Implementing a Student Confidence Index (CI) Rating in a Basic Science Course

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ABSTRACT

Objectives:
The purpose of this abstract is to:
- Describe a process by which student perceptions of their own learning can be incorporated into an undergraduate basic science course evaluation.
- Share initial results from this form of course evaluation.

Challenge Addressed:
Traditional course evaluations focus on using student perceptions of teaching to evaluate a course. Although this provides useful feedback to the participating faculty, it fails to address student perception of their own learning. As student confidence can correlate to student performance (Shoemaker, 2010) and a core competency required of graduating Osteopathic Physicians is to recognize the limits of their personal medical knowledge (AACOM Core Competency Report, 2012), knowing how the students perceive their learning may provide valuable feedback about the course. In 2016, Papa and Alexander presented a description of a confidence interval that allowed the students to describe their confidence in their ability to diagnose, treat, manage, and explain specific diseases within the second-year courses they were participating in. Although this paradigm worked well for the second year students, it was less useful for the first year students who were learning the basic sciences related to normal function and was not implemented in those classes. The purpose of this project was to create and implement a similar confidence-index (CI) based evaluation for a basic science (MS1) course.

Methods
Bloom's taxonomy (updated) was used to identify the "tasks" that the students were to consider as they assessed their confidence. It was important that the students be asked to consider confidence at more complex tasks as well as simple knowledge based tasks. Therefore, it was decided to ask the students their confidence in defining/locating specific terms (knowledge level); their ability to explain certain concepts to their classmates (comprehension level); and their ability to diagram/create a flow chart illustrating the body's responses to certain events (application level).
To identify what specific terms/concepts/responses would appear on the evaluation, two faculty focus groups were convened. The first one consisted of faculty who taught in the cardiopulmonary section, while the second one consisted of clinical faculty who taught in the two companion clinical courses delivered in the second year (cardiovascular and respiratory medicine, respectively). Each focus group was asked to consider what it was essential that a student completing Cardiopulmonary 1 know. This generated a very long list of terms that were narrowed down by asking to the same faculty to rank these items based on their importance. The top-ranked terms were then ranked by the faculty's perceived difficulty. The course director (DRK) then selected a list of terms that represented the full range of essential/difficulty.

In its final form, the evaluation includes:
- Five items in which the students are asked how confident they are in their ability to define or locate (e.g. the foramen ovale).
- Five items in which the students are asked how confident they are in their ability to explain to a colleague (e.g. a diastolic murmur)
- Three items in which the students are asked how confident they are in their ability to create a flow chart of the response (e.g. how congestive heart failure affects the lungs).

To help the students understand this form of evaluation, individual lecturers (including the author) created similar evaluations for individual lectures and used i-Clickers to assess student understanding before and after the lecture.

The formal evaluation was delivered at the end of the cardiopulmonary section (November, 2016). The identified competencies were integrated into the anonymous post-course online evaluation

Lessons Learned:
- The input of the second year faculty enabled us to evaluate the content of the Cardiopulmonary 1 course and verify that what they needed the students to understand on day 1 of the respective clinical medicine courses was, in fact, covered adequately in the cardiopulmonary course. Although all content required was covered, we did recognize the need to change the emphasis in some content.
- Both faculty focus groups generated extensive lists of terms that they considered absolutely essential for student understanding (far more than could be included in any course evaluation). Rankings of importance and difficulty were of considerable utility in reducing the list to a workable and rational evaluation.
- The students had little or no difficulty understanding the concept when the confidence interval was introduced as an evaluation of a lecture. This became a useful tool for faculty to identify material that could be pruned from a lecture due to prior teaching/learning.

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The purpose of this abstract is to:
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- Share initial results from this form of course evaluation.

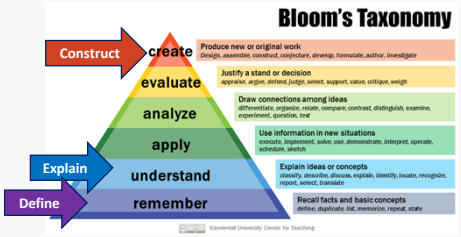
Background

Traditional course evaluations focus on using student perceptions of teaching to evaluate a course. Although this provides useful feedback to the participating faculty, it fails to address student perception of their own learning. As student confidence can correlate to student performance (Shoemaker, 2010) and a core competency required of graduating Osteopathic Physicians is to recognize the limits of their personal medical knowledge (AACOM Core Competency Report, 2012), knowing how the students perceive their learning may provide valuable feedback about the course. In 2016, Papa and Alexander presented a description of a confidence interval that allowed the students to describe their confidence in their ability to diagnose, treat, manage, and explain specific diseases within the second-year courses they were participating in. Although this paradigm worked well for the second year students, it was less useful for the first year students who were learning the basic sciences related to normal function and was not implemented in those classes. The purpose of this project was to create and implement a similar confidence-index (CI) based evaluation for a basic science (OMS1) course.

STEP 1: IDENTIFY APPROPRIATE COMPETENCIES (TASKS)

PROBLEM: Papa and Alexander (2016) asked the students to rate their confidence in their ability to **diagnose, treat, manage, and explain** different patient presentations. These competencies are not appropriate to the OMS1 curriculum at KCU.

SOLUTION: The course director (DRK) identified appropriate competencies for an OMS1 student based on the revised version of Bloom's Taxonomy.



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STEP 2: IDENTIFY APPROPRIATE CONCEPTS/ KNOWLEDGE TO ASSESS STUDENT CONFIDENCE

PROBLEM: Papa and Alexander (2016) asked the students to identify their confidence in their ability to diagnose, treat, manage, and explain **different patient presentations (e.g. heart failure, shock, syncope).** These competencies are not appropriate to the OMS1 curriculum at KCU.

SOLUTION: Two faculty focus groups were created to identify the specific tasks the OMS1 students would be asked to rate their confidence in.
- Focus Group 1: Faculty who teach in the Principles of Clinical Medicine (OMS 1 & 2 curriculum), Cardiovascular Medicine (OMS2), or the Pulmonary Medicine course (OMS2).
- Focus Group 2: Faculty who teach in the Cardiopulmonary 1 course within the OMS1 curriculum.

Each Faculty Focus group worked separately at this stage of the process to develop a list of terms/tasks.

OUTCOME:
- Task: Rate your confidence in your ability to define or locate the following: **52 terms were identified**.
- Task: Rate your ability to explain…: **33 concepts were identified.**
- Task: Create a flow chart: **37 processes were identified.**

Faculty Challenge: Pare down the submitted items to a manageable evaluation. To accomplish this, all faculty involved were asked to identify the EIGHT most important concepts/facts from each list using an electronic survey (www.surveymonkey.com)

OUTCOME:
- Task: Rate your confidence in your ability to define or locate the following: **10 terms were selected for further consideration**.
- Task: Rate your ability to explain…: **10 concepts were selected for further consideration.**
- Task: Create a flow chart: **5 processes were selected for further consideration.**

Faculty Challenge: Further refine the evaluation by asking the faculty to rank the selected terms from easiest (1) to hardest (10) using an electronic survey (www.surveymonkey.com)

OUTCOME:
Based on the data from the two surveys, the course director (DRK) selected:
- **5 items:** Rate your confidence in your ability to define or locate the following.
- **5 items:** Rate your ability to explain.
- **3 Items:** Create a flow chart

In addition, a 3-tiered Likert scale was developed
- I am 100% certain I could _____ correctly.
- I am not sure I could _____ correctly.
- I know I cannot _____ correctly.

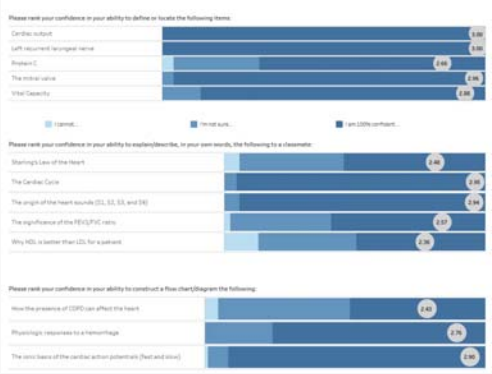
Results

The Student Confidence Index as Delivered

Please rank your confidence in your ability to define or locate the following items:			
	I am 100% confident I can define/locate it	I'm not sure I can define/locate it	I cannot define/ locate it
The mitral valve			
Vital Capacity			
Cardiac output			
Left recurrent laryngeal nerve			
Protein C			
Please rank your confidence in your ability to explain/describe, in your own words, the following to a classmate:			
	I am 100% confident I can explain it correctly	I'm not sure I can explain it correctly	I cannot explain it to a classmate.
Starling's Law of the Heart			
The significance of the FEV$_1$/FVC ratio			
Why HDL is better than LDL for a patient			
The Cardiac Cycle			
The origin of the heart sounds (S1, S2, S3, and S4)			
Please rank your confidence in your ability to construct a flow chart/diagram the following:			
	I am 100% confident I can diagram it correctly	I'm not sure I can diagram it correctly	I cannot diagram it correctly.
The ionic basis of the cardiac action potentials (fast and slow)			
Physiologic responses to a hemorrhage			
How the presence of COPD can affect the heart.			

The evaluation was inserted into the standard end-of-course evaluation as an addition to the normal course evaluation.

84 of 277 (30%) students completed the course evaluation, including the Student Confidence Index. As these evaluations are not required, this is a typical response rate.



Conclusions

- **Identifying the competencies the students were to be asked about was the most difficult aspect of creating the Student Confidence Index Evaluation form.** *Involvement of the faculty created substantial "buy-in" but faculty were often reluctant to "let go" of a favored competency. The large number of important competencies identified allows for the creation of a "rolling evaluation" to verify that what is currently well understood by the students remains that way.*
- **The evaluation allowed us to identify several competencies that the students do not feel confident in.** *In response to concerns about the understanding of HDL vs. LDL as well as protein C, we will be creating a module driven by a case of coronary artery disease to integrate those topics and explicitly address student uncertainty about why these topics were addressed in the Cardiopulmonary course.*
- **Future directions include formal validation of the measure using comparisons to test performance.** *As our current evaluation is anonymous, it was only possible to draw rough conclusions about how this measure of confidence differs from student examination performance. Preliminary data analysis suggests that examination performance is positively correlated to student confidence, but only accounts for ~40% of the factors predicting student confidence.*

References

Papa, F. and J. Alexander. The Confidence Index (CI): A Curricular Continuous Quality Improvement Tool. Presented at the 2016 Annual meeting of the American Association of Colleges of Osteopathic Medicine. Washington, D.C. (http://www.aacom.org/docs/default-source/2016-Annual-Conference/confidence-index.pdf).

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