

E-learning vs. Standard Teaching Methods in Medical Clerkship, Is There a Difference?



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Disclaimers

This work was supported by USU protocol MED-83-9443. The opinions or assertions contained herein are the private ones of the authors and are not construed as official or reflecting the views of USU, the Department of the Navy, Department of Defense, nor the U.S. Government.

Conflict of Interest:

None

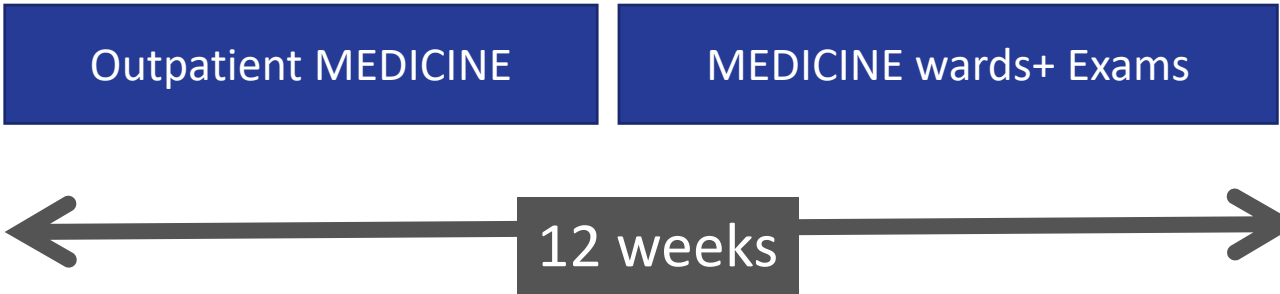
Background - Curriculum reform

- “Molecules to Military Medicine” (2011)
- Clerkship year starts 6 months *earlier*
- Basic science *integration* in clinical rotations
- USMLE Step One after the clerkship



The Problem

- Student & Faculty across entire USA!
- Med Clerkship now 2 weeks *shorter* (16%)
- 25% *increase* in lecture content
- Now sharing block of time with psychiatry...



Outpatient MEDICINE

MEDICINE wards+ Exams

Outpatient MEDICINE	Psychiatry	MEDICINE wards	Exams Week
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Outpatient MEDICINE	MEDICINE wards	Psychiatry	Exams Week
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Psychiatry	Outpatient MEDICINE	MEDICINE wards	Exams Week
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MEDICINE wards	Psychiatry	Outpatient MEDICINE	Exams Week
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MEDICINE wards	Outpatient MEDICINE	Psychiatry	Exams Week
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Psychiatry	MEDICINE wards	Outpatient MEDICINE	Exams Week
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← 15 weeks →



“IGS”

- Group Sessions that are...
 - “Interactive” = NOT lectures
 - “Integrative” = Basic Science correlates
 - “INTERPRETER” (RIME)
- 90-minutes, weekly
- CDIM Core Curriculum

BUT what about students who are not there?

What about E-learning?

- Similar or better outcomes to lectures
 - Surgical clerks using MEDU WISE*
 - ECG reading web-based vs classroom†
 - Family Medicine - Low Back Pain Module**
 - Exam of Diabetes treatment knowledge††

*Am J Surg. 2015;209(1):145-151

†Journal of electrocardiology. 2016;49(2):112-116

**Journal of the American Geriatrics Society. 2014;62(6):1161-1167

† † BMC medical education. 2016;16:158

E-learning Solution

AQUEDUCT
by Aquifer

Courses Users Help Feedback My Profile

formerly MedU LOG OUT

HISTORY


HISTORY OF PRESENT ILLNESS

DIAGNOSES

FINDINGS

NOTES

BOOKMARKS



Dr. Smith hands you Ms. Hunt's chart.

The screenshot shows a user interface for a medical history application. At the top, there is a navigation bar with the Aqueduct logo and links for Courses, Users, Help, Feedback, and My Profile. On the right side of the bar, it says 'formerly MedU' and has a 'LOG OUT' button. Below the navigation bar, the main content area is titled 'HISTORY OF PRESENT ILLNESS'. On the right side of this area, there is a vertical sidebar with a 'HISTORY' label and a calendar icon, and four menu items: 'DIAGNOSES', 'FINDINGS', 'NOTES', and 'BOOKMARKS', each with a corresponding icon. The main content area features a photograph of a doctor in a white coat sitting at a desk with a patient, Ms. Hunt. The doctor is handing a chart to the patient. Below the photograph, there is a caption: 'Dr. Smith hands you Ms. Hunt's chart.'

- MEDU SIMPLE (Now Aquifer) virtual patients
- Core Clerkship Curriculum Guide V 3.0

IGS Topics

Chest pain

Fever/antibiotics

Diabetes

Acid-Base

Dementia/delirium

CHF

Obesity

Anemia

Hypertension/lipids

Fluids/osmolarity

Renal failure

Liver/ascites

HIV

Dyspnea

Syncope

**When students are away on psychiatry they cover
the 5 topics they miss using e-learning**

With one-third of core topics for any individual student now being delivered via e-learning, are educational outcomes impacted?

- This project was reviewed by the USU IRB and determined to be exempt under 32 CFR 219.101 (b)(1)

Methods

- First 15 weeks, Class of 2018 (N=57 Students)
- Assessment outcomes:
 - Clinical points/overall clerkship grade
 - Examinations: NBME, MSX, OSCE
 - Analyzed by rotation sequence
 - **Script concordance test (SCT)**
 - % correct e-learning vs. lecture
 - Linear regression mode vs. topic

Script concordance Test (SCT)*

Based on illness script theory

You are evaluating a 60 year old male with dyspnea

If you are considering	And you find	Your hypothesis becomes
1. ACS	Normal EKG	-1 0 +1
2. PE	Hypoxemia	-1 0 +1

-1=much less likely

0=Neither much more nor much less likely

+1=Much more likely

*Kelly W, Durning S, Denton G.. Teach Learn Med. 2012;24(3):187-193

Results

- 100% IGS session attendance on Medicine
- 57/57 (100%) attempted the SIMPLE cases while away on Psychiatry
- 52/57 (91%) completed all FIVE modules
- Mean completed was 6 (SD 2.5; range 3-15)
- No relationship between #modules and SCT

Results – Script Concordance

SIMPLE % Correct	IGS % Correct
64%	65%

- Paired T test of mode of learning vs result no significant differences ($p=.63$)
- SIMPLE module (mean=64%, SD=0.19)
- IGS modules (mean=65%, SD=0.10)

Results – Script Concordance

Linear Regression Analysis

Variable	Unstandardized coefficient	Standardized coefficient	t	p value
Mode	.12	.07	1.64	.10
Topic	.01	.01	.83	.41
Interaction	-.03	.02	-2.06	.04

- Outcome= SCT Performance
- R2 of the model was very small ($R^2 = .01$)
 - Interaction was negligible.

Results by rotation sequence

	Amb- Ward- Psych	Amb- Psych- Ward	Ward- Amb- Psych	Ward- Psych- Amb	Psych- Amb- Ward	Psych- Ward- Amb	Overall
	N=9	N=11	N=10	N=9	N=9	N=10	N=58
NBME (100)	64.3	72.9	67.2	69.1	64.9	71.5	ns
MSX (%)	24.4	25.2	24.0	25.1	22.4	23.7	ns
Int Med OSCE (%)	62.6	67.2	63.6	67.7	63.6	62.9	ns
SCT	59.4	61.8	69.0	64.4	66.1	67.0	ns
Clin pts (66)	33.4	40.2	28.5	34.8	37.9	33.7	ns
Total Points (100)	48.6	61.3	44.8	52.5	50.1	53.8	ns

Discussion

- We demonstrated non-inferiority of e-learning compared with traditional teaching
- Multiple educational outcomes
 - Script Concordance Test
 - NBME shelf
 - OSCE
 - Overall clerkship grade

Limitations

- 1 Block Pilot, early in academic year
 - Underpowered n=57
- Single institution
- Script Concordance Test only 20 items
- Other Possible Influences
 - Bedside clinical teaching
 - Additional self-study resources

Summary

- Replacing Five core lectures with E-learning...
 - Increased feasibility & consistency of our program
 - No adverse impact on learner outcomes
 - No difference in clinical reasoning assessment (SCT)
- **E-learning may benefit Sites with:**
 - **Multisite clerkships**
 - **Provider RVU pressure**
 - **Barriers to classroom learning**

Thanks to

- Steve Durning MD, PhD
- USU Dept. of Medicine Administration
 - Sandy Hofmann
 - Kemi Omotoyinbo
 - Pamela Cross
 - Debra Weed
 - Myra Tu
- USU Dept. of Medicine Education Committee
- Aquifer - Cate Hancock
- Our Students and Faculty!!

