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## Research Paper

## Development of valid and reliable tools for student evaluation of teaching

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## ARTICLE INFO

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## ABSTRACT

**Introduction:** The objective of this project was to develop valid and reliable course and instructor student evaluation tools (SETs) of teaching for utilization by a college of pharmacy.

**Methods:** A collection of 119 course and instructor evaluation items was compiled from a review of the primary literature and grouped into six different themes (subscales): organization, communication, motivation, rapport, fairness, and learning. Input was sought from the college of pharmacy faculty to reduce the list of items to a more manageable pilot tool (27 for course evaluations; 29 for instructor evaluations) for developing pilot SETs. The results were analyzed for internal consistency and reliability using Cronbach's alpha, and whether factor structures aligned with the content structure using Confirmatory Factor Analysis (CFA).

**Results:** The Cronbach's alpha for all six subscales in the designed instructor evaluation and for three of the six subscales in the designed course evaluation were above 0.9, indicating high internal consistency and reliability. The CFA results indicated a moderate model fit with factor loadings for all items above 0.6. The correlation coefficients between each dimension were about 0.8, indicating high correlations among dimensions. Those data items found to be valid were then used to construct new course and instructor evaluation instruments, both consisting of three validated items in each of the six themes (subscales).

**Conclusion:** This report describes the process that one college of pharmacy employed to develop a valid and reliable SET. The methodology can inform other colleges and schools of pharmacy who wish to design, revise, or develop their own SETs.

## Introduction

Student evaluations of teaching can be a controversial topic within higher education, primarily due to their use in faculty review and promotion decisions. Many student advocates and higher education administrators consider student evaluation tools (SETs) valid, worthwhile, and reliable measurements of teaching efficacy.<sup>1–5</sup> In contrast, many scholars point to evidence of gender bias, subsequent grade manipulation, and teacher effectiveness being negatively correlated with students' evaluations.<sup>6–11</sup> There are questions as to what constructs students are adequately prepared to evaluate regarding teaching. Specific to pharmacy education,

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Kidd et al.<sup>12</sup> found a correlation between SET results and student's grades. This is especially concerning due to the potential for grade inflation within pharmacy education.<sup>12</sup> Accordingly, a comprehensive and unbiased review of the literature regarding the merits and flaws of SETs may not be a productive endeavor, and will likely not provide the methods by which to develop validated SETs.

The 2008–2009 American Association of Colleges of Pharmacy (AACP) Council of Faculties identified the need for greater emphasis on and recognition of teaching excellence.<sup>13</sup> The Council recognized that there is a role for SETs in identifying teaching excellence; however, the Council also provided the caveat that SETs should not be the only metric by which teaching excellence is defined.

In 2009, Barnett and Matthews<sup>14</sup> provided the most recent landscape update regarding the use of SETs in pharmacy education. Based on a survey of 89 colleges and schools of pharmacy, 100% were found to have a student evaluation process of classroom teaching.<sup>14</sup> Almost half (46%, n = 41) of these respondents reported that the instruments utilized for student evaluation of classroom teaching were developed by the individual institutions. However, a review of the pharmacy education literature did not yield any information regarding design and/or validation processes used in developing these homegrown SETs.

At the 2014 Annual Meeting of the AACP, members of the Assessment Special Interest Group's (SIG's) Evaluation of Teaching Committee<sup>15</sup> presented the results of their work on creating an "ideal list" of SET items. The Committee, which consisted of seven members from as many different US schools of pharmacy, compiled the SET item lists from their own institutions, removing duplicates and revising some items for clarity. The end product of their work was the development of a master list of 134 SET items. The list was pared down to 26 items through an initial perception survey of 307 faculty, followed by analysis and discussion of the survey results by the Committee.<sup>15</sup> The Committee's approach to the task resulted in a finely-tuned set of evaluation items; however, it was unclear if those items were ever assessed for validity and/or reliability.

Considering the impact that the results of SETs may have on faculty (promotion, tenure, and merit pay decisions) and the reality that many SETs are designed in-house, the authors sought to develop practical methods by which SETs could be designed and validated at a college or school level. These metrics are designed to provide validity evidence for the assessment measures. The objective of this manuscript is to describe the process by which a college of pharmacy identified evaluative metrics, designed pilot SETs, validated their internal reliability, conducted a confirmatory factor analysis, and created valid and reliable SETs for use at the College.

## Methods

The following will help define and clarify some basic terminology that is used throughout this manuscript. Overall, there were two constructs that need to be evaluated, the instructor, and the course. These are considered indirect constructs as they cannot be directly measured in one way like measuring the length of a board, or the weight of a cow. We sought to measure these constructs by creating our own set of SETs, otherwise referred to as the creation of a scale. Tables 1 and 2 in their entirety are each a scale; moreover, they are meant to evaluate their respective eponymous constructs, instructors, and courses. A scale can be made up of subscales which are constituent parts of the overall scale, each header in Tables 1 and 2 are subscales. The subscales used in this project were aligned with the quality teaching themes discussed further in the methods section. Last, an item is the individual question being asked within each subscale.

**Table 1**  
Instructor evaluation tool.

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Organization:
The instructor presented content in an organized manner.
The instructor was prepared for each instructional activity.
The instructor appeared well prepared for class.
Communication:
The instructor clearly defined and explained the course expectations.
The instructor explains ideas and theories clearly.
The instructor made it clear how each topic fit into the course.
Motivation/Enthusiasm
The instructor found ways to help students answer their own questions.
The instructor facilitated participation to enhance critical thinking and communication skills.
The instructor stimulated student interest in the course material.
Rapport
The instructor created an environment in which students felt comfortable asking questions and expressing their views.
The instructor was responsive to students' questions.
The instructor engaged the class in productive discussions.
Fairness
The instructor dealt fairly and impartially with all learners.
The instructor evaluated student work in fair and appropriate ways.
The instructor treated students with respect.
Learning
The instructor increased my understanding of course material.
The instructor was effective in facilitating learning of the course material.
The instructor provided guidance for understanding course exercises.

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Rated on a 1–5 Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree.

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