

## Comparison of Pharmacy Learner Self-Reflection and Preceptor Evaluations Using a Single-Point Rubric during Experiential Rotations

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### Abstract

**Background:** Development of successful, practice-ready pharmacists includes ensuring learners are self-aware and able to reflect on knowledge, skills, and abilities. Though evidence indicates reflective practices are important in pharmacy education, there is a general lack of structure for implementation of reflective practices. The primary objective of this study was to compare learner self-evaluations to preceptor and pharmacy resident evaluations for scored learning activities completed on experiential rotations to assess consistency of student self-reflections. **Methods:** This study compared learner self-evaluations to preceptor and pharmacy resident evaluations using a single-point rubric for three types of assignments completed during experiential rotations at a community teaching hospital. These assignments included clinical presentations, patient counseling, and written drug information responses. Data were collected via retrospective review of completed, de-identified evaluations. The primary endpoint was differences in overall scores between students and evaluators, analyzed via paired T-test. **Findings:** A total of 68 learner evaluations were reviewed, with a majority (89.7%) completed by students on Advanced Pharmacy Practice Experiences. Overall, no significant differences emerged between student and preceptor evaluator scores, indicating that students were able to consistently self-reflect. **Conclusion:** Pharmacy students on experiential rotations demonstrated consistency in self-scoring and evaluation with preceptors on assignments related to presentations, drug information responses, and patient counseling when using single-point rubrics to self-evaluate.

**Keywords:** Assessment, Experiential Education, Rubric, Reflection

### DESCRIPTION OF THE PROBLEM

Development of successful, practice-ready pharmacists includes ensuring learners are self-aware and able to reflect on personal knowledge, skills, and abilities as stated in Standard 4 of the Accreditation Council for Pharmacy Education (ACPE) 2016 Standards.<sup>1</sup> After completion of experiential learning activities, self-reflection can be utilized to encourage deep learning.<sup>2</sup> Deep learning is a process through which material taught in the didactic portion of education is connected to clinical practice through reflection. This type of reflective learning encourages learners to develop critical thinking skills, expand problem solving skills, and promotes self-directed learning.<sup>3,4</sup> In addition to solidifying conceptual knowledge, development of reflection skills permits learners to gain experience taking on new perspectives and challenging viewpoints.<sup>4,5</sup>

Metacognition is an important part of deep learning, with these being mutually reinforcing processes. Where deep learning involves the transformation of surface-level understanding into robust comprehension, metacognition is the awareness of one's thinking and understanding.<sup>6</sup> Students with strong metacognitive skills are able to learn and perform at a higher level due to their ability to identify areas for improvement and select appropriate strategies to facilitate learning and growth.<sup>6</sup>

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Furthermore, metacognition allows learners to adapt learning to new concepts and tasks.<sup>7,8</sup>

Prior literature has found that pharmacy students lack metacognitive skills and are prone to inaccurately evaluating self-performance. Isaacs et al highlighted the importance of self-reflection in improving metacognition, finding that quantity of self-reflections completed was a factor associated with overall changes in metacognition while completing Advanced Pharmacy Practice Experiences (APPE).<sup>9</sup> Studies by Steuber et al and Nisly et al found that students consistently overestimate their performance when compared to faculty or preceptor evaluations.<sup>10,11</sup> However, Nisly et al observed that differences in scores decreased over time, indicating possible improvement in metacognition with repetition.<sup>11</sup>

Similarly, Wagner et al noted differences in faculty and student assignment scores, but indicated that student self-reflection on areas of strength and weakness was consistent with faculty.<sup>12</sup> Current evidence demonstrates that students with higher levels of reflective practice have stronger metacognitive skills, achieve deep learning, and are able to perform better.<sup>6-11</sup> Though evidence indicates reflective practices are important in pharmacy education, there is a lack of structure for implementation of reflective practices in the experiential setting.<sup>2-5</sup> The purpose of this study was to compare student self-evaluations to preceptor and resident preceptor evaluations utilizing single-point rubrics for scored activities on Introductory Pharmacy Practice Experiences (IPPE) and APPEs to encourage self-reflection while attempting to better align preceptor and student evaluations of performance.

## STATEMENT OF INNOVATION

Activities completed by learners on experiential rotations are utilized to evaluate student learning while encouraging application of clinical knowledge. Various types of rubrics may be utilized to assess learner assignments and performance. Previously, analytic rubrics were used at our institution. Analytic rubrics are arranged in grid format with criteria for performance listed along one axis and categories evaluated listed along the other. Specific criteria within each category are then used to complete the evaluation.<sup>13</sup> Faculty preceptors noted that analytic rubrics allowed for clear scoring, but did not promote individualized feedback or encourage student self-reflection. Beginning in May 2020, faculty preceptors at Cape Fear Valley Medical Center (CFVMC) began using single-point rubrics to evaluate student activities (available upon request). The use of a single-point rubric allows for evaluators to provide specific, actionable, and individualized feedback to students while encouraging self-reflection.<sup>14-15</sup> The single-point rubric is organized into three columns. The middle column contains criteria associated with proficient completion of the learning activity, while the left and right columns contain space for reflecting on areas for improvement and areas of excellence, respectively.

In addition to detailing specific criteria associated with proficient completion, the middle column also informs on the number of criteria required to be present for successful completion within a given category on the rubric (e.g. for students completing clinical pearls the category focusing on the use of primary literature requires that three of the following be included: utilizes at least 1 source of primary literature; if guidelines are available for chosen topic these are incorporated; provides an accurate overview of primary literature including critical assessment; relates the information provided to the care of internal medicine patients; appropriate citations are included for all primary literature and guidelines within the presentation).

Categories evaluated by the single-point rubrics for each assignment included organization, knowledge of topic, writing or presentation skills, critical assessment of literature, and ability to appropriately answer questions. These single-point rubrics were piloted with resident and faculty preceptor evaluations of student performance from May 2020 to January 2022. It was anecdotally found that resident and faculty preceptor scores were more consistent. With the single-point rubric meeting the need for uniform formative and summative feedback, and limited data on the use of these rubrics in pharmacy education, it was decided to utilize these rubrics for all rotation assignments including student self-evaluations with the goal of supporting student metacognition.

### Design

CFVMC is a teaching hospital located in Fayetteville, North Carolina that facilitates IPPE and APPE rotations for students

from multiple schools of pharmacy. Due to the variable nature of these experiences, IPPE and Internal Medicine (IM) APPE rotations were included in this analysis. Throughout rotations, students completed patient counseling, clinical presentations, and drug information responses. All students participated in patient counseling. During required two-month IM APPEs, students completed a clinical pearl and drug information response within the first six months of the APPE year, followed by a journal club and patient case presentation latter portion the year.

Following completion of activities, students and preceptors completed evaluations using assignment-specific single-point rubrics. After rubrics were completed time was set aside by the preceptor to review and provide feedback on performance to each student. These rubrics were provided at the beginning of rotations to encourage student familiarity and set clear expectations. Evaluations were also completed by pharmacy residents if they were on the rotation with students.

### Data Collection/Analysis

IPPE and APPE students completing rotations at CFVMC between January 2022 through March 2023 completed self-evaluations using single-point rubrics prior to receiving feedback from preceptors. Data were collected via retrospective review of completed, de-identified evaluations. This project received approval from the CFVMC IRB (#1139-22). Total evaluation scores and commentary completed by students, resident preceptors, and faculty preceptors during the study period were collected, along with type of rotation (IPPE vs IM APPE). The primary objective was to compare student self-evaluation scores to faculty preceptor scores for written assignments, clinical presentations, and patient counseling.

Resident evaluator scores were also compared to faculty preceptor scores and student self-evaluations. Secondary objectives included comparing evaluator scores for the individual assignments by type and characterizing written feedback from both students and preceptors via qualitative analyses. Due to the anticipated small number of IPPE students relative to APPE students no analysis was planned between IPPE and APPE self-assessment scores. Primary and secondary endpoints were analyzed via paired T-test using JMP 15 (SAS; Cary, NC). Comments and feedback documented by preceptors and students on evaluations were collected utilizing a paper-based process. Data were reviewed to identify potential themes and label comments provided. Comments were then reviewed by a single reviewer to identify keywords that were then labeled as themes specifically related to areas for improvement.

### Findings

From January 2022 through March 2023, CFVMC had 68 pharmacy students on campus for a total of 122 student months. A total of 68 learner evaluations were reviewed for all

assignments completed by IPPE or IM APPE students, with 68 corresponding evaluations completed by preceptors. The majority (89.7%) of evaluations were completed by students on APPE rotations. The clinical presentations category included 16 learner evaluations for journal club presentations, 16 learner evaluations for clinical pearl presentations, and 11 learner evaluations for patient case presentations. A total of 10 learner evaluations were completed for drug information responses within the written assignments category. Lastly, 15 learner evaluations were completed for patient counseling, with seven evaluations completed by IPPE students. A total of 47 resident evaluations were also reviewed for assignments completed by students on APPE learning experiences when residents were present.

There was no statistically significant difference in mean evaluation scores for all assignments when comparing student versus preceptor evaluations, with mean student scores at  $83.4\% \pm 6.9$  and preceptor scores at  $82.1\% \pm 8.9$  (95% CI -0.41 to 1.08,  $p=0.372$ ). Student self-evaluations did not differ significantly from preceptor evaluations when comparing individual assignment type, with mean differences in scoring between 1.4-2.4% (Table 1). Notably, a statistically significant difference emerged in mean scores when comparing student versus preceptor evaluations for clinical pearl presentations ( $84.2\% \pm 1.6$  vs.  $75.8\% \pm 1.7$ , 95% CI 0.65 to 3.78,  $p=0.0092$ ). Student scores were also similar to resident scores across all assignments ( $83.4\% \pm 6.9$  vs.  $85.1\% \pm 9.4$ , 95% CI -1.77 to 0.47,  $p=0.081$ ). There was a statistically significant difference in evaluation scores for all assignments (95% CI 0.59 to 1.97,  $p=0.0005$ ) and clinical presentations (95% CI 2.1 to 6.81,  $p=0.0004$ ) when resident and preceptor scores were compared.

Evaluation of feedback revealed that areas for improvement identified by students overlapped considerably with those identified by preceptors (Figure 1). Student self-evaluations for written assignments and presentations focused on formatting and delivery, while preceptor feedback focused on critical assessment of literature and application to practice. For patient counseling, students focused on delivery of counseling and clinical confidence, while preceptors focused on clinical reasoning and selection of appropriate counseling techniques.

### CRITICAL ANALYSIS

There were no statistically significant differences between student and preceptor evaluations across all assignments. This remained consistent when evaluations were compared by assignment type. However, when individual assignments within the clinical presentations category were evaluated, a significant difference in clinical pearl scoring between preceptors and students was identified. This difference may be attributed to completion of this assignment within the first six months of the APPE year when students have limited experience with self-evaluation and are completing their first IM APPE. These results indicate that students were able to self-evaluate performance

in a manner consistent with preceptors for specified learning activities utilizing single-point rubrics, in contrast to findings reported by Nisly et al and Steuber et al.<sup>10,11</sup> This difference may be explained by the style of rubric utilized. In the current study, single-point rubrics were utilized to promote individualized self-reflection and feedback, as compared to selection of a performance category on an analytic rubric. The findings of this study are similar to those of Wagner et al and Isaacs et al based on the preceptor and student comment themes identifying similarities in areas for improvement (Figure 1) and student ability to self-evaluate improving over time.<sup>9,12</sup>

Alignment of expectations, consistent feedback provided to learners throughout learning experiences, and use of a standardized template (ie, single point rubric) to better anchor student self-evaluations may also explain similarities in scoring. Furthermore, these assignments were completed as part of pass/fail rotations, which may have prompted students to be more objective in their self-assessment. Notably, the mean difference between student self-evaluations and preceptor, or resident scores, was less than 3% on all assignment types. Although statistically significant differences were present between resident and preceptor evaluations overall and for clinical presentations, these differences were not academically meaningful as score ranges remained within 10%. It should be noted that two faculty preceptors provided 95.6% of the evaluations, while eight residents completed evaluations, and over 40 individual students completed self-evaluations.

Student and preceptor comments indicated that the use of single-point rubrics for student self-evaluation promoted metacognition. While preceptors often focused on higher level feedback centered around assessment and application, and students focused on a lower level of learning, significant overlap in themes was present. It is worth noting that as a result of students providing fewer comments, there may be an underestimation of learner ability to accurately provide formative self-reflection.

Strengths of this study include the use of a single-point rubric that was piloted prior to implementation of this project and student familiarity with the rubrics utilized due to availability prior to assignment completion. Additionally, consistent faculty evaluators allowed for rubric norming. Several limitations also exist for this study. The small sample size may have limited ability to accurately detect a difference in self-evaluation skills, especially for written and counseling related assignments. Similarly, due to the limited number of IPPE students, evaluation of differences between IPPE and APPE self-assessment scores was not possible. Lastly, no data were collected pertaining to student perceptions of individual evaluation skills and how students may have perceived the development of self-reflective skills.

**NEXT STEPS**

This study showed that students' ability to self-evaluate was similar to both faculty and resident preceptors on a variety of assignments when using single-point rubrics. It also demonstrated the utility of single-point rubrics in promoting the development of metacognition. These rubrics have been distributed to all preceptors at the practice site, along with faculty preceptors at our College of Pharmacy for multi-institution implementation. Implementation of the single-point rubric for evaluation of IPPE and APPE students at other institutions will allow for a multi-center evaluation of their utility and potential evaluation of inter-rater reliability. Moreover, feedback and themes from the thematic analysis have allowed for further refinement of the single point rubrics to promote additional clarity and self-reflection (e.g. adjusting "application to clinical practice" to serve as its own criteria under use of primary literature sections on rubrics). Additional next steps may include incorporating an incentive to encourage student self-reflection and conducting a confidence-based assessment of learner self-evaluation as internal motivation may be a factor influencing how seriously students take participation in self-reflection that was not accounted for in this project.

**Conflicts of Interest:** None

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**Disclaimer:** The statements, opinions, and data contained in all publications are those of the authors.

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Table 1. Mean Evaluation Scores

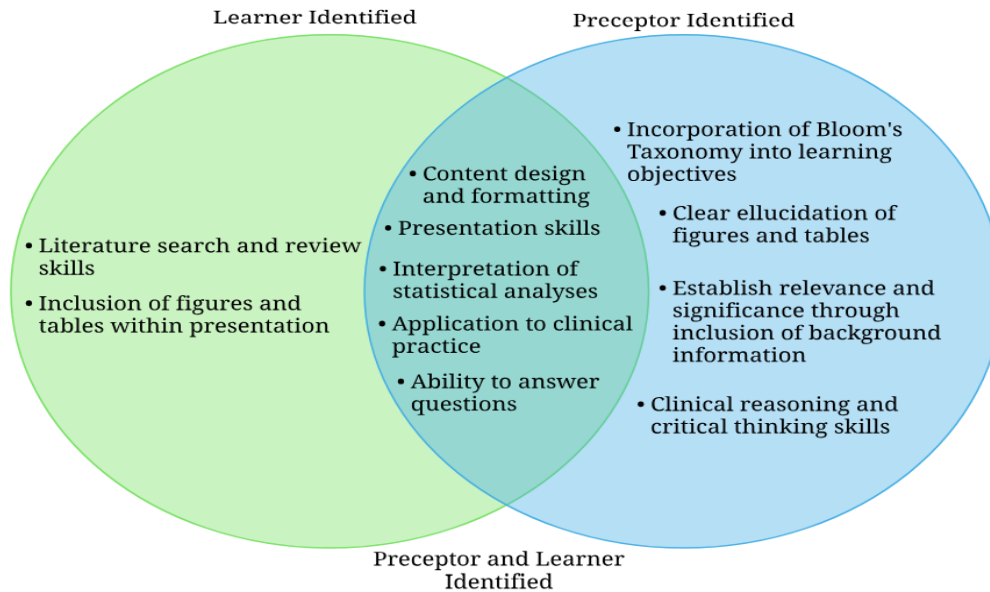
Primary Endpoint	Student Score (N=68)	Preceptor Score (N=68)	Resident Score (N=47)	95% CI, p-value		
				Student vs. Preceptor	Student vs. Resident	Resident vs. Preceptor
All assignments - % $\pm$ SD	83.4 $\pm$ 6.9	82.1 $\pm$ 8.9	85.1 $\pm$ 9.4	-0.41 to 1.08, p= 0.372	-1.77 to 0.47, p=0.081	<b>0.59 to 1.97, p=0.0005</b>
<b>Secondary Endpoints</b>						
Clinical presentations <sup>a</sup> - % $\pm$ SD	82.4 $\pm$ 6.7 (N=43)	81.0 $\pm$ 9.5 (N=43)	85.0 $\pm$ 9.4 (N=41)	-1.9 to 5.62, p=0.322	-6.18 to 1, p=0.152	<b>2.1 to 6.81, p=0.0004</b>
Written assignments <sup>b</sup> - % $\pm$ SD	86.2 $\pm$ 5.7 (N=10)	84.6 $\pm$ 5.4 (N=10)	85.8 $\pm$ 9.8 (N=6)	-6.06 to 9.39, p=0.603	-14.28 to 15.11, p=0.944	-10.33 to 12.84, p=0.793
Patient counseling - % $\pm$ SD	86.7 $\pm$ 7.6 (N=15)	84.3 $\pm$ 8.9 (N=15)	--	-3.6 to 8.38, p=0.415	--	--

<sup>a</sup>Clinical presentations: journal club presentation, evidence-based medicine presentation, clinical pearl presentation

<sup>b</sup>Written assignments: drug information response.

**Figure 1. Identified Themes in Areas for Improvement**

**Written Assignments and Presentations**



**Patient Counseling**

