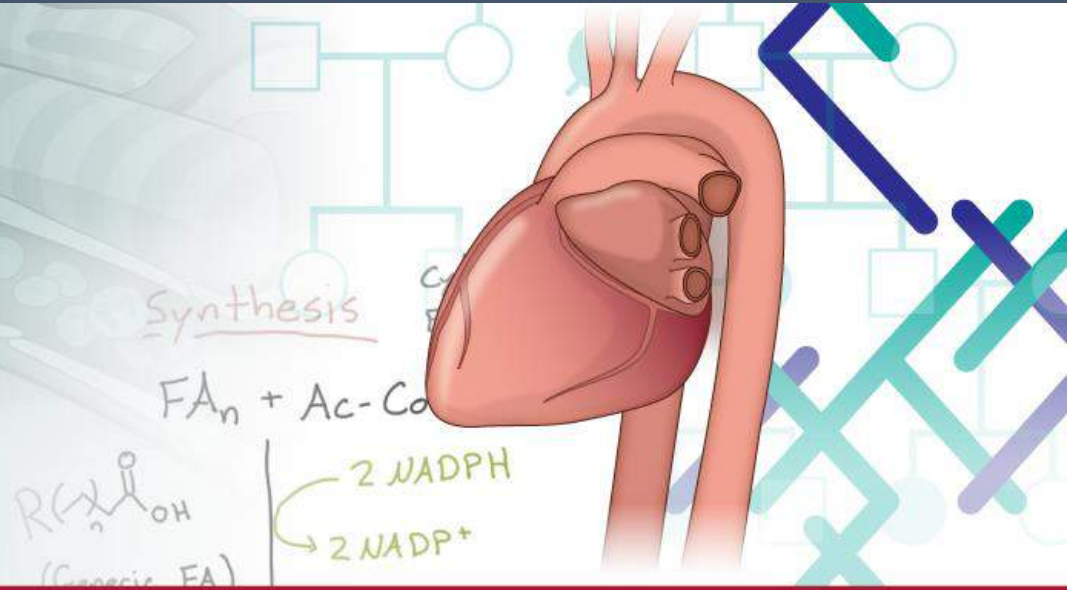




HMX



Innovating Via an Online Curriculum Harvard Medical School's HMX Fundamentals Program

A. Enrique Caballero, MD
Director, International Innovation Programs
Office for External Education
Harvard Medical School

Harvard Medical School Curriculum

- Major inflection/reform points
 - New Pathway – 1985
 - Small groups, self-directed learning, mainly pre-clinical
 - Evolution – new integrated curriculum in 2006
 - Pathways – 2015-now

Pathways Reform

- Goals include
 - Active learning and critical thinking
 - Earlier clinical experience and integration
 - Advanced clinical science experiences
- Achieving these goals requires structural changes

Structural Changes

- Different formats, fewer “lectures” in person, more material online including assessment
- No longer “2+2”



New Pathway



New Pathway Curriculum Map

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Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
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Year I	I T P	Fundamentals of Medicine						
		Molecular & Cellular Basis of Medicine The Human Body Human Genetics Introduction to Social Medicine Patient Doctor I Pursuing Inquiry in Medicine			CE & PH Intro to HCP	Integrated Human Physiology Immunology, Microbiology & Pathology Medical Ethics and Professionalism Patient Doctor I		



Year II	Fundamentals of Medicine						USMLE I	PCE*
	Human Systems Patient Doctor II Human Development Psychopathology Integration Week I			Human Systems Patient Doctor II Integration Week II				PDIII* Primary Care*
								Medicine

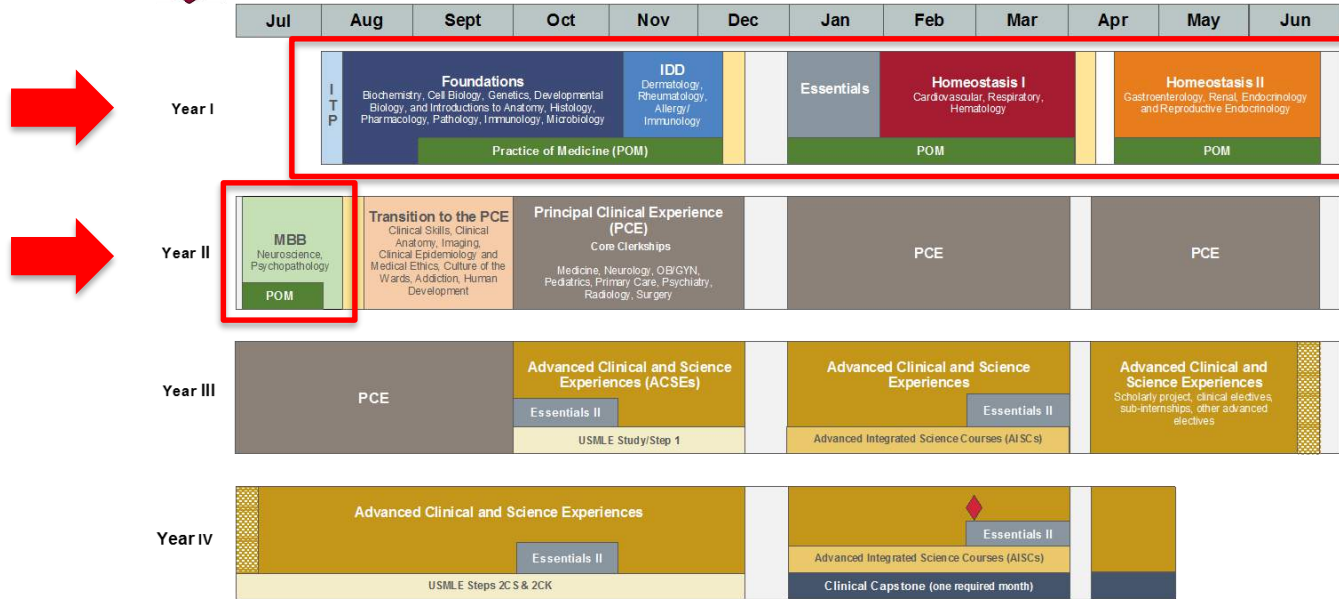
Year III	Principal Clinical Experience (continued)*								Adv. Experiences	
	Patient Doctor III (continued)*				Primary Care (continued)*				Required Sub-Internship Clinical Electives Unspecified Electives USMLE II CK and CS**	
	Medicine (continued)	OB/GYN	Pediatrics	Surgery		Radiology	Neurology	Psychiatry		
Rotation determined by student schedule										

Year IV	Advanced Experiences in Clinical Medicine and Science									
	Required Sub-Internship Clinical Electives Unspecified Electives USMLE II CK and CS**									

Pathways



Pathways Curriculum Map HARVARD MEDICAL SCHOOL



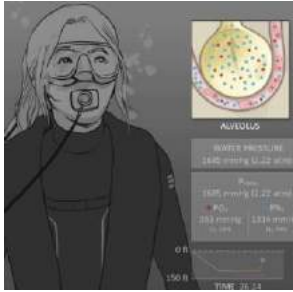
Consequences

- Preparation and assessment are critical to achieving goals of reform
 - Clinical connections sooner
 - Less time up front to get basic science foundation
 - Greater recognition that assessment → learning
- Online learning is ideal for supporting preparation and strong assessment strategy

HMX Program

- Seeing same challenge elsewhere, HMS sought to develop a widely accessible solution - HMX
- Fully online learning from HMS
- Targeted at student preparation (e.g. incoming/pre-matriculation and first years)
- Covering foundational topics in medicine
- Started 4 years ago

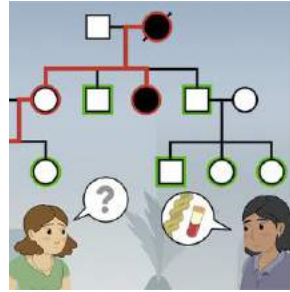
HMX Fundamentals Courses



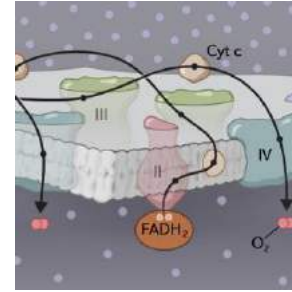
Physiology



Immunology



Genetics



Biochemistry



Pharmacology

HMS Use Cases

- 2018: 4th iteration of using HMX with incoming HMS students (Pathways, Dental, HST, MEMP, Immunology Masters/PhD)
- Students first use the material over the summer
- Linked to as “flipped” material in HMS 1st year courses: Foundations, Immunity in Defense and Disease (IDD), Homeostasis

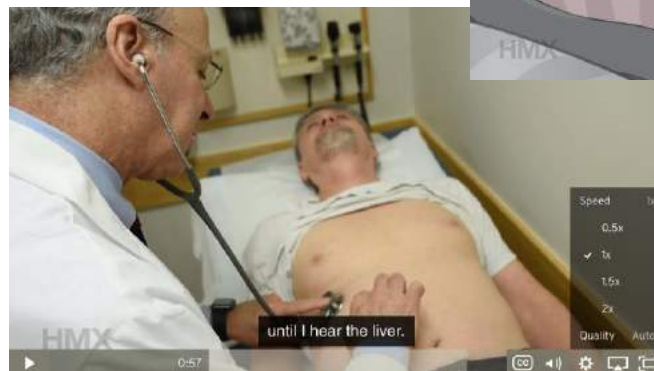
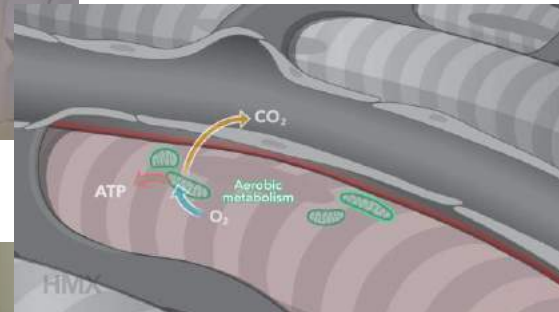


Motivation for HMX

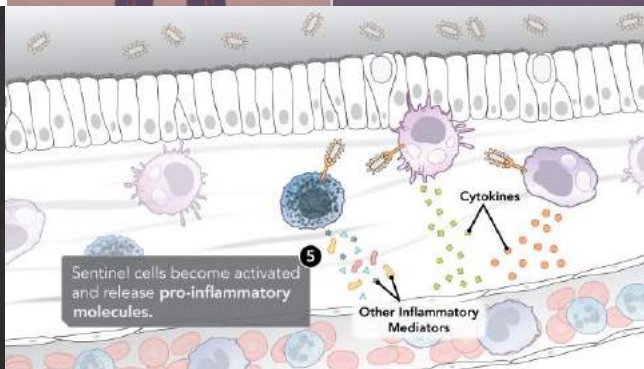
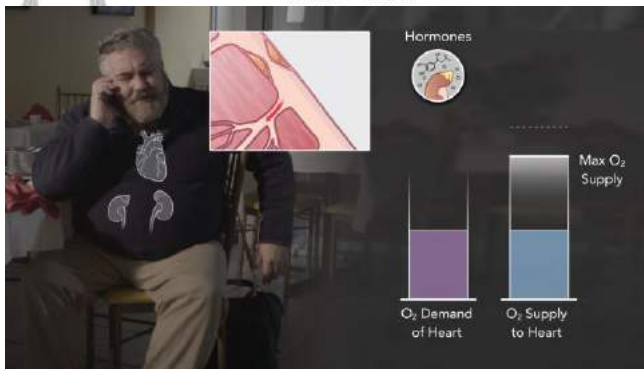
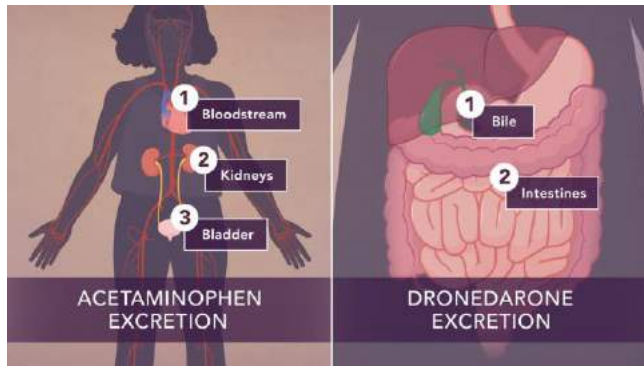
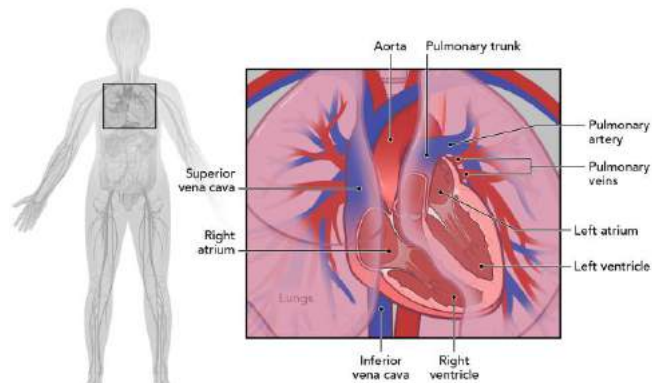
- Variable preparation for students from a variety of backgrounds
- Need for integration of clinical medicine and basic science
- Lack of useful, actionable data about learning behaviors and cognitive performance early in med school

What Makes It Different

- Clinical applications
- Biomedical visualizations
- Assessment and learning science
- Team



Biomedical Visualizations/Animations



Clinical Linkages

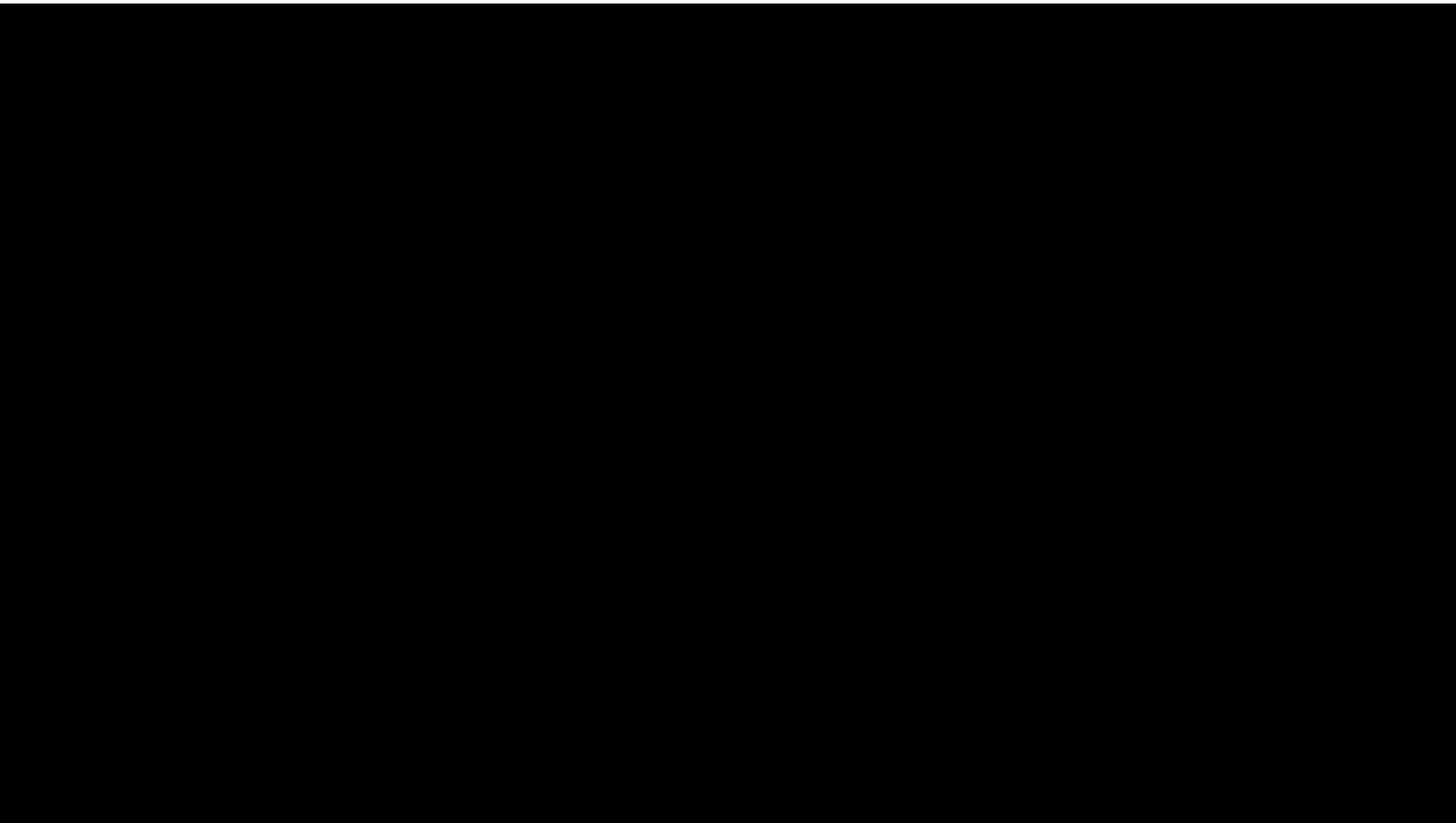


Example: Anesthesia



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Use Cases

- Used internally at HMS for 4 years
- Used at institutions around the world for 3 years

HMX Usage With Schools

- Partnering with other medical schools to run courses and deliver insight from data
- > 2500 students from medical schools around the world (from 15-20 different institutions) have taken the courses



Some Examples



David Geffen
School of Medicine



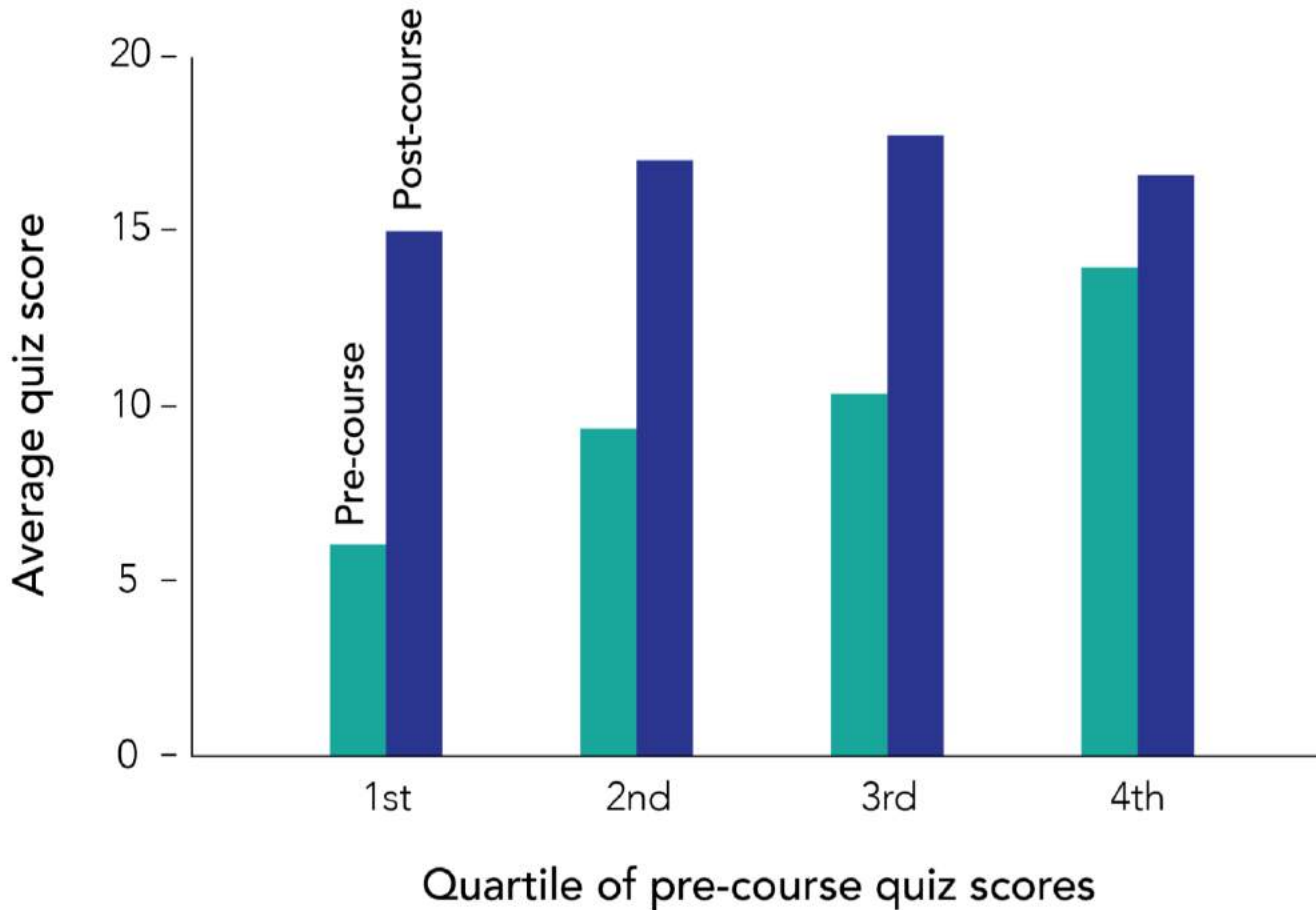
มหาวิทยาลัยขอนแก่น
KHON KAEN UNIVERSITY



Usage With Schools

- Example: used over last 3 years with Khon Kaen University (KKU) in Thailand
- Goals include
 - improving medical English proficiency
 - increasing scores on national exams
 - offer additional support in challenging subjects
 - offer faculty and students insight into Harvard Medical School's approach to online learning

Leveling the Playing Field



Student Profile: Sofía Hincapié Arias



How do you think these courses have helped you in medical school?

I really loved the way the courses explained the basic concepts so accurately and then applied these concepts into the clinic with real patients. In my experience with medical school, sometimes I was like, 'How can I treat patients?' When I was seeing these videos, I could watch these doctors in an examination of a patient and think, 'Oh, this is how I could do it better, I could apply this practice into my medical rotation.' Even though I'm in the last year of medical school, I learned every week. So I was really satisfied with the course.

Catholic University of Santiago de Guayaquil, Ecuador



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Student Profile: Ivan Gomez



How did the course content compare with what you've studied in medical school?

One of the main differences, specifically talking about the physiology course, is that they explain the phenomenon and the physics behind it, all the formulas and principles. Usually in school these are just mentioned. So, having them explained is really a plus because you get a deeper and better understanding of why certain processes in the body take place. In school, however, they make more emphasis on things like anatomy and histology which were not a main topic in the course. I believe that it makes a very nice synergy, the course and the classes at school.

University of Guadalajara, Mexico

Student Profile: Francisco Borja



What was the challenge level like for you, as someone who's gone through medical school?

"I think my university lacked the depth of the [HMX] genetics course. The genetics course was really heavy. The most difficult courses I have done so far are biochemistry and genetics, because they're really – I wouldn't say difficult, I would say really challenging, you must really spend time doing this.

A lot of people would say online courses are not as difficult as you think – no, you must really understand the terms and subjects and study the material to actually do something good. In the review questions, if you got something that wasn't correct and you thought something, you actually could see where it was wrong."

Plastic surgeon, Ecuador



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Summary

- Online learning can be designed to be well-aligned with the goals of curriculum reform
- Harvard Medical School is developing HMX to
 - Prepare students to be active, self-directed learners
 - Assess students for learning and progress
 - Innovate in pedagogy, using the science of learning
 - Broaden access to HMS content/teaching



<https://onlinelearning.hms.harvard.edu>

enrique_caballero@hms.harvard.edu

THANK YOU!



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