Education and training of chiropractic students and graduates: a scoping review

Summary report of findings: Step 3 training

August 15, 2023

Greetings! This is a report of our findings for Step 3 training for our Chiropractic Education Research Scoping review. Overall, our group scores and agreements are improving, which is wonderful news!

The bottom-line is that I feel we are ready to begin the inclusion/exclusion process. However, we will need to do some additional training and fine tuning to be more in alignment using the Topic Tool for the data extraction. This is acceptable because it comes after the inclusion/exclusion process.

Next steps The searches and uploading the citations to Covidence will be done shortly. In the meantime, as the author group, we will

1. Get ready and sign in to Covidence. (instructions in the next week)
2. Do an additional training exercise with the Topic Tool. (instructions in the next week)
3. Have a Happy Hour meeting to touch base with everyone who can make it. (dates emailed shortly)

We are looking forward to getting started on the actual scoping review in Covidence! Thank you all for your participation!
Best wishes, Claire

Here are the results from our Step 3 of the training.

The primary purpose of this training is to make sure everyone is on the same page with inclusion/exclusion and data extraction - and to help everyone feel more comfortable with using the process and tools. The explanations for the answers are on the pages that follow. Since everyone received a copy of their answers by email following the completion of this exercise, you can score yourself and see how you did.

ITEM 1 – timeliness

Participation: Of 35 participants, 32 completed the task on time, 3 completed late. We had 100% participation, which is commendable. Yay!

ITEM 23 – results of title and abstract inclusion exclusion exercise

Results: For the 4 abstracts evaluated for inclusion and exclusion we scored very well as a group. Thirty out of 35 scored perfectly on the task of including and excluding the 4 abstracts based on the criteria.

These are excellent results and shows that the author team is doing a great job on this project.

This also means that most of us are ready to begin the first step - Title/Abstract inclusion and exclusion - in Covidence.

InclExcl Only	TitleAbstract 1	TitleAbstract 2	TitleAbstract 3	TitleAbstract 4
100%	Exclude	Exclude	Exclude	Include
100%	Exclude	Exclude	Exclude	Include
100%	Exclude	Exclude	Exclude	Include
100%	Exclude	Exclude	Exclude	Include
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100%	Exclude	Exclude	Exclude	Include
75%	Exclude	Include	Exclude	Include
75%	Exclude	Exclude	Include	Include
75%	Exclude	Exclude	Exclude	Exclude
75%	Exclude	Include	Exclude	Include
50%	Exclude	Exclude	Include	Exclude

Here are the explanations and the answers. Note that green highlights are keywords that are used in the literature search. Below is how this will look similar to the abstracts being highlighted in Covidence. It is important to note that even though a word is highlighted, it may mean something else, therefore, we need to read the words in the titles and abstracts in context and interpret them correctly.

1. **GLA:D Back group-based patient education integrated with exercises to support self-management of back pain - development, theories and scientific evidence**

https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-018-2334-x

Background: Clinical guidelines recommend that people with back pain be given information and education about their back pain, advice to remain active and at work, and exercises to improve mobility and physical activity. Guidelines, however, rarely describe how this is best delivered. The aim of this paper is to present the development, theories, and underlying evidence for 'GLA:D Back' - a group education and exercise program that translates guideline recommendations into a clinician-delivered program for the promotion of self-management in people with persistent/recurrent back pain. Methods: GLA:D Back, which included a rationale and objectives for the program, theory and evidence for the interventions, and program materials, was developed using an iterative process. The content of patient education and exercise programs tested in randomised trials was extracted and a multidisciplinary team of expert researchers and clinicians prioritised common elements hypothesised to improve back pain beliefs and management skills. The program was tested on eight people with persistent back pain in a university clinic and 152 patients from nine primary care physiotherapy and chiropractic clinics.

This study focused on an education intervention for back pain that could be applied in chiropractic clinics. This abstract would be captured during the literature search. Although it could possibly be taught in chiropractic programs, the study was not about chiropractic education.

ANSWER Exclude

2. **Establishing an Integrative Medicine Program Within an Academic Health Center: Essential Considerations**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5007186/

“Integrative medicine” (IM) refers to the combination of conventional and “complementary” medical services (e.g. chiropractic, acupuncture, massage, mindfulness training). More than half of all medical schools in the United States and Canada have programs in IM and more than 30 academic health centers currently deliver multi-disciplinary IM care. What remains unclear, however, is the ideal delivery model (or models) whereby individuals can responsibly access IM care safely, effectively and reproducibly in a coordinated and cost-effective way. Current models of IM across existing clinical centers vary tremendously in their: 1) Organizational settings, principal clinical focus and services provided; 2) Practitioner team composition and training; 3) Incorporation of research activities and educational programs; and 4) Administrative organization, e.g. reporting structure, use of medical records, scope of clinical practice as well as financial strategies, i.e. specific business plans and models for sustainability. In this Perspective, the authors address these important strategic issues by sharing lessons learned from the design and implementation of an IM facility within an academic teaching hospital, i.e. the Brigham and Women's Hospital at Harvard Medical School; and, review alternative options considered based on information about IM centers across the United States. The authors conclude that there is currently no consensus as to how integrative care models should be optimally organized, implemented, replicated, assessed and funded. The time may be right for prospective research in “best practices” across emerging models of IM care nationally in an effort to standardize, refine and replicate them in preparation for rigorous cost-effectiveness evaluations.

This study describes how integrative medicine was included in an academic teaching hospital. Although we could extrapolate the topic “could” be relevant to chiropractic education, the primary purpose was not directly about chiropractic education.

ANSWER Exclude

3. **The use of nutritional guidance within chiropractic patient management: a survey of 333 chiropractors from the ACORN practice-based research network**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5819231/

Background: The promotion of health and good nutrition through healthy eating requires the active involvement of all health professionals including chiropractors. This paper reports findings from the first nationally representative examination of the use of nutritional guidance within chiropractic patient management in Australia. Methods: A sample of 1000 practising chiropractors was randomly selected from the Australian Chiropractic Research Network (ACORN) practice-based research network database for a cross-sectional study and 33% participated in the online survey in November 2016. The questionnaire, based on previous designs used in similar surveys and nutrition resources developed by the National Health and Medical Research Council, was pretested prior to the survey. Pearson's Chi square and bivariate logistic regression were undertaken to explore relationships with variables of interest. Results: Most chiropractors provided nutritional advice as part of their patient care and around a quarter provided specific dietary advice to their patients, including the use of nutrition supplements. Nutrition-related conditions most commonly encountered by the chiropractors were musculoskeletal, usually inflammatory in origin. Common nutritional assessment methods used included questioning patients to assess their nutritional and health status and physical appearance. Most of the participants provided nutritional resources to their patients in their clinics. Conclusions: Australian chiropractors regularly provide nutritional advice and appear to acknowledge the importance of nutrition in their clinical practice especially for patients presenting with chronic disease. If chiropractors are to fulfil their potential in providing such wider public health and preventative health advice to patients.

This study surveyed about use of nutrition in chiropractic practice. Although we could extrapolate the topic "could" be relevant to chiropractic education, the primary purpose was not directly about chiropractic education.
ANSWER Exclude

4. **Tracing the evolution of chiropractic students' confidence in clinical and patient communication skills during a clinical internship: a multi-methods study**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3403999/

Background: A better understanding of the specific aspects of internships that contribute to increasing or decreasing confidence is needed to best support students during the clinical component of their study. Methods: A multi-method approach, combining two large-scale surveys with 269 students and three in-depth individual interviews with a sub-sample of 29 students, was used to investigate the evolution of change in student confidence during a 10-month long internship. Change in levels of confidence in patient communication and clinical skills was measured and relationship to demographic factors were explored. The interviews elicited students' accounts and reflections on what affected the evolution of their confidence during the internship. Results: At the start of their internship, students were more confident in their patient communication skills than their clinical skills but prior experience was significantly related to confidence in both. Initial confidence in patient communication skills was also related to age and prior qualification but not gender whilst confidence in clinical skills was related to gender but not age or prior qualification. These influences were maintained over time. Overall, students' levels of confidence in patient communication and clinical skills confidence increased significantly over the duration of the internship with evidence that change over time in these two aspects were inter-related. To explore how specific aspects of the internship contributed to changing levels of confidence, two extreme sub-groups of interviewees were identified, those with the least increase and those with the highest increase in professional confidence over time. Conclusion: This study provides insight into the factors perceived by students as affecting the development of professional confidence during internships.

This study surveyed students about their confidence in skills during their internship and looked at how these perceptions changed over time. The focus of study was on chiropractic students and education.
ANSWER Include

Helpful hint: Use the methods and results to determine the focus of the study. Do not extrapolate.

ITEM 4 – results of categorization for data extraction

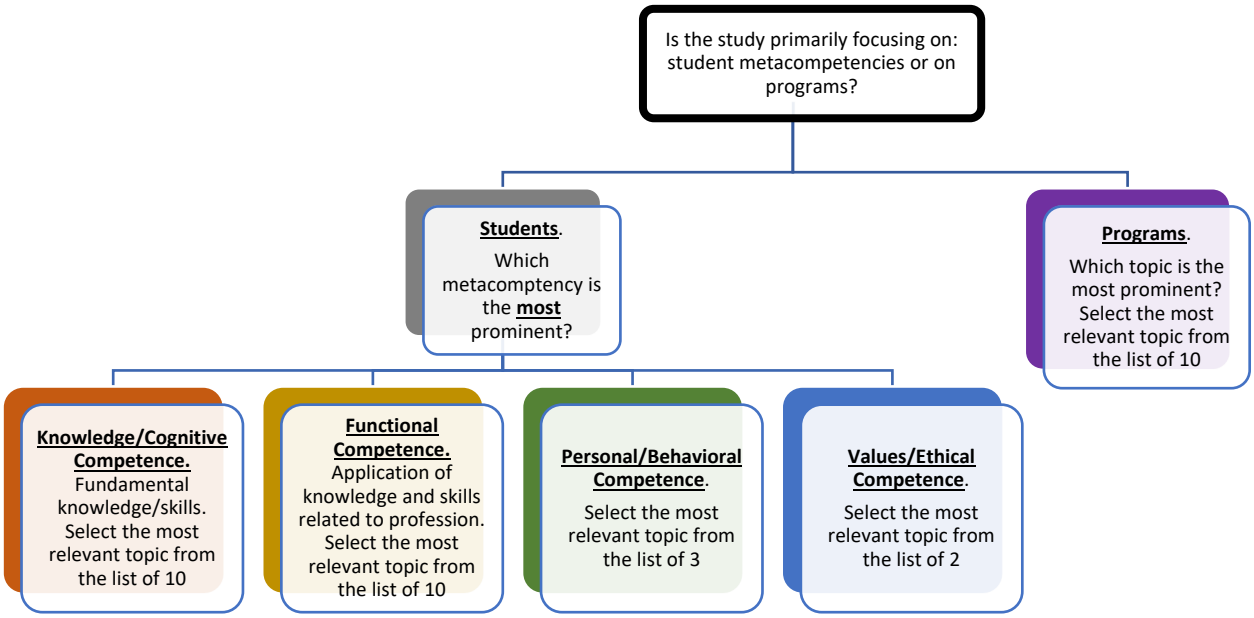
For the categorization of the studies, here is how we scored. It is impressive that everyone scored Paper 4 correctly. Great job, everyone. As a group, we are improving but I would like to see more scoring accuracy above the blue line. We can do this with additional training exercises.

Note: partial credit was given for being in the correct metacompetency group.

Paper 1	Paper 2	Paper 3	Paper 4	Extraction
E7	B9	A7	C2	100%
E7	B9	A7	C2	100%
E5	B9	A7	C2	88%
E7	B2	A7	C2	88%
E7	B2	A7	C2	88%
E7	B1	A7	C2	88%
E7	A5	A7	C2	75%
E7	B9	C2	C2	75%
E4	B9	A5	C2	75%
E7	B9	B1	C2	75%
E7	A5	A7	C2	75%
E7	A5	A7	C2	75%
E7	B2	A10	C2	75%
E7	B1	C2	C2	63%
E7	B2	B3	C2	63%
E7	A9	A4	C2	63%
E7	A5	A4	C2	63%
E7	B1	C3	C2	63%
E7	B2	C2	C2	63%
E9	B9	B3	C2	63%
E7	A5	B2	C2	63%
E7	A5	B3	C2	50%
E7	A5	B3	C2	50%
E7	A5	C2	C2	50%
E7	A5	B8	C2	50%
A2	B9	B1	C2	50%
E7	A5	C2	C2	50%
E7	A5	E7	C2	50%
E7	A5	B8	C2	50%
E7	D2	C2	C2	50%
E7	A5	B1	C2	50%
E7	A5	B1	C2	50%
A2	B1	C2	C2	38%
A2	B2	B8	C2	38%
B2	B2	C2	C2	38%

The following algorithm was created to help us with our decision making.
Categories There are 2 main categories for this scoping review.

- **Student** - is when the study primarily focuses on the metacompetencies of the students or learners, who may be pre or post-graduate. These topics are the 4 meta-competency columns in the Topic Tool: A) knowledge/cognitive, B) functional, C) personal/behavioral, and D) values/ethical.
- **Program** - is when the study primarily focuses on studying or measuring the overall academic program, administration, faculty, infrastructure, or accreditation, or other items related to program accreditation, as in the 5th column of the Topic Tool.



Let's go over the answers to the 4 papers in this exercise.

Paper 1 Anatomical Sciences in Chiropractic Education: A Survey of Chiropractic Programs in Australia.
https://research-repository.uwa.edu.au/en/publications/anatomical-sciences-in-chiropractic-education-a-survey-of-chiropr

This study focused on programs. It was a survey of how anatomy education was delivered across 4 chiropractic programs in Australia. Although the topic of Anatomy "could" relate to the metacompetency "A" of knowledge, the study did not evaluate students' fundamental anatomy knowledge, instead the study evaluated the programs. Therefore, this fits best in the "E" category and "7" under evaluation of curriculum content.

Answer

Category = E7 Program Curriculum

Paper 2 An investigation into chiropractic intern adherence to radiographic guidelines in clinical decisions with a descriptive comparison to clinical practitioners
https://doi.org/10.7899/JCE-21-47

The focus of the study was about students. The study used clinical vignettes to assess if the students would apply evidence-based practice guidelines to clinical cases. The study assessed functional competence since it was about applying knowledge in a clinical scenario. Although category A5 could be close, the study was more about functional competence (application in a work setting) than fundamental knowledge. Therefore, this study best matches the functional metacompetency "B" and "9" under the application of critical thinking, evidence-based practice skills.

Answer

Category = B9 Demonstrate Critical Thinking

Paper 3 A cross-sectional study of Australian chiropractors' and students' readiness to identify and support patients experiencing intimate partner violence
https://doi.org/10.7899/JCE-21-45

This study focused on students. It measured if students felt that they had knowledge and training to recognize and respond to patients who are experiencing intimate partner violence. The primary focus was on knowledge and the study did not appear to be an assessment skill or knowledge demonstration in a clinical setting. Although one would need empathy, compassion, and caring communication in such an encounter with a patient, the study did not measure these. The study did not measure performance in a real or mock setting, thus was not a measure of functional competence. The paper discussed topics that were potentially in multiple categories in the introduction and discussion, however the actual study did not measure those items. This study best matches the knowledge and cognitive competence "A" and "7" patient needs (eg, exposure to violence).

Answer

Category = A7 Knowledge of patient needs

Paper 4 Empathy levels in Australian chiropractic students
https://doi.org/10.7899/JCE-21-16

This study focused on students. This study measured empathy scores of different groups of chiropractic students and compared differences between male and female students. Empathy is a component of behavioral competencies, so "C" category, and "2" which relates to competency in behaviors with patients (empathy).

Answer

Category = C2 Demonstrate Patient/Person Competence

Notes from Claire and Helpful Hints:

Great job everyone! I applaud everyone's efforts. This was a challenging exercise! And, we can be certain that we will continue to be challenged along the way as we look at each paper included in our scoping review. We cannot change the literature that has already been published. However, we can improve how we look at the metacompetencies to identify which is the primary one to categorize the studies. Some thoughts.

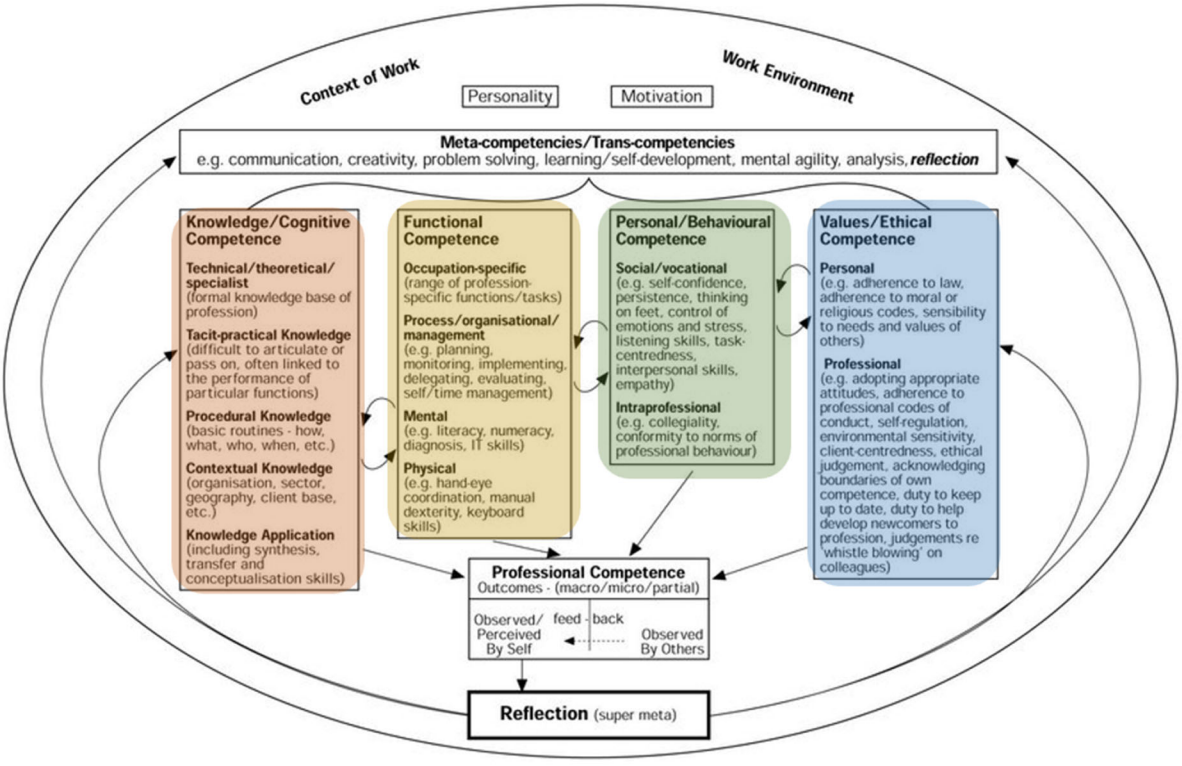
- As a general rule - If the study primarily measures or focuses on studying or reporting student knowledge, skills, or attitudes, then the topic should probably fall within the meta-competency topics A, B, C, or D. If the study focuses primarily on the program and infrastructure (how to improve the curriculum, faculty/staff training, modifying teaching models), the category should be within the E category.
- Avoid trying to "word match" words in the Topic Tool, since each cell only holds examples and is not an exhaustive list. A better approach is to understand the concepts for each of the metacompetencies, then apply the concept when trying to select the best match.
- Based on some of the comments, some of us may be over-thinking the papers or extrapolating too much. For categorization using the Topic Tool, we are asking to select the most relevant item, even if the study touches on several items. Yes, this is challenging, but must be done this way.
- We will have papers that will be challenging to categorize. Some of the difficulty is with the way the papers are written, the authors are not always clear. Another difficulty is when the study is complex and covers several metacompetencies. However, we still need to enter one category. So sometimes we need to step back and squint a little to see what the paper is really about. The decision is not always black and white, we just have to do our best.

To try to help - A brief review of the Topic Tool may help us improve our overall scoring. Our Topic Tool is about metacompetencies and accreditation standards. The tool was built on the Cheetham and Chivers (1996) model of professional competence. Although we are familiar with Bloom's taxonomy which is for classification of learning objectives or other similar tools, those serve different purpose. For the purpose of this scoping review, we need to record the primary metacompetency category for each study relevant to students, and use category E for program studies. Here is a reminder on the origins of the Topic Tool.

- We developed a topic categorization tool (Topic Tool) for this scoping review since none existed. We considered various models and selected the Cheetham and Chivers (1996) model of professional competence because of the need to focus on identifying meta-competencies in chiropractic literature.
- We translated the model to make it relevant to the chiropractic profession and tested the model using the competencies from the following accrediting entities CCE (2021), ECCE (2019), CCEA (2017), FCC (2018) to make sure all could be included when looking at the literature.
- To capture information related to chiropractic education in selected papers that is not about competencies but instead about the chiropractic programs, we added a fifth category, basing the contents on the accrediting entities CCE, ECCE, CCEA, FCC, checking that all could be captured using the Topic Tool.
- Following this, the project leader met with several accreditation and education administration experts to review the contents to make sure nothing was missing.
- Following this, the Topic Tool was tested for ease of use with the scoping review team, and we have confirmed that it is a viable instrument.

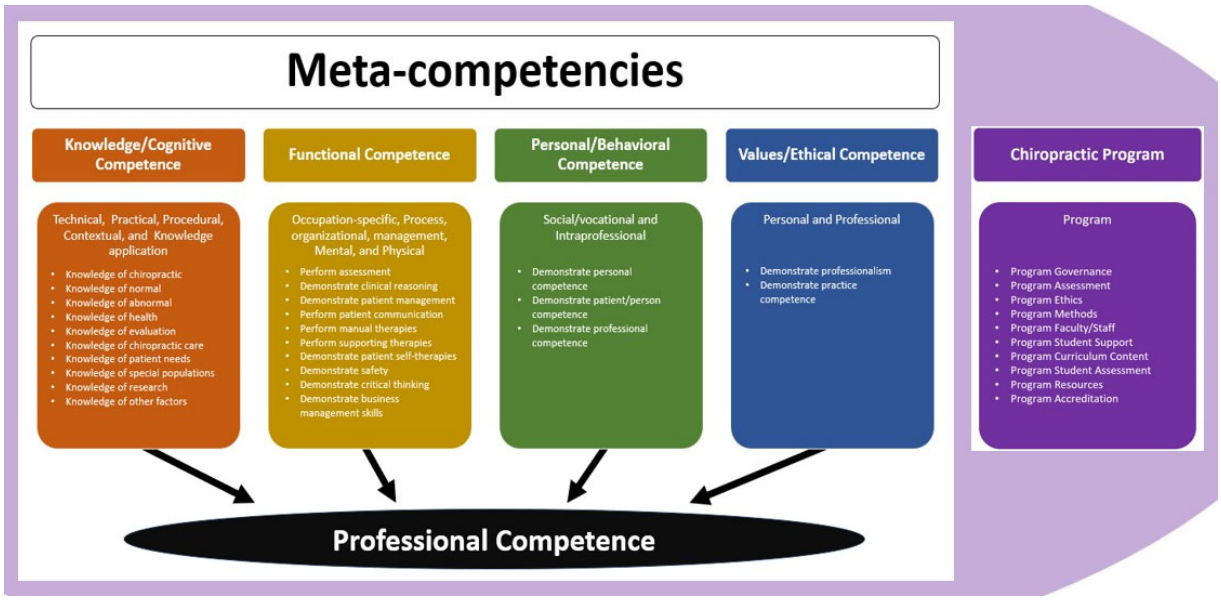
A refresher video has been created and may be found here https://youtu.be/KH978AwgLps

Here is the Cheetham and Chivers (1996) model of professional competence that we used as foundational information to develop the Topic Tool



Cheetham G, Chivers G. Towards a holistic model of professional competence. Journal of European industrial training. 1996 Jul 1;20(5):20-30.

This is the Topic Tool that we developed for chiropractic education and training and will be using for data extraction in Covidence.



Optional comments from participants who completed Step 3. Thank you for your comments. This is all a part of the training for our study. Keep up the good work!

- The papers were a challenge as were the include and exclude exercises. The GLAD paper could be viewed as a postgrad training exercise to influence practice but decided to exclude as it was not specific about educational translation. The papers took much longer than expected and tricky particularly as they contained multiple objectives, crossed a number of categories and the lines between A knowledge, cognitive competence and B functional competence are slightly blurred by the definitions which may need clarification. Cognitive competence is the ability to put this to effective use which could be interpreted as a performance task and functional competence is the ability to perform tasks effectively. So maybe these definitions could be clarified to ensure there is a distinct difference between A and B categories. I think the first round was more of a word search which created errors so a deeper dive this round, which may have been too deep so getting the balance right.
- I know that we are training for the Covidence part of the study but this training really points to a) some very important and novel work being done in chiropractic education research, and 2) how difficult it is to categorize when studies look at questions related to higher levels of Bloom's taxonomy and professional emotional competence. Paper 1 was difficult to categorize within E. It was a descriptive report of 4 programs and the content of the anatomy education in all 4 programs. It therefore did report on methods, resources used, delivery methods, and teaching environments. It was just descriptive, which is why I picked E7. I would have picked E4 if there was something novel presented, or information about the teaching paradigms used, but I did not see that kind of information in the full paper. So, not E4 in my view. For paper 2, it could possibly be B4 or B9. However, the majority of the content of the paper focused on interns' application of knowledge in the area of evidence-based decision-making and clinical practice. So, I went with B7. Paper 4 was difficult to categorize. The students completed the empathy questionnaire, which identifies their personal levels of empathy (category C). However, it does not neatly fit the definition of category C "the ability to adopt appropriate, observable behaviors in work-related situations." The students did not adopt any behaviors in a work-related situation. But it seems that C2 is the best choice, as it does not demonstrate their application of empathy (category B) or their knowledge of it (category A). So I picked C2.
- I fully expect to be in detention and busted back down to 1st year! Training exercises are crucial and these are well designed to help us.....
- In the study related to IPV, it was hard to determine whether the focus was on knowledge or readiness to DO IPV screening... In sum, there was more inquiry related to knowledge than readiness to manage, but I felt classifying it based on being able (knowledge) and ready (readiness) to conduct a quality interview was a better fit than choosing between the two areas of inquiry.
- Paper #3 on IPV demonstrates how the topic tool can be too simplistic. Miller's pyramid of clinical competence includes knowledge, application of knowledge, clinical skills competency, and clinical performance. The researchers found deficits in all sections, thus spanning the Topic Tool's A and B sections. Because the researchers used language of "definite" relating to knows, and "perhaps" or "may not" relating to knows how, shows how and do, I leaned towards Topic A, but I don't think there is a "right answer".
- I spent more than the 60 minutes of uninterrupted time on this one! This exercise had me researching the sub-elements of the topic tool in much greater detail. For instance, in IPV, IPV is a public health topic, and knowledge of it (which was mentioned numerous times in the methods) was the reason I selected A4 In "A Survey of Chiropractic Programs in Australia.", multiple minor topics of Section E were discussed (faculty expertise, resources, use of cadavers), however I selected Program curriculum content as the study focused on the delivery of anatomy curriculum I found the title of, "An investigation into chiropractic intern adherence to radiographic guidelines in clinical decisions with a descriptive comparison to clinical practitioners" as a bit misleading (to me) as the methods focused on the knowledge of the guidelines primarily as the driver of the need to follow up with radiographs. This is why I selected A as the major topic.
- Changed survey responses on an item. In retrospect can't help but think that I may be overthinking my initial response. In general the articles were more challenging to rate.
- Paper 3, I was conflicted between B1 and B4. The paper is assessing what the student knows about IPV, so I picked 1 as they need to be knowledgeable about IPV to perform an assessment.

- The lessons learnt from the previous training made this preparation much easier. Paper 3 was a little tricky, but the guidance and tips from the second training provided some direction and clarity. Thank you for doing this activity before the review :)
- Thank you for your thoughtful preparation and execution of this training program. This was a colossal effort and a sacrifice of much time to produce these materials with soundness and rigor. It is a privilege to participate in this study. Now: to work!
- There are some challenging decisions where there is argument for a paper to straddle two areas. Feedback given so far seems to suggest we should sit in the camp where it most easily fits. Example is on prep 2 with the second paper that is addressing curriculum (E7) but more so (in my opinion) assessing the adequacy and quality of assessment within a curriculum (E2). E7 being the answer this process was looking for there. Which is more of the general place it sits, opposed to the specific place. . . These queries therefore make this process a challenge where some overlap could occur. I am definitely doing my best though - thank you!
- I find Paper 3 quite challenging as it encompasses several components related to Student Functional Competence.
- For #12 and #13, I debated between A7, A10, B8 & C2. Ultimately, I chose A7 because it was more specific than A10 and the survey seemed to primarily assess knowledge competence vs functional or behavioral competence.
- I found paper 2 hard to categorise as I feel it could have gone in a few from A to D. Either knowledge of other or evaluation. I am struggling slightly with knowing which one belongs where, but I do think with practice this will improve!