Teaching evidence based practice (EBP) in a flipped classroom model:
A controlled comparison between learning on-campus and online

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Background: The flipped classroom model

Benefits over a traditional classroom for health care education (Hew & Lo, *BMC Med Educ*, 2018)

The "traditional classroom" is evolving
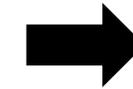

Class Preparation

Mentor-guided Assignment and Discussion

Icons by Luis Prado and Franck Juncker/fjopus7 from the Noun Project

Aims

1. Describe how a flipped classroom model EBP course traditionally taught with an on-campus component was translated to an exclusively online learning experience

2. Compare outcomes of two cohorts of physiotherapy graduate students enrolled in a flipped classroom model EBP course with either an on-campus component or exclusively online
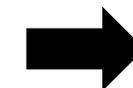
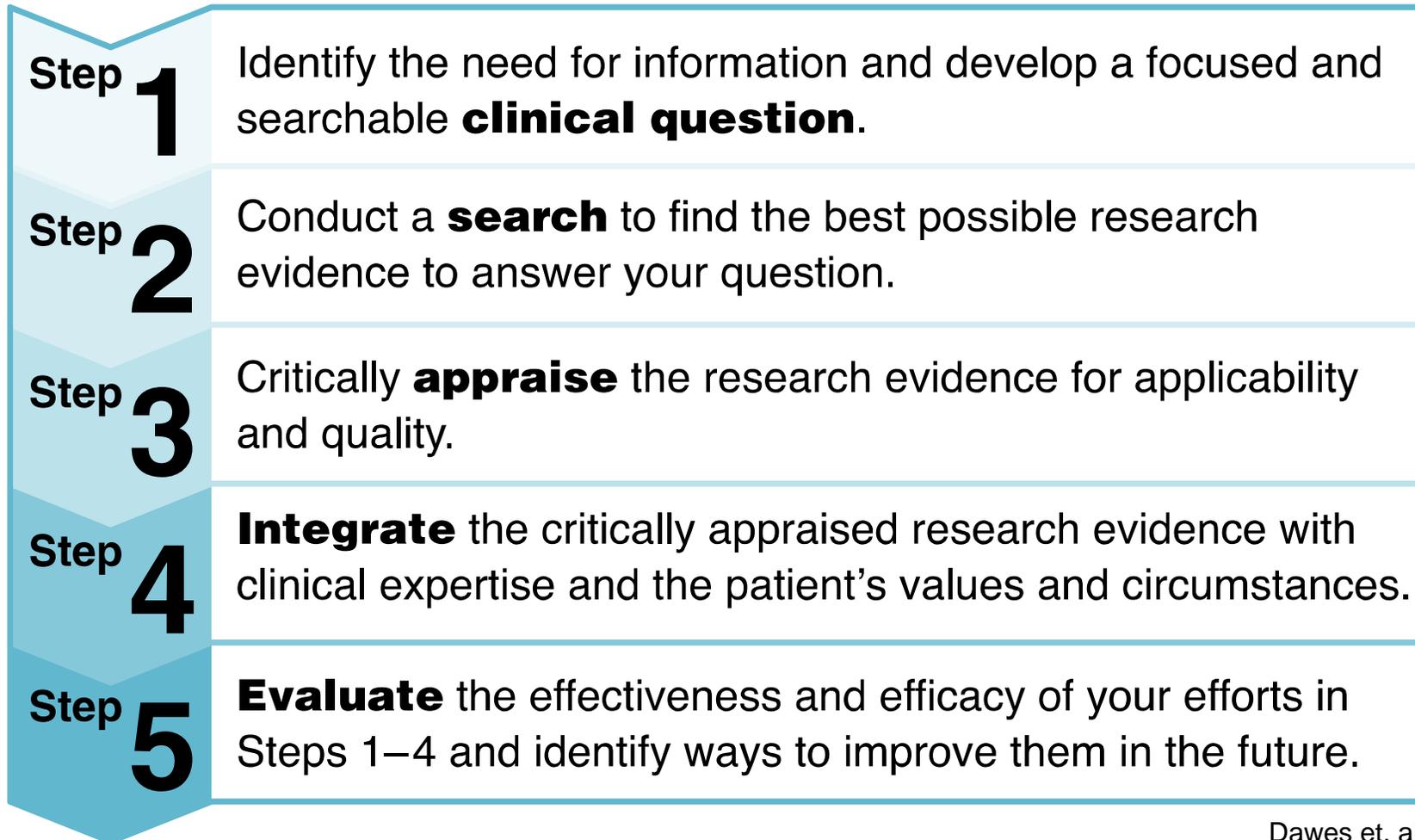On-campus flipped EBP class

→ Student outcomes
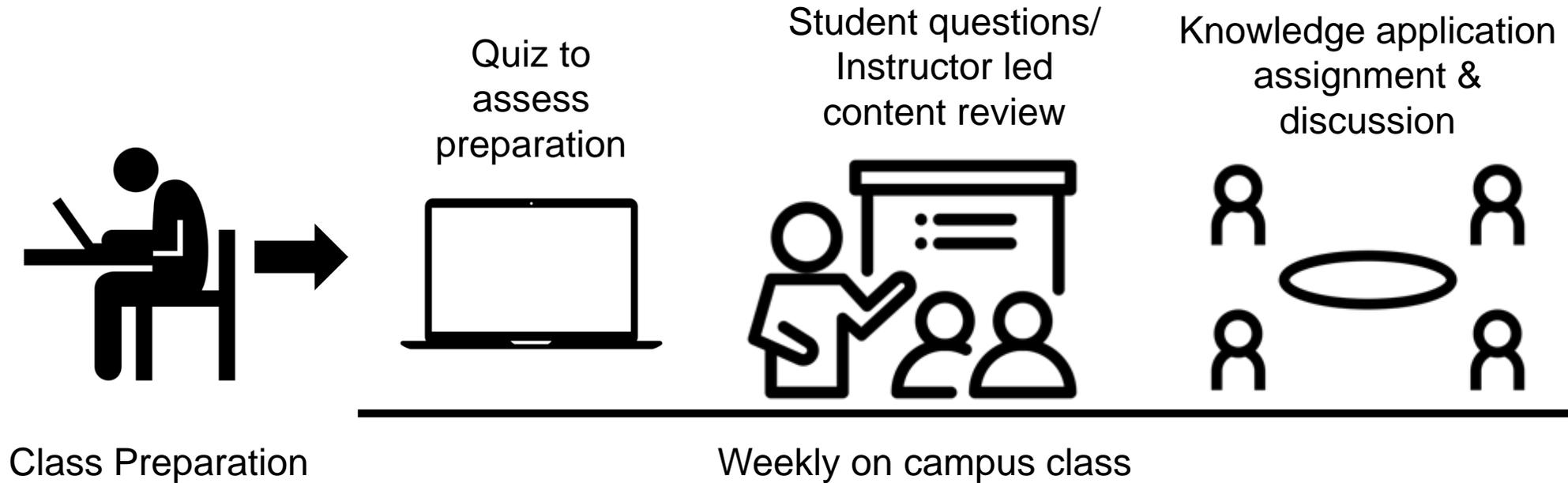
Online flipped EBP class

→ Student outcomes

Icons by Luis Prado from the Noun Project

Methods (Aim 1):
EBP course framework and objectives

Step 1 — Identify the need for information and develop a focused and searchable **clinical question**.

Step 2 — Conduct a **search** to find the best possible research evidence to answer your question.

Step 3 — Critically **appraise** the research evidence for applicability and quality.

Step 4 — **Integrate** the critically appraised research evidence with clinical expertise and the patient's values and circumstances.

Step 5 — **Evaluate** the effectiveness and efficacy of your efforts in Steps 1–4 and identify ways to improve them in the future.

Dawes et. al, BMC Med Educ, 2005
Kaplan et. al, *J Phys Ther Educ*, 2016.
Image: Fetters and Tilson. *Evidence Based Physical Therapy, 2nd ed.* 2018

Methods (Aim 1):
On campus EBP flipped class model

Quiz to assess preparation

Student questions/ Instructor led content review

Knowledge application assignment & discussion

Class Preparation

Weekly on campus class

Methods (Aim 1):
Translating flipped class preparation materials

Class Preparation
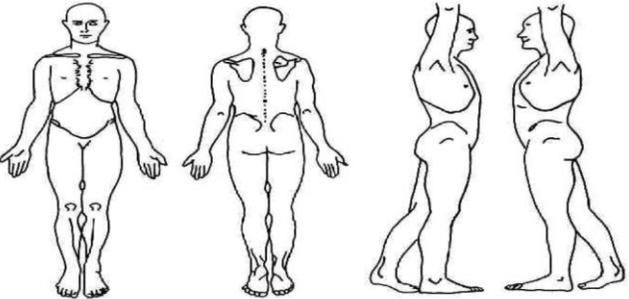
Original:
Paper-based
patient case scenarios
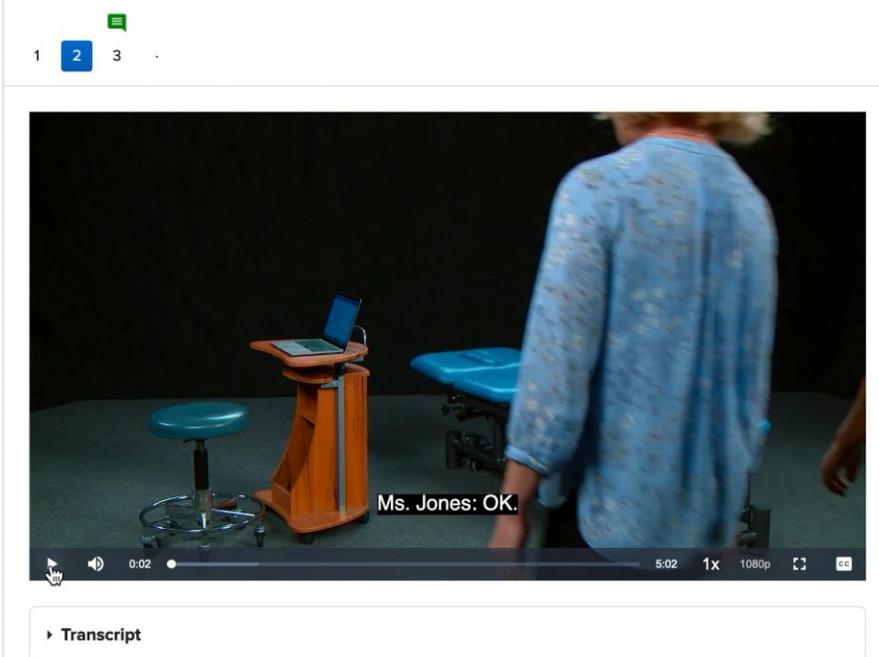
Translation:
Video-based
patient case scenarios

Methods (Aim 1):
Translating flipped class preparation materials

Class
Preparation

Original:
Pre-recorded lectures

Unit 2 | Appraising Intervention Studies, Part 1 (0:54:49)
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Appraising Intervention
Research Evidence

Part I
Is This Article Any Good?

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DPT@USC

Play Video

2.15 Purpose

2.16 Single vs Multiple Study Sites

2.17 Sample Size and Dropouts

Translation:
Content modules (Video lectures and review questions)

Methods (Aim 1):
Translating weekly class meetings

On-campus Doctor of Physical Therapy
(DPT) track:
Weekly on campus class

Online Doctor of Physical Therapy
(DPT) track:
Weekly video conference

Results (Aim 1): Course translation

- 15 Content modules completed during 16 week semester

Content Type	Mean (SD) per Module
Required student engagement time (min)	93.1 (39.1)
Number of video lectures	10.7 (6.0)
Number of review question	10.1 (8.0)

Results (Aim 1):
On- campus and online EBP flipped classes

DPT Track	Class Preparation	Weekly Class Meeting	Instructor to Student Ratio
On campus			
Online			

Methods (Aim 2):
Controlled comparison design

DPT Track (n)	Semester Duration	Learning Outcomes
On campus (n = 96) Online (n = 46)	**January – May, 2019** 16 weeks	• **Student Performance** • Midterm Evidence Appraisal • Final Examination • Total Course Grade

Results (Aim 2): Cohort characteristics

Cohort Characteristics	On Campus	Online
N	96	46
Female (%)	63	48
Age (y), mean (SD)	25.0 (3.1)	26.7 (4.3)
Live in driving distance to campus (%)	100	37

Results (Aim 2): Student performance

Assignment		On Campus	Online	P value
Midterm Appraisal (Total Possible = 70)	Mean	**66.6 (2.2)**	**66.3 (0.2)**	0.41
	Min	60	58.5	
	Max	70	70	
Final Exam (Total Possible = 55)	Mean	**50.2 (3.8)**	**49.6 (3.5)**	0.22
	Min	34	40	
	Max	55	55	
Total Course Grade (Total Possible = 100)	Mean	**95.0 (2.6)**	**94.6 (2.8)**	0.43
	Min	86.0	86.3	
	Max	99.0	99.5	

Limits

- Students could not be randomly assigned to groups
- Translation was time and resource intensive
- Did not use standardized tool to compare student outcomes

Bottom Line

- Advancing technology improves the ability to deliver curricula online
- No difference in student outcomes between on campus and online EBP course delivery
- Comparing student performance provides insight into best practices for student centered learning