Assessing students’ information literacy skills in their search for evidence-based nursing information and creating targeted opportunities for curriculum-integrated information literacy

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Introduction
Evidence-based practice is a growing part of the nursing profession, and information literacy skills are crucial to finding the best evidence. While the emphasis on teaching evidence-based practice skills in nursing education has increased, the teaching of information literacy skills has not received the same attention. This project first sets a performance benchmark for the information literacy skills of third year nursing students using a discipline-specific survey and rubric. In the survey, gaps in information literacy skills became apparent, so this project also seeks to reinforce information literacy concepts and skills within the existing curriculum through recommendations for faculty instruction, skill-building assignments, and the creation of library resources to assist students after the library instruction session.

Assessment Methods and Results
Students were given a survey with a clinical scenario and five questions that sought to identify information literacy skills within the process of searching for evidence-based literature. A rubric was developed to assign performance levels for each question. The following section breaks down the survey question by question, providing the question, expected answers, actual student results, and interpretation of those results.

Scenario: You are caring for an adult patient who has just had a total hip arthroplasty (hip replacement). You have heard that heterotopic ossification (bone growth in otherwise soft places) is a possibility in cases like this and would like to find more information.

Question 1:

Question: Construct a research question on this subject based on techniques used in evidence-based practice.

Objective: Evaluate students’ use of PICO and other skills to determine key concepts and form a research question.

Answers: Most valued- a research question that explores the relationship of all the key topics (total hip arthroplasty and heterotopic ossification)

: Acceptable- a research question that contains all the key topics but makes assumptions that have not yet been proven
Results: Out of 37 students responding, 20 developed an appropriate research question. 15 students developed questions that made assumptions or were too detailed. 2 students submitted research questions not related to the topics at hand.

Interpretation: While many students developed a concise, answerable research question, nearly the same amount had difficulties in determining the key concepts and forming a question in the scenario.

Question 2:

Question: Which of the following resources do you think is best to use when searching for scholarly journal articles on this topic? Choose one.

A. Academic Search Premier
B. Medline Plus
C. Google Scholar
D. IUCAT
E. CINAHL
F. Health Source: Consumer Edition
G. Handbook of Nursing Diagnosis
H. PubMed

Objective: Determine if students select the most effective resources for their information need from a list of potential sources.

Answers: Most valued - subject specific resources that contain journal articles, such as PubMed and CINAHL
Acceptable - non-subject specific resources that contain journal articles, such as Academic Search Premier and Google Scholar
Not acceptable - resources that do not contain journal articles or resources that are not at the appropriate skill level for the author, such as IUCAT and Handbook of Nursing Diagnosis (do not contain articles) or Medline Plus and Health Source: Consumer Edition (information intended for the average user)

Results: Of the 37 students, 26 selected a subject-specific resource that contained journal articles. 9 students selected non-subject-specific resources that also contained journal articles. 2 students chose resources that were not appropriate for the search.

Interpretation: Nearly a third of the class is not using the best resources for their research, which could adversely affect their research. Students need more reminders of which resources meet certain types of information needs and more practice in selecting and using those resources in their practice.

Question 3:

Question: With the resource you selected and the topic in mind, what keywords would you use when searching the resource? Please write out your search exactly as you would enter it into the chosen resource:
**Objective:** Provide students with scenario and possible keywords and evaluate their use of keywords and search strategy.

**Answers: Most valued** - Use of provided controlled vocabulary (MeSH or CINAHL headings) terms and keyword searching that expresses all key topics in scenario  
  : **Acceptable** - Use of controlled vocabulary terms or keyword searching that expresses all key topics in scenario  
  : **Not acceptable** - Use of keywords that partially reflect the key topics in scenario; unrelated keywords

**Results:** Of the 37 students, 16 used a combination of controlled vocabulary terms and keyword searching. 19 students used only controlled vocabulary terms or keyword searching. 2 used an incomplete set of keywords or irrelevant keywords.

**Interpretation:** Students were supplied both MeSH terms and keyword searching terms for the scenario, but more than half of students did not fully utilize these terms. Students need to learn more about search strategy and keyword choice for the most effective searching.

**Question 4:**

**Question:** What factor is most important in choosing an article? Choose one.  
A. year of publication  
B. article is immediately available  
C. journal the article is in  
D. famous author of article  
E. I don’t know  
F. type of study conducted in article  
G. title of article

**Objective:** Demonstrate students’ ability to evaluate and select articles for authority, credibility, and relevance to EBP

**Answers: Most valued** - Selection of factor that may indicate authority, credibility, and relevance to evidence-based practice, such as type of study described in article  
  : **Acceptable** - Selection of factor that may indicate authority and credibility, but does not indicate relevance to evidence-based practice, such as the year of publication or journal name  
  : **Not acceptable** - Selection of factor that does not provide any indication of authority, credibility, or significance to evidence-based practice, such as the title of article, availability of full text, or the fame of the author

**Results:** Of the 37 students, only 13 chose type of study as the most important factor. 13 students chose year of publication and 1 chose the journal name, which are important indicators but not a sign of the level of evidence. 6 students chose the availability of full text and 4 chose the title of the article, neither of which typically have any significance to the level of evidence.

**Interpretation:** Students are over-emphasizing the year of publication in their searches. Students should learn that year of publication should be considered in the selection and appraisal of the article, but using it to limit the initial search may prevent a thorough search for the best evidence for clinical decisions. Students also need reinforcement teaching them that limiting to available full text is convenient for class work, but it does not provide the best evidence or most relevant articles.
Question 5:

Question: You want to tell your charge nurse about your research. Read the following sentences and write a single sentence in your own words that includes all the key concepts expressed in the 2 sentences.

Sentence 1: "Heterotopic ossification (HO) can develop after bone-related surgery or traumatic brain injury, and it can be prevented with radiation or NSAID therapy."
Sentence 2: “Radiation and NSAID therapy prevent HO with equal effectiveness, though radiation can have serious side effects for the patient.”

Objective: Assess students’ ability to determine key concepts, synthesize information, and use information to make a clinical decision.

Answers: Most valued - A single, clear sentence in the students’ own words that retains all key concepts from the original sentences and shows evidence of interpretation for making a clinical decision. (Key concepts- relevant cause of HO, existence of two prophylactic therapies, comparative effectiveness of therapies, and adverse effects for patient)

Acceptable - A single, clear sentence in the students’ own words that retains most key concepts of the original sentences, but lacks one or more key concepts

Not acceptable - A sentence that lacks multiple key concepts and/or is not in the students’ own words and/or is unclear, or use of two sentences that possess the same negative characteristics

Results: Of the 37 students, 7 successfully synthesized the sentences with all key concepts and demonstrated consideration for the intended use of the information. 26 students synthesized the sentences but did not include all key concepts that influence the intended use of the information. 4 students interpreted sentences but did not synthesize all key concepts into one sentence.

Interpretation: The sentences included four key concepts that are necessary to make a clinical decision, as well as some concepts not relative to the scenario. Students displayed difficulty in reporting all key concepts to the charge nurse and eliminating irrelevant information in the sentences. While eliminating irrelevant information is not crucial to patient care (in most cases), but the inclusion of the concepts necessary for making clinical decisions is crucial. Students need more practice interpreting information and applying it to a clinical scenario.

Recommendations:

Summary of Results:

1. Give students more practice turning a clinical scenario into a research question.
2. Emphasize choice of nursing- or medical-specific resources (such as CINAHL and PubMed) rather than general resources (such as Google Scholar).
3. When discussing the research process, remind students of the many subject headings and keywords they should use to perform a thorough search.
4. Teach students to search first, limit later and to never ever click the full-text only button in the limits.
5. Allow students to make a clinical decision based on their appraisal of articles or guidelines.
**Assignment Ideas:**

These are some assignments that allow students time to practice their information literacy skills while completing assignments that also teach evidence-based practice. They can be done with or without a librarian’s help.

1. Combine your appraisal worksheets with a clinical scenario and have students make a clinical decision.
2. Have students trace the diagnosis, etiology, or treatment of a disease over time and put it together in a lit review or presentation. Students can practice searching in information resources other than electronic databases and they can have a clear example of why evidence-based practice is so important.
3. Have students break into groups and have each group study one particular source for evidence-based information (PubMed, CINAHL, NGC, Cochrane, etc.). Then have the students come together and teach each other what they think is important to know about the resource. Give them pointers of what to look for, such as subject headings, search shortcuts, types of limits, kinds of information, audience, etc.
4. Or, give students a list of multiple EBP resources and a worksheet that asks them to look at specific aspects of the resource (such as subject headings, search shortcuts, types of limits, kinds of information, audience, etc.)
5. Give students an older systematic review and have them do some searches to update it.
6. Find two contradictory or differing guidelines on the same topic and have students find the best evidence and debate which guideline is best.
7. Give the students several clinical questions and have them search within different resources for the best evidence. [http://www.dartmouth.edu/%7Ebiomed/resources.html#guides/FindingGoodAnswers.pdf](http://www.dartmouth.edu/%7Ebiomed/resources.html#guides/FindingGoodAnswers.pdf)
8. Have students critically appraise an article (in addition to your worksheets) and write an essay or present it in class.

These are assignments that are useful in nursing, but may not be evidence-based practice specific.

1. Have students pick a specific topic, then have them search for literature, appraise the articles, and then find patient information. This will demonstrate the different kinds of medical information and their uses.
2. Have students work together to write a grant proposal and submit it.
3. Students research a topic and create a professional level poster, then present it to their peers or submit it to a conference.
4. Give students a list of resources and have them compare resources and write reviews. Then have them present one as though they were asking an administrator to purchase the resource.
5. Have students research and list the major journals for a particular area of nursing and teach the class.
6. Given a highly relevant, evidence-based article, have students locate related articles.
7. Have students in various classes put on a conference with posters and papers.
Evidence Gathering Worksheet (For Nursing H365):
Because the survey was administered to the third year Nursing H365 course, this is a targeted worksheet to get students thinking about how they are searching for their proposal information.

Evidence Gathering Worksheet
1. What is the topic of your research proposal?

2. What resource(s) will you use to search for articles?

3. What are some keywords or terms you might use to search for articles on your topic?

4. What subject headings would apply to your topic?

4. What search limiters might be useful in this situation?

5. Provide an example of your search strategy. Do a search in your chosen resource and provide a screenshot of your search history.