Teaching with Technology:
Facilitating Blended Learning in Medical Education

David Green | Senior Instructional Designer | Academic Technologies
University of Miami Miller School of Medicine

EDUCAUSE ELI Webinar
March 28, 2016
Today’s objectives

- Visualize the ’Cane Academy conceptual model for blended course redesigns

- Experience recent medical education course redesigns by interacting with actual content

- Examine faculty development strategies that accompany learner-centered education
“Especially during their preclinical education, students frequently ponder the relevance of what they are being taught.”
“... the growing trend in medical education reform ... implementation of learner-centered models as well as competency-based curricula ... student progression is achieved by demonstration of ‘mastery of academic content, regardless of time, place, or pace of learning’.”

“Self-regulated learning can help smooth out the transitions through medical school by preparing 1\textsuperscript{st} and 2\textsuperscript{nd} year students for expectations in the 3\textsuperscript{rd} and 4\textsuperscript{th} years, which can then maximize learning in the clinical milieu, and prepare medical students for a lifetime of learning.”

White, C.; Advances Health Sci Ed, 2007:12
“Well-designed computer-assisted instruction (CAI) can potentially transform medical education. … The improvements in clinical skills were likely mediated by learners’ enhanced engagement with the material in a way that did not distract from the processing of the information.”

“The videos have limited value unless learners use the knowledge gained from them in meaningful exercises with faculty and peers.”
“The question to be investigated is not whether these new forms of media are effective tools for learning … The question to be addressed then becomes, under what conditions are various media effective educational tools for different learners?”

Homer et al.; Computers in Human Behavior, Vol. 24
How do we take this:
… and put it here …
… while simultaneously preparing our next generation of world-class physicians?
’Cane Academy: Mission
To lead next generation medical education reforms by featuring student-centered learning strategies to train world-class physicians
"The Blend"

- Continuous process
- Customized learning plan to meet individual student needs and pace
- Results: deeper learning and high-impact educational practices
The ’Cane Academy Flipped Design Conceptual Model helps illustrate the entire process a student will complete. The green boxes represent materials completed online (Self-guided Learning Modules, or SGM’s) and the orange boxes represent face-to-face sessions (also called In-class Learning opportunities, or ICL’s). Continual reflective and assessment opportunities are provided throughout the process.
’Cane Academy: Conceptual Model

- Introduction
- Measurable learning objectives listed
- Mapped to IEOs and/or national standardized competencies
- Interactive Concept Map
- Integrative theme (of societal importance) and/or cross-cutting theme(s) to link courses
’Cane Academy: Conceptual Model

- Pre-assessment activities
- Incoming baseline knowledge
- Opportunity for student self-assessment
’Cane Academy: Conceptual Model

- Sub-modules – interactive digital learning assets
- Self-guided learning opportunities
- Reusable
’Cane Academy: Conceptual Model

- Practice problems that relate to the self-guided learning assets
- Connected reflective exercises to community service projects (i.e. DOCS)
- Critical thinking, higher order thinking skills
Introduction with Learning Objectives

Pre-quiz (baseline knowledge assessment)

Sub-modules
- Khan-style videos
- Summary Outline document
- Storyboard Summary Image(s)
- Repository of Images with explanation

Reflection Exercises

Assessment of Learning Gains

Recap that revisits expected Learning Objectives

In-class Learning (ICL) Session

Formal Assessment of Student Learning Gains

- Formal assessment exercises (quizzes, graded homework, etc.)
- Compared to incoming baseline knowledge to document actual learning gains
- Can be compared to student assessment of their own learning gains using the SALG survey
’Cane Academy: Conceptual Model

- Preparatory materials that link SGL activities to upcoming ICL sessions
- Enhances the connection between the two components of a flipped classroom
’Cane Academy: Conceptual Model

- Revisit learning objectives and competencies
- Revisit integrative and/or cross-cutting themes
- A final recap of the SGL module
In-class Learning (ICL) Session

Application of academic content (higher-order thinking skills required):
- Role-play exercises, gamification
- Case Studies, Simulations and Labs
- Team-based learning, Problem-based learning
- Discussions, Formal Debates, and Seminars
- Community-based Events
’Cane Academy: Conceptual Model

- Formal assessment of student learning gains activities (exams, etc.)
- Reflective of both SGL and ICL activities
’Cane Academy: Conceptual Model

- Continuous process
- Customized learning plan to meet individual student needs and pace
- Results: Deeper-learning and high-impact educational practices
’Cane Academy: High-impact

Face-to-Face Sessions:

- **reflect** SGM’s
- **apply** content to real-world scenarios
- **evaluate** info under challenging context
- **synthesize** a product
- **forge** meaningful interactions w/ faculty

<table>
<thead>
<tr>
<th>Reflection</th>
<th>Below Expectations</th>
<th>Approaching Expectations</th>
<th>At or Exceeds Expectations</th>
<th>Score (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise fails to provide students adequate opportunities to reflect on knowledge gains;</td>
<td>Exercise attempts to provide students adequate opportunities to reflect on knowledge gains;</td>
<td>Exercise provides students multiple opportunities to reflect on knowledge gains;</td>
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</tr>
<tr>
<td></td>
<td>Exercise fails to map properly to content presented in self-guided learning modules (1)</td>
<td>Exercise needs improvement in mapping to content presented in self-guided learning modules (2)</td>
<td>Exercise strongly maps to content presented in self-guided learning modules (3)</td>
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<thead>
<tr>
<th>Application</th>
<th>Below Expectations</th>
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<tbody>
<tr>
<td></td>
<td>Exercise fails to provide students adequate opportunities to apply knowledge gains;</td>
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<td>Exercise provides students multiple opportunities to apply knowledge gains;</td>
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<tr>
<td></td>
<td>Exercise fails to connect with real-world scenarios and/or experiences (1)</td>
<td>Exercise needs improvement with connecting to real-world scenarios and/or experiences (2)</td>
<td>Exercise strongly connects to real-world scenarios and/or experiences (3)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Below Expectations</th>
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<th>Score (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise fails to provide students adequate opportunities to evaluate course content under the context of a challenging scenario (1)</td>
<td>Exercise needs improvement in providing students adequate opportunities to evaluate course content under the context of a challenging scenario (2)</td>
<td>Exercise provides students multiple opportunities to evaluate course content under the context of a challenging scenario (3)</td>
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<table>
<thead>
<tr>
<th>Synthesis</th>
<th>Below Expectations</th>
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<th>Score (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise provides no opportunity for students to synthesize a product that demonstrates their learning (1)</td>
<td>Exercise attempts to provide students an opportunity to synthesize a product that demonstrates their learning, but may need improvements with mapping to course content and/or course learning objectives (2)</td>
<td>Exercise provides students opportunities to synthesize a product that demonstrates their learning;</td>
<td></td>
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<tr>
<td></td>
<td>Synthesis product strongly maps to course content and to course learning objectives (3)</td>
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<td></td>
<td>The in-class session fails to create an atmosphere where deep and meaningful interactions are forged between students and instructor(s) (1)</td>
<td>The in-class session needs improvement in creating an atmosphere where deep and meaningful interactions are forged between students and instructor(s) (2)</td>
<td>The in-class session creates a strong atmosphere where deep and meaningful interactions are forged between students and instructor(s) (3)</td>
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<tr>
<th>Faculty Preparation</th>
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<th>At or Exceeds Expectations</th>
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<tr>
<td>Faculty member(s) not prepared for the role change needed to coach students</td>
<td>Faculty member(s) need improvements in preparing for the role change needed to coach students</td>
<td>Faculty member(s) are fully prepared for the role change needed to coach students</td>
<td></td>
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</table>

**Total Score:**
Cane Academy: Let’s have a peek!

Contents

- Introduction & Learning Objectives
- Concept #1: Aging
- Concept #2: Wound Healing
- Connecting to In-class Learning Sessions
- Recap
- Faculty, Support, & Course Information

Click here to access a learning module example.
’Cane Academy: Facilitating Learning Environments

David Patrick James Green, Senior Instructional Designer

University of Miami Miller School of Medicine
Undergraduate Medical Education | Educational Development Office | ’Cane Academy

’Cane Academy fosters teaching and learning environments where self-guided mobile learning is blended with enhanced face-to-face opportunities that promote deeper learning and high-impact educational practices.

1. Pedagogy
   - The blend: online learning assets
   - The blend: face-to-face sessions

2. Faculty development
   - Webinars
   - Course blueprints

3. Infrastructure
   - Roadmap
   - Checklist
   - Story of a redesign
   - Visit our website


Contact: davidgreen@umiami.edu | 305-243-7080 | 3138 RFL-2167
Cane Academy: Course Blueprints

Dermatology - Course Blueprint

Course Description:
Using a blended design strategy, this course will emphasize both the basic science and clinical aspects of the skin. Consistent with the goals set by the curriculum office for this course, we aim to give you an overview of the representative dermatologic findings and diseases that reflect pathophysiologic mechanisms. The intent of the course is not to teach a comprehensive course in the specialty, but to introduce and teach you the scientific basis of the pathophysiology of disease, through the use of representative disorders. By the end of the course, you should have an understanding for both normal and abnormal findings expected on physical examination of a patient for a given disease process. In addition, we hope that you will begin to develop an appreciation for the effect that genetics and environmental factors may have on development of the disorders discussed.

Practice-based Learning & Improvement:
Demonstrate the ability to investigate and evaluate one’s care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning.

Knowledge for Practice:
Demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care.

Course Goals:
Demonstrate ability to recall key information related to the normal structure and function of skin.

Objectives:
Demonstrate the knowledge needed to identify fundamental skin structures and functions.

Learning Outcomes:
- Self-guided learning module (SGM)
- Self-assessment exercises
- Exam Questions

Case Studies:
- Introductory Vignettes
- Case Studies: Breakout Group Discussions
- Case Studies: Large Group Debriefings

Contact:
David Green | Instructional Designer | david.green@miami.edu
'Cane Academy: Faculty Development

Success!

1. Attended "iFlip@UMMSM" seminar
2. Joined "Yammer: 'Cane Academy"
3. Completed Introduction
4. Participated in "Teaching w/ Tech"
5. Completed "The Playbook"
6. Joined a "Coffee Break"
7. Redesigned
8. Implemented and assessed
9. Shared and mentored
10. Published manuscript

After completing a carefully-orchestrated set of tasks, a faculty member:

- implements a competency-based course redesign;
- assesses student learning gains of the course redesign;
- recruits & mentors fellow faculty members;
- achieves meaningful assets for a promotion portfolio.

Contact 'Cane Academy today!

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Instructional Designer | Academic Technologies | 'Cane Academy
Learning Innovation and Faculty Engagement
RMSB #2167A
305.243.7605
david.green@miami.edu
‘Cane Academy: Implemented

a. Traditional classroom model for Dermatology module

Passive learning: Lecturing

<table>
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b. Flipped classroom model for Dermatology module

Active learning: Student-centered, self-paced activities

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a. Traditional classroom model for Ophthalmology module

**Passive learning: Lecturing**

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Engagement

Student Engagement: Hours Spent in Blackboard During Ophtho & Derm

Ophtho
Total time spent in Blackboard: 2798.06 hours
Average time per student: 13.32 hours

Derm
Total time spent in Blackboard: 2996.83 hours
Average time per student: 14.62 hours
Performance: Derm

Documenting Learning Gains

<table>
<thead>
<tr>
<th></th>
<th>Previous Semester 1</th>
<th>Previous Semester 2</th>
<th>Current Redesign</th>
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<tbody>
<tr>
<td></td>
<td>90%</td>
<td>90%</td>
<td>92%</td>
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Final Exam Scores Compared Against Previous Semesters

Structure & Function
Skin Changes: Time & Injury
Skin as a window to systemic disease
Inflammatory & Immune Conditions
Infections of the Skin
Skin Neoplasms
Diseases of Adnexal Structures & Nails

http://www.mede.edu.miami.edu/Cane%20Academy%20Webpage/courses.html
Performance: Ophtho

Ophthalmology Exam Score (%)

Overall

- 2015-16
- 2014-15
- 2013-14
- 2012-13
- 2012-13

MD

- 2015-16
- 2014-15
- 2013-14
- 2012-13
- 2012-13

MPH

- 2015-16
- 2014-15
- 2013-14
- 2012-13
- 2012-13
Results

- Most students entered with minimal online or blended learning experiences
- Students self-assessed their performance through carefully-choreographed reflection and practice opportunities that allowed them to learn at their own pace
- Knowledge gains increased as demonstrated from pre-course, mid-course, and final exams
- 80% of students "Agreed" or "Strongly Agreed" that the case studies related academic content to real-world scenarios
- Students slightly exceeded final exam performance when compared against previous semester scores where traditional teaching methods were used
- Nearly ¾ of students reported they "Agreed" or "Strongly Agreed" that ’Cane Academy methods are favorable for future lessons
’Cane Academy: Tools

- Blackboard LMS
- Softchalk
- Khan-style videos
- YouTube
- Widgets
- Google Drive
- iClicker
- eTextbook
- Panopto Lecture-capture videos
- Qualtrics surveys
- Box
Lessons Learned

• Faculty ownership promotes increased student excitement, interest, and engagement;

• Student feedback is generally positive and academic performance is consistent with or even slightly exceeds performance in previous courses taught using a traditional lecture-based format;

• Effective communication between administration and faculty is critical to optimal success.
Significance

- Incoming student foundational knowledge is variable → this approach allows for self-paced learning;
- Streamlines lecture content → creates consistent, quality-controlled messages and content;
- Experiential learning opportunities → provide necessary skills to future physicians that relate to real-world scenarios and map to national competencies;
- Learner progress → can be monitored through a “knowledge map” via a dashboard interface by visualizing user analytics associated with mastery of competencies;
- Proper implementation → has the potential to accelerate student progress through the curriculum.
Acknowledgements

- Executive Dean Laurence Gardner
- Dr. Alex J. Mechaber
- Dr. Mark O’Connell
- Dr. Richard Riley
- Nick Pikarsky
- David Faber
- Matthew Kofoed
- Dr. Robert Kirsner (Derm)
- Dr. Moe Lowery (Cardio)
- Dr. Alabiad and Dr. Karp (Ophtho)
- Allan Gyorke
- Hannah Inzko
- Learning Innovations and Faculty Engagement team
- UMIT – Academic Technologies team
- #BlendKit2015
- Rishi Desai (Stanford, Khan Academy, & Osmosis)
- EDUCAUSE
  - Veronica Diaz, Malcolm Brown, Greg Dobbin
Thank you!

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University of Southern California Rossier School of Education

Dissertation focus: metacognitive self-regulated learning processes in hypermedia-driven learning environments