Encouraging Active Learning and Critical Clinical Thinking Early in the Veterinary Curriculum? Yes, We "Khan"

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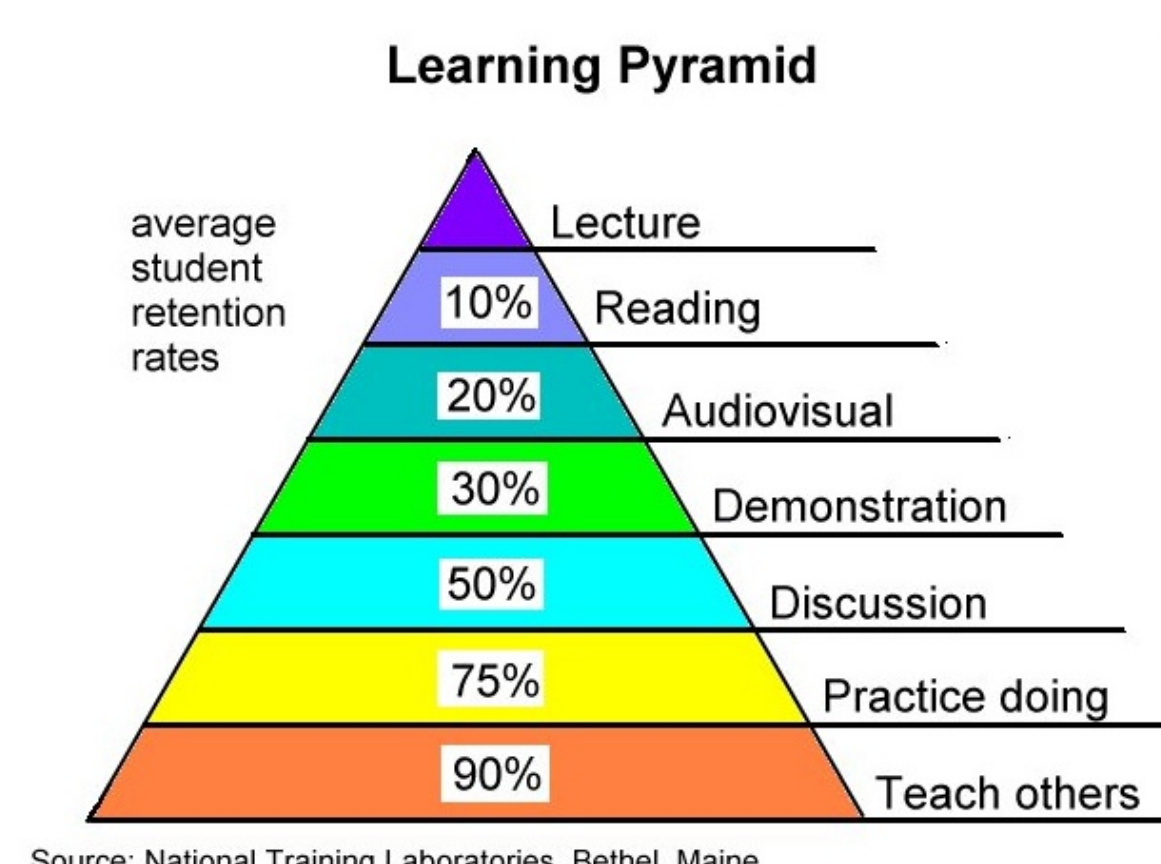
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ABSTRACT

Traditional lecture-based veterinary curricula result in a decline in critical thinking skills during pre-clinical years (Herron et al, 1992). Decades later, despite information available via the Internet, the instructional focus often remains on content and not on development of problem-solving skills (i.e. critical clinical thinking). A proposed "new" role of faculty should be to coach students while they practice applying information. "Flipping" the class is only one approach, but a 2010 Dept. of Education meta-analysis of 90 higher education studies showed that such "blended" learning results in greater learning outcome, and similar findings have been observed in veterinary students.[2] The technology exists for sharing content modules to support using more classroom time for engagement of students with faculty. An active learning culture must be nurtured, and cannot easily be organized by one academic institution. A call for such an approach has recently come within human medicine.[3] European veterinary schools initiated the sharing of learning materials through WikiVet[4] and NOVICE.[5] Veterinary technician schools employ learning modules shared via VetMedTeam.[6] Veterinary Internet Content Exchange (VetICE)[7] is soon being reconfigured by VetMedTeam as a repository of learning materials with linked relevant learning objectives. A database of 5-15 minute video modules is being proposed, modeled after those on Khan Academy[8] or TED Ed,[9] and of related classroom problems/cases such as those developed with web-based tools at When Knowing Matters.[10] Interested content experts are being sought to develop and/or review materials supporting self-driven learning, leading to greater long-term retention, hopefully the goal of every educator.

Figure 1: RETENTION RATES

Learning Pyramid

average student retention rates		
10%	Lecture
20%	Reading
30%	Audiovisual
50%	Demonstration
75%	Discussion
90%	Practice doing
	Teach others

Source: National Training Laboratories, Bethel, Maine

VetMedTeam
Providing Educational Pathways to Great Careers

Rick Mills Consulting LLC
Ames, Iowa

INTRODUCTION

HOW DO WE EXPECT STUDENTS TO LEARN?

This presentation is largely a philosophical "call to action" based upon findings of educational research on young adults, with a suggestion for collaborative sharing of best practices and materials for enhancing active learning in the classroom

OBSERVATIONS AND PREMISES:

✓ Greater *stickiness* is necessary for all instruction
✓ 21st century professional students seek more engagement, which should enhance long-term retention (Fig. 1)
✓ Faculty can no longer teach everything necessary to an entry-level graduate
✓ Most veterinary instruction remains lecture-based and content driven (Figs. 2 and 3) particularly at the pre-clinical level
✓ With more non-veterinary instructors in the pre-clinical years, it is becoming administratively more difficult to balance the need for breadth of instructional expertise, while sustaining necessary depth of research expertise

Figure 2: View of a Traditional Veterinary Classroom

Figure 3: Typical Proportion of Time in VM1 Didactic Courses at Illinois CVM

- Eval 10%
- Disc 9%
- Lab 29%
- Lect 52%
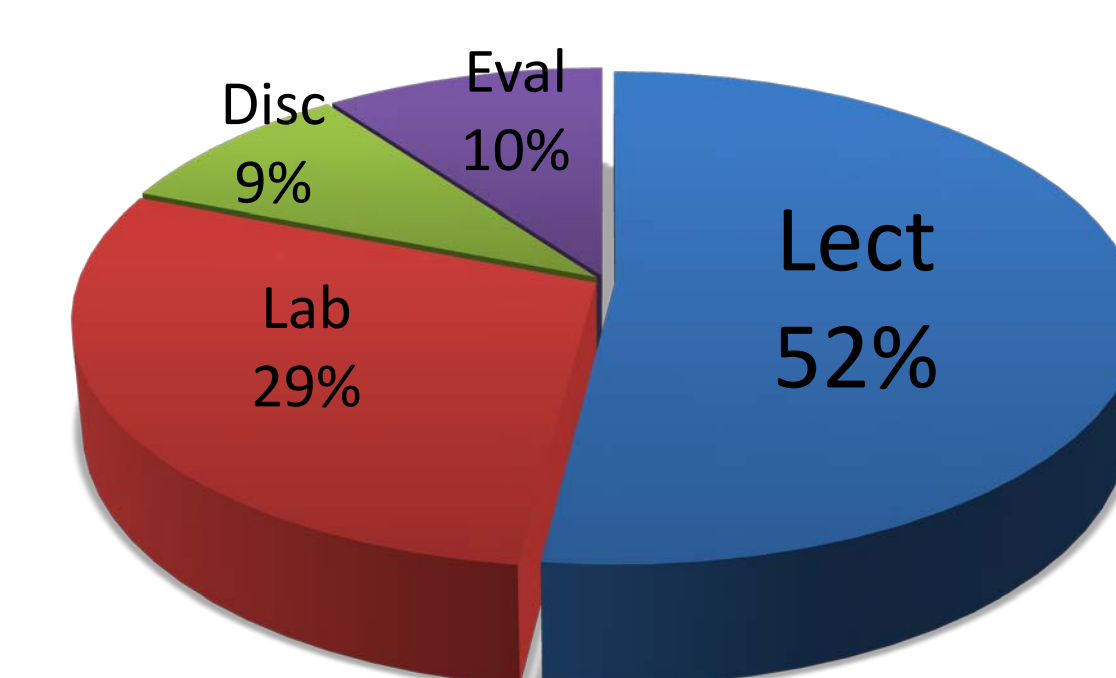
EXAMPLES OF EFFORTS TO SHARE MEDICAL EDUCATIONAL MATERIALS

GENERAL
✓ **YouTube**: Examples (Search Term:# videos): *Veterinary*: 184K *Biochemistry*: 148K ; *Thyroid Physiology*: 8K
✓ **Khan Academy**:MCAT Biochemistry Prephttps://www.khanacademy.org/science/mcat
✓ **TED Ed:** http://ed.ted.com

HUMAN MEDICINE-FOCUSED
✓ MedEdPortal (AAMC): http://www.mededportal.org
✓ MedU: http://www.med-u.org and http://videos.undergroundmed.net (med student-developed)
✓ **Future Teaching Physicians:** http://www.ftplectures.com
✓ **IMedicalSchool:** http://www.youtube.com/user/iMedicalSchool

VETERINARY MEDICINE-FOCUSED
✓ **VetMedTeam:** http://www.vetmedteam.com/classes-free.aspx
✓ **NOVICE:** http://www.noviceproject.eu
✓ **WikiVet:** http://en.wikivet.net/
✓ **VetICE** (Veterinary Internet Content Exchange): http://www.vetice.net ; being reconfigured by VetMedTeam; short videos and cases/problems with learning objectives
✓ **When Knowing Matters:** http://whenknowingmatters.com ; case and problem development
✓ **Hannover Univ of Vet Med:** German and English videoshttps://www.youtube.com/user/TiHoVideos

SCANNING CURRENT TRENDS AND BEST PRACTICES IN MEDICAL EDUCATION LITERATURE

Dept. of Education Meta-Analysis[1]
✓ 90 higher education studies from 1996-2008
✓ with learning outcomes
✓ Learning in purely online vs. purely face-to face conditions were statistically equivalent
✓ Online together with face-to-face instruction led to greater learning than did purely online instruction (+0.35, p < .001).

Veterinary Student Learning Styles[2]
✓ Balanced approach to teaching is essential to allow all students to learn optimally
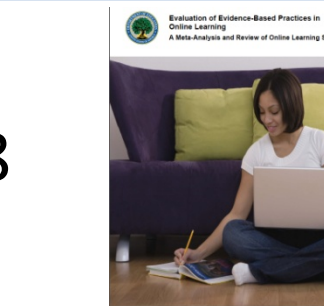
PBL vs. Traditional Medical Students[12]
PBL Students
✓ Rough transition into medical school, but following adaptation, they embraced the independence and responsibility for their own learning
✓ Better able to channel their motivation into effective transitions from the classroom into clerkships

Traditional Students
✓ Relied on faculty to direct and control learning
✓ Channeled their motivation toward achieving highest grade
✓ Not as prepared for clinical faculty expectations of independence and self-direction of learning

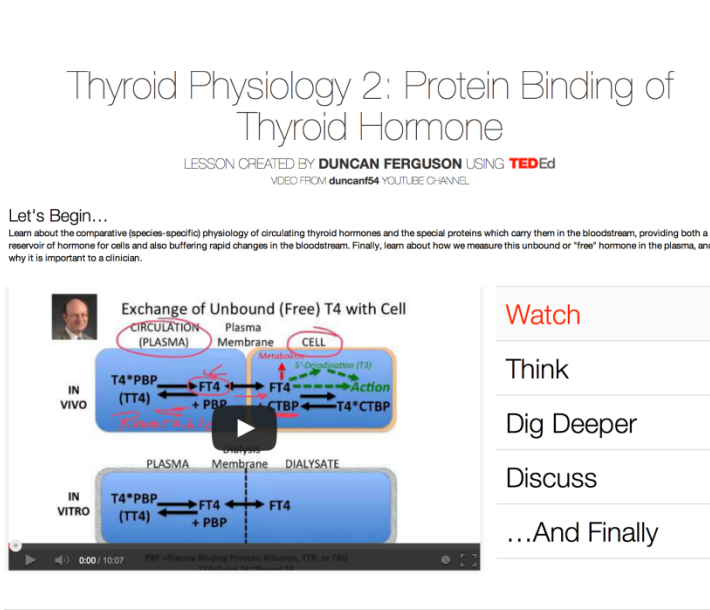### Call to Action: Stanford Medical Professor and Salman Khan of Khan Academy[3,11]
✓ Propose new model for medical education based on flipped classroom design
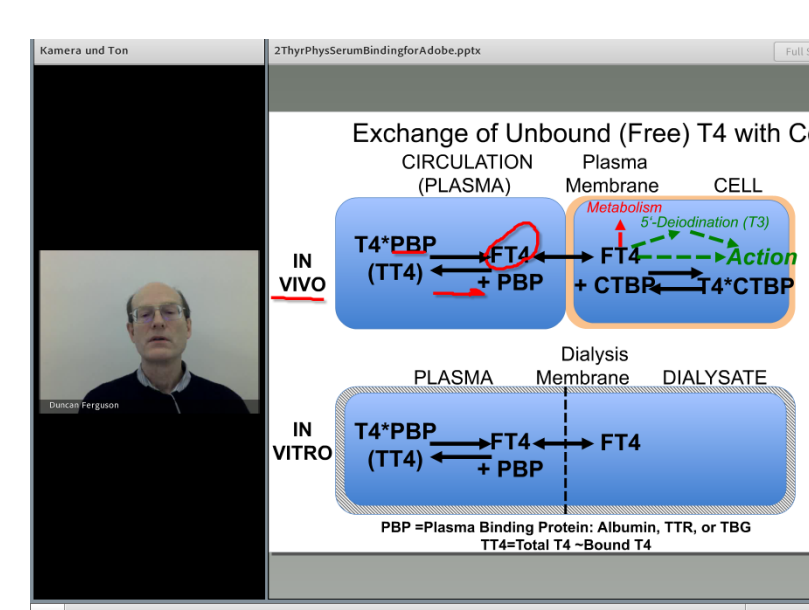✓ Creation and adoption of model would be enhanced by cooperative efforts between schools

FLEXIBLE ENVIRONMENTS
LEARNING CULTURE
INTENTIONAL CONTENT
PROFESSIONAL EDUCATORS
PILLARS OF FLIPPED LEARNING

STYLES OF SHORT VIDEOS

TED Ed: Audio & Graphic/Animation
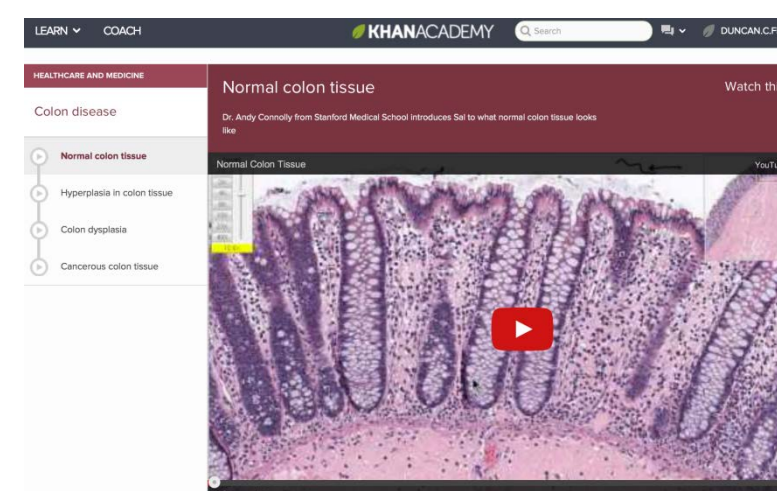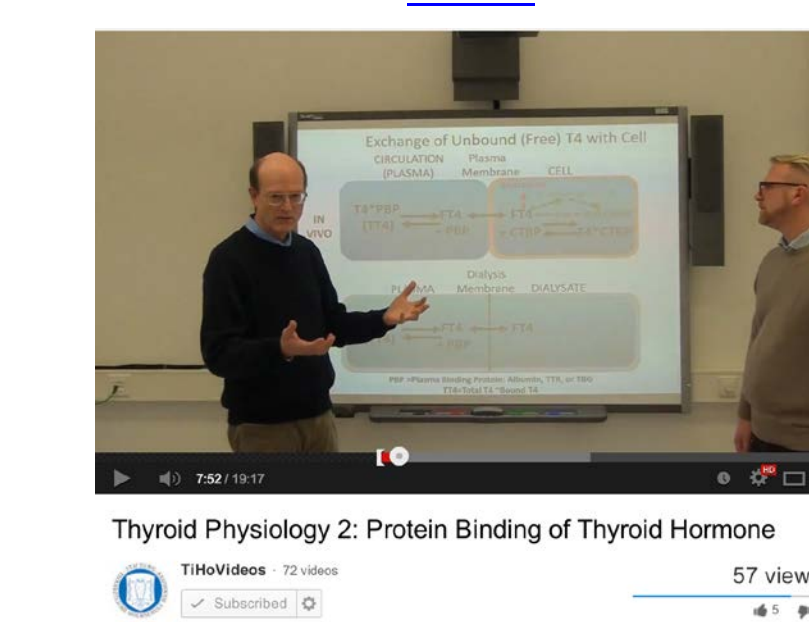http://ed.ted.com/on/a7qwevf8#watch

Talking Head: Adobe Connect

Audio Interview: Khan Academy
https://www.khanacademy.org/science/healthcare-and-medicine/colon-disease/v/normal-colon-tissue

Video Interview
http://www.youtube.com/watch?v=6FyGmMGwDV4

BEST PRACTICES IN ACTIVE LEARNING

Types of Material "off-loaded" from classroom
✓ Short (5-15 min) content videos with progress quizzes[3,8,9] to allow instructor to focus on most conceptually difficult topics
✓ Individual attempt at problem or case analysis which will be further discussed in class: e.g. Assessment exercise developed with When Knowing Matters software[10]
✓ Current scientific literature for discussion within the class[12]
✓ Reading textbooks!!!: electronic or paper

Types of Possible Classroom Activities
✓ Problem/case analysis demonstrations by instructor[10]
✓ Micro-lectures with clicker questions[12]
✓ Pair-and-share activities within classroom[12]
✓ Small group discussions to compare understanding before full class discussion
✓ Researching and planning presentations or videos to share

Developing Best Practices for Videos
✓ Short: 5-15 minutes to match attention span[14]
✓ Good quality audio is crucial[14]
✓ Planned, scripted, but informal to simulate one-on-one instruction[14]
✓ Include learning objectives, progress questions and suggested reading
✓ Active video of instructor might be limited to brief introduction, otherwise should not distract from matched visuals with audio[14]
✓ Engagement increases when audio, drawings and animations are synchronized
✓ Be sure to replace copyrighted material, or seek permission for use, if intent is to publish openly

CONCLUSIONS

✓ **Greater emphasis should be on active learning (engagement) to enhance long-term retention, encourage reflective and discovery-based learning, and develop lifelong learning habits**
✓ **Intentional and graduated guidance on critical clinical thinking and integration is necessary throughout the curriculum**
✓ **A proposed "new" role of faculty should be to coach students while they practice applying information**
✓ **Enhanced use of faculty/student contact for active learning requires off-loading of some content to be reviewed by students, such as with "flipping" the class (blended learning)**
✓ **No single institution can easily accomplish this mission**
✓ **The need and technology exists for veterinary educators to collaborate by sharing of relevant instructional modules and problems/cases/exercises**

REFERENCES AND LINKS

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