



# Designing Instruction and Assessment

Time saving strategies for educators



# Today's Speaker

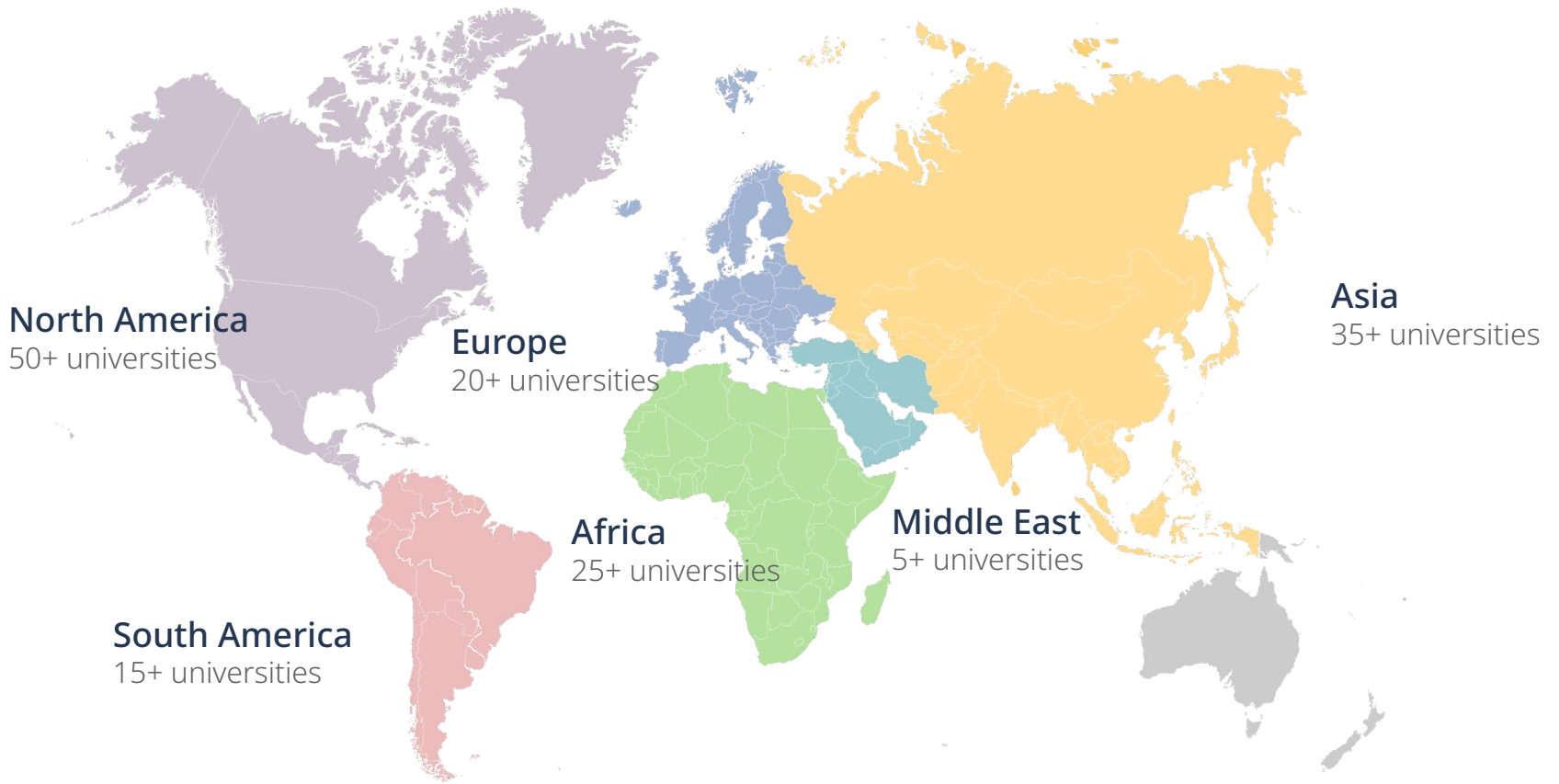


## **Adonis Wazir**

Medical Doctor, East Surrey Hospital,  
Redhill, United Kingdom

MSc Medical Education, Swansea  
University Medical School

Medical Education Consultant,  
Lecturio



# Welcome to the Start Smart Educator Series!

- Enhance your teaching strategies and optimize learner success on their exams as we start the new school year.
- Download our complimentary resources, question-writing templates, and watch past webinars.
- Specifically designed for medical & nursing educators on key back-to-school topics.



# Get Your Resource Pack Now!

Download our complimentary Start Smart resources pack, specifically designed to help educators like you to kick off the with innovative teaching strategies.

## Medical



## Nursing





# Today's Agenda

1

Who are we?

2

Principles of Instructional Design

3

Assessments

4

Using Lecturio

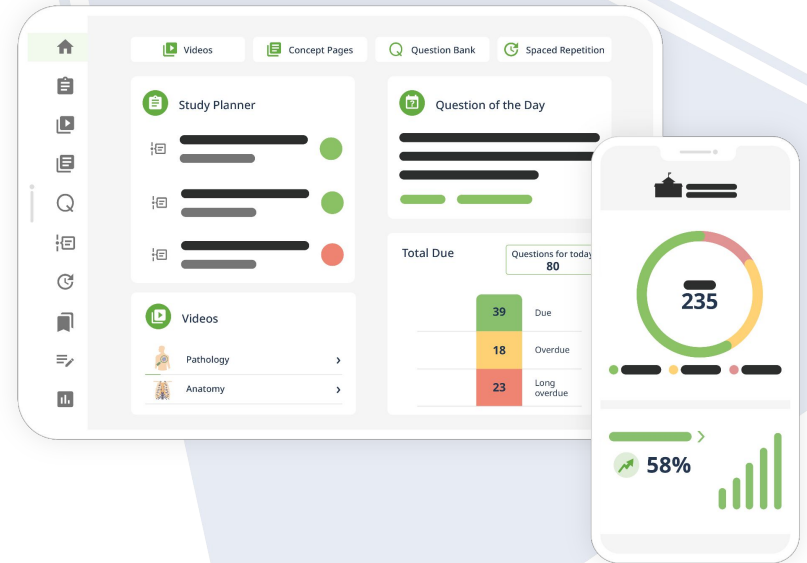
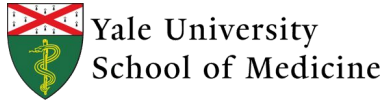


# What is Lecturio

# Lecturio

comprehensive digital medical education platform

Content from top professors including from





Lecturio Covers the Entire  
**Medical & Nursing**  
Curricula in all key learning formats



**12,000+ High-End Videos**  
in TV quality, short, and engaging



**9,800+ Clinical Cases**  
with text and video explanations



**35,000+ Recall Questions**  
using a spaced repetition  
algorithm and adaptive review

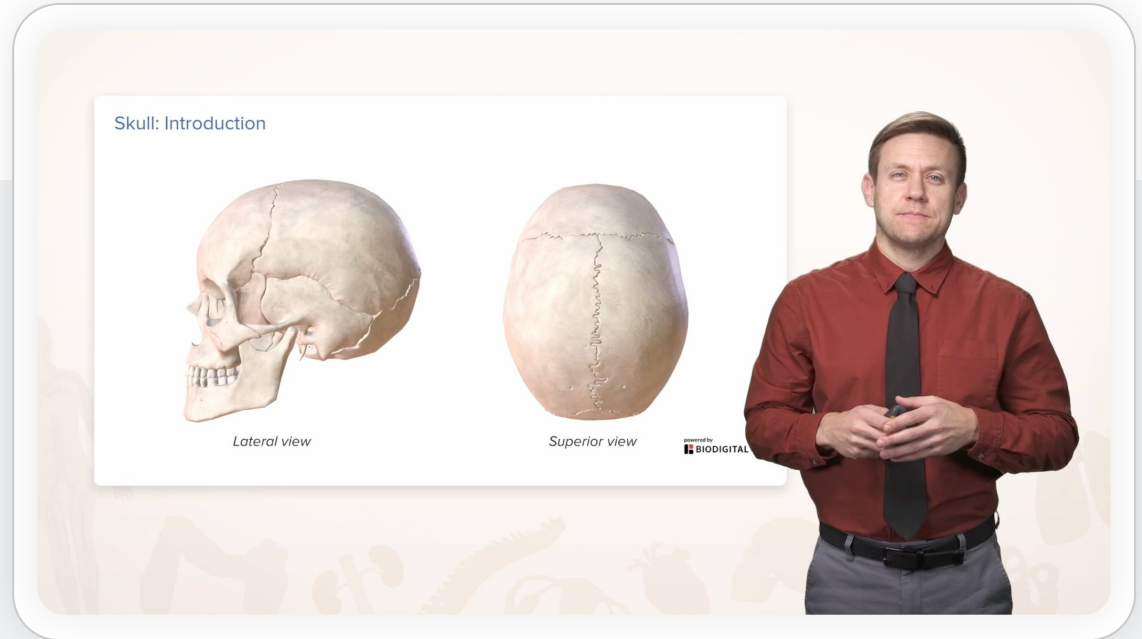


**1,500+ Concept Pages**  
organized in a comprehensive library



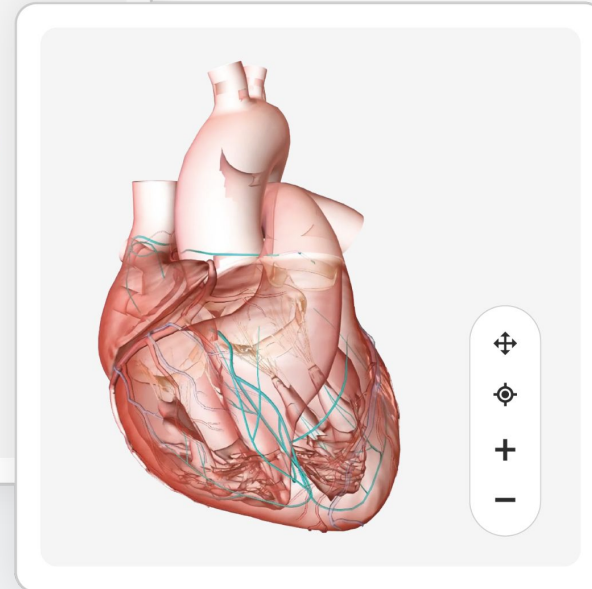
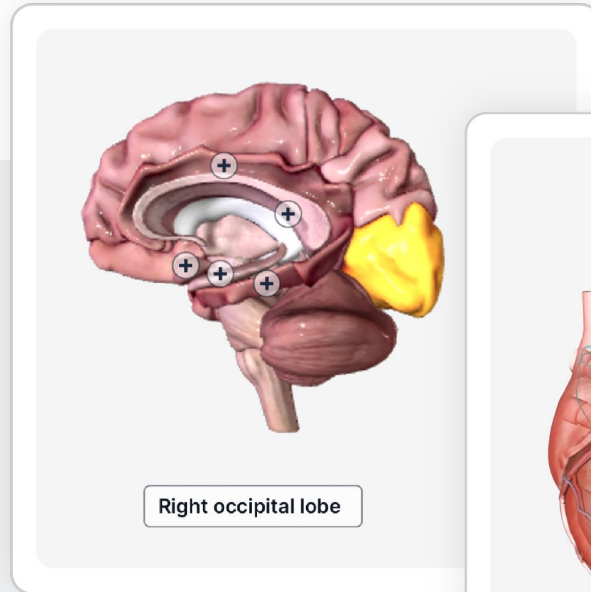
# Concise Videos on All Key Concepts

- All key medical concepts are covered in-depth
- 3-9 minutes
- Linked recall questions for formative assessment



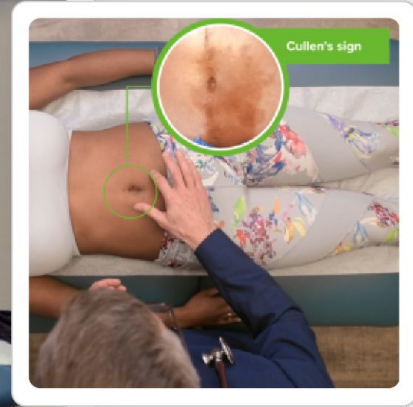
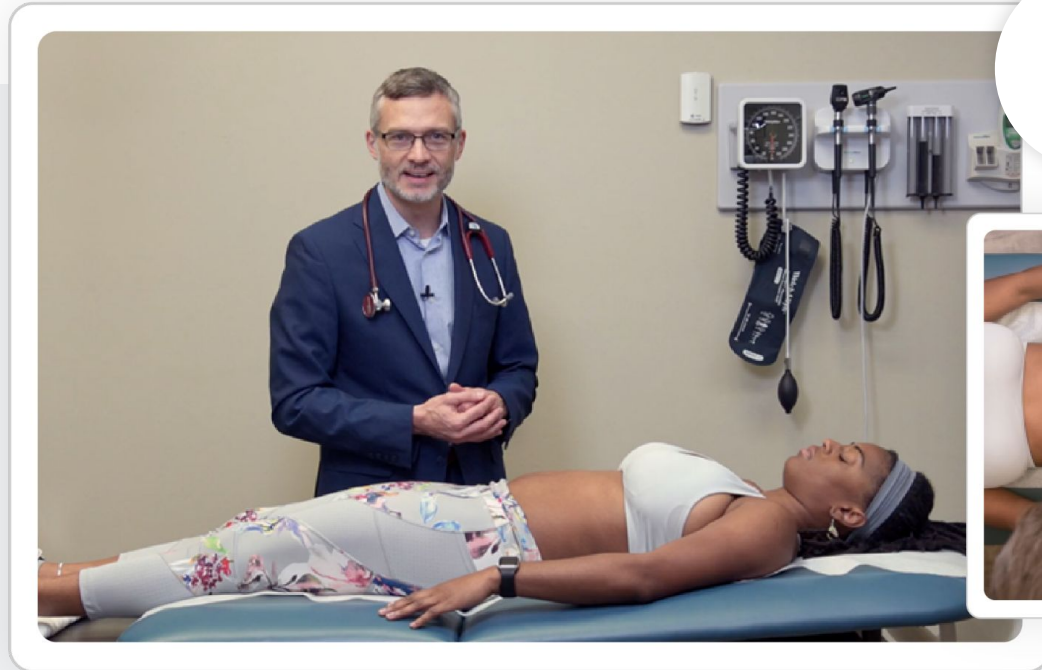


# 3D Anatomy With 400 Pre-Mapped Views





# Comprehensive Coverage of Clinical Skills





# Comprehensive Coverage of Clinical Skills





# Clinical Cases to Practice Application of Learned Concepts

- Real-life clinical scenarios
- Automated feedback
- Linked videos
- Use for self-directed learning or exams

The screenshot displays a digital learning interface for a clinical case. On the left, a vertical list of numbers 1 through 14 is shown, with number 5 highlighted in blue. The main content area is divided into several sections:

- Question:** A text-based question with four horizontal lines representing redacted text.
- Options:** Four multiple-choice options labeled A, B, C, and D. Option D is selected, indicated by a black dot in a circle.
- Image:** A chest X-ray image showing the lungs and heart.
- Feedback:** A green checkmark and the word "CORRECT" are displayed below the options.
- Explanation:** A section titled "Explanation" containing a diagram of the human respiratory system, showing the lungs and trachea.
- Related Videos:** A section titled "Related Videos" with a play button icon and a horizontal line representing a video link.
- Book References:** A section titled "Book References" with a horizontal line representing a book reference.

On the right side of the interface, there are three floating panels:

- Custom Tests:** A panel with a list icon, the text "Custom Tests", a horizontal line, and a green button labeled "CREATE CUSTOM TEST".
- Difficulty:** A panel with the text "Difficulty" and three radio button options: "Easy", "Normal" (which is selected), and "Hard".
- Filtering:** A panel with two radio button options: "by Subjects" and "by Systems" (which is selected). Below these are three horizontal bars with green segments, representing progress or completion levels for different categories.



# Detailed Learning Paths

for USMLE<sup>®</sup> Step 1, 2, NCLEX-RN<sup>®</sup>,  
NBME Subject Exams & More

- Learning Paths combine video and Qbank blocks
- **Adaptive review** within each path

Learning Paths

Next Gen NCLEX-RN<sup>®</sup> (NGN)  
NCLEX-RN<sup>®</sup> Prep

START

10%

**Subjects**

Course	Answered	Completion	Correct	Accuracy
Biochemistry	4/4	100%	2/4	50%
Histology	6/6	100%	6/6	100%

**System**

START ADAPTIVE REVIEW

Course	Answered	Completion	Correct	Accuracy
Cardiovascular System	3/3	100%	1/3	33%
Nervous System	4/4	100%	3/4	75%

# Lecturio Concept Pages

The fastest and easiest way to find and fill knowledge gaps

## Heart: Anatomy

The heart is a 4-chambered muscular pump made primarily of cardiac muscle tissue. The heart is divided into 4 chambers: 2 upper chambers receiving blood from the great vessels, known as the right and left atria, and 2 stronger lower chambers, known as the right and left ventricle pump blood throughout the body. Blood flows through the heart in 1 direction, moving from the right side of the heart, through the lungs, & returning to the left side of the heart, where it is pumped out to the rest of the body. As blood moves through the heart, 4 important valves backflow. The heart muscle itself is supplied by the coronary arteries. The heart also has its own conduction system, triggering its own contractions.

Last updated: March 10, 2023

0/0 questions correct

START TEST

### CONTENTS

General Structure and Location of the Heart

The Pericardium

The Heart Wall

Heart Chambers and Valves

Blood Flow through the Heart

Coronary Circulation

Cardiac Conduction System

Clinical Relevance

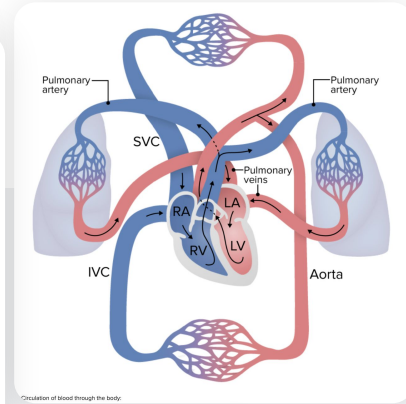
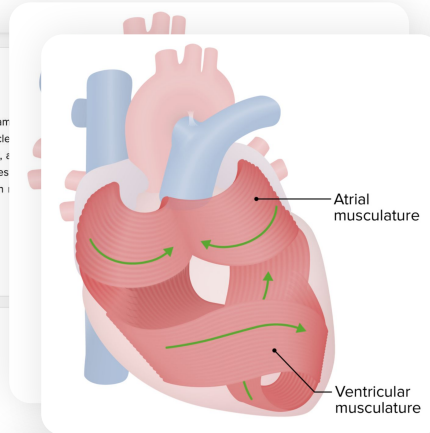
References

## General Structure and Location of the Heart

### Overview of the heart structure

The heart is a 4-chambered muscular pump made of cardiac muscle tissue.

- 4 primary muscular chambers:
  - Right atrium (RA)
  - Right ventricle (RV)
  - Left atrium (LA)
  - Left ventricle (LV)
- Connections to the great vessels:
  - Veins (bring blood back to the heart):
    - Superior and inferior vena cava (deoxygenated) → RA
    - Pulmonary veins (oxygenated) → LA
  - Arteries (carry blood away):
    - Pulmonary trunk and pulmonary arteries (deoxygenated) → from the RV
    - Aorta (oxygenated) → from the LV



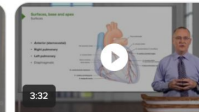
## Related videos



Cardiovascular System – Anatomy of the Heart



Components of the Heart – Anatomy of the Heart



Surface Anatomy of the Heart – Heart (Cor)



# The Two Sides of Precision Health Science Teaching

For Students

Personalized smart tutor

BOOKMATCHER Search CHANGE PLAN

Downloadable Slides

Learning Paths  
Pharmacology Exam Prep  
CONTINUE

Learning Objectives  
Playlists  
Notes

Explanation  
CORRECT

Question Bank  
24%

Spaced Repetition	Rate
12	Easy
8	Medium
5	Hard

Related Videos

Book References

For Faculty

Digital teaching assistant

Admin Dashboard

Watched Minutes  
884

Viewed Concept Pages  
367

Activity

Answered Qbank Questions  
238 67% correct

Answered Recall Questions  
285 48% correct

Performance  
Total 2137  
Correct  
Incorrect  
Omitted

Potentially At-Risk Learners

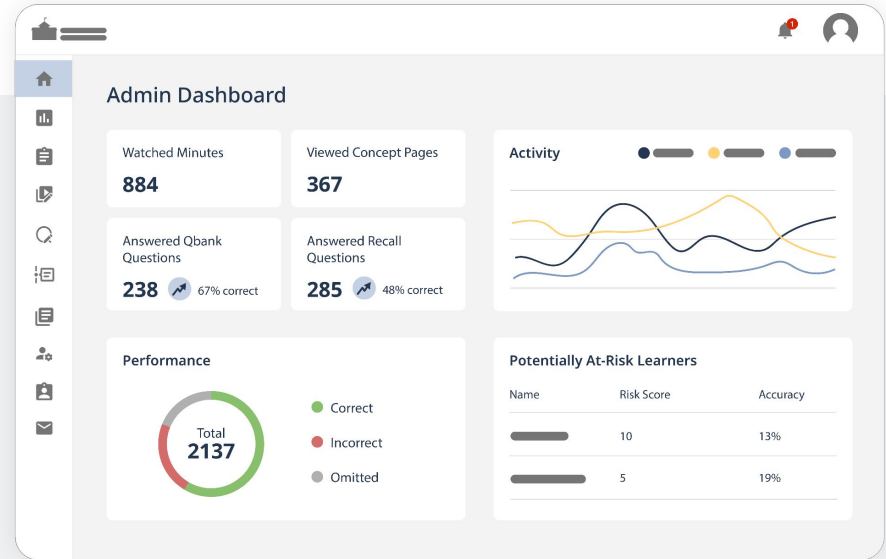
Name	Risk Score	Accuracy
	10	13%
	5	19%



# Comprehensive Tracking Enables a Comprehensive Live Faculty Dashboard

The system tracks:

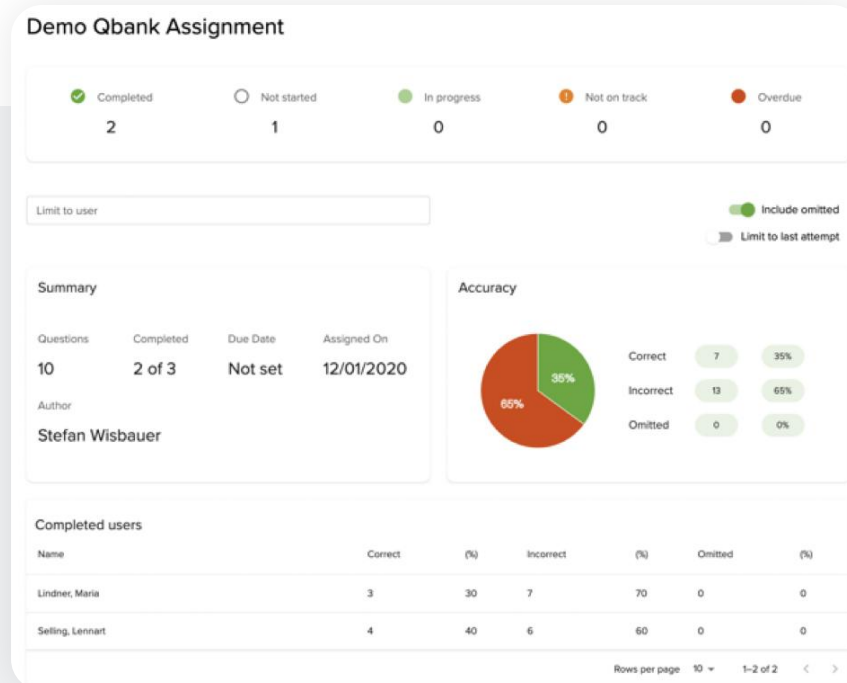
- competence
- confidence
- overconfidence
- spaced repetition adherence
- mastery level
- typical mistakes
- readiness assessments





# Assignment Stats

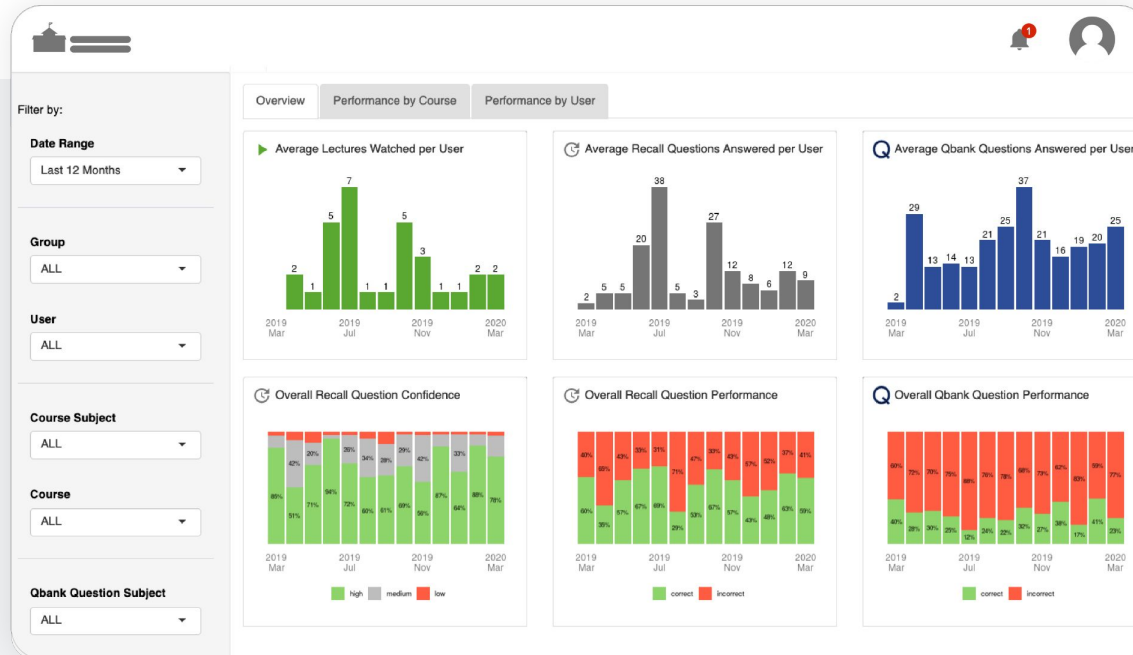
Help Focus Teaching Time on Where Students Struggle Including Typical Mistakes





# Your Teaching Dashboard

Aggregate Data With Location Drill-Down on Activity, Competence, Confidence, Over-Confidence





# Easy Integration With Your Existing Setup

## LMS / Testing



Deep Linking  
LTI SSO

Proctoring  
Integrations



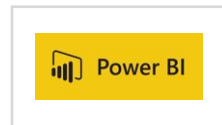
Session Prep:  
Strengths &  
Weaknesses,  
Typical Mistakes

Content &  
Recording  
Upload

## Live Teaching & Training



## Data Lake / Analytics





# Principles of Instructional Design



## Question

What comes to your mind when we say Instructional Design?

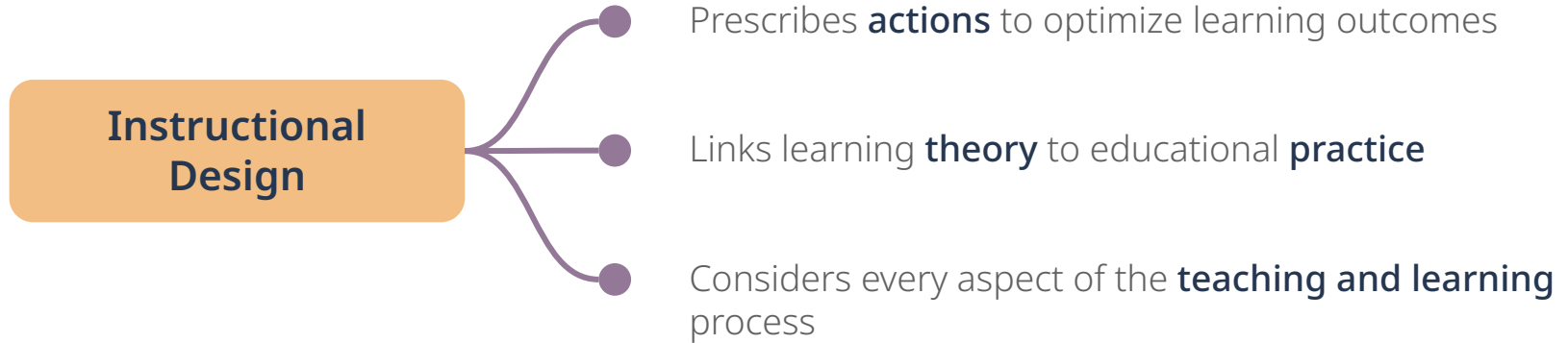
# Instructional Design



A systematic approach to developing educational experiences that optimize learning outcomes



# Instructional Design



# What Is the Importance of Instructional Design?

- Instructional design provides a framework for **evidence-based instruction**.
- Instructional design helps make learning more **effective, efficient, and engaging**.
- Instructional design helps ensure **alignment**
- Addresses **current issues** in medical and healthcare professions education
- Allows for **replicability, consistency, and transferability** of high quality resources

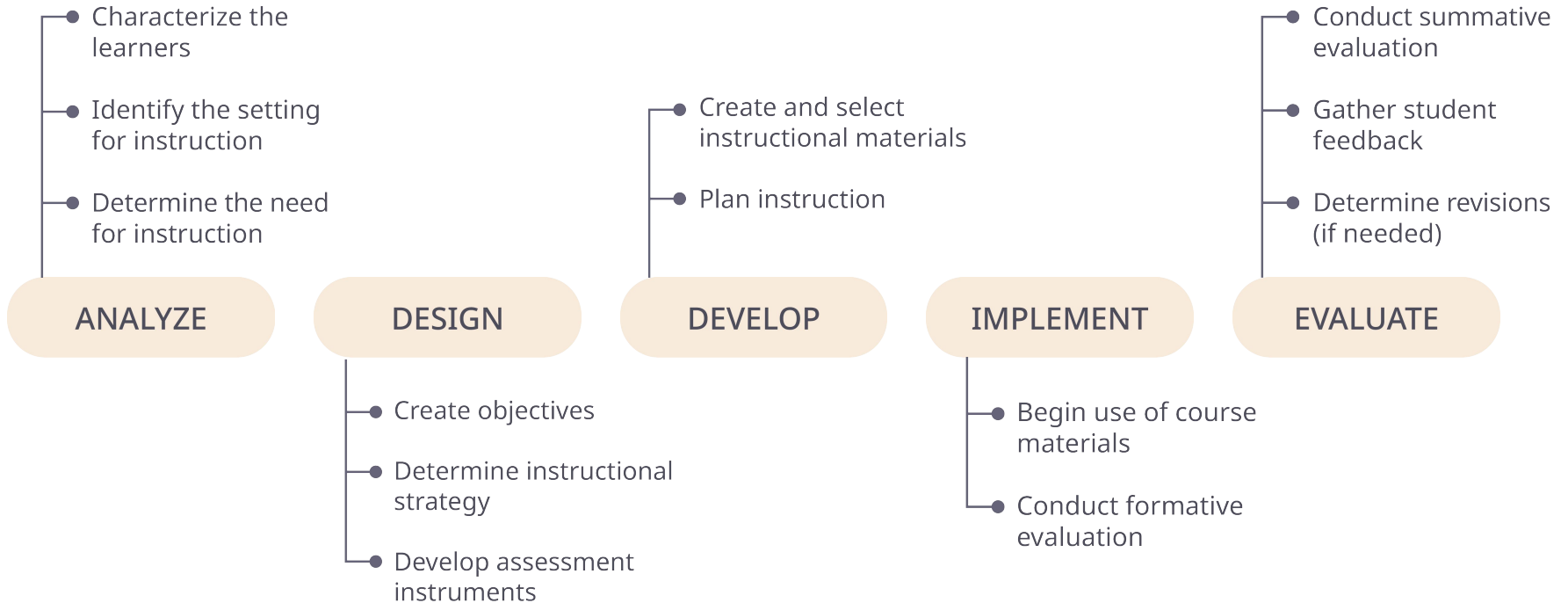


# Instructional Design

## Models

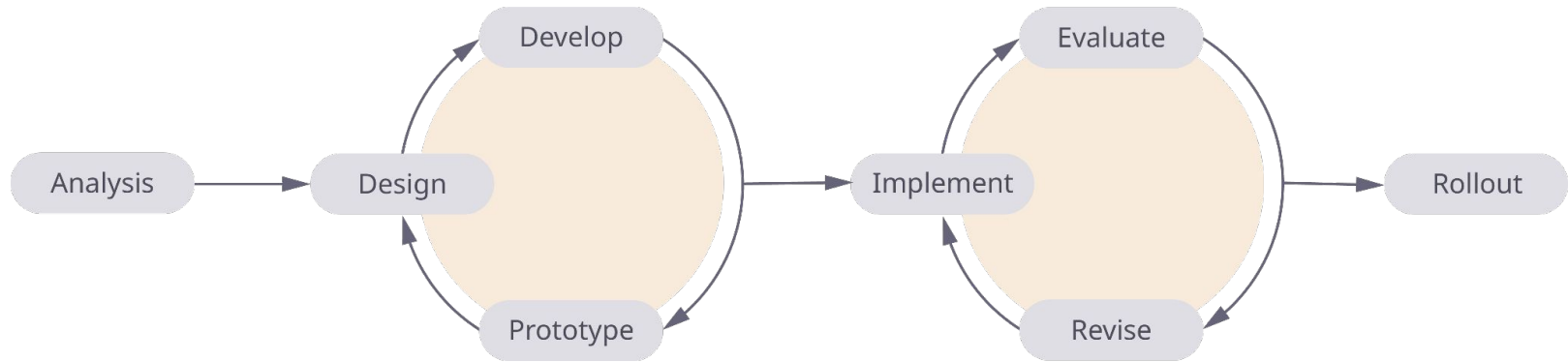
# Instructional Design Models

## Linear Model: ADDIE



# Instructional Design Models

## Agile Model: Successive Approximation Model (SAM)





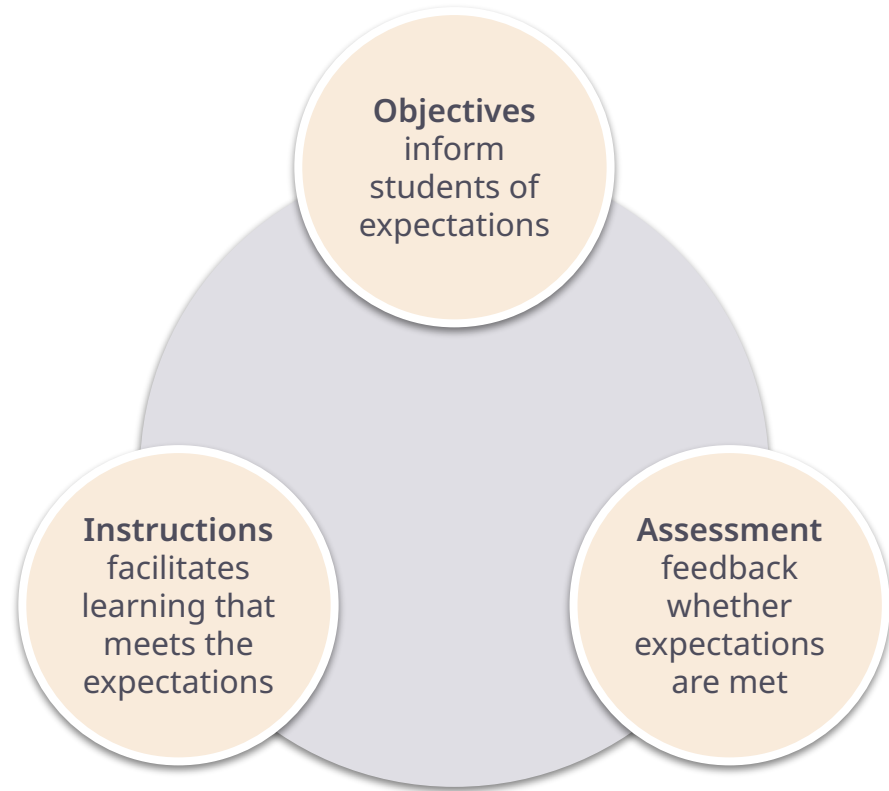
# **Instructional Design**

## Learning Objectives & Alignment

# Instructional Alignment

## The Golden Triangle:

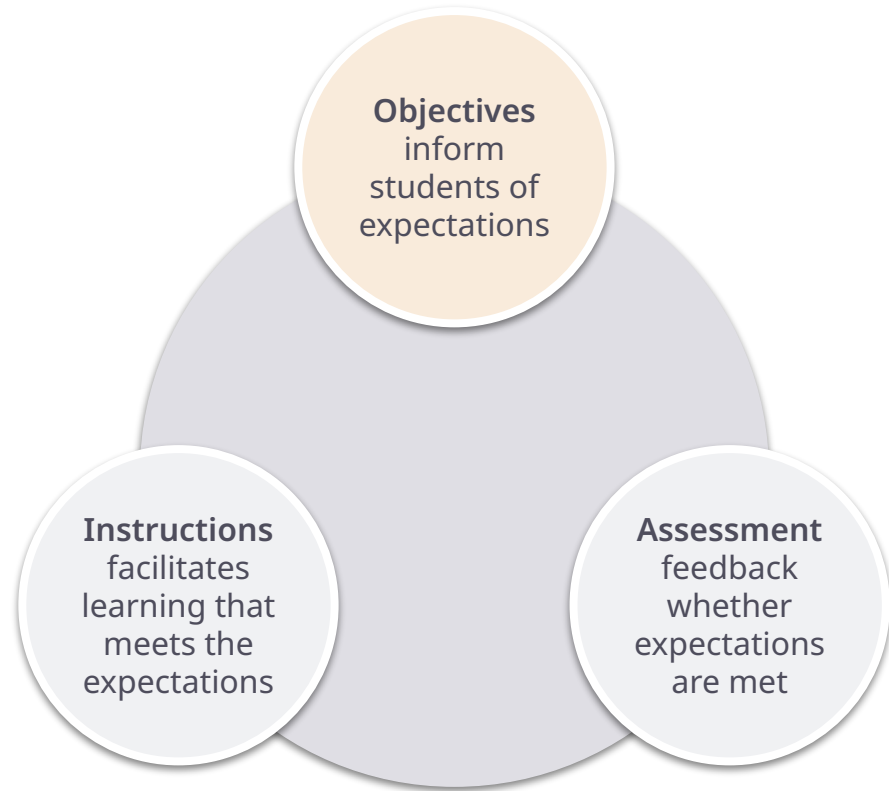
Alignment of objectives, assessment, and instruction



# Instructional Alignment

## The Golden Triangle:

Alignment of objectives, assessment, and instruction





# Learning Objectives Help Educators

- **Organize** content to clarify the goals of instruction
- **Create** assessments
- **Select** materials
- **Communicate** to students what they need to know and do

☰ Learning Objectives ✕

Describe the three potential spaces that exist within the thoracic cavity

---

Explain the clinical importance of the thoracic spaces

---

Describe the structures of the thoracic cavity in the axial section

---

Identify the structures of the thoracic cavity on a radiograph

---

Identify the structures of the thoracic cavity in the axial section in a CT scan

1. Khan T, Hande S, Bedi S, Singh T, Kumar V. Learning Objectives: "Perfect is the Enemy of Good!" Int J User-Driven Healthc [Internet]. 2012 Jul 1 [cited 2022 Jul 29];2(3):44–62. Available from: <https://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/ijudh.2012070105>
2. Dick W, Carey L, Carey, James O. The Systematic Design of Instruction. 8th ed. Boston: Pearson; 2015.

# ABCD Model

The ABCD model allows the development of well-defined learning objectives



**Audience:**

Who are the learners?

Students



**Behavior:**

What will they do?

will describe



**Condition:**

What are the resources, tools, or environment?

how DNA probes can be used to detect specific nucleic acid sequences in clinical specimens



**Degree:**

What determines success?

at a level of detail sufficient for another student to complete the procedure.

# SMART Model

- S** Specific
- M** Measurable
- A** Attainable
- R** Relevant
- T** Timely



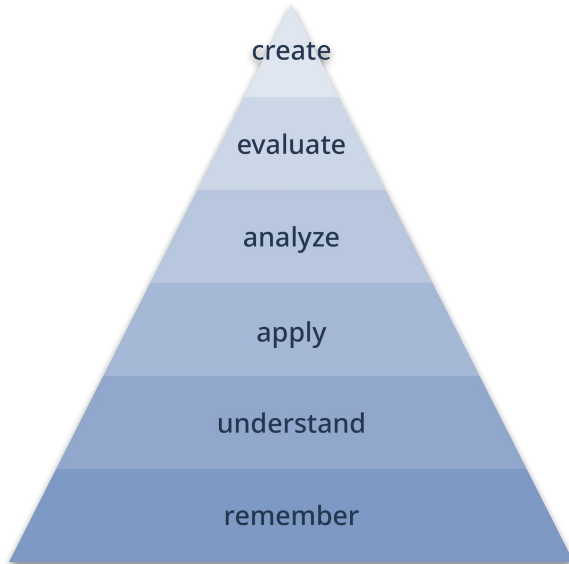
1. Chatterjee D, Corral J. How to Write Well-Defined Learning Objectives. J Educ Perioper Med JEPM [Internet]. 2017 Oct 1 [cited 2022 Jul 27];19(4):E610. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5944406/>



## Question

Create a learning objective for a lesson based on your current role

# Instructional Alignment



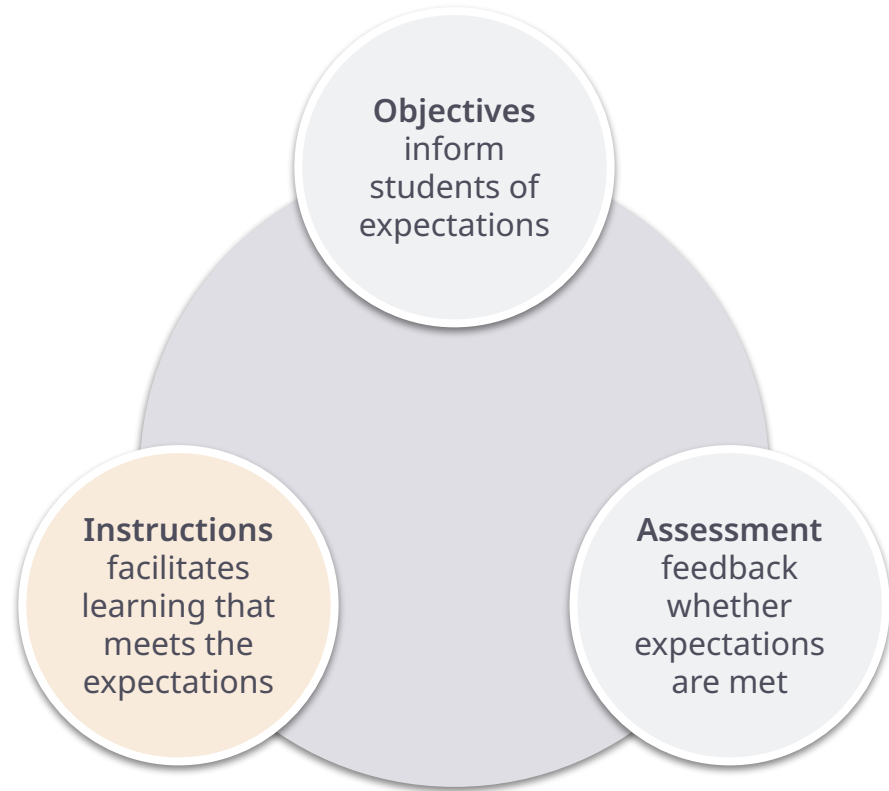
Remembering	Understanding	Applying	Analysing	Evaluating	Creating
acquire	arrange	apply	analyse	appraise	calculate
choose	categorize	calculate	appraise	argue	change
collect	change	change	break down	assess	combine
complete	chart compile	choose	classify	compare	compose
copy	conclude	classify	combine	conclude	constitute
define	convert	compute	compare	contrast	create
describe	defend	conduct	contrast	critique	derive
detect	determine	construct	criticize	decide	devise
distinguish	diagram	demonstrate	deduce	discriminate	discover
duplicate	differentiate	develop	defend	interpret	document
find	document edit	discover	detect	judge	generalize
identify	estimate	employ	differentiate	justify	modify
indicate	explain	generalize	distinguish	recommend	originate
isolate	extrapolate	manipulate	evaluate	relate	plan
label	formulate	modify	formulate	standardize	produce
list	generalize	operate	generate	validate	rearrange
mark	give example	organize	illustrate		relate
match	illustrate	predict	infer		revise
name order	interpret	prepare	outline		signify
outline place	organize	produce	paraphrase		specify
recall recognize	paraphrase	relate	plan		synthesize
reproduce select	predict	restructure	relate		tell
state underline	prepare	show	save		write
	relate	solve transfer	separate		
	summarize	use	shorten		
	update		structure		
			subdivide		

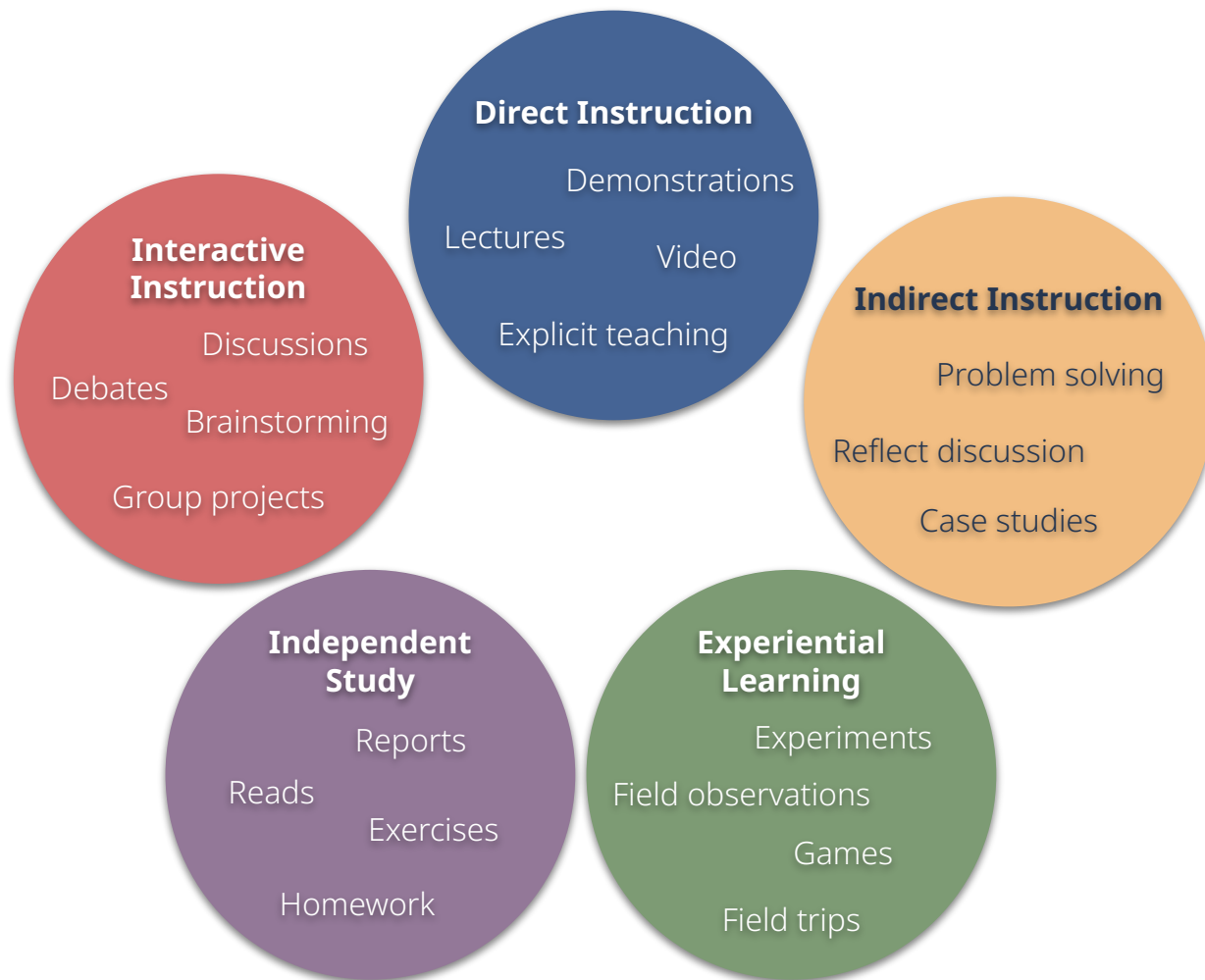
Bloom's Revised Taxonomy

# Instructional Alignment

## The Golden Triangle:

Alignment of objectives, assessment, and instruction







## Question

Based on the learning objective, how will you design instruction?

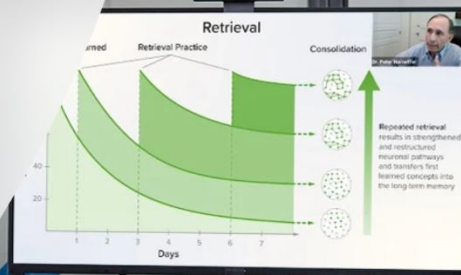


Faculty Events

# Lecturio Educator Events and Networking Opportunities

Explore Lecturio webinars and get practical recommendations on implementing effective evidence-based teaching strategies into your pedagogical practice. Every session is designed from the bottom up to meet the needs of health professions educators.

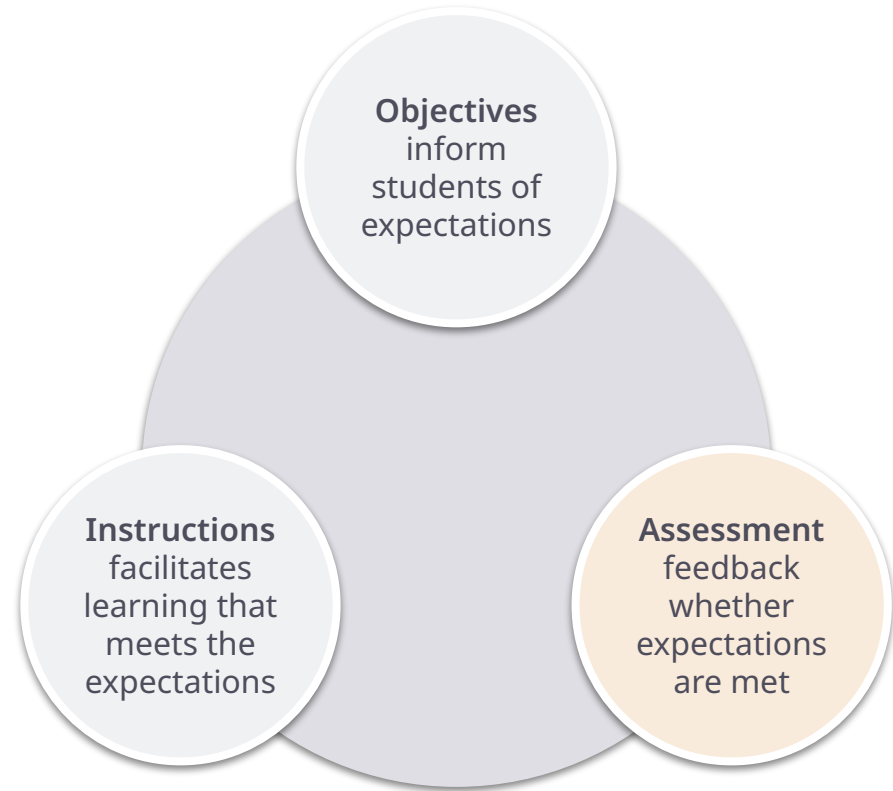
[EXPLORE OUR EVENTS](#)



# Instructional Alignment

## The Golden Triangle:

Alignment of objectives, assessment, and instruction





## Question

Based on the learning objective,  
how will you assess learning?

# How Alignment Works

## Objective

After the lesson, students should be able to:

## Assessment

After the instruction is complete, students are assessed through:

Poorly aligned



Identify the right steps for an ABG sample draw



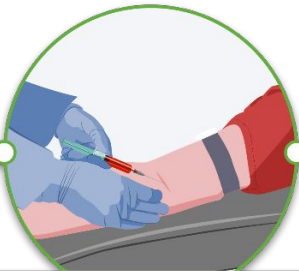
Direct observation of procedural skills exam (DOPS)



# How Alignment Works

## Objective

After the lesson, students should be able to:



Safely perform an ABG sample draw

## Assessment

After the instruction is complete, students are assessed through:



Direct observation of procedural skills exam (DOPS)

Well aligned



## IAMSE 2021—Plenary Session: Top 10 Ways an Instructional Designer Can Help You Define the New Normal

[Atsusi Hirumi](#)<sup>✉</sup>

▶ [Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) ▶ [PMC Disclaimer](#)

### Abstract

[Go to:](#) ▶

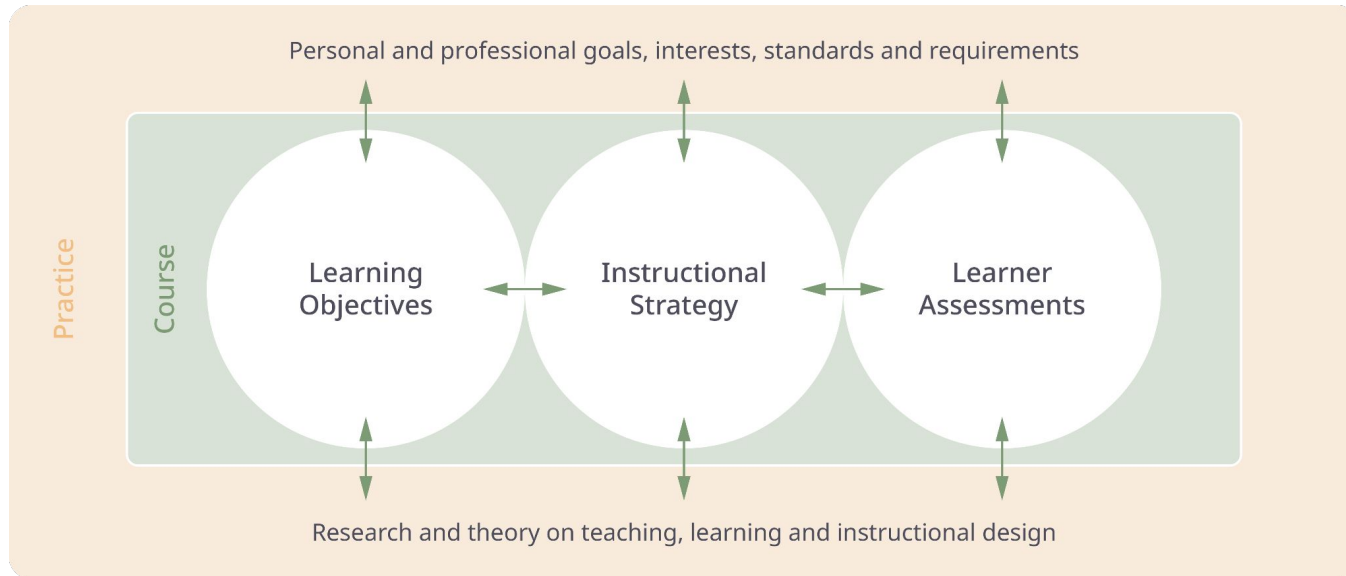
Journal Article

Along with the continued exponential growth of information and treatment options, healthcare practitioners must now deal with increasing documentation requirements, varying data systems, altering health plans, rising patient expectations, loss of autonomy, and demands to decrease costs while increasing revenue. Add to the complexity, the need to transform coursework and clinical experiences to address the constraints presented by COVID-19 can quickly overwhelm medical educators. Given such prodigious challenges, educational specialists with a solid understanding of learning research and theory, instructional design, and emerging technology can play a vital role in designing engaging learning experiences. In this plenary session, Dr. Atsusi “2c” Hirumi illuminated 10 ways an instructional designer may help health science educators unlock the potential of the new normal based on his experience working with professionals in medical, healthcare, aviation, sports, and hospitality industries as well as faculty, staff, and administrators in K12 and higher education across five continents.

**Keywords:** Instructional design, Evidence-based medical education, Plenary session, Keynote

# Instructional Alignment

Objectives should be aligned **horizontally** and **vertically** (1)





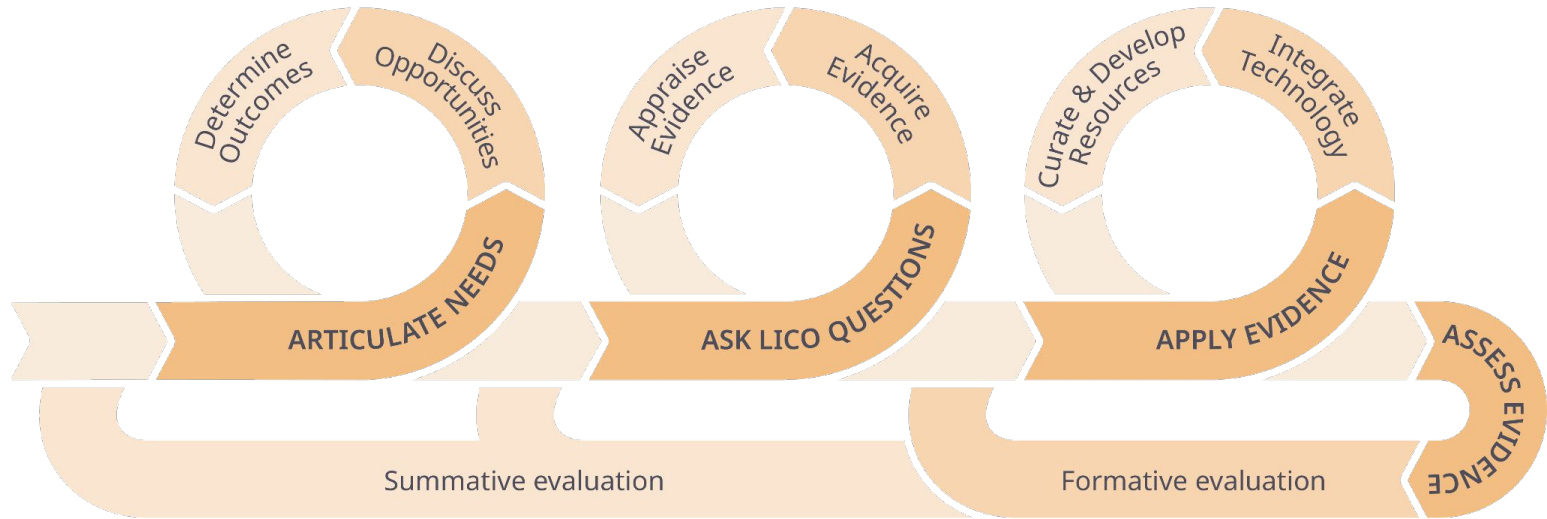
# Instructional Design

Practical application



# Instructional Design Models

## AVIDesign Model



# Case Study: AVIDesign Model

A faculty member has proposed a new elective in **Palliative Care and Pain Management**.

## Articulate: Right size the initiative

What gap in the curriculum needs to be filled?

A new course in palliative care and pain management has been proposed and accepted. These topics are mentioned in other courses but this will be the first full course in the topic. This will also fill a department need for more online electives during Covid restrictions.

Who are the learners and what do you need them to be able to do after the module/course/experience?

The students are third and fourth year medical students. I expect this course to be an introduction to the topic to make them aware of palliative care issues. They need to be able to identify end of life needs, manage pain in basic cases, and communicate with families.

How much time do you have for design and delivery?

This course will begin in 6 months and I can meet once a week for an hour, plus planning by email as needed.

## Ask, Acquire & Appraise: Analyze the context

### Ask LICO questions (Learners, Intervention, Context, Outcomes)

Who are the Learners? What are their professional needs and interests? What motivates them?

This will be open to third and fourth year medical students. Since this is an elective, they would be choosing this course based on interest level but their professional goals may vary widely. They seem to be motivated by learning practical material that translates directly into patient care.

What is the desired intervention? Will it be online, synchronous?

This course will be an online course. There will be a mix of synchronous sessions and asynchronous work. We will meet 3 hours a week synchronously. The course may be 2 weeks or 4 weeks.

What is the context for learning and performance? [What materials and resources are available for learning? When, where, and how will students use this on the job?]

This course meets 3 hours a week synchronously and students are expected to spend a minimum 10 hours per week doing asynchronous work. Our learning management system (LMS) provides quizzing tools, a discussion board, and I can integrate videos and other links. The students will be expected to use this information in hospital settings or hospice care.

What are the desired outcomes?

Students will determine treatment plans for simple cases involving end of life care, signs of impending death, and best practices involving opioid management.

# AVIDesign Model

## Acquiring and appraising educational evidence



- Relate to educational goals, students, resources and context
- Consider quality of evidence, strength, relevance
- Consider patient cases, relevant knowledge, cultural considerations

# AVIDesign Model

## Designing and developing

- An initial set of objectives is made for four modules. The first two will cover the basic concepts for pain management and end of life care, the second two modules will repeat those topics, going more in depth and using more complicated cases.
- Because the course is pass/fail, the instructor proposes that the preferred assessments will be formative assessments consisting of discussions, individual feedback, and group debriefing.
- Based on the instructor's educational philosophy, the learners' interests, and the curricular needs, the team suggests 3 instructional strategies: The BSCS 5E model, Constructivist Learning, and the 5 Component Lesson Model.
- The instructor chooses the 5E model which guides the students through five major stages: Engage, Explore, Explain, Elaborate, and Evaluate. The team decides to prototype one module to be used as a guide for the rest.

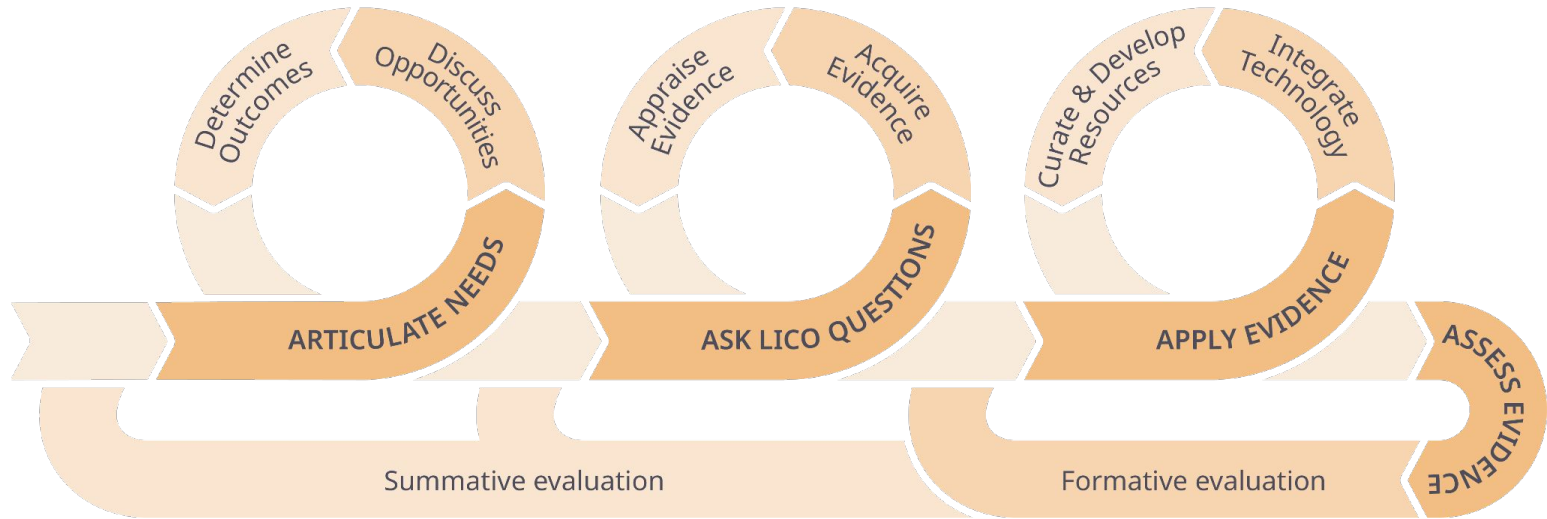
# **AVIDesign Model**

## **Feedback and evaluation**

- From the development of the first module, the team would then plan a formative evaluation by asking a student to review the module and give feedback.
- Based on the student feedback, the team would make revisions and develop the other modules so the course is ready for full implementation.
- After the course, the instructor and the department use student feedback to determine the need for further revision.

# Instructional Design Models

## AVIDesign Model





# Instructional Design

## Assessments



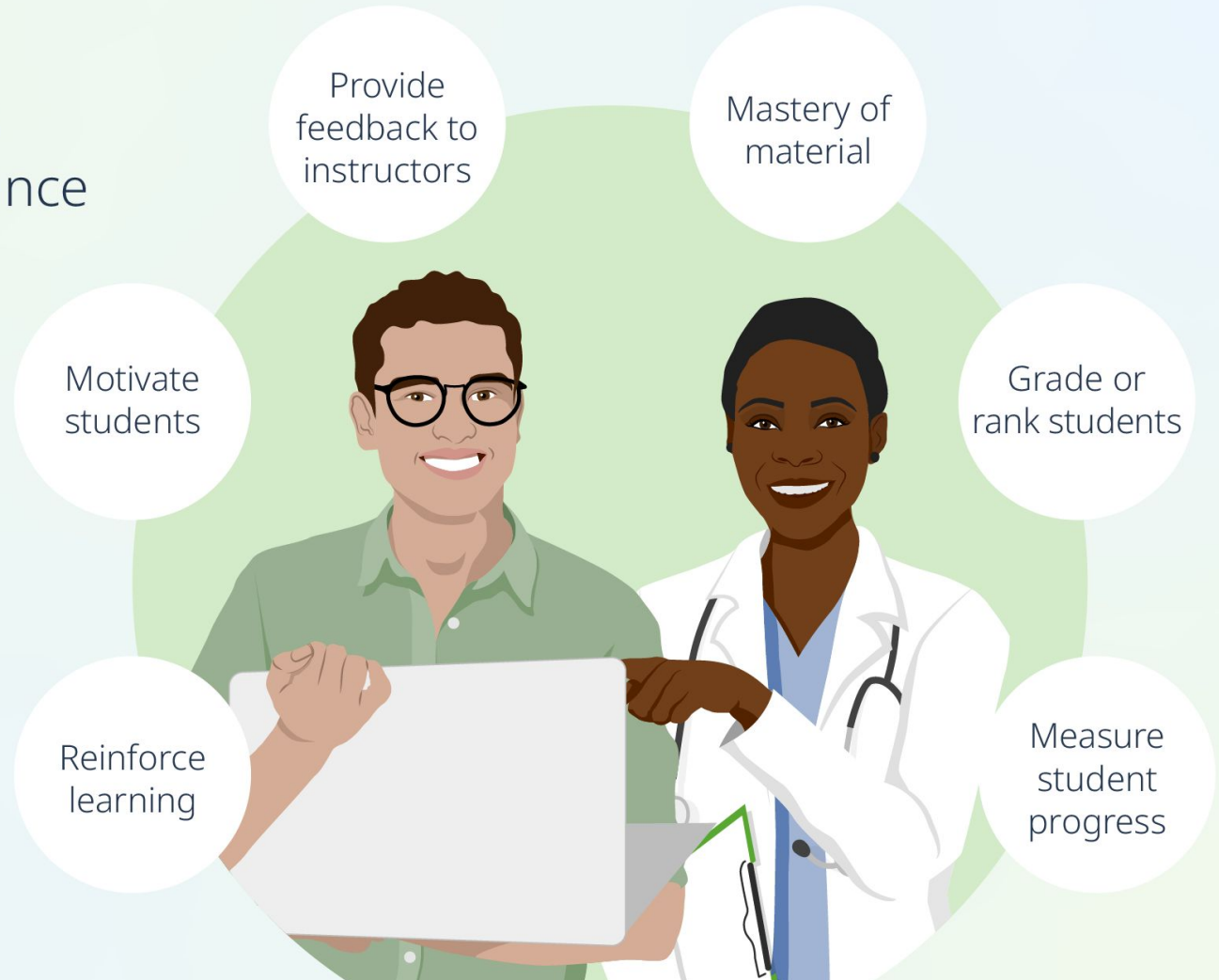


## Question

What is/are the roles of assessments?

# Assessments

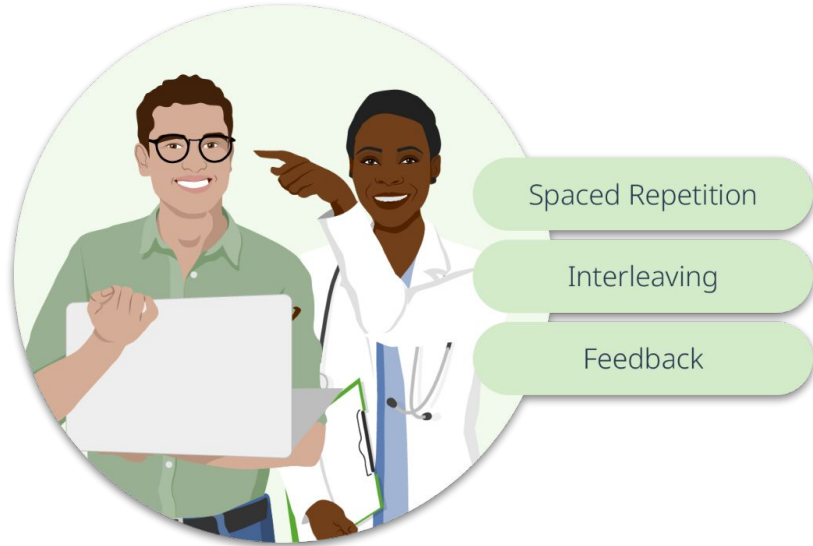
Measure and Enhance Learning



# Formative Assessments

## Reinforcing learning

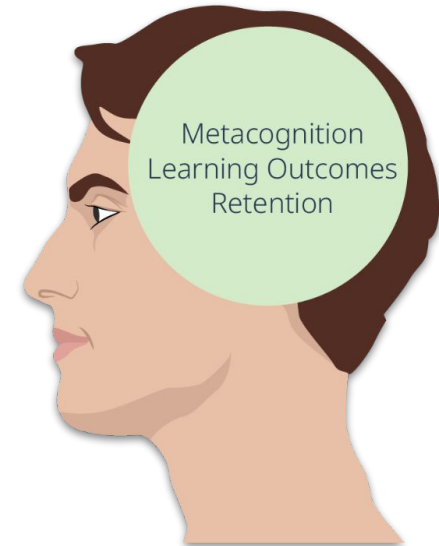
When assessments promote:

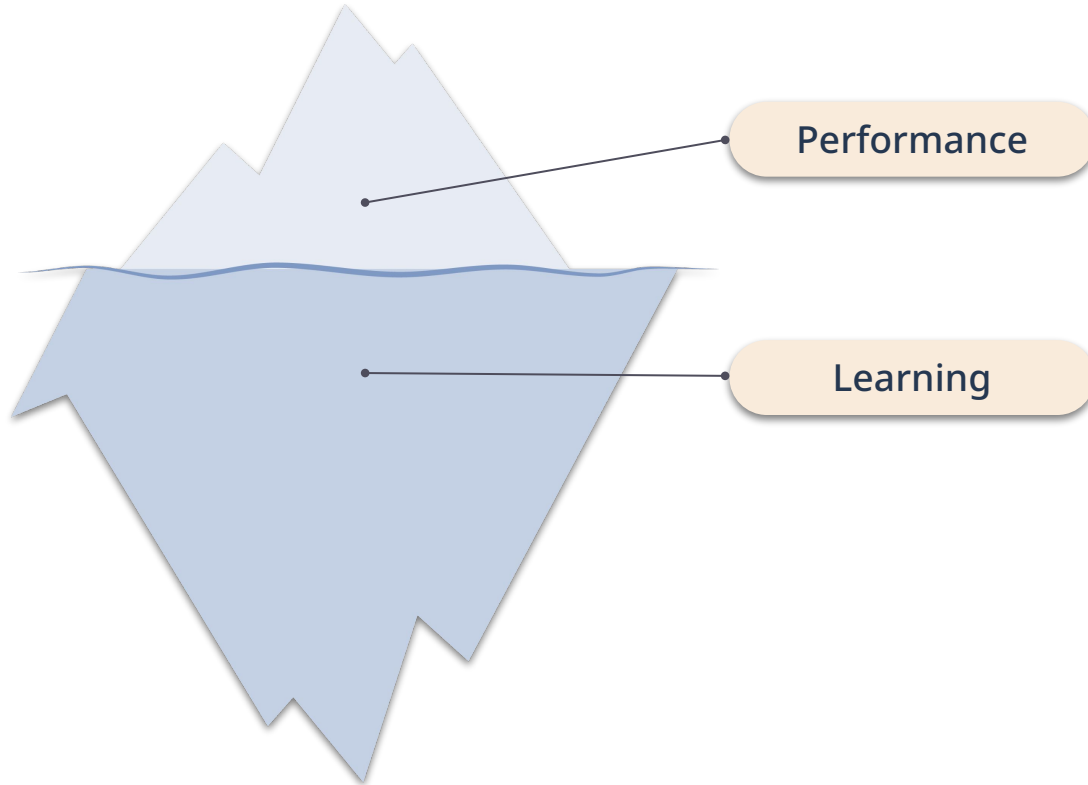


Test Enhanced  
Learning



We see improved results in:





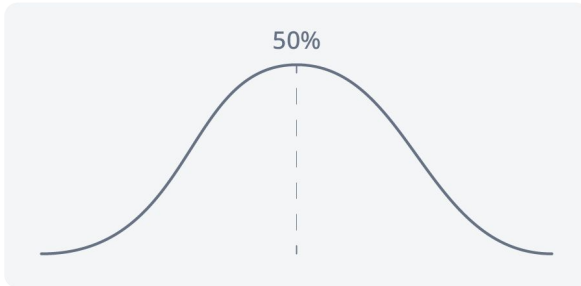


# Designing Assessments

# Assessment Approaches

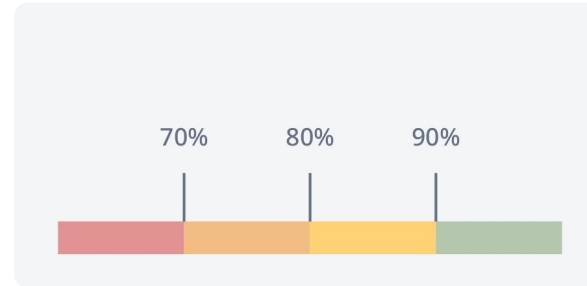
## Norm vs Criterion referenced assessments

### Norm-referenced



- Students are ranked, scores are standardized.
- By design, 50% of students are above, 50% are below.

### Criterion-referenced



- Students are scored based on mastery.
- Scores are grades or ratings such as pass/fail.

# Instructional Design

## Designing assessment

The need for instruction, the learners, the context for learning, and the objectives all help determine the need for assessment such as:

- The **format** in which will learners be assessed, e.g, online, on paper, or observed in a clinical setting.
- The **number of assessments** that will be given and when.
- The **type of feedback needed** to help the students develop the necessary skills, knowledge, and dispositions.

# Mapping Assessment to Learning Objectives

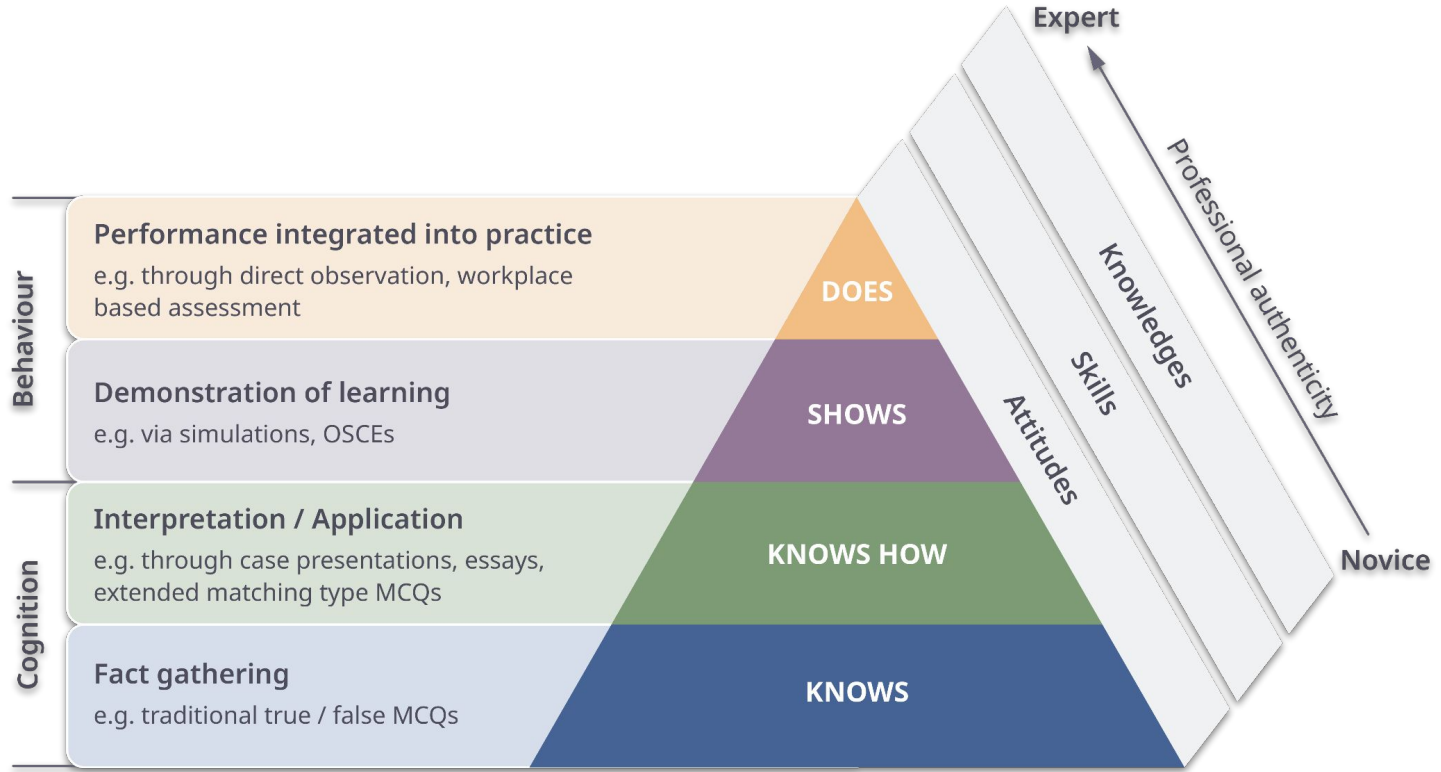
## Test blueprints

Objective	% of test	Domain(s)*			
		Cognitive: Remember	Cognitive: Understand	Cognitive: Apply	Affective: Reaction
<b>Terminal objective:</b> 1.0 Use SPIKES framework to give bad news.**					
<b>Enabling objectives</b>					
1.1 Define parts of the SPIKES mnemonic	10 %	10 %			
1.2 Identify appropriate settings and contexts in which to use SPIKES	10 %	5 %	5 %		
1.3 Given a patient case, explain how the SPIKES framework would be used.	40 %	10 %	10 %	20 %	
1.4 Given patient reaction(s), determine how to best respond.	40 %			20 %	20 %

\*) Assessments may include any levels of cognitive, affective, and/or psychomotor domains. Only a few are shown here for space considerations.

\*\*\*) SPIKES stands for Setting, Perception, Invitation or information, Knowledge, Empathy, Summarize or Strategies

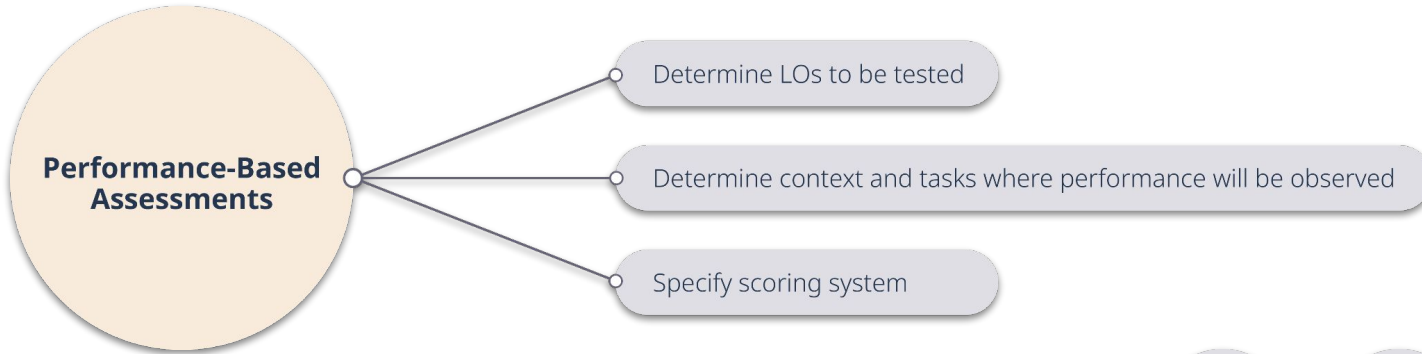




Based on work by Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9); 63-67  
Adapted by Drs. R. Mehay & R. Burns, UK (Jan 2009)

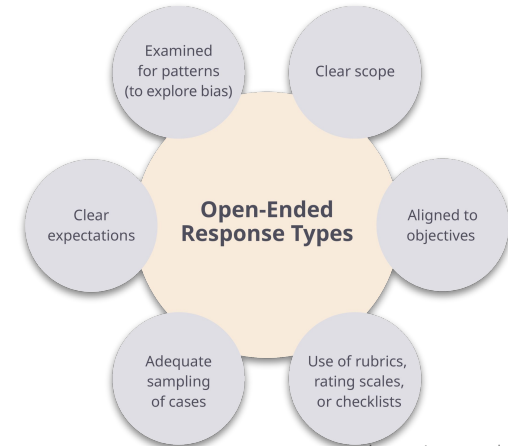
# Assessment Methods

## Specific considerations



## Multiple Choice Questions

- The stem (the first part of the question) should fully formulate the problem or question. A student should be able to formulate the correct answer before viewing the responses (5,15).
- The responses should all grammatically match the stem, be homogenous (e.g. all diseases or all tests), and be kept as short as possible (5,15).
- The detractors (wrong answers) should be plausible to an uninformed person but not arguably correct (5).
- The options “all of the above” and “none of the above” should be used sparingly (5).
- Negative phrasing should be avoided but when used, the negative (e.g. “not”) should be bold and/or capitalized to ensure it is noticed (5).



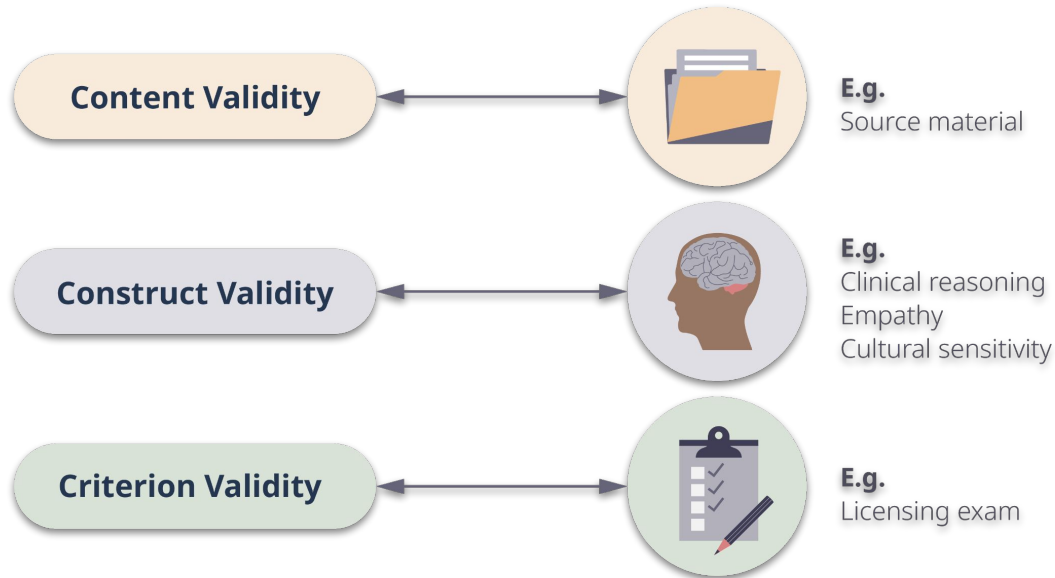


# Evaluating Assessments

# Assessments

## Validity and reliability

**Validity** refers to the degree to which the assessment measures what it intends to measure while **reliability** refers to the consistency with which an assessment measures



# Assessments

## Validity and reliability

**Validity** refers to the degree to which the assessment measures what it intends to measure while **reliability** refers to the consistency with which an assessment measures



# Evaluating Assessments

## Item analysis

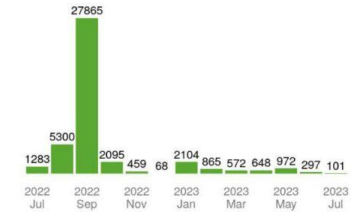
1. Difficulty Index
2. Discrimination Index
3. Item-Total correlation
4. Cronbach's Alpha
5. Distractor analysis

# Evaluating Assessments

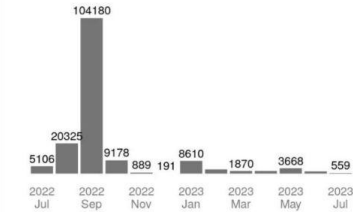
## Learning Analytics

Total Activity [switch to average activity per user](#)

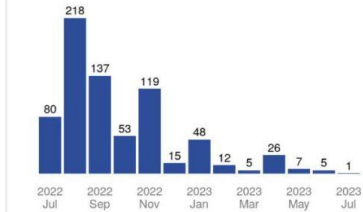
► Total Lectures Watched



🔄 Total Recall Questions Answered

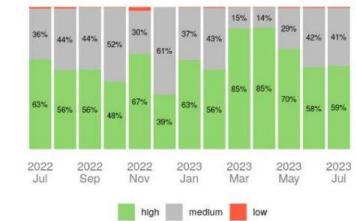


🔍 Total Qbank Questions Answered

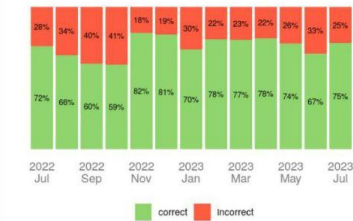


Overall Question Confidence and Performance

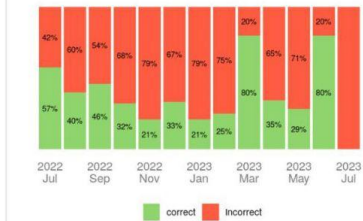
🔄 Overall Recall Question Confidence



🔄 Overall Recall Question Performance



🔍 Overall Qbank Question Performance



# Evaluating Assessments

## Item analysis

Item	Difficulty Index	Discrimination Index: 20%	Discrimination Index: 33%	Discrimination Index: 50%	Item-total correlation	Corrected item-total correlation	Cronbach's Alpha
Key	Good	Ideal			Good		
	Too difficult	Good			Consider review		
	Too easy	Consider review			Needs review		
		Needs review					
		Consider removal					
4108	0.781	0.336	0.253	0.171	0.375	0.357	0.928
4110	0.69	0.29	0.237	0.197	0.265	0.244	0.928
4226	0.603	<b>0.53</b>	0.331	0.239	0.328	0.306	0.928
4228	0.519	0.343	0.254	0.206	0.223	0.199	0.928
4326	0.793	0.246	0.224	0.18	0.3	0.281	0.928
4354	0.823	0.276	0.255	0.195	0.33	0.314	0.928
4358	0.552	0.298	0.255	0.193	0.262	0.239	0.928
4370	0.788	0.161	0.167	0.135	0.229	0.21	0.928
4384	0.614	<b>0.451</b>	0.357	0.24	0.313	0.291	0.928
4392	0.819	0.356	0.263	0.181	0.333	0.317	0.928
4398	0.734	0.323	0.248	0.15	0.307	0.287	0.928
4404	0.454	0.337	0.258	0.175	0.215	0.192	0.928
4464	0.82	0.308	0.211	0.139	0.296	0.279	0.928
4506	0.405	0.347	0.299	0.194	0.242	0.219	0.928
4598	0.414	0.15	0.06	0.067	0.077	0.053	0.929
4746	0.467	<b>0.432</b>	0.223	0.122	0.263	0.24	0.928
4770	0.778	<b>0.484</b>	0.383	0.256	0.472	0.456	0.928



## Question

A 55-year-old man presents with chest pain radiating to his left arm. An ECG shows ST-segment elevation in leads II, III, and aVF. Which of the following is the most likely diagnosis?

- A. Aortic dissection
- B. Pulmonary embolism
- C. Acute pericarditis
- D. Myocardial infarction

**Difficulty Index (p-value):** 0.95 (Very high, meaning most students answered correctly, suggesting the question might be too easy.)

**Discrimination Index:** 0.10 (Low, indicating that the question does not effectively differentiate between high-performing and low-performing students.)

**Distractor Analysis:** Most students chose the correct answer (D), while almost none selected distractors A, B, or C.

## Revised question

A 55-year-old man presents with chest pain radiating to his left arm. He also reports shortness of breath and diaphoresis. His medical history includes hypertension and hyperlipidemia. An ECG shows ST-segment elevation in leads II, III, and aVF. Troponin levels are elevated. Which of the following is the most appropriate immediate management?

- A. Administering intravenous thrombolysis
- B. Emergency percutaneous coronary intervention
- C. Administering intravenous beta-blockers
- D. Initiating anticoagulation therapy with heparin

# Assessments: New Uses for an Old Tool

October 12, 2022 ·

Authors: Meredith Ratliff, MAT MA; Satria Nur Sya'ban, MD; Adonis Wazir, MD; Sarah Haidar, M.Ed., TD.; Sara Keeth, PhD, PMP; Peter Horneffer, MD

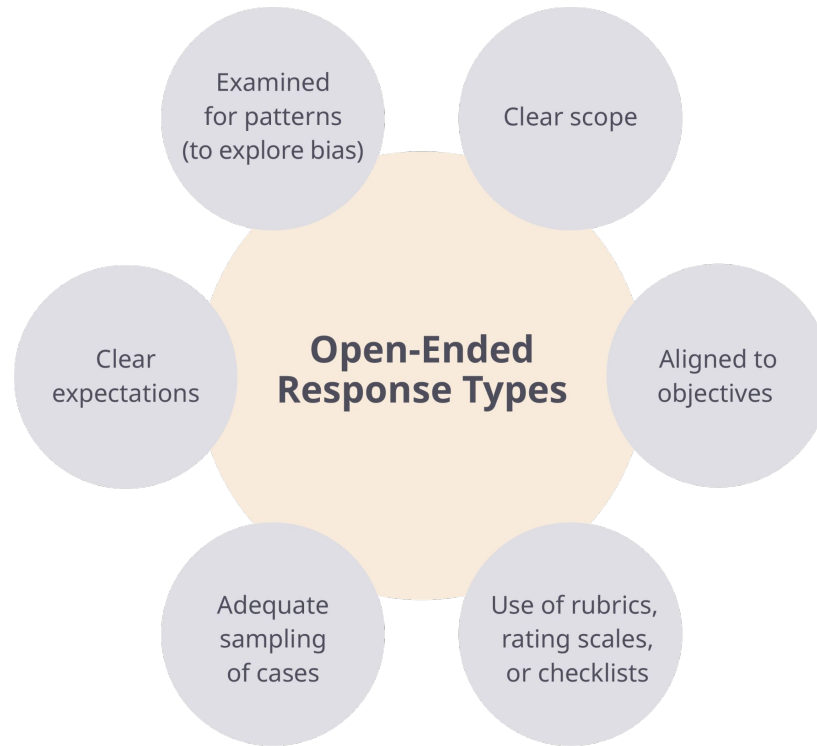
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Educators and students alike often think of an assessment as the final stop on the path of learning. Our current understanding of cognitive and neuroscience has taught us, however, that assessments can be an invaluable learning tool as well as a means of evaluation. Properly designed and well-written assessments can determine mastery of material, grade or rank students, measure student progress, reinforce learning, motivate students, and provide feedback to instructors (1). Assessments include more than just written exams; they encompass any form of evaluation or appraisal of a student's educational progress by formal or informal means.

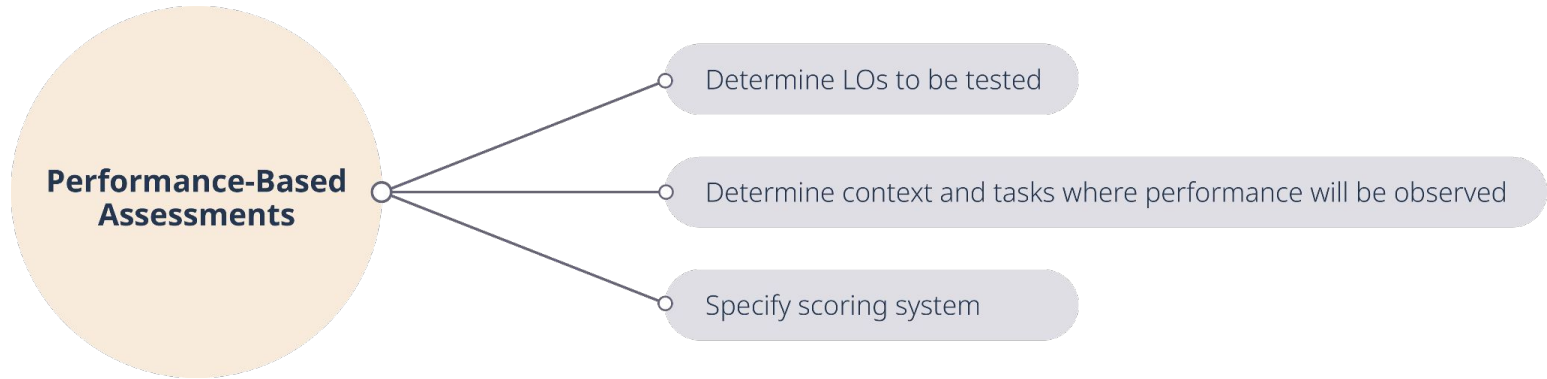
# Multiple Choice Questions

- The stem (the first part of the question) should fully formulate the problem or question. A student should be able to formulate the correct answer before viewing the responses (5,15).
- The responses should all grammatically match the stem, be homogenous (e.g. all diseases or all tests), and be kept as short as possible (5,15).
- The detractors (wrong answers) should be plausible to an uninformed person but not arguably correct (5).
- The options “all of the above” and “none of the above” should be used sparingly (5).
- Negative phrasing should be avoided but when used, the negative (e.g. “not”) should be bold and/or capitalized to ensure it is noticed (5).
- Avoid extreme statements such as always or never (16).
- Questions that are context-rich and include clinical information aid in assessing higher order skills and transfer of learning (13,14,16).
- When creating context-rich questions, put all relevant clinical information first and avoid any ambiguity (16)

# Open-ended Questions



# Performance-based Assessments





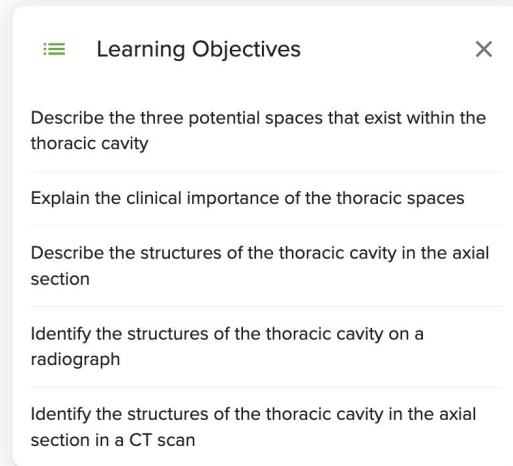
# How Can Lecturio Help?

1

# Determine Objectives and Outcomes

## Time saving feature

Video Lecture objectives



Preset objectives that can help inspire or support educators in determining or matching lesson objectives with assignments through Lecturio



## 2

# Align Assessments

## Time saving feature

### Qbank and Quiz Questions

The screenshot displays the Lectorio interface. On the left, a vertical list of question numbers (1-33) is visible, with question 32 highlighted. The main content area shows a question about cardiac muscle histology. The text reads: "Cardiac muscle serves many necessary functions and it has a specific structure that serves these functions. The structure highlighted is an important histologic component of cardiac muscle. What would be the outcome if this structure diffusely failed to function?". Below the text are five multiple-choice options (A-E). To the right of the text is a histological image of cardiac muscle with a white box highlighting a specific structure. Below the image is the credit: "Image by Dr. S. Glond, Anton Becker, License: CC BY 2.5". At the bottom of the question area is a "Submit answer and show explanation" button. On the right side of the interface, a separate window shows a question: "What structure or structures appear(s) black on a CT scan of an axial section through the thorax?". Below this question are five radio button options: Pulmonary arteries, Bronchial lumen, Chest wall, Descending aorta, and Heart. The interface also includes a top navigation bar with icons for "Auto Translate", "Lab Values", "Notes", "Calculator", and "Reverse color". At the bottom, there is a "Lectorio" logo, a "Feedback" button, an "End" button, and three colored buttons (red, blue, green) with smiley face icons.

Qbank and Quiz Questions repository can act as springboard for educators to align assessments from. Pre-mapped Qbank helps take burden off of educators.

## 3

# Evaluate Learning and Assessments

## Time saving feature

### Learning analytics



The Learning Analytics data in Lecturio can show where students need work, what questions they find difficult, and what objectives they have already covered. (etc etc)

# 4

## Formulate Instructional Strategies

### Time saving feature

Faculty development

Faculty Events

#### Lecturio Educator Events and Networking Opportunities

Explore Lecturio webinars and get practical recommendations on implementing effective evidence-based teaching strategies into your pedagogical practice. Every session is designed from the bottom up to meet the needs of health professions educators.

EXPLORE OUR EVENTS

The Lecturio webinars and faculty development workshops can help educators stay up to date on the latest instructional strategies and teaching approaches.

5

# Create and Curate Content

## Time saving feature

### Video library

Videos / ... / Thoracic Viscera with Dr. Canby / Thoracic Cavity – Lungs, mediastinum and cardiac valves

**Thoracic cavity**  
Three major compartments  
Thoracic cavity  
Three potential spaces

- Right pleural cavity
- Left pleural cavity
- Mediastinum
- Note cardiac window

1:46 / -7:16

Thoracic Cavity – Lungs, mediastinum and cardiac valves by Craig Canby, PhD

ASSIGN

Bookmark 3D Model Transcript Objectives Materials Notes Report

**Learning Objectives**

- Describe the three potential spaces that exist within the thoracic cavity
- Explain the clinical importance of the thoracic spaces
- Describe the structures of the thoracic cavity in the axial section
- Identify the structures of the thoracic cavity on a radiograph
- Identify the structures of the thoracic cavity in the axial section in a CT scan

**Playlist**  
25 videos

- Thoracic Cavity – Lungs, mediastinum and cardiac valves
- Topography of the Lungs – Lungs, mediastinum and cardiac valves

Our video library and concept notes provide a ready-to-use repository of content, making this step much faster.

5

## Create and Curate Content

### Time saving feature

#### Learning Paths

The screenshot displays a user interface for 'MD - Board Exams' with a grid of six learning path options. Each option includes an icon, a title, and an 'ADD TO STUDY PLANNER' button. The options are:

- USMLE Step 1 Schedule (40 days) - Icon: Calendar with '40'
- USMLE Step 1 Practice Exams - Icon: Clipboard with checklist and pencil
- USMLE Step 1 Self-Assessment - Icon: Clipboard with bar chart and pencil
- USMLE Step 2 Self-Assessment - Icon: Clipboard with bar chart and pencil
- USMLE Step 2 Schedule (40 days) - Icon: Calendar with '40'
- USMLE Step 1 Schedule (99 days) - Icon: Calendar with '99'

Learning paths save time by providing a ready-to-use and aligned lesson-assessment combination, prepared for you and your students by our team of experts.

6

## Create and Curate Content

8

## Time saving feature

### Learning Paths

The screenshot displays a user interface for 'MD - Board Exams' with a grid of six learning path cards. Each card includes an icon, a title, and an 'ADD TO STUDY PLANNER' button. The cards are:

- USMLE Step 1 Schedule (40 days) - icon: calendar with '40'
- USMLE Step 1 Practice Exams - icon: clipboard with pencil
- USMLE Step 1 Self-Assessment - icon: clipboard with pencil and bar chart
- USMLE Step 2 Self-Assessment - icon: clipboard with pencil and bar chart
- USMLE Step 2 Schedule (40 days) - icon: calendar with '40'
- USMLE Step 1 Schedule (99 days) - icon: calendar with '99'

Learning paths save time by providing a ready-to-use and aligned lesson-assessment combination, prepared for you and your students by our team of experts.

7

## Create and Curate Content

### Time saving feature

Course mapping

Pre-Medical / Generic

Pre-Medical / MCAT

Pre-Medical / NEET-UG

Pre-Clinical / Generic

Pre-Clinical / USMLE Step 1

Pre-Clinical / COMLEX Level 1

Clinical / Generic

Clinical / USMLE Step 2

Clinical / COMLEX Level 2

Clinical / NEET-PG

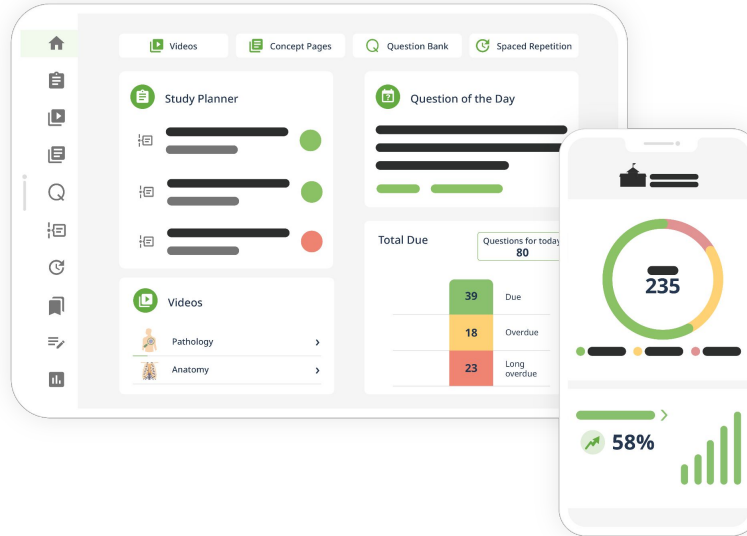
Lecturio course mapping can take the burden off of educators by curating content into courses that fit your curriculum and plans.

6

## Integrate Technology

### Time saving feature

Desktop and App access



The Lecturio web app and mobile app can be some of the technological tools that teachers include as part of their instructional approach.



## 7

# Write High-Quality Questions

## The AI-Question Writer

← AI Question Generator

Subject:  Question style:  Level of difficulty:

Add additional details for question context

Eye Anatomy: The human eye is a sensory organ whose primary function is vision. The eye has a spheroidal shape and is structured in 3 layers: a supporting outer fibrous layer, a middle vascular layer, and an inner neural layer. The eye can also be subdivided into 3 compartments: the anterior, posterior, and vitreous chambers. Surrounding the eyeball itself are the extraocular muscles, the lacrimal apparatus, various nerves and vessels, and the bony structure of the orbit.

Add explanation to answers options

**(RE) GENERATE QUESTION**

Generated question

A 25-year-old patient presents with a sudden loss of vision in one eye. On examination, a retinal detachment is suspected. The retina is part of which layer of the eye and what is its primary function?

Answers 1  ❌

Answers 2  ❌

Answers 3  ✅

Answers 4  ❌

Answers 5  ❌

# Inside Lecturio

## What the AI question generator looks

The screenshot displays the Lecturio administration interface. On the left is a navigation sidebar under the heading 'ADMINISTRATION'. The 'Dashboard' menu item is highlighted in green. Below it, the 'AI Question Generator' menu item is highlighted with a red rectangular box. Other menu items include Statistics, Assignments, Library Management, Qbank Management, Test Management, Qbanks Visibility, Question Visibility, Create Questions, and Concept Pages. The main content area shows a 'Viewed Concept Pages' card with a value of 1,679 and an 'Answered Recall Questions' card with a value of 6,146 and a 47.12% correct rate. A line chart titled 'Activity' tracks 'No. of watched videos', 'No. of answered quiz questions', and 'No. of answered qbank questions' from November 2022 to October 2023. The 'AI Question Generator' menu item is highlighted with a red box.

ADMINISTRATION

- Dashboard
- Statistics
- Assignments
- Library Management
- Qbank Management
  - Test Management
  - Qbanks Visibility
  - Question Visibility
  - Create Questions
  - AI Question Generator**
- Concept Pages

Viewed Concept Pages

1,679

Answered Recall Questions

47.12% correct

6,146

Activity > Group

● No. of watched videos ● No. of answered quiz questions ● No. of answered qbank questions

Nov-2022 Dec-2022 Jan-2023 Feb-2023 Mar-2023 Apr-2023 May-2023 Jun-2023 Jul-2023 Aug-2023 Sep-2023 Oct-2023

Performance and Areas of Difficulty >  Subjects  Systems

Qbank >

<https://acme.lecturio.com/js-app/admin/#/ai/q-gen>

## ← AI Question Generator

Subject

Anatomy

Question style

USMLE Step 1 Exam Question

Level of difficulty

Easy

Add additional details for question context

**Eye Anatomy:** The human eye is a sensory organ whose primary function is vision. The eye has a spheroidal shape and is structured in 3 layers: a supporting outer fibrous layer, a middle vascular layer, and an inner neural layer. The eye can also be subdivided into 3 compartments: the anterior, posterior, and vitreous chambers. Surrounding the eyeball itself are the extraocular muscles, the lacrimal apparatus, various nerves and vessels, and the bony structure of the orbit.

Add explanation to answers options

(RE) GENERATE QUESTION

Generated question

A 25-year-old patient presents with a sudden loss of vision in one eye. On examination, a retinal detachment is suspected. The retina is part of which layer of the eye and what is its primary function?



Answers 1

Retina is part of the outer fibrous layer and its primary function is to protect the eye.



Answers 2

Retina is part of the middle vascular layer and its primary function is to provide nourishment to the eye.



Answers 3

Retina is part of the inner neural layer and its primary function is to convert the light stimulus into a neural impulse.



Answers 4

Retina is part of the anterior chamber and its primary function is to regulate eye pressure.



Answers 5

Retina is part of the vitreous chamber and its primary function is to provide structural support to the eye.

GO TO MY QUESTION BANK

SAVE DRAFT

PUBLISH

(RE) GENERATE QUESTION

Generated question

A 25-year-old patient presents with a sudden loss of vision in one eye. On examination, a retinal detachment is suspected. The retina is part of which layer of the eye and what is its primary function?



Answers 1

Retina is part of the outer fibrous layer and its primary function is to protect the eye.



Answers 2

Retina is part of the middle vascular layer and its primary function is to provide nourishment to the eye.



Answers 3

Retina is part of the inner neural layer and its primary function is to convert the light stimulus into a neural impulse.



Answers 4

Retina is part of the anterior chamber and its primary function is to regulate eye pressure.



Answers 5

Retina is part of the vitreous chamber and its primary function is to provide structural support to the eye.



Paragraph



**Correct answer C:** The retina is part of the inner neural layer of the eye. Its primary function is to convert the light stimulus into a neural impulse, which is then carried by the optic nerve to the brain for interpretation. The intention of this question was to test the student's understanding of eye anatomy and the role of different layers in vision.

**Answer A** is incorrect because the outer fibrous layer primarily provides mechanical support and protection to the eye.

**Answer B** is incorrect as the middle vascular layer primarily provides nourishment to the eye.

**Answer D** is incorrect because the anterior chamber is involved in regulating intraocular pressure, not vision.

**Answer E** is incorrect as the vitreous chamber provides structural support to the eye, not vision.

**Learning Objective:** Students should be able to identify the different layers of the eye and understand their primary functions in vision.



## 7

# Write High-Quality Questions

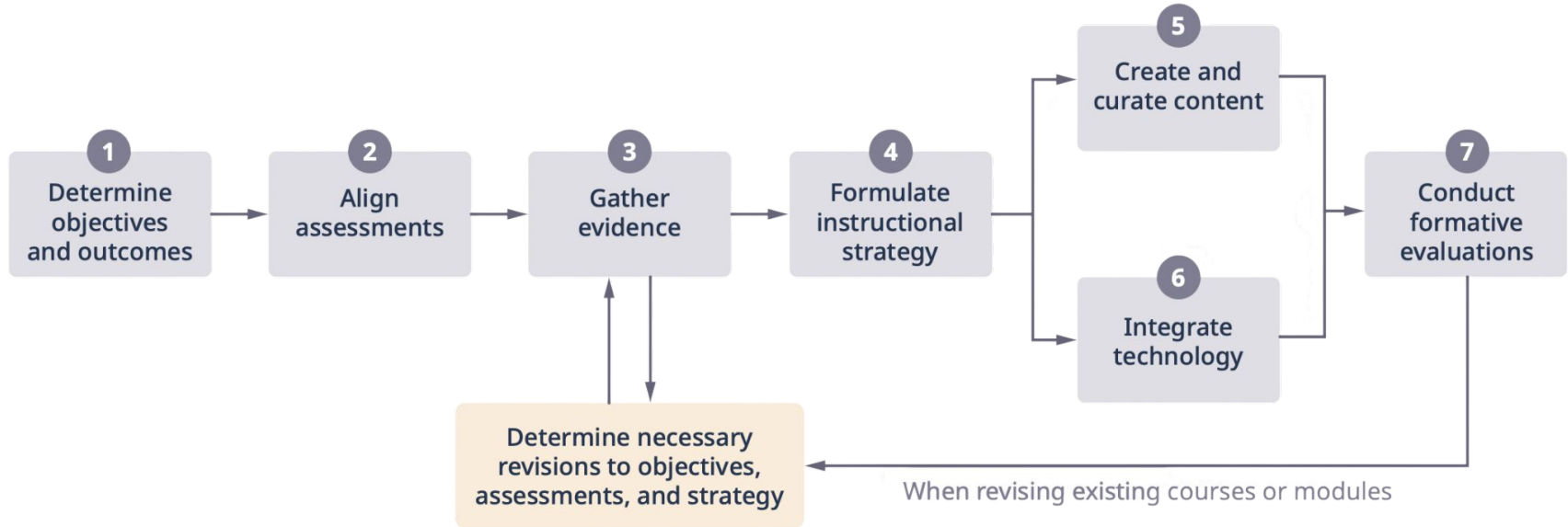
## The AI-Question Writer

The screenshot shows the 'AI Question Generator' interface. At the top, there is a back arrow and the title 'AI Question Generator'. Below this, there are three input fields: 'Subject' with the value 'Anatomy', 'Question style' with a dropdown menu showing 'USMLE Step 1 Exam Question', and 'Level of difficulty' with a dropdown menu showing 'Easy'. A text box below these fields contains the prompt: 'Add additional details for question context. Eye Anatomy: The human eye is a sensory organ whose primary function is vision. The eye has a spheroidal shape and is structured in 3 layers: a supporting outer fibrous layer, a middle vascular layer, and an inner neural layer. The eye can also be subdivided into 3 compartments: the anterior, posterior, and vitreous chambers. Surrounding the eyeball itself are the extraocular muscles, the lacrimal apparatus, various nerves and vessels, and the bony structure of the orbit.' Below the text box is a checked checkbox labeled 'Add explanation to answers options' and a green button labeled '(RE) GENERATE QUESTION'. The 'Generated question' section displays: 'A 25-year-old patient presents with a sudden loss of vision in one eye. On examination, a retinal detachment is suspected. The retina is part of which layer of the eye and what is its primary function?'. Below this are five answer options, each with a red 'X' icon and a text box: 'Answers 1: Retina is part of the outer fibrous layer and its primary function is to protect the eye.', 'Answers 2: Retina is part of the middle vascular layer and its primary function is to provide nourishment to the eye.', 'Answers 3: Retina is part of the inner neural layer and its primary function is to convert the light stimulus into a neural impulse.', 'Answers 4: Retina is part of the anterior chamber and its primary function is to regulate eye pressure.', and 'Answers 5: Retina is part of the vitreous chamber and its primary function is to provide structural support to the eye.' The third answer is marked with a green checkmark. At the bottom right, there are three buttons: 'GO TO MY QUESTION BANK', 'SAVE DRAFT', and 'PUBLISH'.

AI Question Writer in Lecturio helps educators **write questions with AI**, in a way that is **fast, accurate**, and most importantly, **still fully under the educator's control / supervision**

# Instructional Design Outline

## Developing a new course





# Other Ways Lecturio can Help

# The Two Sides of Precision Health Science Teaching

For Students

Personalized smart tutor

The student interface, titled 'BOOKMATCHER', features a search bar and a 'CHANGE PLAN' button. It displays 'Downloadable Slides' with an anatomical diagram of the human respiratory system. A 'Learning Paths' section for 'Pharmacology Exam Prep' includes a 'CONTINUE' button and progress indicators for various topics. A central video player shows a male instructor. Below the video, there are sections for 'Learning Objectives', 'Playlists', and 'Notes'. A bottom navigation bar includes 'Explanation', 'Question Bank' (showing a 24% progress bar), 'Spaced Repetition' (with a table of items: 12 Blue, 8 Orange, 5 Long-term), 'Related Videos', and 'Book References'. A 'CORRECT' notification is visible on the left.

For Faculty

Digital teaching assistant

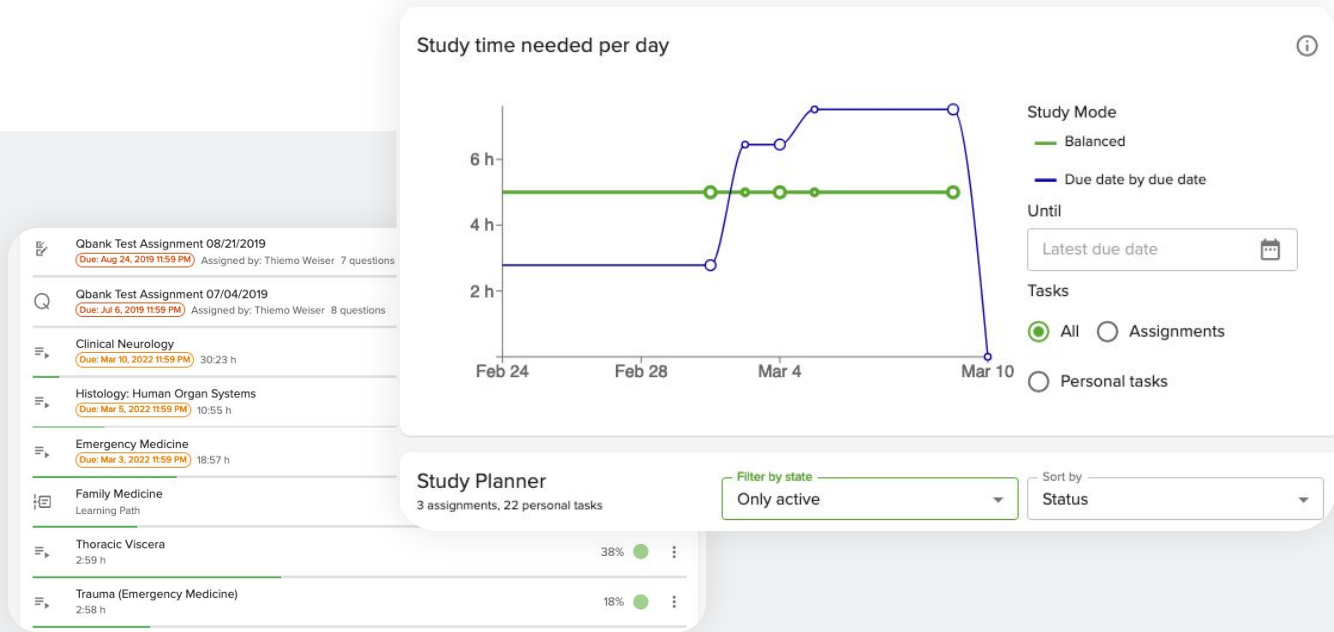
The 'Admin Dashboard' provides an overview of student activity and performance. It includes metrics for 'Watched Minutes' (884) and 'Viewed Concept Pages' (367). 'Answered Qbank Questions' are 238 (67% correct), and 'Answered Recall Questions' are 285 (48% correct). A line graph shows 'Activity' over time. The 'Performance' section features a donut chart for 'Total 2137' questions, categorized as Correct (green), Incorrect (red), and Omitted (grey). The 'Potentially At-Risk Learners' table is as follows:

Name	Risk Score	Accuracy
██████████	10	13%
██████████	5	19%





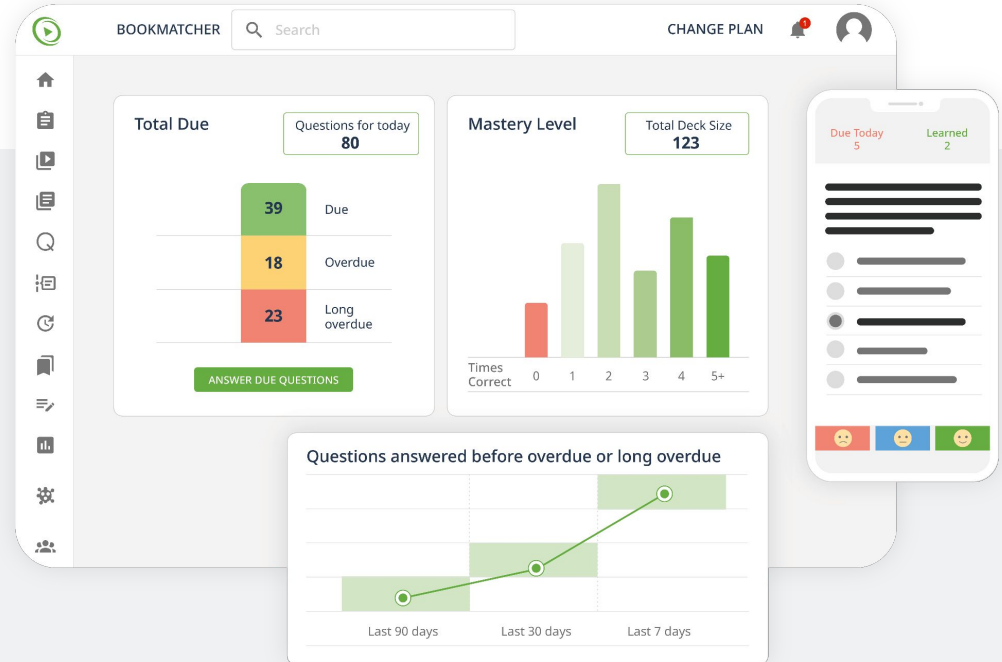
# Balanced Study Coach Helps Avoid Study Crunches by Planning Ahead





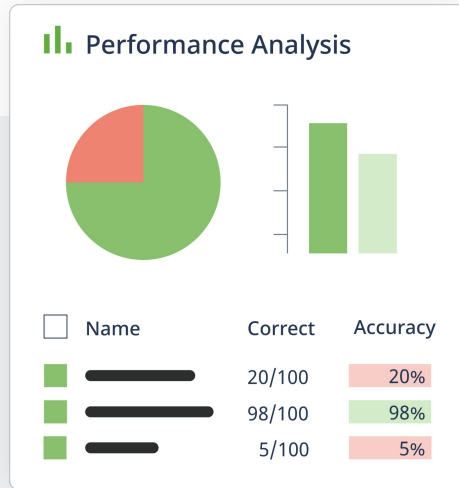
# Adaptive Spaced Retrieval Algorithm Drives Long-Term Mastery

- Adaptive algorithm improves information recall
- Faculty can track / incentivise compliance





# Configurable Adaptive Review Supports Effective Self-Directed Learning



### Subjects

START ADAPTIVE REVIEW

Course	Answered	Completion	Correct	Accuracy
Biochemistry	4/4	100%	2/4	50%
Histology	6/6	100%	6/6	100%

### System

START ADAPTIVE REVIEW

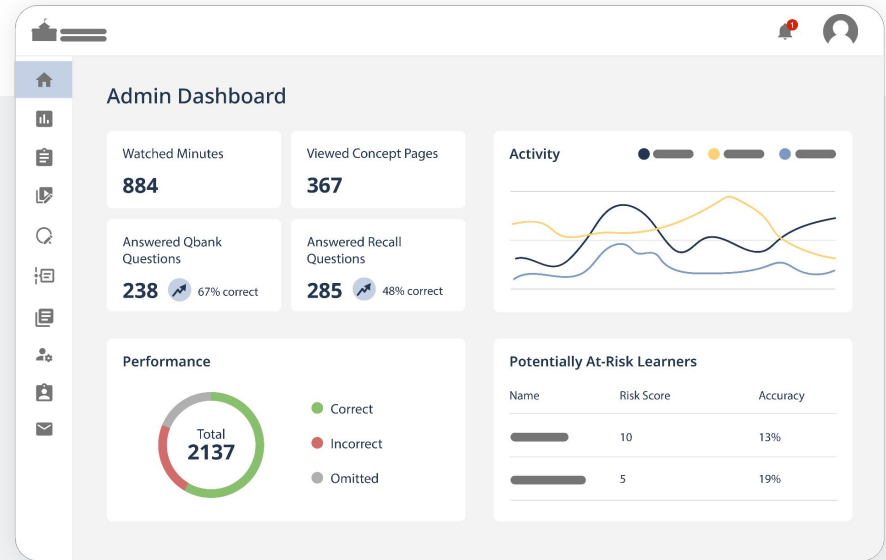
Course	Answered	Completion	Correct	Accuracy
Cardiovascular System	3/3	100%	1/3	33%
Nervous System	4/4	100%	3/4	75%



# Comprehensive Tracking Enables a Comprehensive Live Faculty Dashboard

The system tracks:

- competence
- confidence
- overconfidence
- spaced repetition adherence
- mastery level
- typical mistakes
- readiness assessments





# Assignment Stats

## Help Focus Teaching Time on Where Students Struggle Including Typical Mistakes

**Demo Qbank Assignment**

Completed: 2    Not started: 1    In progress: 0    Not on track: 0    Overdue: 0

Limit to user:      Include omitted     Limit to last attempt

### Summary

Questions	Completed	Due Date	Assigned On
10	2 of 3	Not set	12/01/2020
Author	Stefan Wisbauer		

### Accuracy

Correct	7	35%
Incorrect	13	65%
Omitted	0	0%

### Completed users

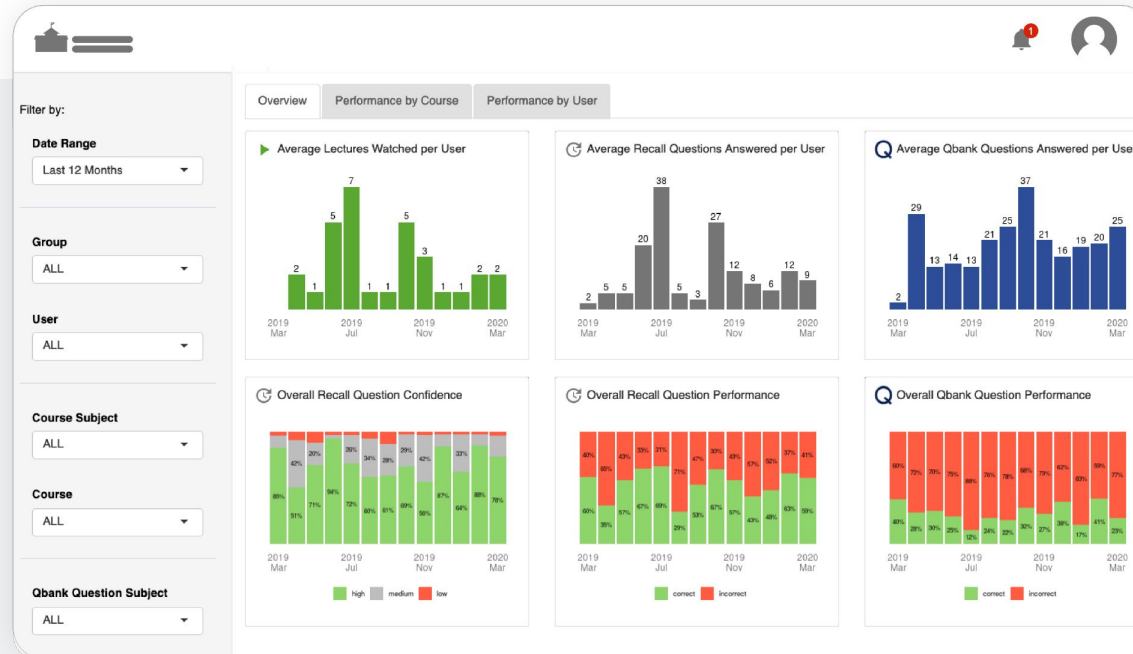
Name	Correct	(%)	Incorrect	(%)	Omitted	(%)
Lindner, Maria	3	30	7	70	0	0
Selling, Lennart	4	40	6	60	0	0

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# Your Teaching Dashboard

Aggregate Data With Location Drill-Down on Activity, Competence, Confidence, Over-Confidence





# Insight Reports

## Activity

### Overall activity

Your students' overall engagement is excellent. The key figures shown below cover the last 12 months.

#### Platform Usage >

Last 12 months

Watched Minutes

**282,530**

Viewed Concept Pages

**772**

Answered Qbank Questions

37.47% correct

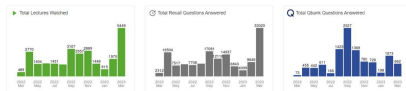
**14,267**

Answered Recall Questions

63.72% correct

**207,730**

The graphs below show the usage of Lecturio's key resources (video lessons, recall questions, and qbank questions) from month to month.



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## International Benchmark Case Questions

Subject	Accuracy	Accuracy (average all B2U Clients)	Accuracy (average all US Clients)	Delta Global	Delta US
Mental Health	43%	22%	19%	21%	24%
Med-Surg	45%	28%	34%	16%	11%
Fundamentals of Nursing: Theory	46%	30%	25%	16%	21%
Leadership	53%	47%	52%	6%	2%
Ethics	58%	55%	65%	3%	-8%
Fundamentals of Nursing: Clinical Skills	42%	41%	63%	1%	-20%
Pharmacology	41%	45%	47%	-4%	-7%
Social Sciences/Ethics	48%	54%	59%	-6%	-12%
Care of the Childbearing Family	34%	40%	51%	-6%	-16%
Physiology	37%	44%	48%	-7%	-11%
Embryology	35%	43%	45%	-7%	-10%
OB/GYN	46%	54%	55%	-8%	-9%
Behavioral Science / Psychiatry	41%	49%	58%	-8%	-17%
Gerontology	22%	35%	46%	-13%	-24%
Anatomy	27%	42%	41%	-14%	-14%
Immunology	30%	45%	50%	-15%	-20%
Psychiatry	37%	52%	58%	-15%	-22%
Microbiology	30%	47%	52%	-17%	-21%
Biochemistry	23%	43%	48%	-20%	-24%
Pathology & Pathophysiology	29%	50%	56%	-21%	-27%
Pediatrics	29%	51%	58%	-22%	-29%
Internal Medicine	28%	52%	53%	-23%	-25%

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# Lecturio

Insights Report

For

**Nursing**

1



# Easy Integration With Your Existing Setup

## LMS / Testing



Deep Linking  
LTI SSO

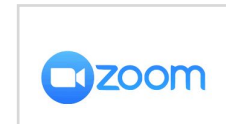
Proctoring  
Integrations



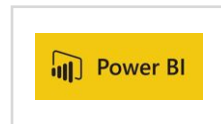
Session Prep:  
Strengths &  
Weaknesses,  
Typical Mistakes

Content &  
Recording  
Upload

## Live Teaching & Training



## Data Lake / Analytics





# Other ways Lecturio can help

Lecture Preparation

Testing-as-learning assignments

Early High-Risk Identification

Simulation (De)Briefing

In-Class Use (Quiz, Qbank)

Blended Learning

Exam Prep

Faculty Development

Formative Assessment

Flipped Classroom

Remediation Support

Data Analytics Support

Summative Assessment

TBL/PBL support (iRATS, tRATS ...)

Clerkship Support

Proctoring (via integration)

# Lecturio Acquires NEJM Healer

The screenshot displays the NEJM Healer application interface. At the top, there is a dark teal header with the NEJM Healer logo (POWERED BY LECTURIO) on the left, a user profile icon, and a hamburger menu on the right. Below the header is a navigation bar with tabs: Triage, History, Physical Exam (selected), Diagnostics, DxPause, and Management.

Under the Physical Exam tab, there is a text instruction: "Check off physical exam findings that are important to your differential. Use the Diagnosis Pad to review, update your PR, and update your diagnoses."

On the left side, there is a list of "ORGAN SYSTEMS" with the following items: GENERAL EXAM, SKIN, HEENT, NEUROMUSCULAR, CARDIAC, RESPIRATORY, GI EXAM, UPPER EXTREMITIES, LOWER EXTREMITIES, LYMPHATICS, SKELETAL, and GENITAL/RECTAL EXAM.

In the center, there is a 3D illustration of a female patient in a white lab coat.

On the right, a "DIAGNOSIS PAD" overlay is shown. It features a header "DIAGNOSIS PAD" and three buttons: "Your PR", "Your DDx 4", and "Findings 4". Below these are two sections:

- Your PR**: A text area containing the text: "A 58-year-old woman presents with new onset, progressive, non-productive cough, fever, tachycardia, and low-normal oxygen saturation breathing ambient air."
- Your differential**: A section with a "Count: 4" and a search bar labeled "Start typing". Below the search bar is a list of four differential diagnoses, each with a numbered green box and a trash icon:
  - 1 Covid-19
  - 2 Pneumonia
  - 3 Influenza
  - 4 Asthma



# Let's Teach

*Evidence-Based Medicine in an  
Evidence-Based Manner*

Request a demo:

[institutions@lecturio.com](mailto:institutions@lecturio.com)

[www.lecturio.com](http://www.lecturio.com)



# Get Your Resource Pack Now!

Download our complimentary Start Smart resources pack, specifically designed to help educators like you to kick off the with innovative teaching strategies.

## Medical



## Nursing





# Thank You for Joining

Contact us: [learning-science@lecturio.de](mailto:learning-science@lecturio.de)

