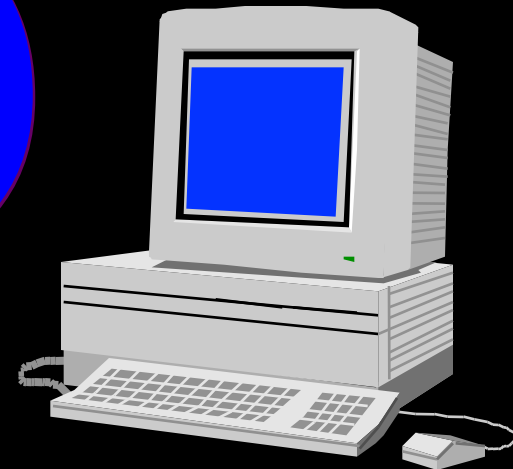
Spontaneity of Interactions

- Interpret verbal and non-verbal cues
- Clarify expectations
 - Address individual needs/concerns
 - Provide insights & elaborations
 - Give directions
 - Facilitate discussions
 - Present immediate feedback

Key Differences?



Instructor-Led
Coursework



Web-Based
Education

Key Differences?

- Limited real-time (synchronous) spontaneous 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 to address individual needs and interests
- Reduces feelings of isolation & anonymity
- Tool for transforming instructor-led to learner-centered methods
- Defining characteristic & vital to DE (Moore, 1989)
- Single most important element (Kearsley, 1998)

What do we know?

Basic Definition:

Learner accessing a page of text via a web interface and reading some content.

(Carlson & Repman, 1999)

Complex Definition:

Five Criteria (a) interruptability, (b) graceful degradation, (c) limited look-ahead, (d) no default, and (e) seemingly infinite database.

(Lippman, 1988)

What do we know?

"...passing on content as if 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 com.
- Synchronous com.
- Browse and click
- Branch
- Track

- Coach
- Help
- Practice
- Feedback

(breakthebarrier.com, 2001)

- Interact with content
- Monitor and regulate
- Support performance

- Collaborate
- Converse

(Northrup, 2001)

- Confirm
- Navigate
- Elaborate

- Pace
- Inquire

(Hannifin, 1989)

Frameworks (Activity-based)

Level 1 - Passive

Level 2 - Limited participation

Level 3 - Complex participation

Level 4 - Real-time participation

(Department of Defense, 2001)

Frameworks (Tool-based)

- Electronic mail and delayed messaging
- Remote access and delayed collaboration
- Real-time brainstorming and conversation
- Real-time text collaboration
- Real-time multimedia and hypermedia collaboration

(Bonk & King, 1998)

Limitations

- Relationship between interactions.
- Interrelationships between interactions, strategies and technologies.
- Systematic process to design and sequence interactions.

Objectives

1. Design & sequence interactions
2. Design & develop student-centered environments
3. Facilitate creativity, and change

Contents

- I. Posit framework that delimits relationship between interactions, instruction and technology.
- II. Situate framework within systematic process for designing and sequencing elearning interactions.

Proposed Framework

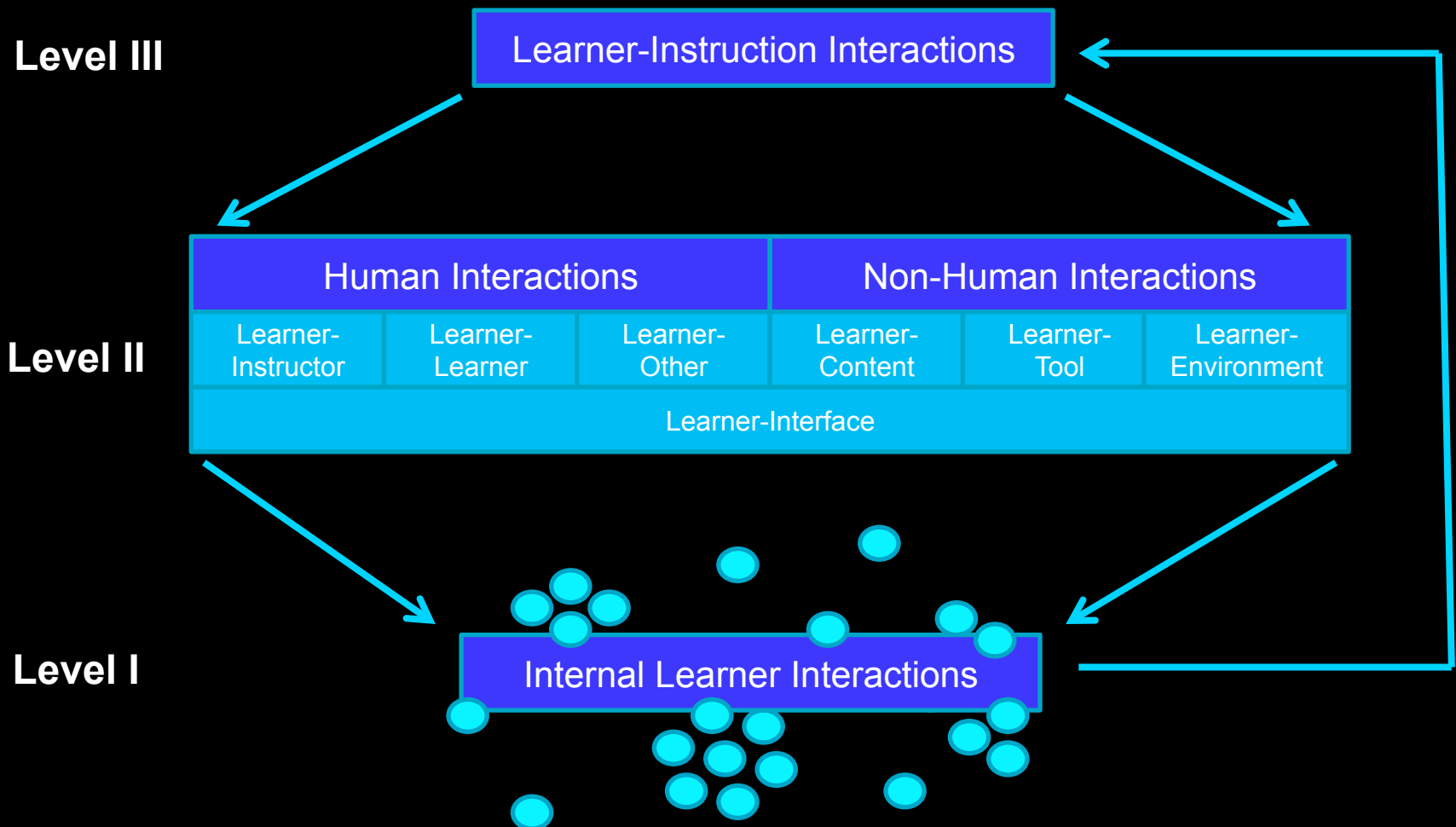


Figure 1. Three-Level framework for elearning Interactions (Hirumi, in press)

Contents

- I. Posit framework that delimits relationship between interactions, instruction and technology.
- II. Situate framework within systematic process for designing and sequencing elearning interactions.

Systematic Design Process

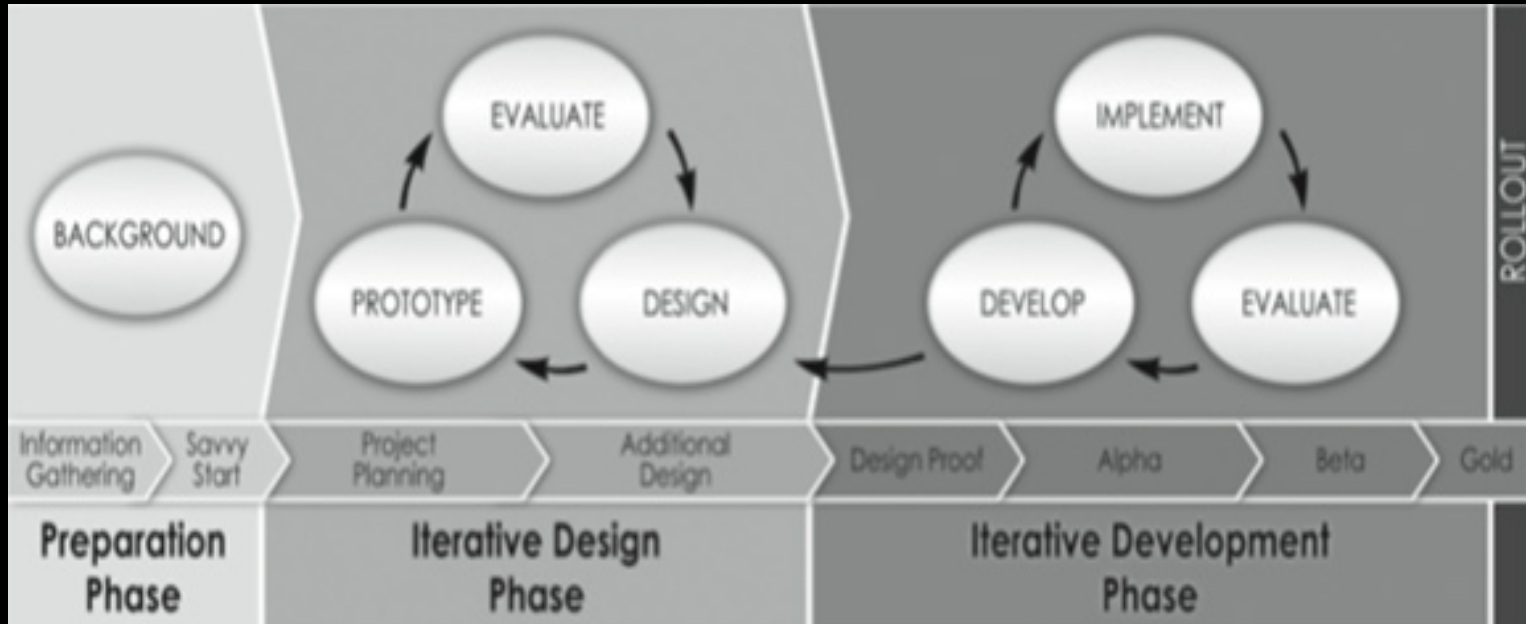


Figure 2. Extended Successive Approximation Model (SAM2)

Design

- Goals & Objectives
- Learner Assessments
- Instructional Strategy
- Media Selection

Instructional Strategy & Media Selection

Prepare Treatment Plan

Step 1. Select instructional strategy

Step 2. Operationalize strategy

Step 3. Determine type of interactions

Step 4. Map tools to events

Step 5. Analyze Interactions

*What is the difference
between...*

Information vs.
Education?

Craft-Based vs.
Grounded Design?

Craft-Based Design

Sequence of events based
on past practices, opinions,
fads, politics, etc.

Grounded Design

Sequence of events based
on experience, research
& theory

Grounded 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 Design

Key Conditions

- Rooted in defensible theoretical framework
- Consistent with research findings
- Generalizable beyond unique conditions
- Validated through successive implementations

Grounded Design

Rationale

- Aligns research, theory, and practice
- Explains and predicts results
- Establishes foundation for design decisions
- Allows systematic study, continuous improvement, and effective use across context

Instructional Strategy & Media Selection

Prepare Treatment Plan

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze Interactions

Step 1: Select Strategy

- Educational Philosophy
- Knowledge of strategies
- Goals and Objectives

Educational Philosophy

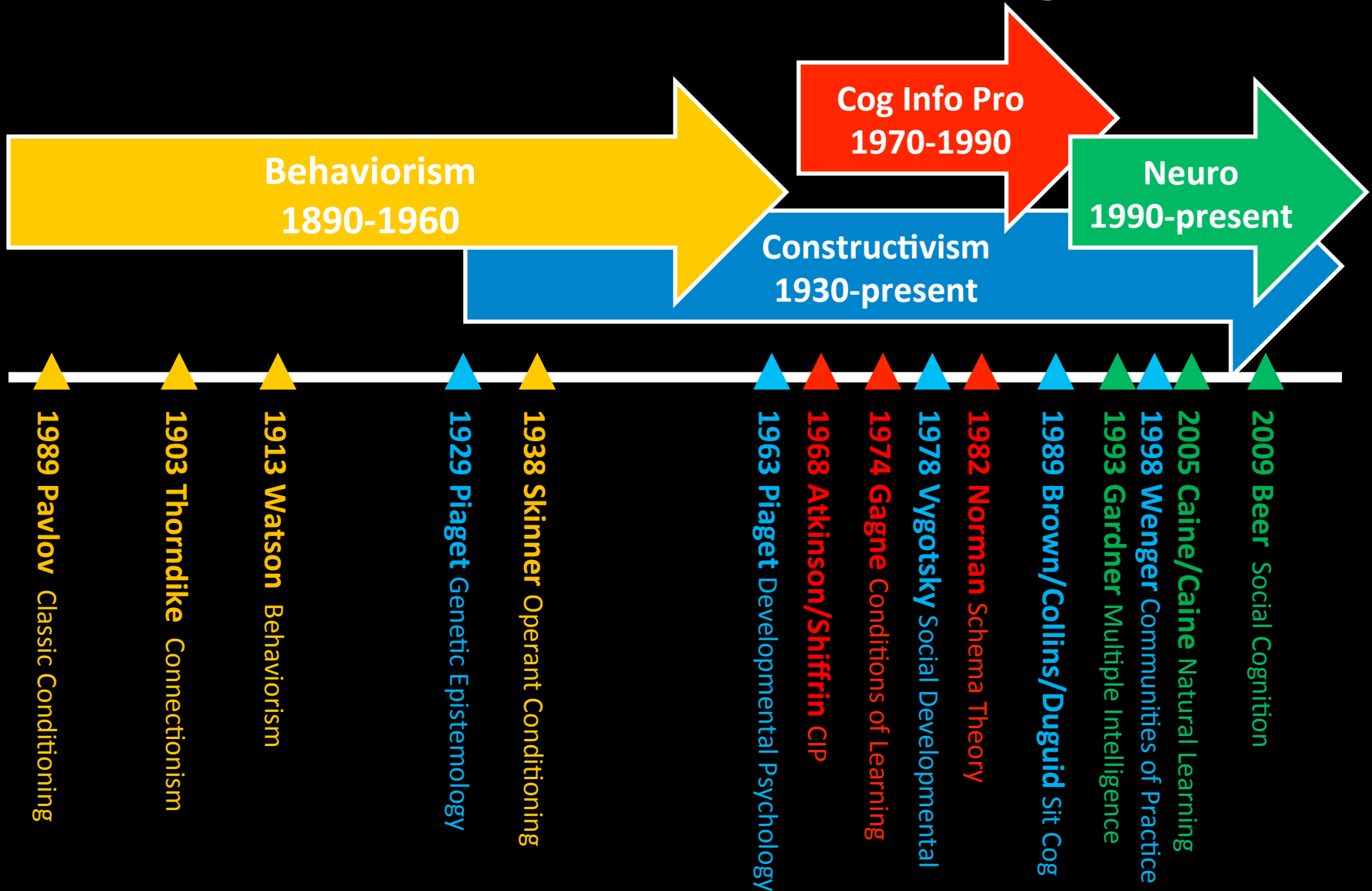


Figure 3. Major Classes of Learning Theories

Knowledge & Philosophy

(Handout: Grounded Instructional Strategies)

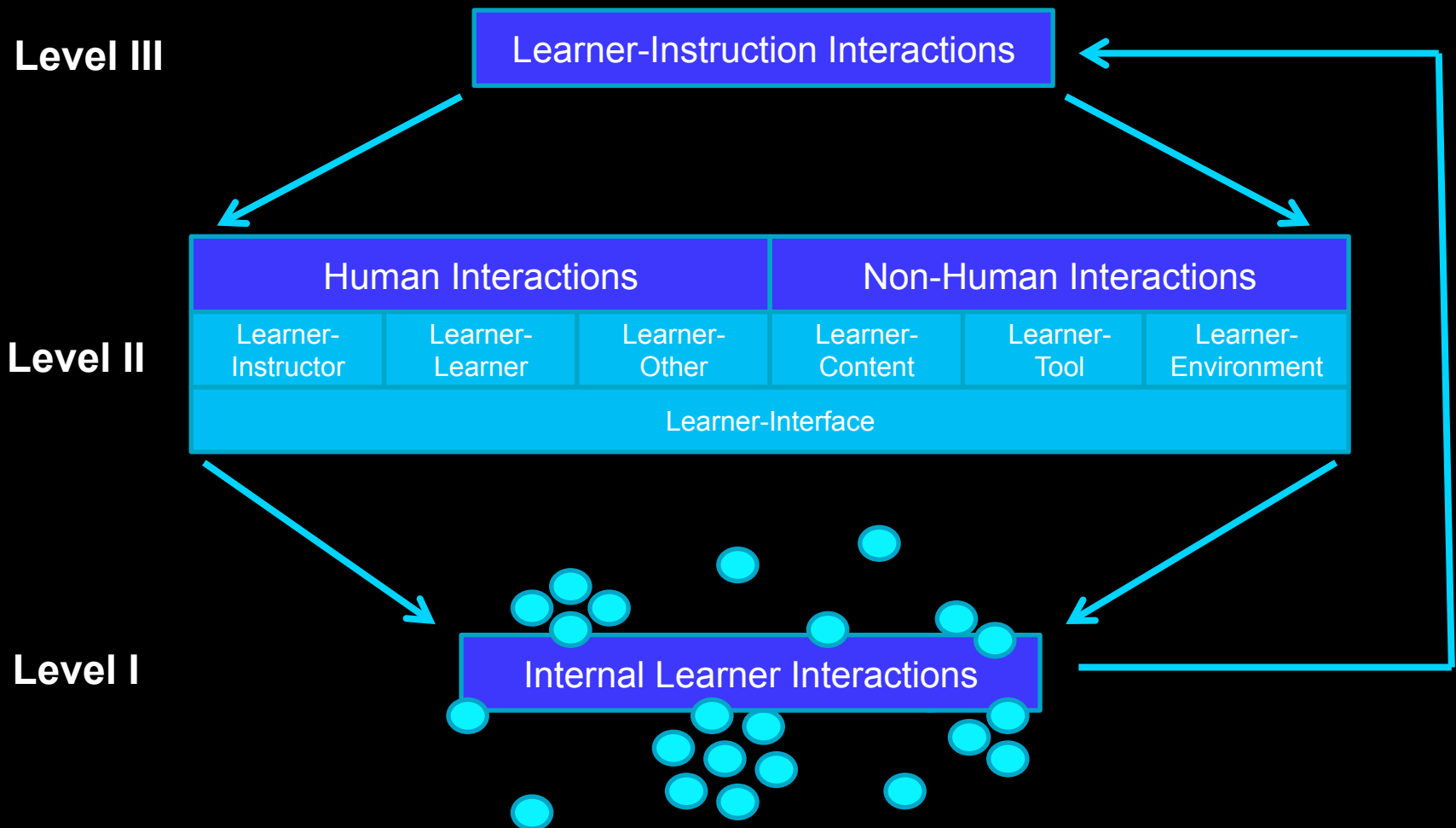


Figure 1. Three-Level Framework for elearning Interactions (Hirumi, in press)

Goals & 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	Comprehension		Understand			Understand Relationships		
	Rules	Application		Apply	Procedural Knowledge	How to	Apply Skills		
		Analysis		Analyze			Apply Generic Skills		
	Problem Solving	Synthesis		Evaluate	What Happens				
		Evaluation		Create					
	Cognitive Strategies								
Affective	Attitudes						Receiving Responding Valuing Organization Characterization		
Psychomotor	Motor Skills							Perception Set Guided Response Mechanism Complex Response Adaptation Origination	

Goals & Objectives

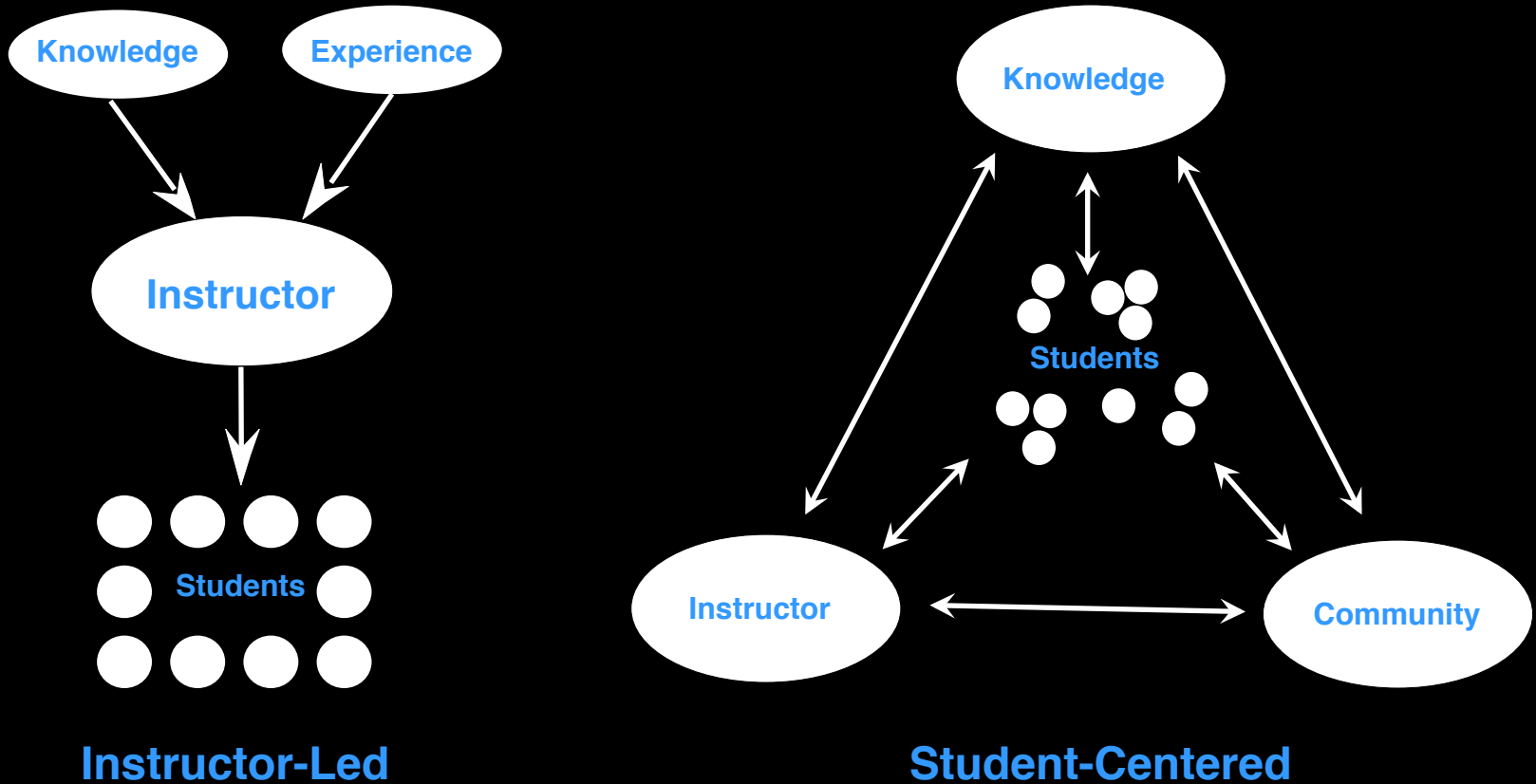


Figure 4. Comparison of teacher versus student-centered learning environments

Step 1: Select Strategy

Table 2a. Sample Instructional Treatment Plan Applying 5E Model

Event	Description	Interaction(s)	Tools
Engage			
Explore			
Explain			
Elaborate			
Evaluate			

Instructional Strategy & Media Selection

Prepare Treatment Plan

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze Interactions

Step 2: Operationalize Strategy

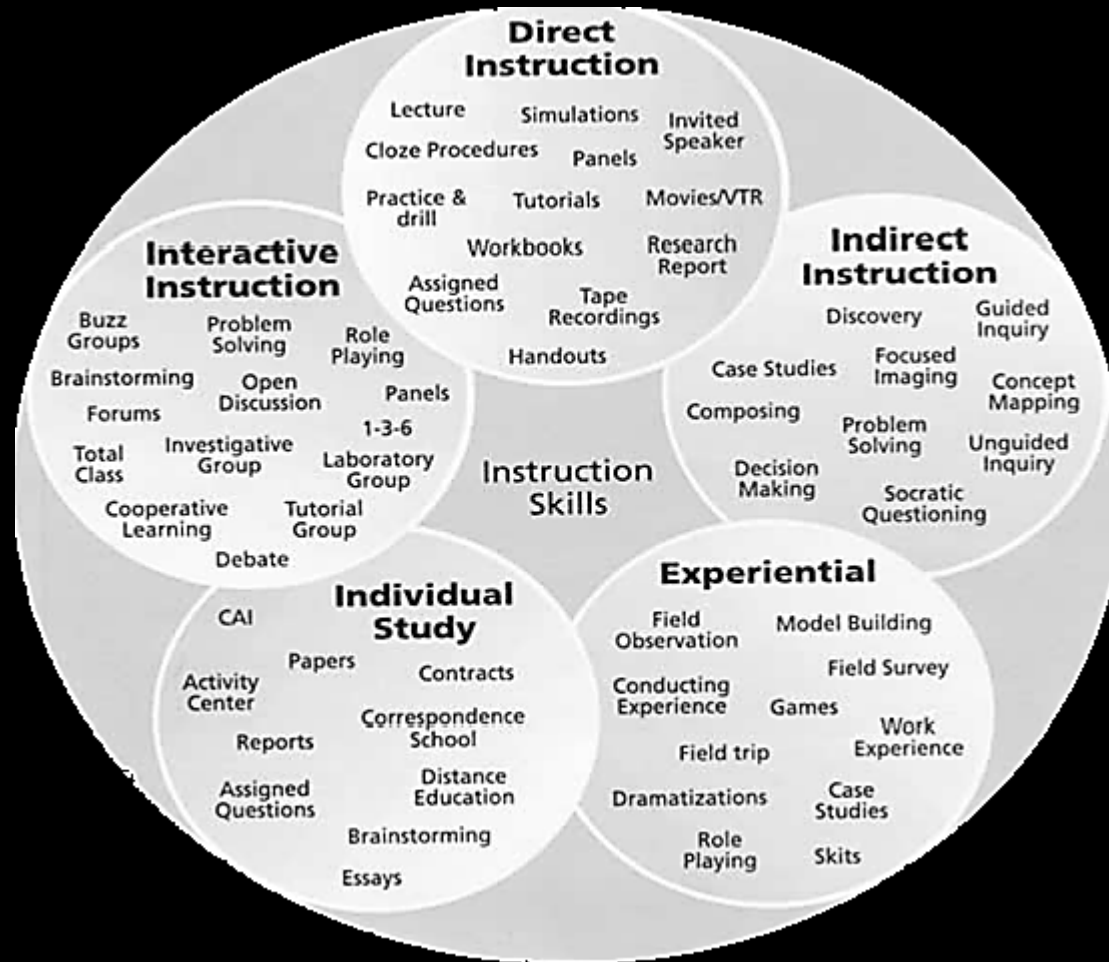


Figure 5. Instructional events associated with 5 types of strategies

<http://www.sasked.gov.sk.ca/docs/native10/images/Image18.jpg>

Step 2: Operationalize Strategy

(Handout: Grounded Instructional Events)

- **Verbal Information**
- **Concepts**
- **Rules**
- **Problem Solving**
- **Cognitive Strategies**
- **Attitudes**

Step 2: Operationalize Strategy

Table 2b. Sample Instructional Treatment Plan

Event	Description	Interact	Tools
Engage	Present shocking/inspiring picture to evoke emotion. Note role of emotions in learning. Post engaging video about affective neuroscience.		
Explore	Present basic to more advanced levels of content information. Distinguish the degree of technical difficulty associated with each level of resources.		
Explain	Ask students to explain what they learned from exploration, meeting Standards for Critical Thinking. Encourage students to read and respond to each other's explanation.		
Elaborate	Students to elaborate by working in teams to discuss individual explorations and explanations , and by redesigning an instructional unit based on what they learned.		
Evaluate	Use Paul & Elder' critical thinking and reasoning explanations to evaluate explanations and elaborations. Ask students to complete teamwork evaluation forms		

Instructional Strategy & Media Selection

Prepare Treatment Plan

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze Interactions

Step 3: Determine Interactions

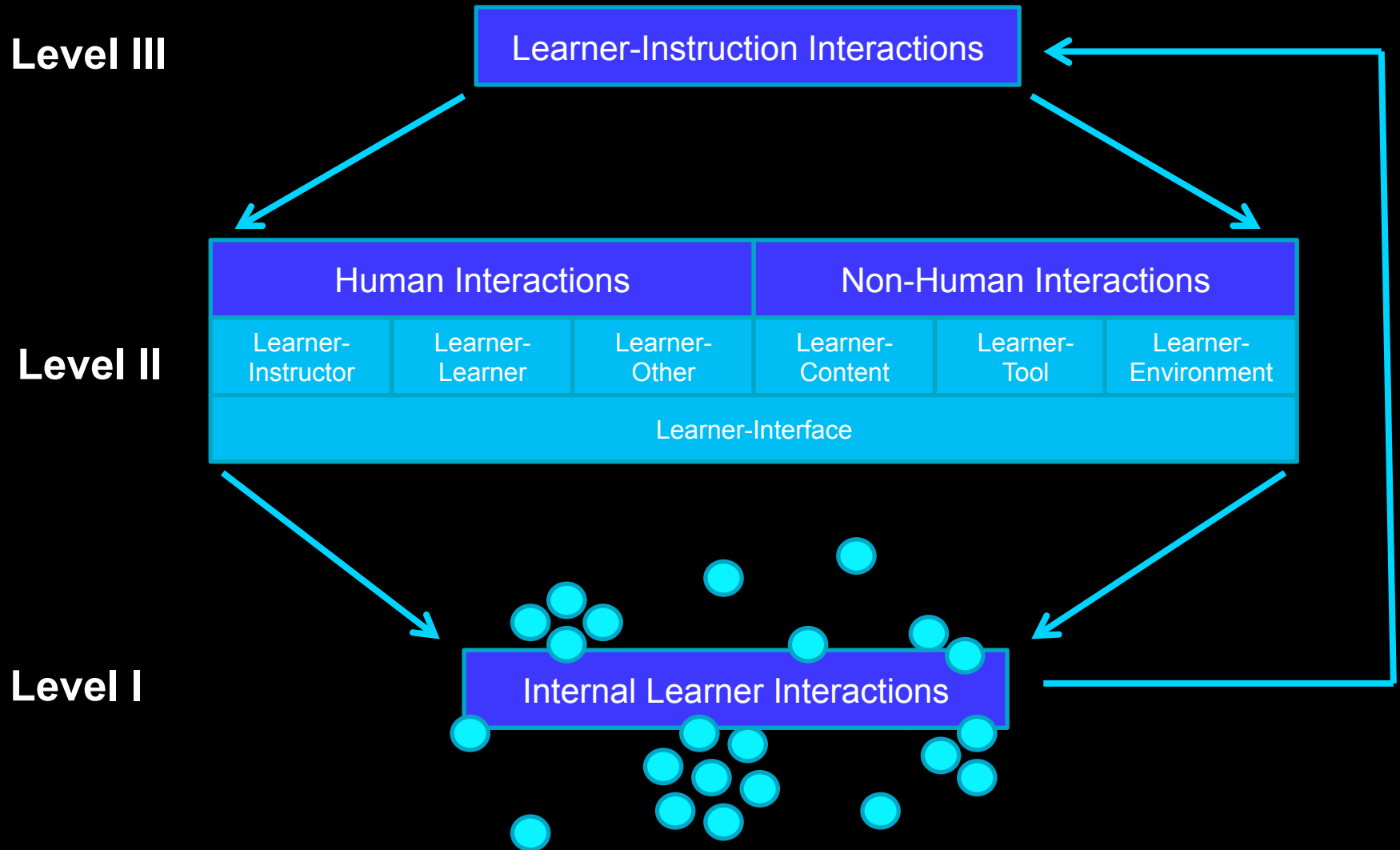


Figure 1. Three-Level Framework for elearning Interactions (Hirumi, in press)

Step 3: Determine Interactions

Table 2c. Sample Instructional Treatment Plan Applying 5E Model

Event	Description	Interaction(s)	Tools
Engage	Present shocking/inspiring picture to evoke emotion. Note role of emotions in learning. Post engaging video about affective neuroscience.	<ul style="list-style-type: none"> • Learner-Content • Learner-Interface 	
Explore	Present basic to more advanced levels of content information. Distinguish the degree of technical difficulty associated with each level of resources.	<ul style="list-style-type: none"> • Learner-Content • Learner-Interface 	
Explain	Ask students to explain what they learned from exploration, meeting Standards for Critical Thinking. Encourage students to read and respond to each other's explanation.	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor • Learner-Interface 	
Elaborate	Students to elaborate by working in teams to discuss individual explorations and explanations, and by redesigning an instructional unit based on what they learned.	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor • Learner-Interface • Learner-Environment 	
Evaluate	Use Paul & Elder' critical thinking standards to evaluate explanations. Use Paul & Elder's reasoning standards to evaluate team elaborations. Ask students to complete teamwork evaluations.	<ul style="list-style-type: none"> • Learner-Content • Learner-Instructor • Learner-Interface 	

Instructional Strategy & Media Selection

Prepare Treatment Plan

Step 1. Select strategy

Step 2. Operationalize strategy

Step 3. Determine interactions

Step 4. Map tools

Step 5. Analyze Interactions

Step 4: Map Tools

Educational Media (1970s)

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

Decade of Personal Computers (1980s)

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

Decade of Electronic Networks (1990s)

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

Decade of Advanced Digital Technologies (2000s)

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

Step 4: Map Tools

- Media requirements
- Interaction requirements
- Learner/instructor configuration
- Availability and budget
- Human support

Step 4: Map Tools

Table 2d. Sample Instructional Treatment Plan Applying 5E Model

Event	Description	Interaction(s)	Tools
Engage	Present shocking/inspiring picture to evoke emotion. Note role of emotions in learning. Post engaging video about affective neuroscience.	<ul style="list-style-type: none"> • Learner-Content • Learner-Interface 	<ul style="list-style-type: none"> • Audio, Video, • Text, Graphics
Explore	Present basic to more advanced levels of content information. Distinguish the degree of technical difficulty associated with each level of resources.	<ul style="list-style-type: none"> • Learner-Content • Learner-Interface 	<ul style="list-style-type: none"> • Articles, Videos • Textbook
Explain	Ask students to explain what they learned from exploration, meeting Standards for Critical Thinking. Encourage students to read and respond to each other's explanation.	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor • Learner-Interface 	<ul style="list-style-type: none"> • Online Discussion
Elaborate	Students to elaborate by working in teams to discuss individual explorations and explanations, and by redesigning an instructional unit based on what they learned.	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor • Learner-Interface • Learner-Environment 	<ul style="list-style-type: none"> • F2F Class • Wiki, email • Phone
Evaluate	Use Paul & Elder' critical thinking standards to evaluate explanations and reasoning standards to evaluate team elaborations. Ask students to complete teamwork evaluations.	<ul style="list-style-type: none"> • Learner-Content • Learner-Instructor • Learner-Interface 	<ul style="list-style-type: none"> • Online Discussion • Email

Instructional Strategy & Media Selection

Prepare Treatment Plan

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 Treatment Plan for Engineering Lesson (Hirumi, 2006)

Event	Description	Interaction(s)	Tools
Introduction	Present questions to establish context, need for learning and guide task. Ask learners to post prior experiences.	<ul style="list-style-type: none"> • Learner-Content • Learner-Instructor • Learner-Learner 	<ul style="list-style-type: none"> • WWW • BBS
Task	<ul style="list-style-type: none"> • Generate a feasibility report • Facilitate oral debriefing report 	<ul style="list-style-type: none"> • Learner-Content 	<ul style="list-style-type: none"> • WWW
Process	1. Identify <u>topic</u>	<ul style="list-style-type: none"> • Learner-Content • Learner Instructor 	<ul style="list-style-type: none"> • WWW • Email/BBS
	2. Perform <u>research</u>	<ul style="list-style-type: none"> • Learner-Environment • Learner-Other 	<ul style="list-style-type: none"> • WWW • Library
	3. Generate <u>problem statement</u>	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor 	<ul style="list-style-type: none"> • WWW • BBS
	4. Identify <u>options</u>	<ul style="list-style-type: none"> • Learner-Content 	<ul style="list-style-type: none"> • WWW
	5. Select <u>criteria</u>	<ul style="list-style-type: none"> • Learner-Content 	<ul style="list-style-type: none"> • WWW
	6. Draft <u>report</u>	<ul style="list-style-type: none"> • Learner-Content 	<ul style="list-style-type: none"> • WWW
	7. Conduct <u>peer reviews</u>	<ul style="list-style-type: none"> • Learner-Learner 	<ul style="list-style-type: none"> • BBS/Email
	8. Write final <u>report</u>	<ul style="list-style-type: none"> • Learner-Content • Learner-Instructor 	<ul style="list-style-type: none"> • WWW • BBS/Email
	9. Present <u>debriefing</u>	<ul style="list-style-type: none"> • Learner-Learner • Learner-Instructor 	<ul style="list-style-type: none"> • WWW • Desktop Conf.
Resources	<ul style="list-style-type: none"> • <u>Galileo</u> (online library) • <u>Product Websites</u> • <u>Sample Reports</u> 	<ul style="list-style-type: none"> • Learner-Content • Learner-Other • Learner-Environment 	<ul style="list-style-type: none"> • WWW • F2F, • Email, phone
Evaluation	<ul style="list-style-type: none"> • <u>Assessment Rubric for Report</u> • <u>Assessment Rubric for Debriefing</u> 	<ul style="list-style-type: none"> • Learner-Content • Learner-Instructor 	<ul style="list-style-type: none"> • WWW • Email
Conclusion	Learners to submit reflective journal entry	<ul style="list-style-type: none"> • Learner-Instructor 	<ul style="list-style-type: none"> • Email

Step 5: Analyze Interactions

Table 4. Sample analysis from engineering lesson (Hirumi, 2006)

Interaction	Quan	Description	Design Decision
Learner-Instructor	8	<ul style="list-style-type: none"> • Ask learner to post message • Review and provide feedback on topic • Review and provide feedback on problem • Provide guidance on writing final report • Provide guidance on preparing debriefing • Assess and provide feedback on final report • Assess and provide feedback on debriefing • Review and provide feedback on journal 	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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Contact Librarian • Contact other Engineers 	Ensure access to Librarian and Engineers
Learner-Content	21	<ul style="list-style-type: none"> • 1 lesson overview page covering all events. • Details on completing process • Links to 7 resources & 2 evaluation rubrics • Description of journal entry. 	Test usability of interface and web pages prior to official course delivery.
Learner-Environment	3	<ul style="list-style-type: none"> • Go to Library • Acquire and read Textbook and journal articles 	Ensure access to library resource and textbook
Learner-Tool	2	<ul style="list-style-type: none"> • Use word processor to prepare feasibility report. • Use PowerPoint to prepare presentation. 	Ensure access word processor, PowerPoint.

What Next?

Iterative Design Phase

- Design (Instructional Treatment Plan)
 - Goals & Objectives
 - Instructional Strategies
 - Assessment Method
 - Media Selection
- Prototype
- Evaluation

Iterative Development Phase

- Develop
- Implement
- Evaluate

**What must you do
to promote
creativity
& change?**



Six (6) Keys

- Think Systemically
- Foster Conditions
- Resist, Persist,
- Protect & Prevent

Think Systemically

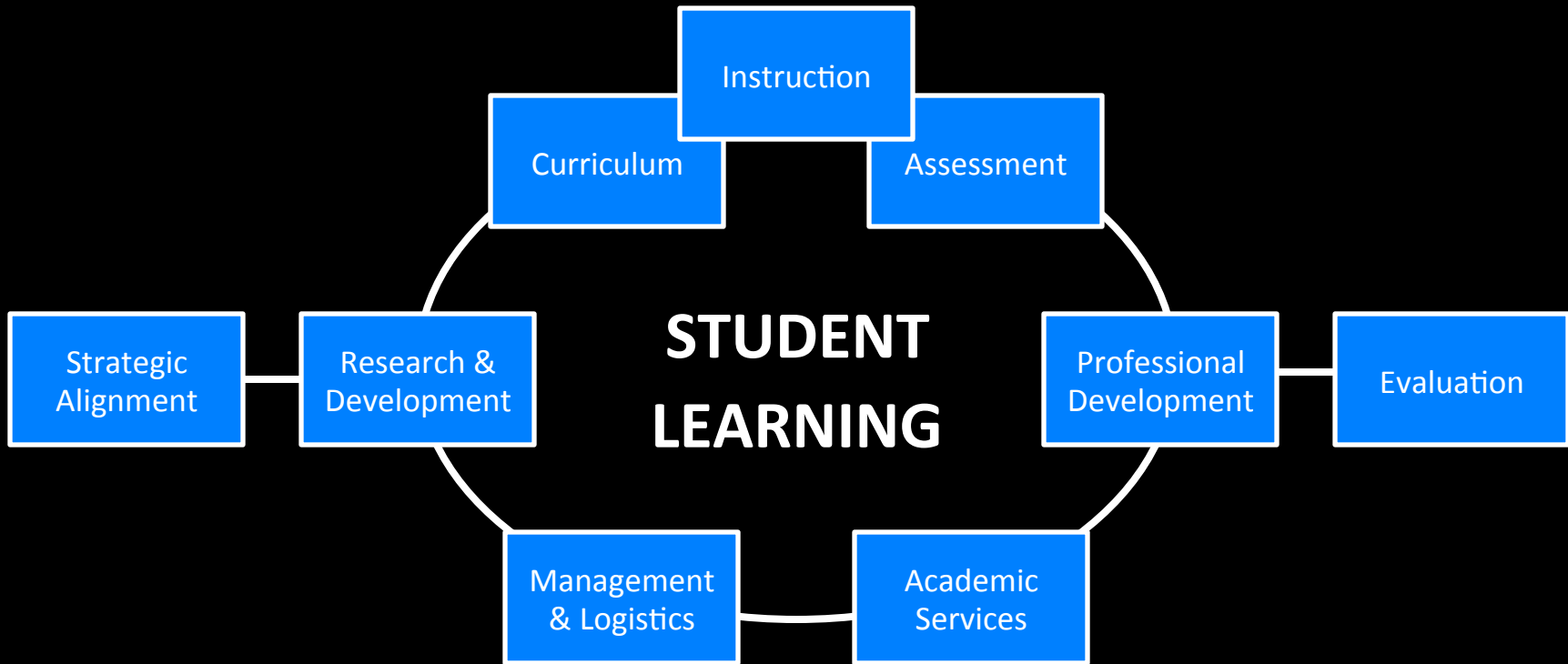
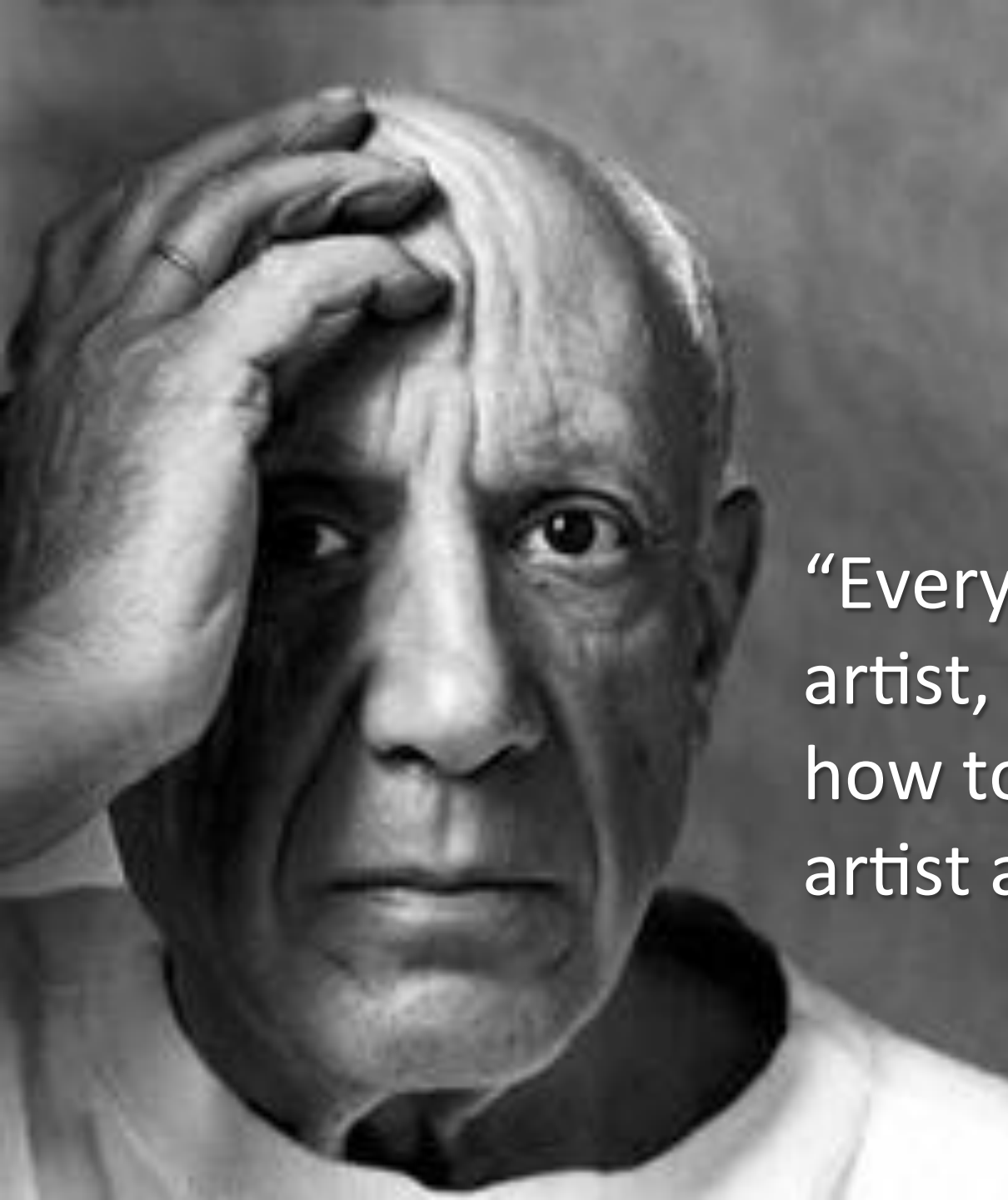


Figure 6. Functional Components of eLearning System (Hirumi, in press, 2010, 2000)

Foster Conditions

Table 5. Comparison of factors found to inhibit a

	Inhibitors	Catalysts
Physical	Structured/Closed Spaces	Flexible/Open Spaces
	Stark/Dark Colors	Warm/Vibrant Colors
	Loud/Distracting Sounds	Soft/Soothing Sounds
	Stale Air	Fresh Air
	Hot/Cold Temperature	Warm/Cool Temperature
Psychological	Focused Attention/Concentration	Unfocused Attention
	Purposeful/Serious	Playful/Reflective
	Decisive/Certain	Contemplative/Flexible
	Forceful/Stressful	Eager/Calm
	Demanding/Pressured	Unpressured/Relaxed
	Negative Mood	Positive Mood
	Fearful/Critical	Confidence/Supportive
	Efficient/Productive	Exploratory/Experimental
	Compliant/Error Free	Open/Constructive Failure



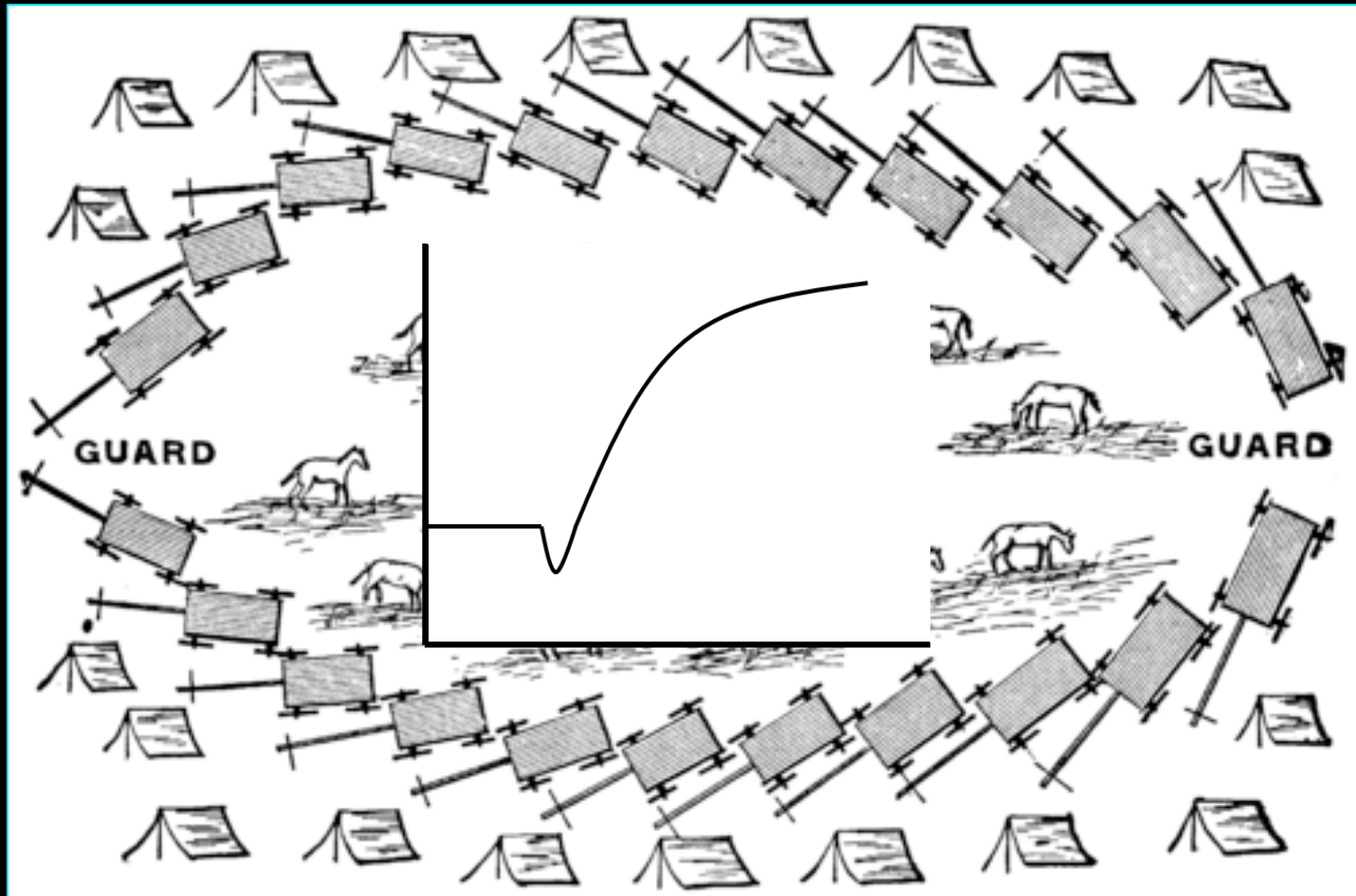
“Every child is born an artist, the problem is how to remain an artist as we grow up.”

Resist



Persist, Protect n' Prevent

Tragedy of the Commons



Summary

- Difference between instructor-led & elearning
 - Frameworks & limitations
 - Three levels
 - Grounded design
 - Five steps
 - Six keys

Summary

1. Design & sequence interactions
2. Design & develop student-centered environments
3. Facilitate creativity, and change





**I'm not ADD,
I'm just not
listening**