Medical Education Journal Club

ACCREDITATION STATEMENT
Florida International University Herbert Wertheim College of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

CREDIT DESIGNATION STATEMENT
Florida International University Herbert Wertheim College of Medicine designates this live activity for a maximum of 1.0 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
## Disclosure Information

### Activity Directors / Planners / Reviewers / Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Disclosure / Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carla S. Lupi, MD</td>
<td>Activity Director/Planner/Speaker</td>
<td>Dr. Lupi reports no relevant financial relationships.</td>
</tr>
<tr>
<td>Vivian Obeso, MD</td>
<td>Planner/Speaker</td>
<td>Dr. Obeso reports no relevant financial relationships.</td>
</tr>
<tr>
<td>Christian Castro, PhD</td>
<td>Planner</td>
<td>Mr. Castro reports no relevant financial relationships.</td>
</tr>
<tr>
<td>Melissa Ward-Peterson, MPH</td>
<td>Planner</td>
<td>Ms. Ward-Peterson reports no relevant financial relationships.</td>
</tr>
</tbody>
</table>
Learning Objectives

• Be able to list the search results for one medical education database consulted in the design of a course or teaching session.

• Conduct a critical appraisal of an article in the medical education research.

• Identify the applicability of research results to one's own course or teaching session.
Medical Education Journal Club

- Establish a forum for faculty to share and discuss recent literature in medical education
- Use best evidence in medical education literature to evaluate and advance current practices in our educational program
- Establish a culture that promotes curricular innovation and change in an evidence-based manner
- Stimulate educational scholarship
Effectiveness of Case-Based Learning. A BEME Systematic Review: BEME Guide No. 23
http://www.youtube.com/watch?v=73W4VfQmUrl&feature=player_detailpage
BEME Guide No. 23

Medical Teacher 2012;34
"...And Mr. Fieldmore's meaning of the other committee members was interpreted as the only "nay" vote..."
“Claims are made for CBL as an effective learning and teaching method”

“very little evidence is quoted or generated to support these claims”
Topic Review Group (TRG)

- Range of expertise in curriculum development
- General practice, pediatrics, pathology, psychology, physiology, midwifery, e-learning, communication skills, research methodology, medical student
Explore, analyze and synthesize the evidence relating to the effectiveness of CBL

1. To identify the published empirical evidence on the effectiveness of CBL
2. Analyze the strengths and limitations of the studies
3. Propose a definition for CBL
Questions

- How is CBL defined?
- What methods are used and advocated?
- What are students and educators view on CBL?
- Is CBL effective?
- In what ways is CBL effective?
- How does CBL promote learning?
Relevance

- Currently on the path to continued promotion and implementation of a Case Base-Learning curriculum
Systematic Review

- **Inclusion**
  - Medicine, dentistry, vet, nursing, midwifery, social care and allied health professions
  - Outcomes data (not merely descriptions)
  - Not limited to English
  - After 1965

- **Exclusion**
  - Failed to meet inclusion criteria
  - PBL
Search Strategy

- 2 Reviewer – 173 Medline
- 1 Reviewer – Wok, ASSIA
- 1 Reviewer – CINAHL, EMBASE, ER

Table 1. Results from databases:

<table>
<thead>
<tr>
<th>Database</th>
<th>Total abstracts</th>
<th>Excluded</th>
<th>Duplicates</th>
<th>Full papers</th>
<th>Excluded full</th>
<th>Coded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medline</td>
<td>173</td>
<td>94</td>
<td>2</td>
<td>79</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>CINAHL</td>
<td>53</td>
<td>37</td>
<td>7</td>
<td>14</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>EMBASE</td>
<td>71</td>
<td>47</td>
<td>17</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Education research</td>
<td>115</td>
<td>92</td>
<td>4</td>
<td>19</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>ASSIA</td>
<td>13</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>WoK</td>
<td>374</td>
<td>291</td>
<td>36</td>
<td>48</td>
<td>26</td>
<td>22</td>
</tr>
</tbody>
</table>
Appendix 2: Flow diagram of literature search and paper selection

Electronic searches of Medline, CINAHL, EMBASE, Education Research, ASSIA, Web of Knowledge

Abstracts retrieved: 799
Duplicates removed: 54

Review of abstracts against inclusion and exclusion criteria

Papers included in full text review: 178

Review of full articles against inclusion and exclusion criteria

Full text included: 106
Full text excluded: 72

Review and coding of full text articles: 104 (2 x 2 papers had similar data and therefore counted as together)
Coding

- Standard: title, author, coder, inclusion criteria, location, number of students, research design, impact Kirkpatrick hierarchy
  - (1Reaction, 2Learning, 3Behavior, 4Results)

- Modified (added): topic, learning outcomes, years, text/space answer subsidiary questions

- Strength of findings (1-5)

- Overall Impression (poor – excellent)
What happens to patient populations as a result of what they’ve learned?

What do students do with what they’ve learned? What do they intend to do?

What do students know now (short term)? What do they retain & remember (long term)?

How do students feel about their learning experience? About their instructor?
Criteria for Judging

- #participants
- #cohorts
- Comparison of cohorts
- Outcomes data – level 2 or beyond
- Attempts at exploring how CBL is effective
- Clear description of analytic method
Rater Reliability

- Interrater agreement exercise
- 7 members coded 3 papers
- 1 Reviewer
- Papers 3-5 - 2nd coder
Data Analysis

High Quality = 3-5 + excellent, good or acceptable

<table>
<thead>
<tr>
<th>Kirkpatrick level</th>
<th>1 student reaction</th>
<th>2a change in attitude</th>
<th>2b change in knowledge</th>
<th>3 change in behaviour</th>
<th>4 organisational change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength of findings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Overall impression</td>
<td>Poor</td>
<td>Acceptable</td>
<td>Good</td>
<td>Excellent</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3. Double coding (n = 34).

<table>
<thead>
<tr>
<th>Coding</th>
<th>Reviewer 1</th>
<th>Reviewer 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent + 4</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Good + 4</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Acceptable + 4</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Poor + 4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Good + 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Acceptable + 3</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Poor + 3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Good + 2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Acceptable + 2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Poor + 2</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Acceptable + 1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Poor + 1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total significant papers</td>
<td>34</td>
<td>23</td>
</tr>
</tbody>
</table>

- 104 papers
- 23 Significant papers
<table>
<thead>
<tr>
<th>Location</th>
<th>Number in full sample (n = 104)</th>
<th>Number in significant sample (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Other Europe</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>Asia</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>North America</td>
<td>54</td>
<td>14</td>
</tr>
<tr>
<td>South America</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Africa</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Australasia</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Year</td>
<td>Number in full sample (n = 104)</td>
<td>Number in significant sample (n = 23)</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>2010</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>2007</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>2006</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>2005</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>2004</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>2003</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2002</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>2001</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>1990-1999</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Pre-1990</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Student profession</td>
<td>Number in full sample (n = 104)</td>
<td>Number in significant sample (n = 23)</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Chiropractic</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Dentistry</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Medicine</td>
<td>68</td>
<td>15</td>
</tr>
<tr>
<td>Nursing</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Paramedic</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Psychology</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Social science</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Speech pathology</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Veterinary</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Mixed</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 7. Number of students in studies.

<table>
<thead>
<tr>
<th>Total number</th>
<th>Number in full sample ($n = 104$)</th>
<th>Number in significant sample ($n = 23$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than 50</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>51–100</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>101–200</td>
<td>32</td>
<td>9</td>
</tr>
<tr>
<td>Over than 200</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>Not given</td>
<td>16</td>
<td>1 (but 4 years data)</td>
</tr>
</tbody>
</table>

Note: The smallest study had six students and the largest over a 1000 (exact number not given).
Table 8. Number of students learning together on cases per group.

<table>
<thead>
<tr>
<th>Number in group</th>
<th>Number in full sample (n = 104)</th>
<th>Number in significant sample (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working alone</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>2–15</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>16–30</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>More than 30</td>
<td>9 (usually whole year group)</td>
<td>2</td>
</tr>
<tr>
<td>Not given</td>
<td>36</td>
<td>8</td>
</tr>
</tbody>
</table>
Design

- **S** = Single cohort - all students same intervention -
- **M** = multiple cohorts, different interventions for comparison of cohorts or control
- **MY** = similar intervention over different year groups and no comparison
- **MH** = same intervention, historical controls
Design

- Single Cohorts: 63 (61%)
- Multiple/Comparison: 30 (29%)
- Different year: 9 (8%)
- Historical: 2 (2%)

Outcome Data

- Post: 78 (75%)
- Pre/post: 23 (22%)
- During and post: 3 (3%)
Data Analysis

- Narrative Synthesis Approach to compare, contrast and synthesize data

- Guided by the theory of inquiry based learning

*Confirmation, Structured, Guided, Open*
Results

- 104 - Definition, methods/learning activities, student and faculty views, effectiveness level 2
- Summarized:
  - Significant Single Cohort (10)
  - Significant comparison (13)
Definitions of CBL

- GOALS, CONTENT, PROCESS

- GOAL
  - Authentic cases
  - Added breadth of presentation to prepare them for clinical practice
  - Opportunities for formulating diagnosis and plans
  - Explain how underlying mechanisms relate to identifying and treating illness
  - Changing the traditional role of student and faculty
  - Revising instructional goals and design
- **Content**
  - Real life- authentic cases

- **Process**
  - Linking of theory to practice
  - Bridge learning knowledge/working life
  - Mirroring the decision making process of workplace
  - Active discussion
  - Participation
  - Cooperative learning
## Methods of CBL used and Advocated

<table>
<thead>
<tr>
<th>Number in group</th>
<th>Number in full sample (n = 104)</th>
<th>Number in significant sample (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working alone</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>2–15</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>16–30</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>More than 30</td>
<td>9 (usually whole year group)</td>
<td>2</td>
</tr>
<tr>
<td>Not given</td>
<td>36</td>
<td>8</td>
</tr>
</tbody>
</table>
Figure 1. Student learning in CBL on an inquiry-based continuum (adapted from Entwistle 2009 and Banchi & Bell 2008).
Learning Outcome

- Only 35 included learning outcomes
Is CBL Effective
Kirpatrick Level One

- http://youtu.be/0aGmtQIRnt4
Is CBL Effective

- Level 1 Student Reaction
- Liked highly, satisfied, stimulated, motivated, challenged, helpful, value, appreciated, real life relevance, gain in confidence, helped apply knowledge, valuable, wanted more, bolstered personal interest, clinical problem solving, made anatomy more relevant, improved clinical skills, increased confidence in making problem lists, increased confidence in choosing tests, promoted independent learning and critical thinking:
CBL or a Small Group effect???

- Mixed reaction: does not prepare for summative assessment, work load, preferred small group to large group, more structure, clearer instructions, some struggled with self-directed learning
- Unstructured – more enjoyable (Sutyak, 1996)
- Enjoyed but not as a replacement for traditional classroom teaching (Radon 2006)
Level 2 – Change in knowledge

- Knowledge (5 studies)
- Clinical Reasoning Skills (2)
- Skills (1)
How does it work

Statements...

- As good as real patients
- Improves student understanding
- Overcome misconceptions
- **Active participation**
- Aid development of *applied reasoning*
- Learning style did not influence the learning experience
- Maturity effect
Level 2

- Majority of papers found no difference between CBL cohorts or students having other interventions
<table>
<thead>
<tr>
<th>Kirkpatrick Level</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 2 +CBL Significant</th>
<th>No Difference Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of papers N=104</td>
<td>#88 (85%)</td>
<td># 48 (46%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant Papers Total= 23</td>
<td>#6 Worthwhile -Variable -Enjoyed more/links theory -Learned through discussion -Satisfied -Increased motivation</td>
<td>#8 -Reduced misconceptions -Changed pathology scores -Working through errors helps -Better results -Increased importance psychosocial/cultural issues -Enhances learning and collaboration -Preferred CBL to PBL - positive to group work</td>
<td>#9 -Variable -No Difference in exams -No change in critical thinking -No Difference with PBL -No Difference CBL and TBL -No Difference -No Difference -No change in knowledge -No Difference in Simulation and CBL</td>
<td></td>
</tr>
</tbody>
</table>
Limitations

- Subjective –
- Judgment criteria – non specific
- Interrater reliability exercise- poor description/weak
- Most outcome data – Level 1
- “How it works”– subjective statements
- Lack of Description regarding structure/nature of cases –
- Lack of rigor involving whether cases fit an Inquiry based method/delivery?
- Definition of CBL – Broad
- Small Group effect ??
Thoughts……
Approach to Clinical Medicine is complex
Hoping, wishing, gambling?
Assuming that “Case” or “Patient Based Discussions are enough to teach students how doctors think?
Is it enough to Frame the case, walk through, elicit discussion, prompt/ask, guide, self-directed,
Objectives?

- Confirmation of Medical Knowledge
- Linking Basic Science with Clinical Med
- Application Knowledge
- Clinical Skills
- Clinical Reasoning
- Awareness/Integration of Special Topics
- Collaboration
- Group Dynamics
- Individualized Assessment
- Individualized Feedback
Faculty Training
Learner Level of training

- Milestones
- Clinical Reasoning Objectives/Curriculum

- Impact on CASE STRUCTURE
- Complexity, Multiple Solutions, Uncertainty,
- Transitioning – Novice to Experienced
- Robust Case Base Curriculum – 3rd / 4th year ????????
Critical Thinking, Clinical Reasoning....

How doctors think.....

- Expert Knowledge
  - Explicit knowledge/Facts
  - Procedures
- Tacit Knowledge
  - Pattern Recognition
  - Perceptual Discrimination
  - Judgment
  - Mental Models—critical for gaining insight
- CBL - opportunity to identify flaws in mental models and adapt more accurate, comprehensive or useful ones

- IMSH 2014, Gary Klein
- Lou Oberndorf Lecture on Innovation in Healthcare Simulation
"Well, you see, I went to one of those progressive medical schools with no formal classes or credits and the students plan their own course of study so I never learned anything about the lungs, breathing and all that."
Inquiry Based Learning
On a continuum?

- Confirmation
  - CBL customized early learner
- Structure
- CBL
- Guided
- Open PBL -- GOAL? Assessment?
- Measure Outcomes and Performance
- Improve Learning

SMART

SMART Goal Setting
- Specific
- Measurable
- Attainable
- Relevant
- Time-Bound
Future

- Defining CBL
- How much structure?
- Does this vary as students mature?
- Case Delivery
- Does it prepare students?
- Does it translate to practice?
- Does it extend or limit clinical reasoning process?
Please complete the CME survey to receive credit for attendance.