Changing Minds and Brains: Applying Neuro, Cognitive, and Learning Sciences to Online Course Design

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About Boston University

- Founded in 1839
- 34,262 Students
- More than 10,000 faculty and staff
- 17 Schools and Colleges
- More than 300 programs of study
Instructional Designers as SuperHeroes

NeuroMultipliers
Mind, Brain, and Education Science

Interplay of Neuro, Cognitive, and Learning Science
Neuromyths?

- Brain development is complete by the time a person reaches secondary school
  - Myth

- Intelligence is solely due to your genes.
  - Myth
Human Learning Principles – Attention

Questions to Ponder:

As you learn this module, think about the following questions:

- How would you involve stakeholders in the grant writing process?
- How would you identify and recruit board members that have the three W’s?
- How could you help motivate board members in shifting from fulfilling minimum IRS requirements to being a truly effective board?
Human Learning Principles – Attention

Remember, correlation does not equal causation!
Human Learning Principles – Memory

Free Recall

Cognitive scientists have found that Free Recall activities increase students’ learning, so take the next 15 minutes or so, and without reviewing last week’s material, write down everything you can remember from the week.

Don’t worry about making mistakes. Free Recalls are meant to be a learning tool for you—I will not be collecting or grading them. However, I suggest you save the material, as we may refer to the activity in future Live Classrooms.

Compose your thoughts here

Save
Human Learning Principles – Memory

- **Retrieval**

  **Review Question 2.4**

  **Question:** Identify stakeholders in a nonprofit’s case development cycle (Check all that are true.)

  - [ ] Chief development officer
  - [ ] Chief executive director
  - [ ] Development committee
  - [ ] The full board
  - [ ] Donors

  ▼ Show Hint
  
  Review and relearn [Demonstrate the Need for Funds](#).

  [Show Answer]
Human Learning Principles – Memory

- Retrieval
- Interleaving
- Spacing

Review Question 5

Summarize the important features of this module in a paragraph by rearranging the following fragments, capitalizing and punctuating where needed.

1. a small sample is randomly selected
2. additional computing resources are available
3. and is evolved
4. and then creating descendants
5. from the sample
6. further time is available or when no
7. genetic algorithms mimic the process of evolution
8. some mutation is simulated
9. the process stops when
10. the sample is satisfactory or when no
11. there must be a function that evaluates every element
12. this is done by selecting pairs

Show Hint

Sketch your answer on your own first. Then click each step below to compare yours with the suggested fragments in order:

- Choose your first fragment number.
- What is your second fragment number?
Human Learning Principles – Metacognition

- Reflection

Module 4 Review and Reflect

3. Three things you didn’t know before:

Compose your thoughts here:

2. Two things you want to continue to learn more about:

Compose your thoughts here:
# Human Learning Principles – Metacognition

## Rubrics

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Unacceptable</th>
<th>Acceptable</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of the Case Resource File</td>
<td>Case Resource File elements are missing entirely. Without this information, it would be impossible to complete a competitive grant proposal.</td>
<td>The Case Resource File provides most of the necessary tools to write the narrative sections of your final grant proposal. Missing elements derive from the potential case for support.</td>
<td>The Case Resource File provides all the necessary tools to write the narrative sections of your final grant proposal including: mission, goals, objectives, programs, services, finances, governance, staffing, service delivery, planning, evaluation and history.</td>
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</tr>
<tr>
<td>Organization of the Case File Materials</td>
<td>The Case Resource File has little to no organization; sections overlap, and it is very difficult to understand the organization based on how data is presented.</td>
<td>The Case Resource File is not organized well, with overlapping elements. To an outside reader, it is not clear where one section begins and one ends; creating a “speedbump” when pulling data for the LOI and narrative.</td>
<td>The Case Resource File is adequately organized around main headings, providing a quick reference when completing the LOI and proposal.</td>
<td>The Case Resource File is well organized appropriately by organizational heading, creating a clean and clear blueprint for the LOI and proposal.</td>
</tr>
<tr>
<td>Writing Conventions and Design</td>
<td>The author fails to use the standard conventions and submits a Case Resource File that is poorly written from an editorial or grammatical perspective. These errors are so distracting that writing a LOI and narrative based on this file would be very difficult, if not impossible.</td>
<td>The author presents a Case Resource File with editorial and grammatical errors that distract the reader. Based on these errors, the File would be hard to use as a blueprint for the LOI and proposal.</td>
<td>The author presents a pristine Case Resource File with no grammar or spelling deficiencies. Information is concise and complete.</td>
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</tr>
</tbody>
</table>
Human Learning Principles – Metacognition

**Scavenger Hunt**

Keeping up with the deadline in an online course is critical; otherwise it is easy to fall behind – every online student needs to learn how to succeed in completing work in a timely manner. Check all the time management strategies that are helpful.

- **Making a study calendar about due dates and planning ahead**
- **Starting the work early, don’t wait for the last day**
- **Setting aside routine time for studying daily**
- **Breaking up readings into smaller portions to make each module’s workload more manageable**
- **Getting help when you feel challenged about the course content**
Human Learning Principles – Differentiated Instruction

- UDL

Source: Eric Moore, Implementing Universal Design for Learning on Canvas

Boston University Metropolitan College, Office of Distance Education
Human Learning Principles – Critical Thinking

- Practice application, evaluation, and creation

Academic Cases

Selected academic cases are used in this course to illustrate real-world examples of a module’s content. Academic Cases are not discussed or reviewed; you will critique cases based on the instructions.

Rubric: Academic Case Rubric

Due time: At the end of Module 2, Module 3, and Module 4.

Discussion 6.1: Critical Incident

Think back to a particularly troublesome – or especially helpful – interprofessional interaction with another health professional from another health professions discipline. For those who can recall one that involved a learner (yourself or others), you are particularly encouraged to use such an example. What happened in this encounter, and what things made the encounter troublesome or helpful? If troublesome, what might have been different? If it involved a learner, how did that alter the dynamic, and what lessons do you think the learner walked away from the experience with?

Share your incident, and please comment on at least two other students’ postings.
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Human Learning Principles – Critical Thinking

• Explicit connection

Application Problems

This section contains problems that illustrate only a small part of the numerous areas in which the material taught in the module can be applied. Even though working through the problems is optional, we recommend doing so as it can be beneficial to get a solid sense about the application potential of these concepts in the industry.

Problem 1. Transmission efficiency

One of the main design objectives when creating networks is to be able to send as much useful information as possible in a unit of time. However, there are many important functions...
Human Learning Principles – Transfer

- Authentic performance task
- Depth vs. breadth

Optional Video

Here is an additional video from Columbia University that might be helpful in better understanding the concepts of intrinsic, extrinsic, and germane load.

Video: Cognitive Load Student Learning Strategies

Selecting Parameters

Dealing with Constraints

Tools

Summary

Appendix for Further Exploration: Impact; Assorted References
Rethinking of Assessments Design

The term-project assignments in total are worth 60% of the course grade. The teaching team expects your understanding to improve throughout the course. Accordingly, the first sets of assignments weigh less than the rest, so that you have opportunities to catch up along the way. The weight of assignments ramps up as the following:

- Term-Project Assignment Part 1 (Module 1): 5%
- Term-Project Assignment Part 2 (Module 2): 7%
- Term-Project Assignment Part 3 (Module 3): 9%
- Term-Project Assignment Part 4 (Module 4): 11%
- Term-Project Assignment Part 5 (Module 5): 13%
- Term-Project Assignment Part 6 (Module 6): 15%
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Resources


