

# Learning Environments



*slides based on and ©:*

*Hannafin, M., Land, S., & Oliver, K. (1999). Open learning environments: Foundations, methods, and models. In C. Reigeluth (Ed.), Instructional Design Theories and Models (pp. 115-140). Mahwah, NJ: Lawrence Erlbaum Associates.*

## 4 Components

learning environments consist of at least four elements:

- enabling context
- resources
- tools
- scaffolds

## Enabling Context (1 of 2)

- helps activate relevant prior knowledge, to extent that any exists for a topic
- helps learner choose appropriate strategies that may have been deployed on prior tasks
- can be imposed with built-in expectations for specific procedures and tasks (e.g., play role of engineer, retrofit space shuttle to carry nuclear payloads)

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## Enabling Context (2 of 2)

- can be externally induced w/ a case or problem; students given freedom to design relevant processes and select appropriate tasks to interpret case/problem
- can be individually generated by students seeking appropriate processes to manage personally chosen and relevant problems

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## Resources (1 of 2)

- successful learning environments provide extensive resources for use by learners
- can be electronic web sites and videos, print-based books and articles, or human resources in the form of available experts
- can be static and unchanging or dynamic and subject to manipulation (e.g., online census data sorted in various combinations)

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## Resources (2 of 2)

- for externally imposed or induced contexts, resources may be provided to learners
- for individually generated contexts, specific resources can not be pre-determined; rather, large topic-related archives may prove more beneficial (e.g., database of generic Revolutionary War documents enabling personal inquiry into various sub-topics)

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## Tools (1 of 4)

- tools do not inherently promote higher-order thinking, but provide a mechanism through which such thinking may be enhanced
- the mere presence of a tool does not ensure it will be used, thus scaffolding may be a requisite and parallel need in learning environments

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## Tools (2 of 4)

- four types of tools include:
  - information processing tools
  - manipulation tools
  - communication tools
  - scaffolding tools
- some of the best learning environments embed most or all of the above tool types into a tool “suite” or tool “set”

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## Tools (3 of 4)

information processing tools promote:

- **seeking** (searching, using maps/indices)
- **collecting** (bookmarking, cutting/pasting)
- **organizing** (constructing tables, charts, timelines, diagrams, and maps from existing information)
- **integrating** (typing annotations or notes regarding information encountered)
- **generating** (creating new conceptions from resources; web pages, presentations, reports, documents)

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## Tools (4 of 4)

- **manipulation tools allow students to test and revise theories or hypotheses** (simulations, microworlds)
- **communication tools allow students to discuss and debate topics, issues, projects** (electronic bulletin boards, video conferencing)
- **scaffolding tools provide procedural and conceptual directions as well as advice**

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## Scaffolds

- scaffolds may be provided by tools, teachers, experts, or student peers
- procedural scaffolds provide directions
- conceptual scaffolds prompt students to consider certain content
- metacognitive scaffolds prompt students to adapt particular strategies or processes

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## Potential Outcomes

- motivation from relevant topics with real-world implications
- better transfer of knowledge from context-bound problems
- depth of understanding about specific problems, potentially less breadth

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## Potential Outcomes

- better understanding of inquiry processes: evaluating knowledge, identifying needs, testing ideas
- internal locus of control, increased self-efficacy, increased responsibility
- understanding that learning is a formative process; errors and faulty preconceptions are necessary to develop understanding

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## Sample Inquiry Environments Utilizing Multi-Tool Sets

- best examples from academic research groups and K-12 partners, although higher-ed could design similar environments
- see WISE at Berkeley  
<http://wise.berkeley.edu>
- see software tools at Michigan's Hi-Ce group  
<http://hi-ce.eecs.umich.edu/>

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