

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



SELF-REGULATED LEARNING

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 <u>diagnostic</u> purposes – exposure of learning gaps









What Impacts Cognitive Load?

The *prior* knowledge of the learner

The instructional environment

Complexity of the content to be learned



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?



Underlying, Interactive Elements





"**Doorway into a discipline**" – Understanding opens up a new and previously inaccessible way of thinking and <u>allows progression in a discipline</u>

Transformative Irreversible Integrative Troublesome Bounded



WHY is this topic troublesome for learners?



Underlying, Interactive Elements



Development of a Learning Gaps Model









Classroom Assessment: Self-regulated Learning Model



Chen, P. P., & Bonner, S. M. (2020). A framework for classroom assessment, learning, and self-regulation. *Assessment in Education: Principles, Policy & Practice, 27*(4), 373-393.



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 reassess 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 <i>multiple-choice questions</i> that I	Lack of understandin of the concept	g Reading Errors	Both
missed, my major problem seemed to be:			

Identify 3 strategies that were <u>beneficial to you</u> as you prepared for this exam: 1. ______ 2. _____ 3. _____

Describe a strategy <u>you could use during the next examination period</u> to improve your exam performance ______

Evaluate your performance on the following exam topics:

FINANCIAL ACCOUNTING SYSTEM:

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

ACCOUNTING VOCABULARY/CONCEPTS:

My understanding of accounting vocabulary	 	
My understanding of the ACCRUAL basis of accounting	 	
My understanding of the effects of adjusting entries	 	



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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