

18. Building an Innovative, Competency-based Assessment System to Support a Renewed, Small Group Learning-Based, Spiraled Dental Curriculum at the University of British Columbia

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What? → Opportunity Knocks for Faculty of Dentistry = Curriculum Renewal in UBC Faculty of Medicine (FoM) & Faculty of Dentistry (FoD)

Why? Motivation:

- The Commission on Dental Accreditation of Canada Recommendation → refine medical content depth
- FoM's curriculum renewal focused on MD students' needs > DMD students' → affable separation from FoM
- Student & faculty feedback (e.g. student focus groups, student surveys, faculty meetings)

Who?

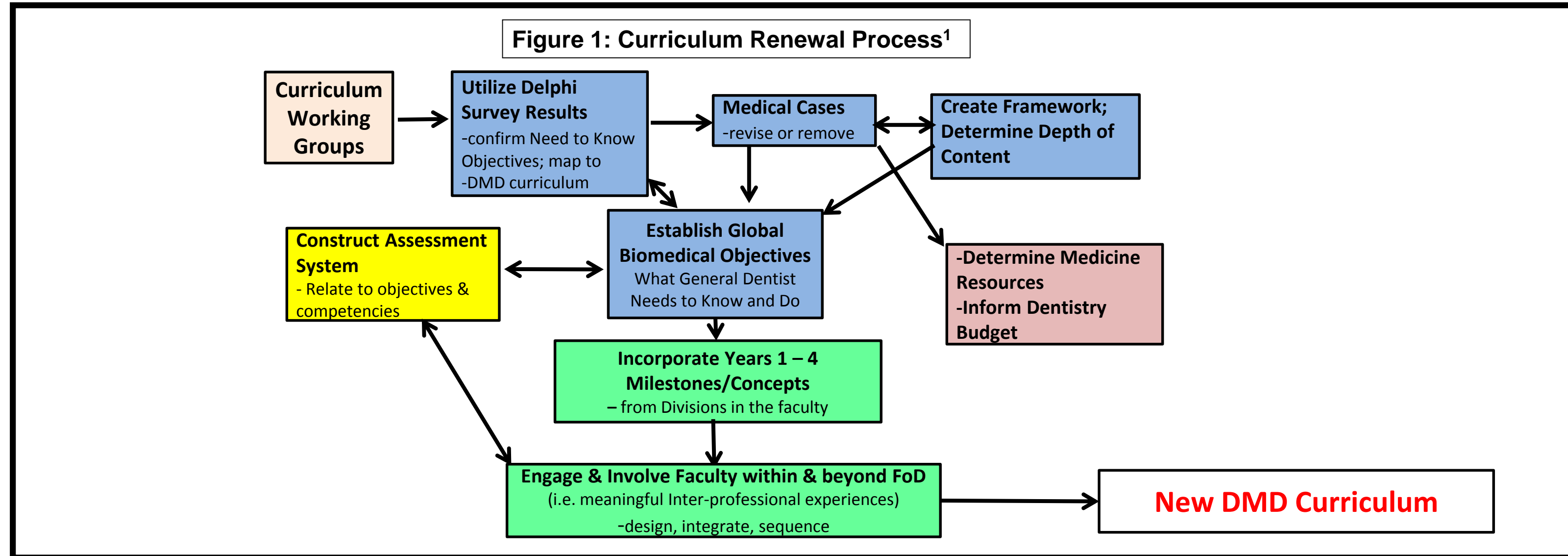
Collaborative negotiations with multiple faculty members in numerous health disciplines led by Associate Dean, Academic Affairs

How?

Dentistry faculty reached consensus on "need-to-know" biomedical science objectives¹ → implemented curriculum renewal process (Fig.1)

Measurements of Outcomes:

Current: Student focus group meetings
Future: Progress survey & NDEB comparative outcomes; student & faculty surveys



Opportunities → Benefits

- Eliminated 2 X 2 curriculum → Manage own timetable & content → **positive domino effect**
- Repatriated funding from FoM after separation
- Created meaningful inter-professional experiences (IPE) - e.g. Grad. Specialties, Dental Hygiene, Pharmacy, Medicine, etc.
- Enhanced focus on professionalism & ethics relevant to dentistry - e.g. FoD Clinical Ethicist, IPE integrated-Ethics model,
- Addressed student feedback - e.g. online content delivery & earlier clinical skills experiences → **Integrated Restorative Dentistry Module starting in Year 1**
- Enhanced clinic efficiency
- Incorporated new Assoc. of Canadian Faculties of Dentistry competency framework → implemented standard syllabus template for 4 year DMD program
- Resulted in dentally relevant, integrated, spiraled curriculum → no loss of pertinent basic science & medical content

INCORPORATES:

- Evidence-based adult learning theory methods ("Flexible/Blended", "Test-Enhanced", and "Peer-Assisted" Learning; multiple forms of small group learning) **AND**
- Assessment revisions → dentally relevant, authentic, more frequent, lower stakes, formative, varied, and competency-based

1. PeerWise Assignment ← PROGRESS PORTFOLIO consists of: → 2. Progress Survey

What? PeerWise A free online learning tool which allows students to create, answer & comment on each others' multiple choice questions (MCQs)

- Students generate an online question bank with imbedded immediate feedback
- Tag questions with metadata to filter questions based on a topic
- Build a participation score based on activity within the platform & the opinion of peers

Why? Efficient Learning!

- Engages students as teachers → "Docendo discimus" = "By teaching we learn"
- Incorporates the benefits of:
 - "Test-Enhanced Learning"^{2,3} → test taking provides better, long-term retention & transfer than studying, & deeper learning
 - "Peer-Assisted Learning"⁴ → effective & empowering when part of exam-making
 - Tailoring MCQs & distractors to current level of understanding

Who? Incorporates:

- An existing learning community
- UBC FoD faculty member
- UBC FoD content experts will vet MCQs

Example of UBC student-generated MCQ: Where does lymph from the location on the tongue labelled "x" directly drain to?

Alternatives

Letter	Alternative	Score	Percentage
A	submental lymph nodes	0%	0.0%
B	deep anterior cervical lymph nodes	100%	100.0%
C	sublingual lymph nodes	0%	0.0%
D	jugulodigastric lymph nodes	0%	0.0%
E	submandibular lymph nodes	0%	0.0%

Explanation

The following explanation has been provided relating to this question:

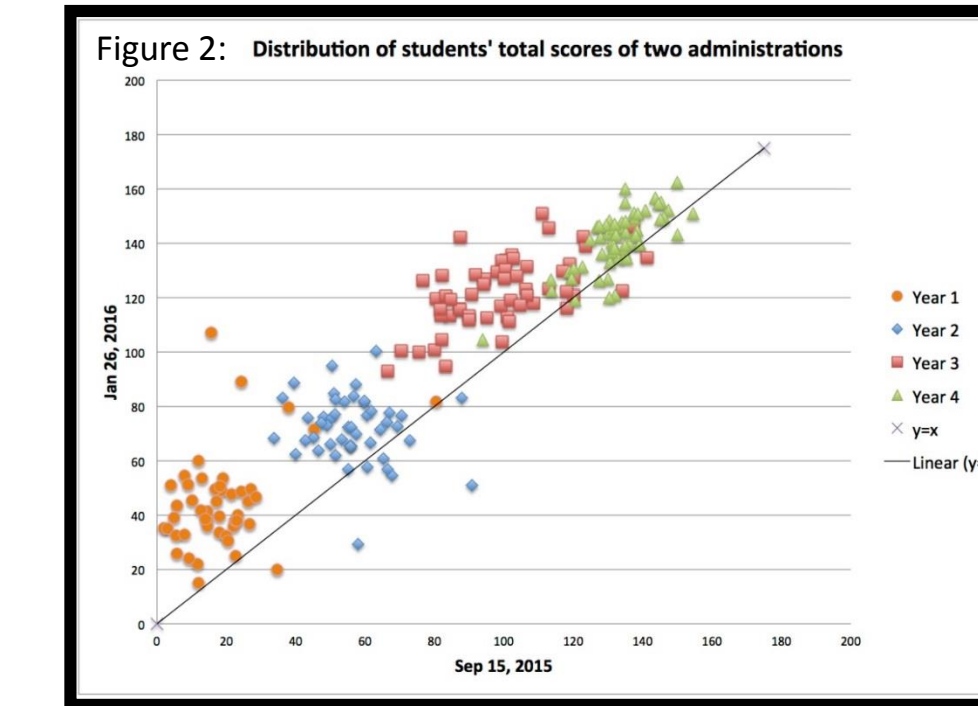
The x is located on the lateral surface of the tongue in the sublingual space. The lymphatic drainage of the sublingual space is to the submental lymph nodes. The deep anterior cervical lymph nodes are part of the deep anterior cervical lymph nodes, so lymph from this region indirectly drains to these nodes. The sublingual lymph nodes are incorrect, these nodes don't exist. The correct terminology is submental lymph nodes. The jugulodigastric lymph nodes are incorrect, these nodes are part of the deep anterior cervical lymph nodes, so lymph from this region indirectly drains to these nodes. The submandibular lymph nodes are incorrect. The lateral surface of the tongue drains directly to the submandibular lymph nodes. The lateral surface of the tongue drain directly to the submandibular lymph nodes.

Comments

I feel like I never learned this, but it is good to know!

What? → Progress Survey

- 3-hour, 200 MCQ test (aka 'survey')
- tests all cognitive knowledge domains of end-point competencies (Fig.2) → curriculum-independent
- twice/year; formative; no studying required



Why? → Invaluable Learning!

- "The Testing Effect"⁵ → tests = extra practice + self-directed learning
- Increase students' awareness of program & competency expectations

Who?

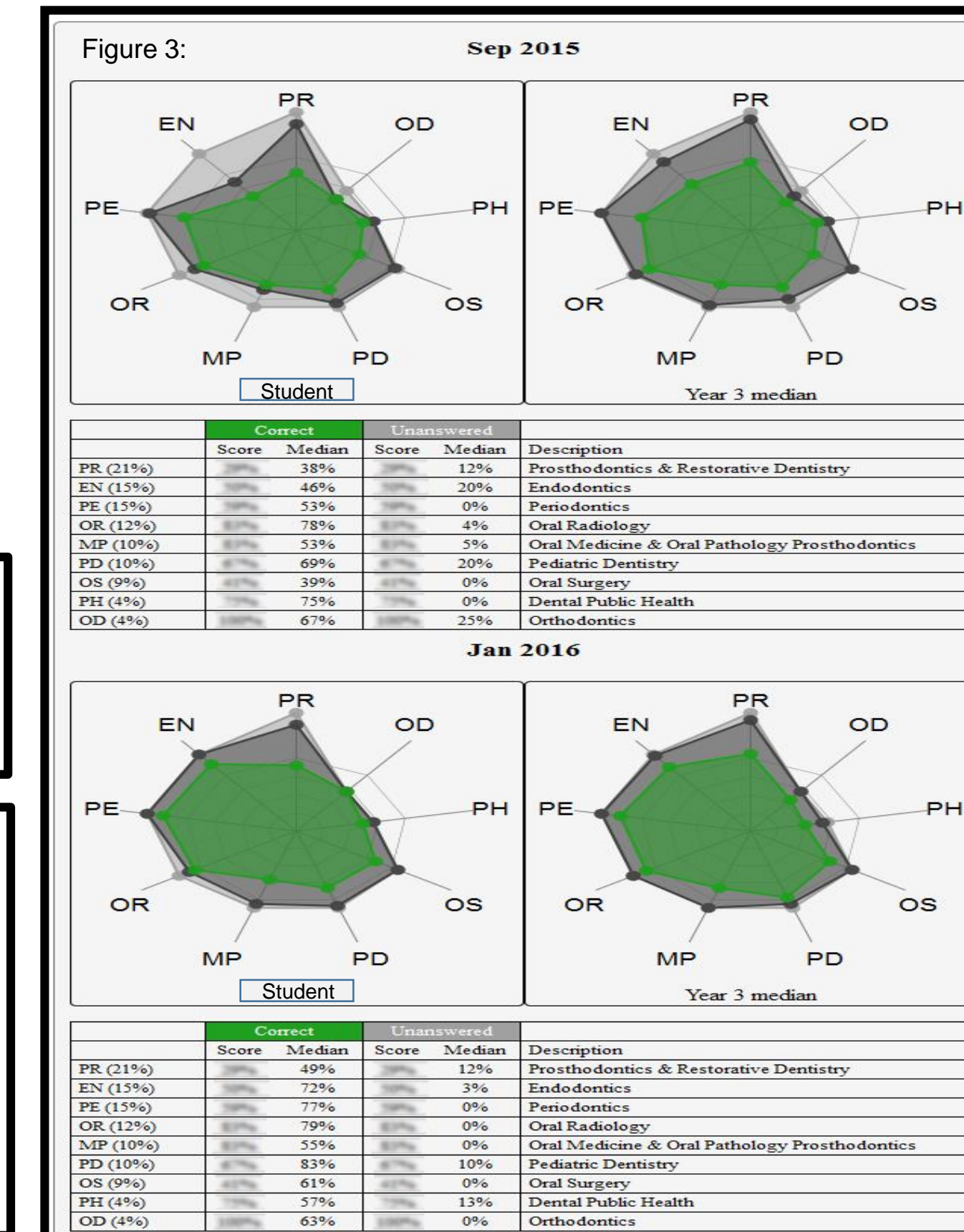
- TST & invigilator support
- MountainMath Co. generates personal progress index maps (PPIMs)
- UBC FoD Education Specialist
- Faculty & students develop/vet MCQs
- All Years 1 to 4 DMD students

How?

- Faculty- & PeerWise-generated MCQs used
- All Years 1-4 – write simultaneously online

Measurements of Outcomes (Fig. 3):

- Generates individualized PPIMs representing performance in each domain relative to peers
- Comparative subsequent PPIMs indicate progression towards end-point competencies



1. Best L, Walton JN, Walker J, von Bergmann H. Reaching consensus on essential biomedical science learning objectives in a dental curriculum. J Dent Educ. 2016 Apr;80(4):422-9.
2. Karpicke JD, Roediger III HL. Repeated retrieval during learning is the key to long-term retention. Journal of Memory and Language. 2007 Aug;57(2):151-62.
3. Larsen DP, Butler AC, Lawson AL, Roediger III HL. The importance of seeing the patient: test-enhanced learning with standardized patients and written tests improves clinical application of knowledge. Adv in Health Sci Educ. 2012 May 23;18(3):409-25.
4. Crouch CH, Mazur E. Peer Instruction: Ten years of experience and results. American Journal of Physics. 2001;69(9):970.
5. Carrier, M., & Pashler, H. (1992). The influence of retrieval on retention. Memory and Cognition, 20, 632-642.