CODA standard

"Assessment of student performance should measure not only retention of factual knowledge, but also the development of skills, behaviors, and attitudes needed for subsequent education and practice. The education program should assess problem solving, clinical reasoning, professionalism, ethical decision-making, and communication skills. In an environment that emphasizes critical thinking and humanistic values, it is essential for students to develop the capacity to self-assess. Self-assessment is indicative of the extent to which students take responsibility for their own learning." (Standard 2-5, Intent, p. 24)

Advanced Features of ExamSoft For Assessment and Learning

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January 16, 2019

Agenda

- Alternative question types
- Rationale as exam feedback to students
- Categories (taxonomy)
- Summary report (including item analysis)
- Strengths and Opportunities report
- Longitudinal report

Alternative question types

- Case-based MCQ
  - Integrated national board dental exam (INBDE): Patient boxes
- Short answer/essay
- Fill in the blank/matching
- Hot spot (New)

INBDE practice question: Patient box example 1

Patient
Male, 60 years old

Chief Complaint
"My gums are bleeding for no apparent cause."

Background and/or Patient History

Prosthetic heart valve
Medications:
   lithium (Lithobid®)
   metformin (Glucophage®)
   atorvastatin (Lipitor®)
   warfarin (Coumadin®)

Current Findings
Vital signs stable No acute distress Spontaneous gingival bleeding INR: 5

Which mechanism of action most likely explains the current complaint?

A. Vitamin K inhibition
B. Direct thrombin inhibition
C. Antithrombin III activation
D. Platelet aggregation inhibition

Key: A
CC09, CC20
FK8, FK1
Field Test A

JCNDE JOINT COMMISSION ON NATIONAL DENTAL EXAMINATIONS

INBDE practice question: Patient box example 1

Patient
Male, 37years old

Chief Complaint
"I have white stuff on my tongue."

Background and/or Patient History
Recurrent low grade fever, fatigue, periodically feels cold and a little ill

Current Findings
White coating can be wiped off

What is the etiology of this condition?

A. Bacterial infection
B. Fungal infection
C. Viral infection
D. Vitamin B12 deficiency

Key: B
CC42
FK7

Short answer question: Example

ID: **44914** Rev 1; Creator: **Zheng, Sinky**

Title: RDS137
Folder: **UOPITTest**
Group: n/a
Status: **Approved**

Categories ⬍

Add or Remove Category ⓘ

Patient Care
Critical thinking

Options ⬍

Weight: **5.0**
Character Limit: **100**

Attachments ⬍

Injections What Not to Do.mov (32.4 MB)

EXPAND QUESTION

Essay Question

Identify and list 5 inappropriate behaviors seen in this video when preparing for anesthesia, delivering anesthetic, and completing anesthesia.
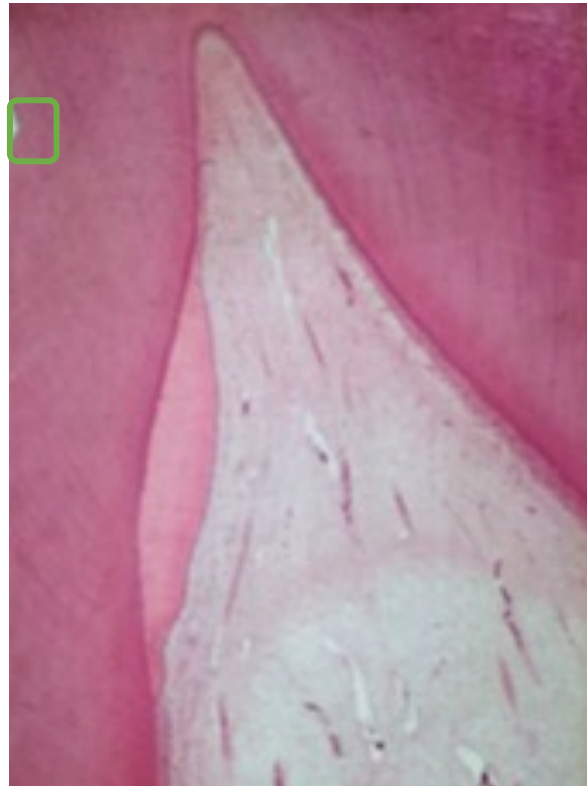
▶ 00:28 ━━━━━━ 01:05 cc 1.00x ✴ 🔊 ⛶

Fill in the blank question: Example

Which **two** major arteries provide blood supply to the brain? 1 and
2

Number	Correct Answer	Actions
1	Vertebral artery|Internal carotid artery|	
2	Internal carotid artery|Vertebral artery|	

Hot spot question: Example

Identify the location of stimulus on the image.

Rationale: Example

Categories

Add or Remove Category

Quiz 9 (2018)

Options

Weight: **1.0**

☐ Randomize Choices

Multiple Answers:
☐ Partial Credit
☐ Select All That Apply

Attachments

No attachments have been applied to this question.

Rationale

The primary initiating agent of periodontal disease is plaque biofilm accumulation around tooth and gingiva. Nutrient deficiencies, excesses, or imbalances do not initiate periodontal disease. Megadoses of supplements neither prevent nor cure periodontal disease. (p369)

Which is the most likely to initiate periodontal disease?

Seq	Answer Choice
a)	Nutrient deficiencies
b)	Nutrient excesses
c)	Nutrient imbalances
d)	Plaque biofilm
e)	Megadoses of supplements

Categories (taxonomy)

Group discussion: Category structure for the Dugoni school
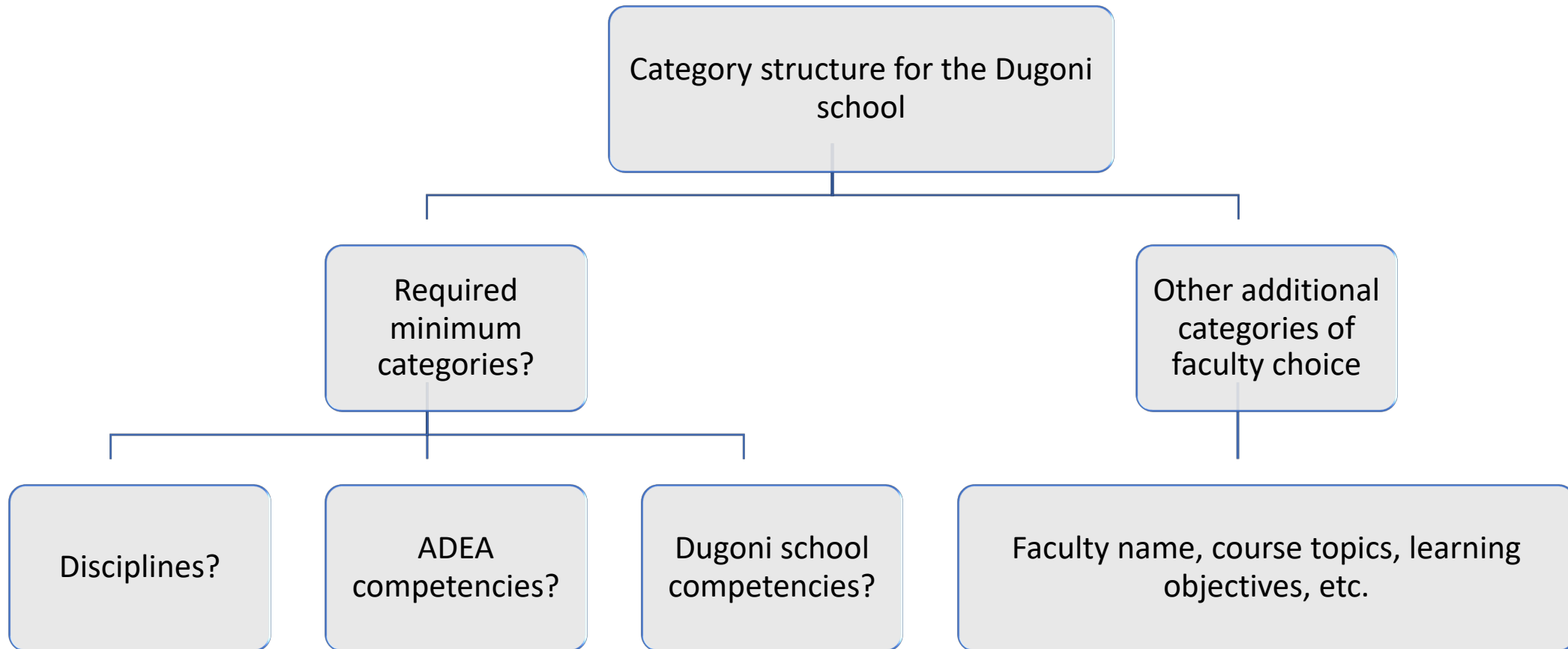
Categories (taxonomy)

Group discussion: Required categories?

01 - Disciplines

- D1-Biomedical science
  - D1a-Human anatomy/Physiology
  - D1b-Histology
  - D1c-Biochemistry
  - D1d-Microbiology/Immunology
  - D1e-Pharmacology
- D2-Diagnostic sciences
  - D2a-Radiology
  - D2b-Pathology
  - D2c-ODTP
- D3-Endodontics
- D4-Periodontics
- D5-Pediatrics
- D6-Restorative dentistry
- D7-Orthodontics
- D8-Oral surgery

02 - ADEA Competencies

- A1-Critical thinking
- A2-Professionalism
- A3-Communication and Interpersonal Skills
- A4-Health Promotion
- A5-Practice Management and Informatics
- A6-Patient Care
  - A6a-Assessment, diagnosis, and treatment planning
  - A6b-Establishment and maintain of oral health

03 - School competencies

- *S1-Basic and clinical science integration
- *S2-Critical thinking
- *S3-Systemic disease impact on oral health
- *S4-Oral healthcare impact on systemic health
- *S5-Health promotion and disease prevention
- *S6-Bioethics
- *S7-Behavioral science
- *S8-Trust, rapport, and empathy
- *S9-Needs of different populations (complex needs, etc.)
- S10-Diagnostic evaluations and risk assessment at all life stages
- S11-Obtain, select, and interpret images and tests
- S12-Treatment planning
- S13-Informed consent
- S14-Infection control
- S15--Preserve and restore hard and soft tissue
  - S15a-Head and neck cancer
  - S15b-Local anesthesia and pain control
  - S15c-Therapeutic and pharmacological agents
  - S15d-Orofacial pain
  - S15e-Communicate with dental lab technicians
  - S15f-Caries
  - S15g-Restore and replace teeth
  - S15h-Periodontal disease
  - S15i-Dental emergencies
  - S15j-Pulpal therapy and endodontics
  - S15k-Oral mucosal and osseous disorders
  - S15l-Bony and soft tissue surgery
  - S15m-Malocclusion and space management
  - S15n-Treatment outcomes and continuing care
- S16-Medical emergencies
- S17-Interact with diverse stakeholders
- S18-Practice and refer within scope of practice
- S19-Lead oral health care team
- S20-Contemporary models of care and role in larger system
- S21-Interprofessional collaboration
- S22- Evaluate and implement modern dental technology
- S23-Quality assurance
- S24-Professionalism
- S25-Local, state and federal policies
- S26-Reflective and lifelong learning
- S27-Self-care
- S28-Participate in professional activities

How to tag a question?

ID: **44728** Rev 1; Creator: **Zheng, Sinky**

Title:

Folder: Select Folder ✱

Group:

Status: **Draft**

Categories

Add or Remove Category ⓘ

Add Categories to Question

Available Categories [Search...] ✕

⊖ CATEGORIES
  ⊖ 01 - Disciplines
    ⊖ D1-Biomedical science
      – D1a-Human anatomy/Physiology
      – D1b-Histology
      – D1c-Biochemistry
      – D1d-Microbiology/Immunology
      – D1e-Pharmacology
    ⊕ D2-Diagnostic sciences
    – D3-Endodontics
    – D4-Periodontics
    – D5-Pediatrics
    – D6-Restorative dentistry
    – D7-Orthodontics
    – D8-Oral surgery
  ⊖ 02 - ADEA Competencies
    – A1-Critical thinking
    – A2-Professionalism
    – A3-Communication and Interpersonal Skills
    – A4-Health Promotion
    – A5-Practice Management and Informatics
    ⊕ A6-Patient Care
  ⊖ 03 - School competencies
    – *S1-Basic and clinical science integration
    – *S2-Critical thinking
    – *S3-Systemic disease impact on oral health

Summary report

- Overall performance of the whole class on the assessment
- Category performance
- Effectiveness of exam questions (psychometric analysis)

Summary report: Example

ASSESSMENT PERFORMANCE

74%
Average Score
(36.9/50)

38%
Low Score
(19/50)

100%
High Score
(50/50)

Assessment Score Reliability (KR-20)

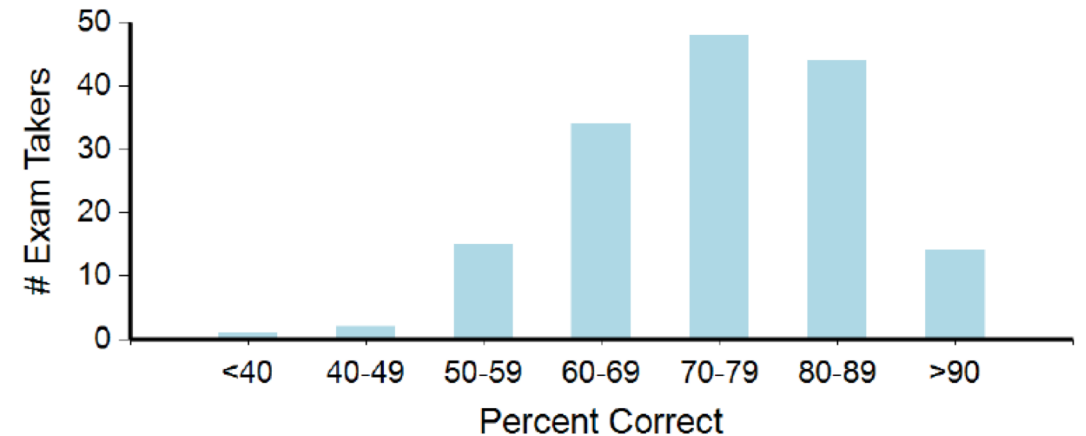0.0   0.77   1.0

POOR   SATISFACTORY   GOOD

Likelihood of students repeating the same performance.
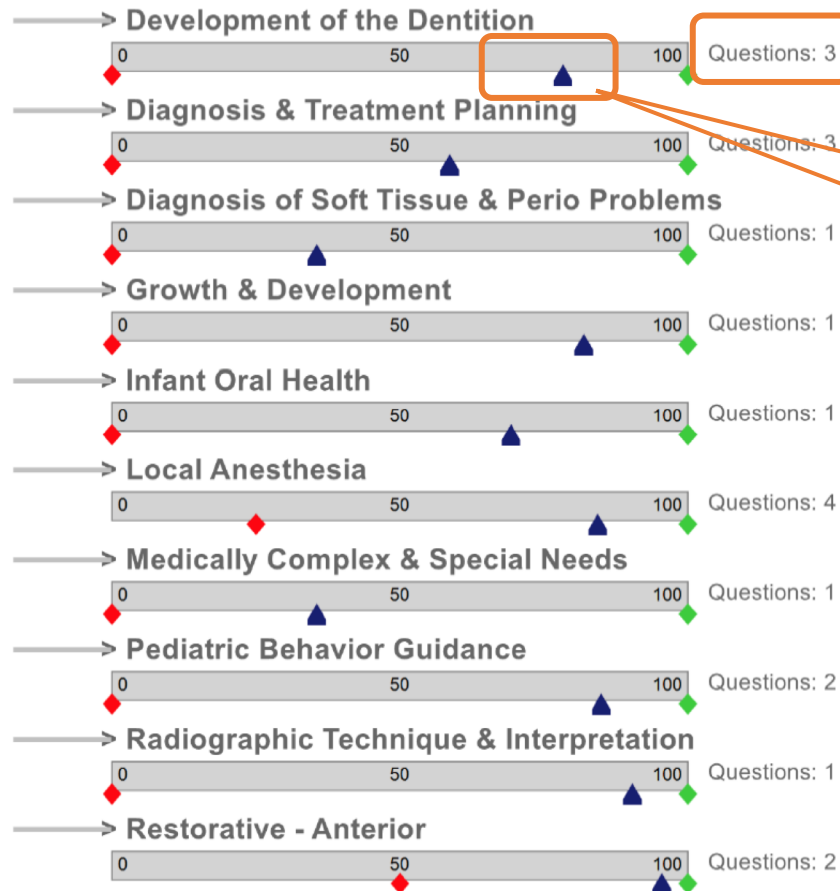
Total Student Performance Histogram

Summary report: Example

LEARNING OUTCOMES *(Category Performance)*

◆ Low   ▲ Avg   ◆ High

Pediatrics

Development of the Dentition — Questions: 3

Diagnosis & Treatment Planning — Questions: 3

Diagnosis of Soft Tissue & Perio Problems — Questions: 1

Growth & Development — Questions: 1

Infant Oral Health — Questions: 1

Local Anesthesia — Questions: 4

Medically Complex & Special Needs — Questions: 1

Pediatric Behavior Guidance — Questions: 2

Radiographic Technique & Interpretation — Questions: 1

Restorative - Anterior — Questions: 2

Total number of questions in this assessment that are tagged to this category.

Blue: Class average (% correct) on the set of 3 questions tagged to this category
Red: Lowest score on the set of 3 questions tagged to this category
Green: Highest score on the set of 3 questions tagged to this category

Summary report: Example

(Lowest 27% of Scorers on this Assessment Posting)

AT RISK STUDENTS

PacificNet ID Last Name First Name % Correct

	% Correct
	48%
	48%
	52%
	52%
	56%
	56%
	60%
	60%
	60%
	60%
	60%
	60%
	64%
	64%

Summary report: Example

QUESTION PERFORMANCE *(Items; Shows Up to 5 Distractors/Choices per Question)*

Seq #	Item ID	Item Stem	Correct	Upper 27%	Lower 27%	Point BiSerial	Disc Index	Response Frequencies A	B	C	D	E
1	42784	Aung is in Piaget's...	82%	100%	64%	0.45	0.36	*136	7	15	8	
2	42785	You decide that you...	90%	93%	82%	0.27	0.11	*150	7	6	0	3
3	42815	Administering 2 carp...	99%	100%	97%	0.15	0.03	0	*146	*18	2	
4	42816	You are planning to...	95%	96%	94%	0.07	0.02	4	*157	5	0	
5	42817	Which of the followi...	58%	84%	39%	0.42	0.45	*97	1	5	18	45
6	42818	You are preparing to...	75%	95%	57%	0.46	0.38	0	38	4	*124	0
7	42819	Based on your clinic...	81%	91%	75%	0.27	0.16	4	4	3	*135	20
8	42826	For restoration of A...	91%	95%	84%	0.27	0.11	1	2	*151	10	2

Strengths and Opportunities report

- Student performance compared with class average
- Student performance in each question
- Rationale as feedback to students

- Can be released online to students' ExamSoft portal
- Help students self-reflect and identify areas of strengths and weakness

Strengths and Opportunities report: Example

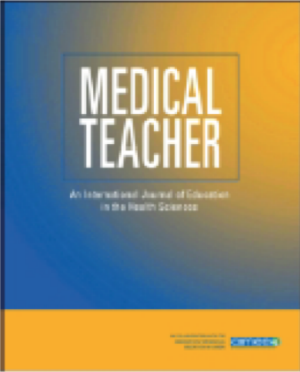StdDev = 0.88 • Mean = 4.27 • Median = 4 • Rank = 2/15 • Percentile Rank = 76.6667

83.33% **71.11%**

My Score
(5/6)

Average Score
(4.26/6)

QUESTION	POINTS
🟢 CORRECT 🟥 INCORRECT 🔶 PARTIAL CREDIT	
1 **Cause of periodontal disease** **Which is the most likely to initiate periodontal disease?**	**1/1**
X A: Nutrient deficiencies X B: Nutrient excesses X C: Nutrient imbalances > D: *Plaque biofilm* X E: Megadoses of supplements Rationale: The primary initiating agent of periodontal disease is plaque biofilm accumulation around tooth and gingiva. Nutrient deficiencies, excesses, or imbalances do not initiate periodontal disease. Megadoses of supplements neither prevent nor cure periodontal disease. (p369)	
2 **Periodontal surgery considerations** **Each is an important consideration for a patient who is scheduled for periodontal surgery EXCEPT:**	**0/1**
X A: *Extent of the surgery* X B: Potential postoperative discomfort X C: Patient's ability to eat after the surgery > D: Limitation/restriction of kilocalories to be consumed Rationale: In preparation for surgery and after surgery, patients should consume adequate kilocalories to meet anabolic (formation of new cells and tissues) needs. Before surgery, the patient should be given a tailored meal plan using nutrient-dense foods and beverages to consume during recovery. The patient's food preferences and dislikes are other factors to be considered. (p372)	

Research on ExamSoft as a learning tool

Medical Teacher

Evaluating outcomes of computer-based classroom testing: Student acceptance and impact on learning and exam performance

Meixun Zheng & Daniel Bender

Key findings from student survey and focus groups
(Zheng & Bender, 2018)

- Strengths and Opportunities report is very helpful for learning.

- Rationale as exam feedback is very helpful for learning.

- Faculty teaching 1st year courses are significantly more likely to release the Strengths and Opportunities report to students than faculty teaching 2nd year courses.

- As a result, D1's perceived value of ExamSoft as a learning tool is significantly higher than D2.

- D1 reviewed the Strengths and Opportunities report when it was released to them.

- Both D1 and D2 want the Strengths and Opportunities report to be released to them.

Longitudinal report

- Performance in categories over time across multiple assessments in a single course or across multiple courses.
- Multiple levels of analysis

(Student)

Course

Cohort

Curriculum
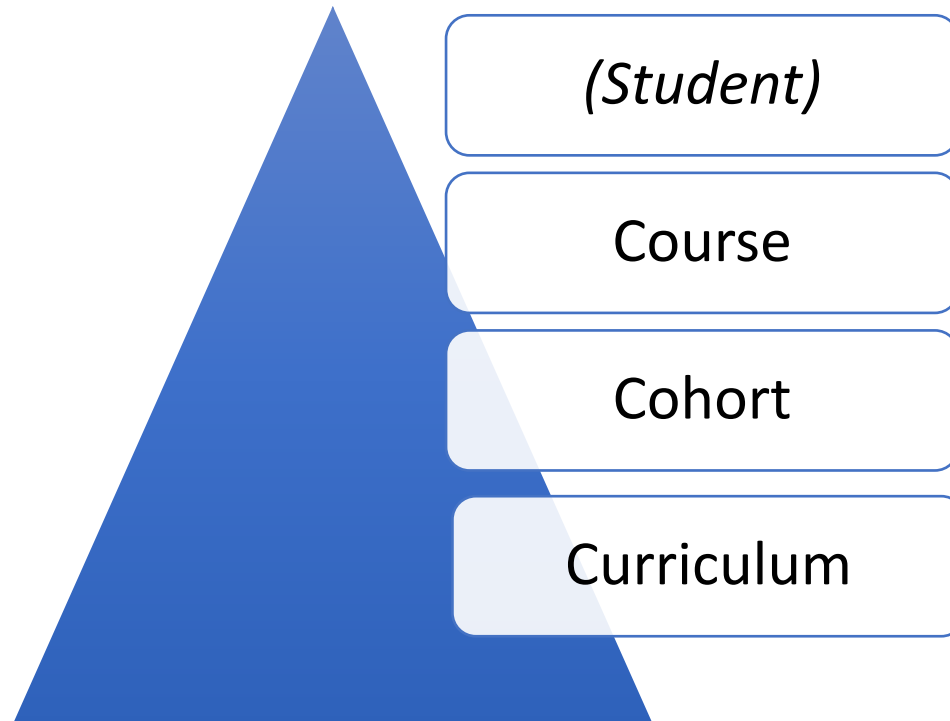
Course level report: Example

Average performance of the class in a single course

Course learning outcomes

	Adverse effects	Drug classification	Drug interaction	Mechanism of action	Monitoring	Brand and generic	Normal dose
# Assessments	4	4	4	3	4	4	4
# Items	60	65	158	32	48	42	45
Group average	78.45%	82.52%	76.46%	77.80%	85.88%	69.53%	92.42%
James Lee	74.34%	80.45%	74.45%	68.45%	88.56%	63.56%	90.23%
David Young	59.79%	83.42%	79.56%	78.56%	81.23%	76.91%	78.51%
Jennifer Smith	76.34%	67.44%	80.34%	72.25%	92.92%	65.40%	94.57%
Michelle Wong	75.68%	86.78%	75.67%	94.55%	88.44%	77.34%	88.53%
Patrick Williams	82.55%	78.58%	72.49%	80.91%	78,.22%	76.91%	100%

Cohort level report: Example 1

*Compare performance of *different cohorts**

Course topics	Acid base balance	Autonomic nervous system	Central nervous system	Heart	Vessels	Action potentials	Biochemistry of saliva, pellicle and plaque
DDS2020							
# Assessments	6	5	6	6	6	7	2
# Items	60	68	72	32	46	48	53
Group average	81.34%	80.18%	80.22%	93.45%	87.20%	78.56%	83.58%
DDS2019							
# Assessments	6	5	6	6	6	7	2
# Items	60	68	72	32	46	48	53
Group average	81.10%	80.67%	78.30%	89.11%	88.45%	78.45%	85.56%
DDS2018							
# Assessments	6	5	6	6	6	7	2
# Items	60	68	72	32	46	48	53
Group average	81.55%	81.20%	79.10%	89.35%	88.64%	80.32%	83.04%

Cohort level report: Example 2

Compare performance in different program year of the same cohort

	Bloom's taxonomy (collapsed)		
	Level 1 and 2 (Knowledge and Understanding)	**Level 3 and 4 (Analysis, synthesis, and evaluation)**	**Level 5 and 6 (Application)**
DDS2019 in their first program year			
# Assessments	28	20	8
# Items	318	142	84
Group average	86.40%	84.34%	70.50%
DDS2019 in their 2nd program year			
# Assessments	18	15	12
# Items	163	99	86
Group average	85.55%	85.40%	82.63%
DDS2019 in their 3rd program year			
# Assessments	10	13	15
# Items	119	187	168
Group average	89.32%	87.82%	87.46%

Curriculum level report: Example

Redesigned Biomedical Science curriculum analysis

	Biomedical science				
	Human anatomy/Physiology	Histology	Biochemistry	Microbiology/Immunology	Pharmacology
DDS2022 in the 1st program year					
# Assessments	15	6	8	3	2
# Items	1200	390	586	35	34
Group average	82.33%	84.18%	82.22%	83.45%	85.28%
DDS2022 in the 2nd program year					
# Assessments	5	2	3	4	8
# Items	468	54	88	200	400
Group average	83.10%	80.67%	78.70%	82.45%	84.45%
DDS2022 in the 3rd program year					
# Assessments	2	4	1		3
# Items	19	12	8		18
Group average	82.45%	91.65%	79.10%		83.60%

Curriculum level report: Example

School *curriculum analysis*

Biomedical science

Diagnostic sciences

Disciplines

	Human anatomy/ Physiology	Histology	Biochemistry	Microbiology /Immunology	Pharmacology	Radiology	Pathology	ODTP	Endodontics	Periodontics	Pediatrics	Restorative dentistry	Orthodontics	Oral surgery
DDS2022 in the 1st program year														
# Assessments	15	6	8	3	2	6	3	2	7	10	4	14	6	3
# Items	1200	390	586	35	34	300	9	11	350	500	45	705	320	26
Group average	82.33%	84.18%	85.22%	83.45%	85.28%	77.01%	80.33%	76.56%	80.44%	85.50%	81.00%	79.21%	78.30%	77.43%
DDS2022 in the 2nd program year														
# Assessments	5	2	3	6	8	4	11	20	15	7	6	12	10	9
# Items	468	54	88	200	400	27	490	164	293	560	342	612	320	45
Group average	83.10%	80.67%	78.70%	82.45%	90.45%	83.65%	82.10%	80.24%	82.45%	84.76%	82.47%	86.50%	80.25%	82.432%
DDS2022 in the 3rd program year														
# Assessments	2	4	1		3	3	6	18	16	4	3	3	9	10
# Items	19	12	8		18	19	520	550	109	56	15	32	48	58
Group average	82.45%	91.65%	77.10%		84.60%	89%	81.78%	85.55%	84.15%	88.44%	85.43%	86.34%	81.56%	82.48%

Reflection activity

- 3 most important things you have learned today

- 2 ideas for application in your course

- 1 more thing you want to learn (or 1 more question you have)

Resources

- **Course Director Orientation:** March 6 and 13, 2019

- School website: Information for faculty and staff → Faculty Resources → Assessment Resources
  - http://dental.pacific.edu/information-for/faculty-and-staff/faculty-resources

- How to run a Summary report
  - https://examsoft.force.com/emcommunity/s/article/Legacy-Portal-Summary-Report

- How to release the Strengths and Opportunities report to students
  - https://examsoft.force.com/emcommunity/s/article/Legacy-Portal-Releasing-Results-to-Exam-Takers

- Longitudinal Report
  - https://examsoft.force.com/emcommunity/s/article/Legacy-Portal-Longitudinal-Analysis-Report

- Categories and Longitudinal Reports (video recording)
  - https://examsoft.force.com/emcommunity/s/article/End-of-Semester-Reflection-Categories-and-Longitudinal-Reports-Recording