Detecting and Closing Learning Gaps in the Post-Pandemic Classroom

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Overview

• Introduction
• Theoretical Framework
• Overview of the 4-stage Assessment Model
• Working through the stages of the model
• Activity: “Unbundling a Complex Topic” in your course
Introduction of Topic

• Critical need for early detection of learning gaps in the wake of COVID-19 pandemic
  – *Impact of the disruptions to learning in 2020 and 2021*
  – *Limitations of online courses*
  – *Gaps in fundamental skills and knowledge are to be expected*
  – *Comprehension of more complex topics contingent on understanding of prerequisite concepts*
Closing the gap
THEORETICAL FOUNDATIONS

SELF-REGULATED LEARNING

ASSESSMENT PRACTICES

COGNITIVE LOAD THEORY

THRESHOLD CONCEPTS
Learners accept responsibility for their learning

Self-checking throughout 3 phases of learning: Forethought, Performance, and Self-reflection

Self-evaluation of degree of learning (what DO I know and what do I STILL NEED TO LEARN?)

Calibration (how accurate is this assessment?)
ASSESSMENT PRACTICES

- **FORMATIVE** vs Summative Assessment

- Low-stakes, informal, integrated into instruction

- Real-time feedback for *diagnostic* purposes – exposure of learning gaps
Efficiency in Learning

Avoid Cognitive Overload!

Optimization of Learning
What Impacts Cognitive Load?

- The *prior* knowledge of the learner
- The instructional environment
- Complexity of the content to be learned

**Intrinsic Load**

[Image of East Tennessee State University logo]
Complex Knowledge – Difficult content found in advanced coursework

- Is the difficulty caused by **complexity** of the content?

- **Complexity** is created by **underlying, interactive** elements that must be processed simultaneously

- **Identification** of the underlying elements = “**Unbundling**”

- Which of these elements have NOT been learned? **Exposure of Learning GAPS!**
Why is the content troublesome?

- Difficult Content
  - Underlying, Interactive Elements
“Doorway into a discipline” – Understanding opens up a new and previously inaccessible way of thinking and allows progression in a discipline.

Transformative
Irreversible
Integrative
Troublesome
Bounded
WHY is this topic troublesome for learners?

- Difficult Content
  - Threshold Concept?
  - Underlying, Interactive Elements
Development of a Learning Gaps Model
Detection and Closing of Learning Gaps

Stage 4
**IDENTIFY**
remaining learning gaps

Stage 3
**ASSESS**
degree of learning of complex topics

Stage 1
**ASSESS**
foundational knowledge

Stage 2
**ASSESS**
knowledge of the underlying elements

At beginning of course

As complex topics are presented

After summative assessment

At conclusion of learning module
Stage 1

Assess Foundational Knowledge at beginning of course

- Identification of foundational knowledge and skills that learners should have previously acquired (including threshold concepts)
- Trace foundational concepts back to prior lower-level “feeder courses”
- Assess degree of readiness for the current course at the beginning of semester
- Develop and provide “remedial resources” to address learning deficiencies before introduction of new concepts
Stage 2

**Assess** Knowledge of Underlying Elements as complex topics are presented

- Determine which topics represent “difficult content” (i.e. high intrinsic cognitive load)
- “Unbundle” each of these topics to determine the underlying elements
- Determine which elements relate to content from previous course(s) and which elements are “to be learned” in the current course
- Review the elements that relate to content from previous courses before adding new elements
- Introduce new concepts serially, focusing on one element at a time
- Develop formative assignments (in-class assignments, low-stakes quizzes) that largely focus on the underlying elements and minimally focus on the interactivity (i.e. simultaneous processing) of these elements
Stage 3

Assess Degree of Learning of Complex Topics at conclusion of learning module

- Design exams to be “cumulative” to reinforce and re-assess mastery of foundational concepts

- Design exams that include multifaceted questions that are aligned with underlying elements of the complex task
Stage 4

*Identify* Remaining Learning Gaps *after summative assessment*

- Allow students time to review summative assessment (course exam)
- Discuss frequently missed questions, particularly those related to fundamental concepts
- Provide students with an “exam wrapper” to facilitate a more meaningful exam review
- Use results of exam to formulate cumulative questions for subsequent exam(s)
EXAM WRAPPER

On this exam, I had MORE difficulty with [ ] Multiple-choice Questions [ ] Worked-out Problems [ ] About the same on both

For the *multiple-choice questions* that I missed, my MAJOR problem seemed to be:

* [ ] Lack of understanding of the concept
* [ ] Reading Errors
* [ ] Both

Identify 3 strategies that were beneficial to you as you prepared for this exam:
1. __________________
2. __________________
3. __________________

Describe a strategy you could use during the next examination period to improve your exam performance __________________

*Evaluate your performance on the following exam topics:*

**FINANCIAL ACCOUNTING SYSTEM:**

My ability to prepare adjusting entries [ ] Good [ ] Fair [ ] Poor
My ability to prepare closing entries [ ] Good [ ] Fair [ ] Poor
My ability to CLASSIFY accounts [ ] Good [ ] Fair [ ] Poor

**ACCOUNTING VOCABULARY/CONCEPTS:**

My understanding of accounting vocabulary [ ] Good [ ] Fair [ ] Poor
My understanding of the ACCRUAL basis of accounting [ ] Good [ ] Fair [ ] Poor
My understanding of the effects of adjusting entries [ ] Good [ ] Fair [ ] Poor
ACTIVITY:
“Unbundling a difficult topic you teach”

2. *What are the underlying elements in your topic?*

3. *Are any of these elements Threshold Concepts?*
CONCLUSION

**DETECT** the gap

**EXPOSE** the gap

**CLOSE** the gap
Questions/comments?

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