A Mixed-Methods Approach to Teaching Critical Appraisal of Research to Neurology Residents Through Social Cognitive Theory

Katherine A. Fu, MD; Joy Chan, MD; Katelyn Stepanyan, MD; Ashley Manchanda, DO; Alonso Zea Vera, MD; Michelle Vermilion, BS; Holly Wilhalme, MS; Adrienne Keener, MD; Roy Strowd, MD, MEd, MS
Disclosures

Dr. Katherine Fu receives an editorial stipend as Deputy Editor of the Neurology® Resident & Fellow Section.

Dr. Roy Strowd serves a consultant for Monteris Medical Inc, Novocure, Alexion. He receives an editorial stipend as Editor of Neurology®: Education. He has received research/grant support from the American Academy of Neurology, American Board of Psychiatry and Neurology, American Society for Clinical Oncology, Southeastern Brain Tumor Foundation, and Jazz Pharmaceuticals. He has served as a paid lecturer for Kaplan, Inc. He receives royalties from Lecturio and Elsevier. No disclosures are related to the content of this talk.

The co-authors have no disclosures related to the content of this talk.

**Background**

- **Evidence based and Informed Practice**
  - Neurology Milestones recognize its importance in graduate medical education (GME)

- **Traditional Journal Clubs have Disadvantages**
  - Passive audience, variable preparation and discussion driven by few participants

- **Flipped Journal Club demonstrates Promise**
  - Bounds et al. demonstrated that discussion-based format favored by residents & faculty
Social Cognitive Learning Theory

(1) Attention
We must first pay attention to the model.

(2) Retention
We must be able to remember the observed behavior.

(3) Reproduction
We must be able to replicate the behavior demonstrated.

(4) Motivation
We must be motivated to demonstrate what we have learned.

SLT Modeling Process

Albert Bandura
Methods

Quasi-experimental, sequential explanatory mixed methods design

| Quantitative: Multiple choice question (MCQs) pre-, post-, and delayed post-tests | Qualitative: Ethnographic observations | Qualitative: Semi-structured interviews and thematic analysis | Integration Procedures: Quantitative & qualitative data mixed |
Methods

Flipped Journal Club
- Creation of Discussion Guide
- Jigsaw approach
- Resident & faculty facilitators guided discussion

Traditional Journal Club
- Creation of Presentation
- Faculty facilitator offers expertise
- Discussion & questions at the end

Journal Club Sequence
- Flipped
- Traditional
- Flipped
- Traditional
Qualitative Methods

**Ethnographic Observation**
1. Field guide created, reviewed & revised
2. Observer (JC) completed field guide during each journal club
3. Debriefing occurred after each session and guide addended

**Semi-structured Interviews**
1. Interview guide created, reviewed, and revised
2. Training of interviewers (KS, AM)
3. Semi-structured interviews conducted
4. Transcripts transcribed and coded
5. Thematic analysis
Quantitative Results

<table>
<thead>
<tr>
<th>Journal Club Session</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 (Flipped)</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>#2 (Traditional)</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>#3 (Flipped)</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>#4 (Traditional)</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

Due to low response rates, delayed post-tests were not included in the analysis (n ≤ 3)

Table. Modeled Estimates of the Change from Pre to Post by Journal Club Type

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Flipped Mean (SD)</th>
<th>Traditional Mean (SD)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score Difference</td>
<td>22.753 (5.613)*</td>
<td>4.725 (6.744)</td>
<td>0.0278</td>
</tr>
<tr>
<td>Methodology Subscore Difference</td>
<td>7.052 (8.202)</td>
<td>1.214 (10.061)</td>
<td>0.6296</td>
</tr>
<tr>
<td>Clinical Application Subscore</td>
<td>49.719 (5.288)*</td>
<td>1.322 (6.374)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

*: indicates significant change from pre to post

Note: Score differences are percentage points
Qualitative: Ethnography Results

- Similar demonstrations of attention across both formats
- More consistent demonstrations of retention, reproduction and motivation in the flipped format
Qualitative: Coding & Thematic Analysis

Adequate preparation is important, but finding time for this is challenging

“I think the main challenge just throughout residency in general is finding the time to actually read the papers. […] I'm not sure how we would address that really because I do feel like you really need to read the paper to discuss it.”

Clinical relevance and topic of the articles are primary motivators

“Maybe that's the reason why I didn't feel the big difference between the traditional versus peer led journal club because my focus wasn’t [research methodology]. I was more hoping for— […] How does that apply to my patients that I’m seeing.”
Passive listening occurred in both formats, with scripted interactions characteristic of flipped format.

“Like I said, we just were going around and then reading the important parts and prompt. Other than that I guess [...] I was mostly listening to the problems. Then when the other residents would say something, again, the peer leader would chime in.”

Learning arises from faculty modeling of practicing evidence-based medicine.

“There was [...] discussion with the faculty member and with some of my other colleagues who had a different take on how this study pertained to general practice [...] I think it was helpful for me to see their perspective.”
Conclusions

Paradox of preparation
Preparation viewed as important, but time is limited

Clinical relevance is a strong internal motivator
Residents value the clinical relevance of learned material. “Need to know”

Principles of Andragogy Predominant
SCLT may not have been ideal conceptual framework

Value of organic conversations
While discussion-based “flipped” format improved engagement, scripted interactions and “forced” dialogue may not be ideal

Value of faculty modeling & importance of faculty development
Faculty development to enhance their ability to serve as effective role models
Future Directions

Expanding to Other Programs

Multi-institutional studies may improve generalizability and response rates

Exploring Novel Journal Club Formats

Piloting an “interactive, no-prep” journal club format based on Dzara et al.

References

Thanks!
Do you have any questions?

Email: kfu@mednet.ucla.edu
X: @KatherineFuMD

Acknowledgments:
• Steve Ortiz for logistical assistance
• Danielle Thordarson for piloting MCQs
• UCLA Neurology residents for participation and insights

CREDITS: This presentation template was created by Slidesgo, and includes icons by Flaticon, and infographics & images by Freepik

Please keep this slide for attribution