

Using Three Types of OSCE Formats to Assess Clinical Competence

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Disclosure - XComP Analytics Inc.

- Commission on Dental Accreditation Standard 2-5 states “The dental education program **must** employ student evaluation methods that measure its defined competencies - including Objective structured clinical examination (OSCE) ”
 - The dental education literature makes a specific delineation between assessment techniques that count towards the evaluation of clinical competence - and OSCE is included.
- SoDM sought to use three different technologies that could be applied to scale OSCEs to improve overall clinical competence of clinical reasoning skills.

- There are three different digital OSCE technologies.
 - (1) **Free-Response OSCE** - presents a progressive disclosure of clinical scenarios with open text boxes. The student is timed for answering each component of the question with written responses. The student response is compared to the pre-determined “right answer.” The student score is based on the relative comparison - giving a percentage of the full points available.
 - (2) **Multi-Response OSCE** - presents case scenarios with many possible answers. The student must choose the correct combination of “right answers,” while avoiding incorrect answers. The student score is based on the points associated with these answers.
 - (3) **Rubric-Enhanced Oral OSCE** - allows a facilitator to present case scenarios with a set of correct and incorrect answers that generate a student score. The SoDM developed all three techniques and mixed the technologies to test different aspects of clinical reasoning.
- Given to 52 students per class for 9 years
- Outcome Measure – Score performance relative to basic didactic and boards



Evaluate User Response

Question:

An 18 yo female patient just received an inferior alveolar nerve block with 2% lidocaine (1:100,000). Immediately following administration she complains of circumoral numbness and becomes very apprehensive. (Submitted by Dr. Steven Thompson)

Question A: – What is your presumptive diagnosis?

Response from

A: Possible intravascular injection.

B: The maximum recommended dose is 7 mg/kg for an adult.

C: If the blood level is this high, the pt may first experience CNS and cardiac excitement, including apprehension, anxiety, tachycardia, tremor, tinnitus and then she may experience CNS depression and cardiac including seizures, bradycardia, and cardiac collapse.

Objectives:

ANSWER A: The immediate post injection response suggests the intravascular injection of anesthetic agent.



2 / 2.0 points

ANSWER B: 4.4 mg/kg (300 mg) (this is lower than the manufacturer's recommendation for lidocaine without vasoconstrictor which is 7.0 mg/kg (500 mg)).



2 / 2.0 points

ANSWER C: Seizure activity



2 / 2.0 points

6.0 of 6.0 total points

Free-Response OSCE

Given Digitally on Laptops

- (1) Compare student response to pre-written correct answers
- (2) Sliders for grading

Pros – Excellent for testing knowledge “depth”
Cons – Time for grading

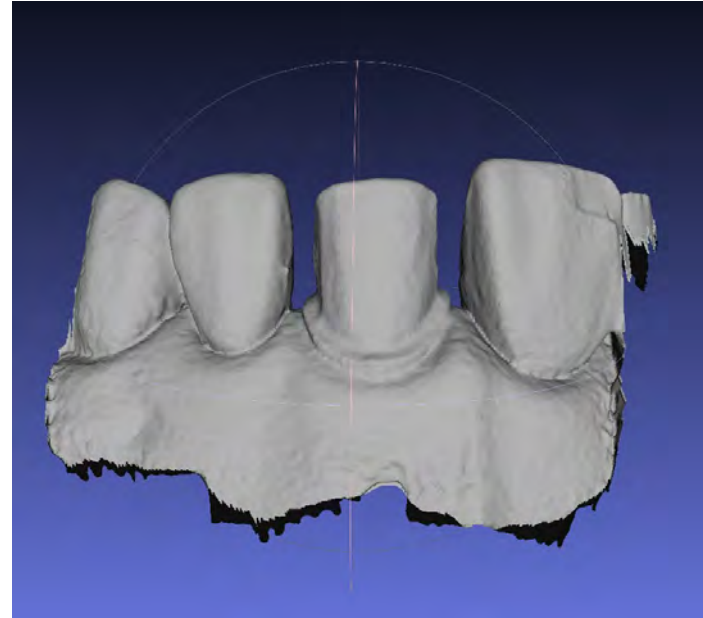
Question

The preparation for an all ceramic crown on tooth #9 _____

(Linc J. Conn Jr., DDS, MPH)

Answer Choices:

- A. is acceptable. (Critical Failure)
- B. is undercut. (2 points)
- C. has adjacent tooth damage (0 points)
- D. is over tapered mesial-distal (Critical Failure)
- E. is over tapered bucco-lingual (0 points)
- F. has insufficient reduction buccally (1 points)
- G. has excessive reduction buccally (-1 points)
- H. has insufficient reduction lingually (1 points)
- I. has excessive reduction lingually (-1 points)
- J. has insufficient reduction mesially (1 points)
- K. has excessive reduction mesially (-1 points)
- L. has insufficient reduction distally (1 points)
- M. has excessive reduction distally (-1 points)
- N. has insufficient reduction incisally / occlusally (0 points)
- O. has excessive reduction incisally / occlusally (0 points)
- P. has unacceptably sharp angles (0 points)
- Q. has unsupported enamel (lipping) of the margin (0 points)



Explanation:

This preparation for an all ceramic crown was done for the January 2015 Mock CITA Manikin Examination. It is too straight. There are mesial and distal undercuts due to the lack of proximal taper. Overall the margins are very smooth and regular, but they are under reduced. This is the preparation for the buccal / opposing view to show inadequate incisal reduction (#9allCeramicBuccal.stl).

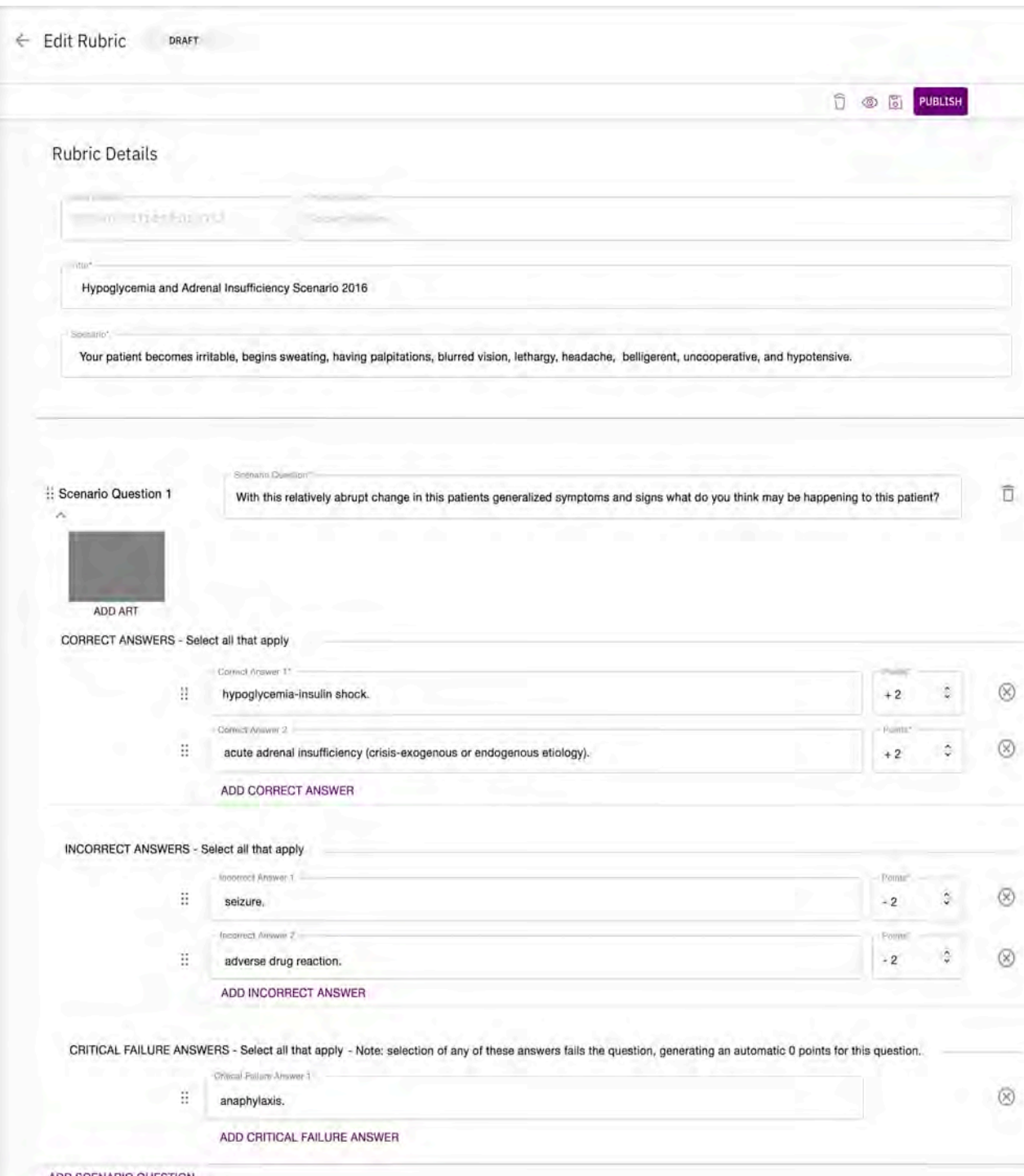
Multi-Resonse OSCE

Given Digitally on Laptops

- (1) Correct Answers – with positive points
- (2) Incorrect Answers – with negative points
- (3) Critical Failure Answers – automatic failure of question

Pro - Excellent for differential diagnosis
Pro - Excellent for media reads (2 and 3D)
Imaging with manipulation

Cons – Item Construction



Rubric-Enhanced Oral OSCE

Given Orally on iPad

- (1) **Correct Answers** – with positive points
- (2) **Incorrect Answers** – with negative points
- (3) **Critical Failure Answers** – automatic failure of question

Pros - Excellent for testing complex sequences – algorithms
Excellent for improvisation – clinical reasoning

Cons – Time

Sequencing (“cheating” as the students wait turn)
Calibration of Graders



- The best students only retain 40% of desired curriculum content.
 - The worst – 10%
- When mapped to the 30 competencies, it is easy to see student-specific content and reasoning deficits.
 - Better correlates (with thresholds) to prediction for board success

1	1,941.0	46.0	71.0	46.0	56.0	69.0	47.0	45.0	41.0	79.0	45.0	63.0	45.0	79.0	66.0	45.0	69.0	114.0	156.0	66.0	74.0	41.0	39.0	44.0	98.0	37.0	120.0	37.0	26.0	28.0	149.0
2	1,922.0	27.0	66.0	53.0	56.0	70.0	54.0	51.0	43.0	67.0	33.0	50.0	52.0	62.0	72.0	50.0	52.0	97.0	163.0	70.0	73.0	31.0	35.0	55.0	107.0	30.0	149.0	54.0	26.0	31.0	143.0
3	1,881.0	43.0	72.0	46.0	59.0	63.0	52.0	42.0	54.0	65.0	48.0	52.0	49.0	93.0	69.0	40.0	76.0	98.0	125.0	66.0	53.0	46.0	35.0	58.0	102.0	39.0	107.0	45.0	28.0	31.0	125.0
4	1,859.0	33.0	62.0	53.0	56.0	58.0	62.0	48.0	49.0	63.0	36.0	46.0	55.0	67.0	70.0	48.0	55.0	105.0	148.0	67.0	79.0	54.0	32.0	44.0	90.0	42.0	118.0	43.0	30.0	31.0	115.0
5	1,846.0	45.0	75.0	51.0	53.0	60.0	48.0	45.0	43.0	86.0	51.0	54.0	50.0	63.0	57.0	39.0	70.0	96.0	137.0	82.0	94.0	42.0	34.0	53.0	91.0	14.0	123.0	43.0	30.0	32.0	85.0
6	1,844.0	37.0	62.0	40.0	53.0	51.0	41.0	40.0	47.0	73.0	40.0	47.0	52.0	91.0	51.0	50.0	61.0	102.0	137.0	88.0	76.0	46.0	37.0	53.0	106.0	38.0	116.0	47.0	27.0	29.0	106.0
7	1,837.0	31.0	56.0	38.0	54.0	53.0	49.0	43.0	37.0	75.0	38.0	50.0	56.0	87.0	65.0	47.0	59.0	90.0	139.0	67.0	71.0	48.0	39.0	59.0	93.0	31.0	133.0	50.0	23.0	31.0	125.0
8	1,779.0	31.0	67.0	42.0	49.0	66.0	50.0	43.0	47.0	63.0	43.0	46.0	46.0	65.0	53.0	54.0	54.0	90.0	143.0	62.0	56.0	46.0	37.0	51.0	95.0	22.0	120.0	52.0	29.0	31.0	126.0
9	1,772.0	30.0	63.0	43.0	53.0	50.0	53.0	42.0	41.0	60.0	51.0	44.0	35.0	90.0	64.0	62.0	50.0	99.0	151.0	81.0	68.0	44.0	31.0	44.0	104.0	23.0	94.0	54.0	31.0	29.0	88.0
10	1,757.0	34.0	57.0	44.0	48.0	54.0	49.0	38.0	47.0	63.0	40.0	48.0	41.0	60.0	64.0	38.0	58.0	101.0	157.0	74.0	71.0	25.0	38.0	40.0	87.0	48.0	107.0	48.0	27.0	31.0	120.0
11	1,753.0	35.0	61.0	42.0	55.0	56.0	37.0	44.0	49.0	50.0	40.0	42.0	41.0	74.0	52.0	41.0	62.0	80.0	136.0	66.0	69.0	50.0	33.0	54.0	84.0	37.0	143.0	44.0	29.0	35.0	112.0
12	1,752.0	26.0	55.0	41.0	59.0	62.0	57.0	56.0	51.0	74.0	50.0	54.0	46.0	74.0	64.0	49.0	54.0	96.0	121.0	67.0	70.0	35.0	29.0	37.0	93.0	26.0	103.0	38.0	25.0	32.0	108.0
13	1,748.0	34.0	65.0	44.0	49.0	59.0	48.0	42.0	34.0	70.0	41.0	55.0	47.0	85.0	72.0	44.0	51.0	79.0	137.0	48.0	73.0	38.0	29.0	40.0	97.0	56.0	103.0	42.0	31.0	34.0	101.0
14	1,731.0	35.0	51.0	45.0	50.0	63.0	41.0	42.0	42.0	68.0	47.0	46.0	52.0	78.0	66.0	50.0	50.0	88.0	129.0	52.0	64.0	46.0	26.0	39.0	84.0	42.0	135.0	39.0	29.0	30.0	102.0
15	1,716.0	27.0	40.0	35.0	52.0	59.0	55.0	44.0	40.0	58.0	35.0	45.0	50.0	72.0	66.0	41.0	47.0	91.0	129.0	63.0	72.0	51.0	40.0	45.0	81.0	24.0	129.0	36.0	25.0	30.0	134.0
16	1,701.0	32.0	62.0	40.0	45.0	58.0	47.0	44.0	46.0	61.0	40.0	45.0	44.0	67.0	53.0	37.0	57.0	70.0	142.0	72.0	67.0	23.0	36.0	48.0	108.0	26.0	121.0	41.0	24.0	32.0	113.0
17	1,697.0	39.0	55.0	47.0	53.0	52.0	47.0	45.0	37.0	68.0	42.0	49.0	52.0	70.0	48.0	52.0	59.0	91.0	155.0	81.0	37.0	37.0	29.0	43.0	84.0	25.0	99.0	40.0	27.0	28.0	115.0
18	1,694.0	26.0	70.0	37.0	49.0	46.0	38.0	36.0	42.0	67.0	38.0	44.0	47.0	67.0	62.0	45.0	57.0	96.0	146.0	66.0	63.0	36.0	29.0	42.0	95.0	24.0	108.0	42.0	25.0	25.0	126.0
19	1,671.0	27.0	47.0	45.0	41.0	46.0	48.0	28.0	32.0	55.0	35.0	44.0	41.0	82.0	67.0	52.0	61.0	92.0	124.0	62.0	44.0	45.0	27.0	38.0	94.0	37.0	150.0	40.0	26.0	32.0	99.0
20	1,658.0	23.0	46.0	44.0	36.0	36.0	50.0	31.0	53.0	62.0	19.0	45.0	43.0	66.0	61.0	59.0	62.0	77.0	136.0	55.0	45.0	30.0	43.0	42.0	96.0	36.0	145.0	47.0	27.0	34.0	119.0
21	1,655.0	27.0	60.0	37.0	44.0	68.0	41.0	51.0	48.0	62.0	43.0	40.0	48.0	66.0	61.0	33.0	52.0	99.0	100.0	56.0	74.0	42.0	31.0	42.0	95.0	19.0	79.0	38.0	26.0	28.0	142.0
22	1,639.0	26.0	50.0	37.0	49.0	39.0	42.0	38.0	41.0	62.0	36.0	36.0	58.0	70.0	52.0	52.0	44.0	92.0	120.0	63.0	59.0	28.0	22.0	39.0	82.0	35.0	145.0	45.0	29.0	36.0	112.0
23	1,634.0	29.0	45.0	37.0	52.0	46.0	39.0	48.0	39.0	72.0	43.0	43.0	41.0	63.0	48.0	37.0	73.0	70.0	129.0	55.0	55.0	35.0	39.0	42.0	90.0	23.0	96.0	53.0	28.0	32.0	132.0
24	1,627.0	28.0	63.0	46.0	57.0	67.0	49.0	43.0	57.0	87.0	38.0	41.0	49.0	63.0	57.0	38.0	49.0	75.0	128.0	52.0	60.0	35.0	18.0	28.0	91.0	26.0	103.0	33.0	23.0	25.0	98.0
25	1,612.0	27.0	65.0	49.0	41.0	53.0	46.0	45.0	43.0	75.0	38.0	40.0	27.0	73.0	51.0	45.0	65.0	85.0	126.0	49.0	54.0	43.0	32.0	46.0	71.0	23.0	121.0	36.0	27.0	28.0	88.0
26	1,610.0	28.0	58.0	36.0	37.0	37.0	41.0	33.0	36.0	54.0	26.0	51.0	51.0	85.0	61.0	60.0	52.0	80.0	128.0	51.0	48.0	39.0	23.0	43.0	84.0	37.0	113.0	45.0	27.0	29.0	115.0
26	1,610.0	27.0	48.0	45.0	42.0	44.0	45.0	40.0	31.0	57.0	36.0	36.0	38.0	58.0	52.0	46.0	57.0	86.0	145.0	62.0	60.0	43.0	28.0	39.0	76.0	27.0	137.0	40.0	29.0	33.0	103.0
28	1,604.0	36.0	64.0	49.0	56.0	74.0	55.0	43.0	45.0	70.0	38.0	49.0	41.0	61.0	41.0	37.0	48.0	77.0	119.0	67.0	57.0	28.0	30.0	40.0	75.0	27.0	88.0	29.0	26.0	31.0	103.0
29	1,602.0	29.0	56.0	40.0	55.0	50.0	46.0	33.0	49.0	60.0	33.0	46.0	40.0	78.0	50.0	37.0	38.0	73.0	142.0	63.0	63.0	48.0	29.0	28.0	85.0	27.0	112.0	45.0	25.0	26.0	96.0
30	1,601.0	26.0	63.0	40.0	36.0	43.0	33.0	45.0	32.0	41.0	26.0	43.0	30.0	70.0	74.0	39.0	60.0	89.0	141.0	62.0	41.0	43.0	24.0	37.0	100.0	10.0	131.0	49.0	33.0	26.0	114.0
31	1,591.0	29.0	47.0	49.0	56.0	53.0	44.0	48.0	50.0	59.0	35.0	39.0	44.0	65.0	43.0	31.0	50.0	84.0	142.0	57.0	67.0	33.0	34.0	39.0	88.0	27.0	100.0	33.0	25.0	28.0	92.0
32	1,590.0	32.0	56.0	49.0	42.0	37.0	43.0	39.0	41.0	64.0	18.0	45.0	26.0	59.0	47.0	47.0	51.0	73.0	111.0	66.0	55.0	35.0	32.0	44.0	101.0	36.0	114.0	49.0	27.0	29.0	122.0
33	1,584.0	30.0	55.0	40.0	46.0	54.0	38.0	31.0	44.0	55.0	31.0	47.0	47.0	71.0	54.0	41.0	56.0	89.0	127.0	52.0	58.0	36.0	23.0	30.0	101.0	14.0	103.0	47.0	30.0	35.0	99.0
34	1,554.0	30.0	58.0	45.0	53.0	59.0	48.0	50.0	41.0	52.0	39.0	43.0	47.0	57.0	54.0	42.0	48.0	71.0	126.0	59.0	53.0	34.0	18.0	30.0	100.0	96.0	91.0	34.0	28.0	27.0	82.0
35	1,546.0	19.0	66.0	33.0	34.0	42.0	41.0	38.0	31.0	51.0	39.0	36.0	35.0	59.0	49.0	49.0	50.0	77.0	119.0	62.0	61.0	39.0	26.0	49.0	92.0	23.0	104.0	37.0	23.0	30.0	132.0
36	1,543.0	27.0	65.0	44.0	55.0	59.0	56.0	51.0	55.0	64.0	49.0	42.0	33.0	68.0	61.0	31.0	58.0	79.0	132.0	38.0	65.0	34.0	24.0	33.0	80.0	21.0	64.0	30.0	22.0	20.0	83.0
37	1,530.0	21.0	55.0	42.0	42.0	48.0	32.0	29.0	36.0	58.0	33.0	44.0	32.0	58.0	46.0	44.0	58.0	80.0	114.0	50.0	62.0	34.0	24.0	36.0	82.0	14.0	134.0	45.0	27.0	28.0	122.0
38	1,527.0	23.0	40.0	37.0	41.0	60.0	37.0	37.0	35.0	62.0	31.0	44.0	39.0	63.0	57.0	43.0	46.0	87.0	143.0	63.0	45.0	32.0	26.0	44.0	80.0	15.0	117.0	40.0	27.0	28.0	85.0
39	1,521.0	26.0	58.0	45.0	48.0	40.0	44.0	34.0	37.0	58.0	35.0	38.0	46.0	60.0	50.0	39.0	69.0	75.0	139.0	53.0	41.0	33.0	19.0	24.0	87.0	43.0	85.0	39.0	27.0	21.0	108.0
40	1,506.0	27.0	54.0	38.0	47.0	52.0	46.0	39.0	44.0	54.0	39.0	51.0	30.0	53.0	61.0	41.0	43.0	82.0	89.0	54.0	62.0	36.0	38.0	46.0	99.0	34.0	79.0	37.0	24.0	32.0	95.0
41	1,489.0	31.0	56.0	39.0	40.0	63.0	43.0	23.0	37.0	58.0	30.0	30.0	39.0	67.0	55.0	53.0	51.0	75.0	120.0	53.0	47.0	19.0	31								

- Use the right type of OSCE for each purpose.
- Performance IS predictive for new INBDE (“Integrated Board”)
 - Does a superior job for applied clinical knowledge.
 - Have to be committed to it as a philosophy.
- Student Hatred
 - All student hate anything that is not multiple choice.
 - D4s hate to be tested after they pass the national boards
- New items each year.
 - Students will pass the OSCEs to the next class (even when you ask them not to)