Outcomes of an Evidence-Based Research (EBR©) tool to Teach Online Research and Critical Thinking Skills

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Need for development of an Evidence-based Research (EBR©) Tool

- Proliferation of medical literature
- Help needed for EBR process
- Lack of critical thinking skill to judge scientific literature
- Technology impacts information access (too much, not high quality)
- Web-based application with mobile view developed and tested
- Research based content
- Mapped to Information Literacy standards
- Mapped to Critical Thinking competency standards
- Two EquipLCU grants enable web-based tool with embedded questions
- Research collaborative established with Lebanese American University to further test EBR © tool
Scientific Background of EBR Tool ©

- Cognitive Apprenticeship Theory (CAT)
  - Rooted in Social Cognitive Theory
  - Learning takes place through explanation and integration (Dennen & Burner, 2008)
  - Informed instructional design elements (Contact North, 2012)

- Need for scientific evidence on using technology in EBP education (Melnyk, 2012)

- EBR Tool © presents how to conduct online research from writing your problem as a searchable question to dissemination of findings

Preliminary Work

- Phase 1:
  - Research Readiness Self-Assessment (RRSA) [NIH funded project] 90% of college students & faculty overestimate their online research skills (Ivanitskaya, et al., 2012).

- Pilot: LCU interdisciplinary students tested using standardized online test (RRSA)=91% below national norm, n=22

- Phase 1 & 2: RN’s (BSN & MSN) self-assessment of research skills moved from poor/fair into good/very good category, n=44 (Virginia Henderson International Nursing Library, http://hdl.handle.net/10755/201898).

- Take Away: Our students near national norm overestimating online research skills
THEMES BEFORE & AFTER EBR TOOL

Before:
• Need technical help
• Need specific search skills
• Need evidence-based skills

After:
• Acquired prioritized systematic search skills
• Focused/targeted search
• Made research process understandable/easier

Qualitative Testing of Tool
• Text answers examined for themes using Wordle
• Text analyzed with inductive coding
• Coded responses:
  ◦ Effective search
  ◦ Search strategies
  ◦ Credibility
  ◦ Affective
  ◦ Vague
  ◦ Not applicable
**Phase 2 Snapshot: How do Lubbock Christian University BSN & MSN students rate their research skills before & after using EBR tool?**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sample Size</th>
<th>Mean Score Change Pre/Post</th>
<th>Paired t-test</th>
<th>Significance</th>
<th>Student Perception of Research Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSN</td>
<td>n=55</td>
<td>3.33 – 2.79</td>
<td>t=4.38, p&lt;0.01</td>
<td></td>
<td>Mean student perception of research skills moved from being “good” to slightly above “very good” after using EBR tool</td>
</tr>
<tr>
<td>MSN</td>
<td>n=51</td>
<td>3.49 – 2.61</td>
<td>t=6.85, p&lt;0.01</td>
<td></td>
<td>Mean student perception of research skills moved from between “good/very good” to between “very good/excellent” after using EBR tool</td>
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Testing Student Learning

Embedded questions assess the learner’s ability to apply research skills to a clinical case while using the tool and allow immediate feedback to the student.

- **Learning outcome:** Students will be able to PICO a research problem. Response: 83% correctly apply PICOTS methodology to clinical case.*

- **Learning outcome:** Students will be able to differentiate the steps in critical appraisal of the research literature. Response: 73% correctly identified what would best help them critically appraise the literature needed for a clinical case.*
<table>
<thead>
<tr>
<th>Pre-EBR: What would you like to learn to improve your online research skills?</th>
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<tbody>
<tr>
<td>• Need to find the most credible sources</td>
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<tr>
<td>• Need to narrow my search to fit my topic</td>
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<tr>
<td>• How to become faster and more thorough</td>
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<tr>
<td>• What peer-reviewed journal should I use?</td>
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<td>• Learn more about evidence-based practice</td>
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<th>Post-EBR: What about the EBR tool contributed to your online research skills?</th>
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<tr>
<td>• Able to narrow search topics</td>
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<tr>
<td>• Systematic way of doing research</td>
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<tr>
<td>• Differentiating between levels of research to which was the best</td>
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<tr>
<td>• How to ask/write a better research question</td>
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<tr>
<td>• How to find peer-reviewed research; increased confidence; showed how to write a good paper</td>
</tr>
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<td>• Nursing faculty review for curriculum changes &amp; IE</td>
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</table>
Phase 3 Single-site RCT with Lebanese American University students and Longitudinal data from LCU Nursing students
We gratefully acknowledge our many colleagues, collaborators, and students who have helped to scientifically test the EBR© tool at Lubbock Christian University and Lebanese American University.