

**Exploring Radiologic Technology Students' Perception
of Feedback Models: An Action Research Project**

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Submitted in partial fulfillment of the requirements for the
Master of Health Science degree at Washburn University

School of Applied Studies

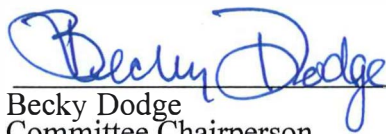
Allied Health Department

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WASHBURN UNIVERSITY
SCHOOL OF APPLIED STUDIES
DEPARTMENT OF ALLIED HEALTH


This capstone project submitted in partial fulfillment of the requirements for the Master of Health Science degree has been examined and approved.

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Abstract

This action research project explores the use of three feedback models in a real-world radiologic technology clinical setting. The Pendleton's Rules model, the One-Minute Preceptor model, and the SET-GO model were utilized to provide feedback to radiologic technology students following examinations/procedures in the clinical setting. Details about the feedback models as well as the importance of feedback, characteristics of effective feedback, and barriers to feedback are described. Following each exam/procedure, participants completed anonymous, online surveys regarding each model. The quantitative and qualitative results were used to draw conclusions about best feedback practices for feedback in the clinical setting. Findings suggest that different feedback models may be better suited for differing levels of educational performance. The One-Minute Preceptor model was conveyed to be most favored overall by study participants. This research aided in my understanding of feedback practices and will continue to foster growth within my teaching practices moving forward.

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Exploring Radiologic Technology Students' Perception of Feedback Models: An Action Research Project

Feedback is critical to a student's learning process as it supports and enhances learning (Al-Bashir et al., 2016). Routinely used as a basis for improvement, feedback bridges the gap between current and desired performance. If provided effectively in the clinical setting, this gap is closed by revealing potential areas of improvement, motivating learners, and reinforcing learning. Despite the importance of quality feedback practices, a common complaint from clinical learners concerns infrequent and insufficient feedback (Burgess et al., 2020). Inadequate feedback in the clinical setting can negatively impact a student's entire learning experience, causing anxiety, negative emotions, and reduced proficiency among learners. Low-quality feedback or a lack of feedback may also cause students to misjudge their clinical knowledge and skills, which robs them of opportunities for improvement. Missed chances to improve performance negatively impact a student's level of competency; thus, potentially influencing the quality of care patients receive.

Just as modes of teaching and learning vary greatly between topics of study, so too must the provision of feedback vary between didactic and clinical settings. Given the dissatisfaction with feedback reported by students in the literature, more research is needed overall. However, special attention should be paid to the delivery of feedback in diverse learning environments, such as the clinical setting. This proposed action research study explored how to improve the feedback experience of radiographic technology students in a real-world clinical setting. This study involved planning and implementing three separate feedback models into my personal practice of delivering clinical feedback to radiologic technology students under my supervision.

While the results are relative to the context of this action research project, findings may allow other clinical educators to reflect upon their feedback practices.

Literature Review

A review of existing literature on feedback reveals a widespread agreement about the main purpose of feedback, which is to close the gap between current and required performance to attain competence (Brand et al., 2015; Burgess et al., 2020; Orsini et al., 2022). There is also evidence of defining education-related feedback in broad and more specific terms. For example, in the broad view, feedback is any response (verbal, written, or non-verbal) to student performance (University of South Carolina, n.d.). Feedback has also been defined in more specific terms that emphasize its fundamental purpose: improvement. For instance, Burgess et al. (2020) described feedback as a process that includes providing a learner with information about the quality of their performance so that this may lead to improvements in learning outcomes. Notably, research offers important insights about feedback within traditional educational settings, but there is a paucity of research about feedback within the radiologic technology clinical setting. The topic of clinical feedback is of added importance because quality feedback practices improve the education of future clinical staff and directly impact the care of patients.

Importance of Feedback

The important role of feedback in the learning process is apparent within the reviewed literature. Hattie and Timperly (2007) referred to feedback as “one of the most powerful influences on learning and achievement” (p. 81), and Chickering and Gamson (1987) included effective and prompt feedback in their published article titled, *Seven Principles for Good Practice in Undergraduate Education*. Burgess et al. (2020) stated that feedback is an essential element of clinical learning because it reinforces good practice and motivates learners.

Additionally, according to Al-Bashir et al. (2016), mistake-detecting instructor feedback is important for making improvements and teaching self-reflection and regulation. Retention of lessons like this can span beyond the student experience into real-world practice and are necessary for enhancing critical thinking skills. However, despite agreement about the critical role of feedback in the learning process, experts emphasize that variability in quality generates positive and negative effects.

Characteristics of Effective Feedback

Across the examined literature, similar desirable characteristics of feedback are described. Firstly, quality feedback should be provided in a way that students leave the conversation feeling positive (Al-Bashir et al., 2016). This practice motivates students to utilize the feedback provided and promotes a positive learning environment. Secondly, when giving feedback, it is important to show students how much they have already improved while pointing out areas that require more attention (Massachusetts Institute of Technology [MIT], n.d.). MIT (n.d.) suggests doing so via formative, process-oriented feedback focused on accomplishments instead of summative feedback, such as letter grades, whenever possible. Thirdly, a key feature of effective feedback is that it targets students at an appropriate level (Hattie & Timperley, 2007; MIT, n.d.). As aforementioned, feedback is often provided with the intent of improving performance so that it reaches the desired level. However, it is important for the provider of feedback to recognize the current level at which the student performs and edit the feedback to support a level above it. Providing feedback multiple performance levels above the current performance can overwhelm the student and create a negative feedback experience (Hattie & Timperley, 2007). Conversely, providing feedback addressing goals that are too easily met may not adequately push students and may leave students with unrealistic expectations of success

(MIT, n.d.). Another crucial aspect of effective feedback is that it is timely (Al-Bashir et al., 2016; MIT, n.d.). Frequent and immediate feedback is most effective when students are learning new knowledge, whereas slightly delayed feedback can be most effective when students apply learned knowledge (MIT, n.d.). Overall, the qualities of effective feedback arising from the literature commonly reflected standards such as positivity, specificity, timeliness, and encouraging active student participation (Haughney et al., 2020).

Barriers to Feedback

One theme that emerged from the reviewed literature is the plethora of barriers to quality feedback relevant to both clinical and classroom settings. Commonly cited barriers include timing, mode of delivery (i.e., verbal, written, model, etc.), and formal training about how to provide and receive feedback (Russell, 2019). Another salient point that appeared in the literature is that conversations involving feedback are inherently sensitive and can become emotive for the supervisor and the student, which can threaten relationships (Russell, 2019). This delicate nature of feedback often discourages supervisors from providing necessary feedback for fear of upsetting students. Along those lines, feedback can be viewed as a negative process overall when the only form of feedback is corrective (Hattie & Timperley, 2007). When only critical feedback is provided, students may view the act of receiving feedback as purely a consequence of poor performance (Hattie & Timperley, 2007).

There are added barriers to effective feedback regarding the clinical setting, specifically. As aforementioned, the variability in quality can impact the effectiveness of feedback provided greatly. Burgess et al. (2020) asserted that feedback is most effective when provided following direct observation of a specific task. Direct observation can be challenging in the clinical setting because this busy environment may be time-poor and not always allow staffing for direct

supervision. Given limits to direct observation in the clinical setting, early and consistent feedback may not be provided, which indirectly necessitates students provide feedback via self-regulation. While self-regulation is a necessary skill for many clinical practices, it is a skill that must be developed. Burgess et al. (2020) cautioned that self-regulated performance assessments are not always accurate. High-performing students often underestimate their performance, and under-performing students tend to overestimate their performance (Burgess et al., 2020). Moreover, even the highest quality of feedback can only do so much without allowing students to practice the provided feedback (MIT, n.d.). Applying or practicing feedback can be challenging in the clinical setting because, as no two patients are alike, no two examinations are alike. The opportunity to perform a similar examination or react to comparable situational factors may be far and few between, depriving students of the chance to improve their prior performance. Lastly, supervisors in the clinical setting are often not formally trained to teach students and provide feedback. This means they may lack confidence in their observations or may not know how to translate them into beneficial, nonjudgmental, constructive feedback for students (Krackov & Ramani, 2012).

No Agreement on Feedback Delivery

Although there is general agreement about the characteristics of effective feedback, the best approach to feedback delivery seems to remain an unanswered question. While there are existing methods and models that guide feedback practices, barriers like those addressed in this paper can restrict perfect usage. However, Krackov & Ramani (2012) articulated twelve guidelines for providing effective feedback in the clinical setting that include:

- “establishing a respectful learning environment,
- communicating goals and objectives for feedback,

- basing feedback on direct observation,
- making feedback timely and a regular occurrence,
- beginning the feedback session with the learner's self-assessment,
- reinforcing and correcting observed behaviors,
- using specific, neutral language, to focus on performance,
- confirming the learner's understanding and facilitating acceptance,
- concluding with an action plan,
- reflecting on one's feedback delivery skills,
- creating staff development opportunities regarding feedback, and
- making feedback part of the institutional culture" (p. 788-790).

Methodology

Once more, the clinical setting can pose many barriers to students receiving quality feedback. Specifically, in the radiology clinical setting, students perform many different examinations. It can be difficult for practitioners to provide adequate feedback and for students to receive it. With that in mind, I set out to test feedback models on real radiologic technology students in the clinical setting to determine the best feedback approach for my teaching practice moving forward.

Study Population

The study population of this research included five radiologic technology students from Washburn University, four radiologic technology students from Metropolitan Community College – Penn Valley, and one radiologic technology student from Cleveland University, all attending clinical education at University Health Truman Medical Center (UHTMC). This population included a mix of first- and second-year, or senior, students. Before engaging with

any students about this project, I first applied for and received approval from the Washburn University Institutional Review Board (IRB #23-04) and gained written approval from UHTMC's Director of Radiology.

Informed Consent

After attaining all necessary approvals, I provided all potential student participants with written informed consent forms on Friday, February 17th, 2023. As an important ethical consideration of the study, students were given the weekend to read about the study's intent thoroughly, take time to consider their participation and ask questions before deciding to participate. Another important ethical consideration contained in the informed consent and reiterated to the prospective students was that all participation was voluntary, and each student could opt out at any point during the research without consequence. The consent also made clear that the collected survey data would be anonymous.

Data Collection

Following all approvals and completion of informed consent, the data collection period began on Monday, February 20th, 2023. I streamlined the process by utilizing three specific feedback models, Pendleton's Rules, One-Minute Preceptor, and SET-GO. During this period, I worked alongside the participating students observing their performance in various radiographic examinations and procedures. Directly following the completion of the examination/procedure, I utilized one of the three pre-determined feedback models to deliver feedback to the student.

The student completed the online, anonymous post-examination/procedure survey after each feedback session. All surveys were identical except for a feedback model identifier, M1 for the Pendleton's Rules model, M2 for the One Minute Preceptor model, and M3 for the SET-GO model (see Appendix C for the Student Survey Layout). The surveys consisted of six questions.

The first question was a demographic question about the student's status (1st or 2nd-year radiology student). Questions 2-4 were rating questions (quantitative), and questions 5 and 6 were open-ended questions (qualitative) about the feedback received and potential areas of improvement. See Appendix C for the entire survey.

Procedure

I employed the Pendleton's Rules model the first week, February 20th, 2023 – February 24th, 2023. This model entailed asking the student what they felt they did well, then telling them what I felt they did well. Next, I asked what the student thought could have been better, and then I told the student what I thought they could improve.

The second week, February 27th, 2023 – March 3rd, 2023, I utilized the One Minute Preceptor model, which involved asking the student for their rationale and supporting evidence for various actions during the examination/procedure. Next, I discussed general rules and evidence-based techniques for the examination/procedure just completed. Then, I reinforced what the student did well. Finally, I offered corrections regarding mistakes they may have made or potential areas for improvement.

In the third and final week, March 6th, 2023 – March 10th, 2023, the SET-GO model was employed to trial group feedback in the clinical setting. To apply this model, I required at least one other student to watch the examination/procedure alongside me. Following the exam/procedure's end, I first asked the students (group) what they saw so that they would describe the performance. Next, I probed further and asked the group to describe even more specific details about the exam/procedure just performed. Then, I focused on the performing student and asked what the student thought about their role in the exam/procedure to encourage self-reflection and problem-solving. Next, I asked the group to discuss the goals we are trying to

achieve with the exam (i.e., What are we looking for?). Lastly, I encouraged the group to discuss suggestions to achieve the exam goal and improve overall performance.

Results

The participating sample included three radiologic technology students from Washburn University, two radiologic technology students from Metropolitan Community College – Penn Valley, and one from Cleveland University. All participating students (100%) were second-year or senior radiologic technology students.

Firstly, eight anonymous surveys were collected during the week in which the Pendleton's Rules model (M1) was applied. The One-Minute Preceptor model (M2) guided feedback delivery the following week. Six anonymous surveys were completed following the receipt of feedback formatted according to this model. Finally, the SET-GO model (M3) was integrated into the third week of the study. During this period, ten anonymous surveys were collected. The number of anonymous surveys collected per week varied based on patient volume during the data collection periods.

Quantitative Results

Beyond the first question about student status, the survey consisted of three quantitative questions. The following describes the results concerning survey questions 2-4. See Appendix D for a breakdown of the results for questions 2-4 organized by feedback model.

Question 2, Importance of Receiving Feedback

Question two of the survey asked respondents to rate the importance of receiving feedback specific to the radiographic examination/procedure that the respondent just completed. The responses were on a 5-point scale. Of the eight responses related to the Pendleton's Rules model, one 4-point/Pretty Important rating (1/8, 12.5%) and seven 5-point/Extremely Important

ratings (7/8, 87.5%) were collected. This resulted in a mean rating of 4.88 associated with Pendleton's Rules. Responses associated with the One-Minute Preceptor model showed one 4-point/Pretty Important rating (1/6, 16.7%) and five 5-point/Extremely Important ratings (5/6, 83.3%), leading to a mean of 4.83. Lastly, the SET-GO model results included four 3-point/Somewhat Important ratings (4/10, 40%), four 4-point/Pretty Important ratings (4/10, 40%), and two 5-point/Extremely Important ratings (2/10, 20%) for an overall mean of 3.8.

Question 3, Feedback's Helpfulness for Enhancing Exam/Procedure Understanding

Question three used a scale from 1-10 and asked respondents to rate how the feedback enhanced their understanding of the radiographic exam/procedure they had just completed. On this 10-point scale, a rating of 1 reflected that the feedback was not at all helpful, 5 indicated that the feedback was somewhat helpful, and a rating of 10 denoted that the feedback was very helpful. Among the eight Pendleton's Rules responses, there was one 6-point rating (1/8, 12.5%), two 8-point ratings (2/8, 25%), one 9-point rating (1/8, 12.5%), and four 10-point ratings (4/8, 50%). Altogether, these ratings averaged 8.88. For the One-Minute Preceptor model, the six responses consisted of one 8-point rating (1/6, 16.7%) and five 10-point ratings (5/6, 83.3%), leading to an average of 9.67. The SET-GO model generated one 2-point rating (1/10, 10%), two 6-point ratings (2/10, 20%), one 7-point rating (1/10, 10%), three 9-point ratings (3/10, 30%), and three 10-point ratings (3/10, 30%) for an overall mean of 7.8.

Question 4, Overall Quality Rating of Feedback Method

Question four asked respondents to rate the overall quality or effectiveness of the given feedback method on a 5-point scale ranging from 1 (*Poor*) to 5 (*Excellent*). Pendleton's Rules showed three 4-point/Above Average ratings (3/8, 37.5%) and five 5-point/Excellent ratings (5/8, 62.5%) for a mean average of 4.63. One-Minute Preceptor resulted in six 5-point/Excellent

ratings (6/6, 100%) for a mean of 5.0. Lastly, the SET-GO model showed one 3-point/Average rating (1/10, 10%), three 4-point/Above Average ratings (3/10, 30%), and six 5-point/Excellent ratings (6/10, 60%). The SET-GO ratings had a mean of 4.5.

Qualitative Results

The remaining two questions in the anonymous surveys were open-ended, qualitative questions. They were designed to gather participants' perceptions (likes and dislikes) about each model. To analyze the results, each response was read multiple times and assigned a code that summarized or captured the overall idea of the response. From there, the codes were deduced to themes, and conclusions were drawn from the themes.

As presented in the student survey layout (Appendix C), question 5 is one of two narrative questions. Question 5 inquired about what respondents *liked* about the feedback they received after completing a specific exam/procedure. Recall that a different feedback model was applied each week for three weeks, and surveys submitted in a given week were coded by feedback model.

Forty responses to question 5 were collected across the study period, with seven themes emerging from the analysis of the narrative responses. Appendix E outlines the identified themes, their association to each model, and selected illustrations of response items for this question. Three themes extended from all three of the feedback models: Enhancing and Testing Knowledge, Opportunities for Improvement, and Positive Experience. The most common of these themes related to the provided feedback helping students enhance or test their knowledge. For example, one student wrote, “[Bailey] altered feedback to show/explain on images which increased my understanding of criteria.” The next most common theme identified across all models had to do with feedback providing opportunities for improvement. Students conveyed

this theme by sharing statements like, “The feedback...required me to walk back through the exam and think of...what I could improve on” and “It helped me see what improvements I needed to make for better imaging and why.” Another common theme that emerged from the question five responses for all models emphasized the preference for an overall positive feedback experience. This was evidenced by students expressing statements like, “I liked her giving me positive feedback as well because I feel like people need to hear what they are doing well” and “It helped to validate what parts I felt I did good or needed improvement on.”

Question six of the survey was the second of two narrative questions, it inquired about what respondents *disliked* about the feedback they received following a specific examination/procedure. There were twenty-eight responses collected across the study period (see Appendix F). Three themes emerged from the analysis of the narrative responses, including: Difficulty Reflecting, Repetitive, and Difficulty Paying Attention. However, the only theme that emerged from all three models was a dislike of nothing communicated in twenty responses. For the remaining themes, one response indicated difficulty in reflecting by expressing that it was difficult to think of the positives in their own performance regarding the Pendleton’s Rules model. Lastly, involving the SET-GO model, one response stated that they did not pay as close of attention when they were watching versus performing the exam, and two responses expressed they felt the feedback was repetitive. For example, one respondent stated, “It being a chest exam, it was a little repetitive/needless to go into depth on what the exam is for and what you are looking for in each image, but it was also a very nice refresher and made me pick my brain a bit.”

Discussion

Following completion of the data collection period, the survey results were analyzed to draw conclusions about potential best practices moving forward. In general, the results showed overall student contentment with all three feedback models. This is evidenced by the qualitative results showing a much larger number of specific “likes” about each model as opposed to the “dislikes” of any model. This brings into question whether the three feedback models studied are a strong fit for the clinical setting or if the study participants appreciated all models because they included set parameters that assured they would receive feedback on examinations/procedures when otherwise they might not.

All in all, it is difficult to pinpoint one model to be superior to the others. However, the strong suits of all models studied can be considered. To start, the narrative responses for Pendleton’s Rules showed the most mention of its benefit in finding opportunities for improvement, seconded by its prospect of enhancing and testing knowledge. One-Minute Preceptor, on the other hand, showed the highest ratings based on percentage for two of the three quantitative survey questions. Specifically, the One-Minute Preceptor received the highest ratings of all models for perceived helpfulness of the feedback and quality of the employed feedback method. Additionally, the qualitative results associated with this model showed a positive reaction, with nearly equal responses about how the feedback pinpointed opportunities for improvement, discussed the reasoning behind aspects of exams/procedures, and offered positive affirmation. Moving on, the strongest theme emerging from the SET-GO model reflected its promotion of image analysis or review. This theme did not arise with any other model. Perhaps this image analysis theme extended from the SET-GO model because of its collaborative nature, during which students bounce ideas off one another and achieve deeper

learning. Given that the image analysis or review theme only appeared in responses related to the SET-GO model, one might conclude that the model is better at stimulating higher-level thinking skills, like those necessary for evaluating radiographic images against set quality criteria.

With all of this in mind, it poses a question about whether various feedback models are better for different stages of learning. For example, perhaps a model like Pendleton's Rules is more beneficial early on in the learning to discover needs for improvement and keep the student actively involved in the feedback process before switching to a model like SET-GO later in students' development to promote higher-ordered thinking and mastery. Another possible conclusion is that the One-Minute Preceptor model was favored by participants in this study because it most evenly covers all aspects of effective feedback posited by the literature and was most relatable to all levels of learning (early to more advanced).

Overall, the responses regarding all models demonstrate that students adequately perceived the main goal of feedback, which is improvement and showing progress towards end goals. This awareness among students is a positive takeaway from the study because it shows that no participant viewed the feedback as a consequence of poor performance.

Conclusion

Throughout the initial analyses and reflection on existing literature, a lack of evidence concerning feedback delivery in the clinical education setting was discovered. While the existing literature agrees that feedback is essential to a student's learning experience and development, there is little agreement on best practices and limited exploration of feedback in diverse settings. All in all, more research is needed regarding feedback to investigate which feedback frameworks or models translate to various settings. Such research could provide the groundwork for

establishing best practices regarding feedback in the clinical setting and other learning environments.

That said, my goal with this research was to test various models of feedback delivery to draw conclusions about best practices as they relate to my specific clinical teaching context. While I feel that I accomplished this goal, I did not anticipate this research spanning beyond my teaching practices and directly benefiting my students, as well. Following the conclusion of the data collection period, I was informed by a few participants that they are continuing aspects of the feedback models by independently applying features to assess their performance after a radiographic examination or procedure. I believe that having a structured feedback process in place, no matter the model, promoted reflection in the students and, for some, contributed to practicing self-regulation. Coincidentally, all participants involved in the study are nearing the end of their student clinical experiences and preparing to sit for their board examination. I hope that aspects of this research will remain with them as they become registered radiologic technologists and join the workforce as my coworkers.

In closing, my teaching philosophy includes individualizing instruction whenever possible to benefit the learning experience of each individual student. It is through this personalization, I believe, that students reach their full optimum potential and thrive in their studies. Not only will my discoveries from this research make me a better teacher overall, but with this knowledge in my repertoire, I aim to be able to recognize patterns and behaviors in students' learning that may warrant one type of feedback delivery over another. This increased awareness will better the learning experiences of my students.

It is my opinion that the extra level of care and consideration to deliver meaningful and positive feedback focused on improvement is essential for instructors of all learning

environments. However, this is especially crucial for instructors supervising clinical students because providing quality feedback has the potential to foster a more competent healthcare workforce, which impacts the care of our entire population. Additionally, I want my students to enjoy their learning experience so that they may remain forever scholars and pass on their knowledge to those who come after them. By doing this, each successive generation of healthcare workers will be more skilled and competent than the last. After all, our clinical students today might just be our caregivers tomorrow.

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Appendix A

IRB Approval E-Mail

 irb
To: Bailey Furse; Becky Dodge

Wed 2/15/2023 12:59 PM

Greetings Bailey Furse and Dr. Becky Dodge,


Your IRB application titled "Feedback in the Clinical Setting: An Action Research Project" (IRB #23-04) has been approved given the clarifications you provided.


You are welcome to begin implementation of the project as soon as you are ready.






Please understand the following:

1. Any proposed changes to the activities included in this IRB application must be submitted to the IRB for approval.
2. If the project is ongoing after February 15, 2023, you must submit a progress report to the IRB.
3. Any adverse events associated with this research must be reported to the IRB within 10 business days.

Marian Jamison
IRB Chair



 irb
To: Bailey Furse; Becky Dodge


    

Thu 2/23/2023 1:14 AM

Greetings Bailey Furse and Dr. Becky Dodge,

I noted an error in the approval letter I sent previously. The date under number 2 below should be February 15, 2024.

Marian Jamison
IRB Chair



Appendix B

Informed Consent

Washburn University

Consent to Participate in an Action Research Study

Title of Study: Feedback in the Clinical Setting: An Action Research Study

Principal Investigator:

Bailey Furse, BHS, RT(R)(ARRT)

(620) [REDACTED] | bailey.furse@washburn.edu

I am asking for your voluntary participation in an action research study I am conducting concerning feedback in the clinical setting. This research is being completed as a requirement of the Master of Health Science program at Washburn University. The study has been approved by Washburn's Institutional Review Board.

What is the study about?

A review of existing literature has shown a paucity of information regarding the necessity of clinical-specific approaches to feedback. The purpose of this research is to explore different feedback methods. A feedback method in this study refers to the technique used to deliver feedback. Findings from the study will be utilized to make determinations about best practices to inform my teaching and potentially benefit students completing radiography clinical education at this site.

What would participation look like?

Should you choose to participate, you will complete routine radiographic examinations and procedures with my accompaniment as normal. Following each exam, you will be provided with a short, anonymous online survey to complete regarding the feedback you received.

Are there any risks to participating in this study?

I do not anticipate any risks to participants from partaking in this research. A small amount of time will be needed following each examination to complete the survey; however, the survey is short so as not to interfere with regular clinical responsibilities. Also, no additional time outside of routine clinical hours will be required.

What are the possible benefits of being in this study?

Although student participants are necessary for this research, there is little to no direct benefit to you.

Anonymity

The data collected will be anonymous with no identifying information attached. Within the research, participants will be referred to by their classification in their x-ray program, either “first year” or “second year.”

Voluntary Participation

Participation in this study is strictly voluntary. Should you decide to partake, you may withdraw from the study at any time without penalty. Additionally, there will be no negative consequences should you choose not to participate.

Questions

If you have any questions about the study or your participation in it, please reach out to me - Bailey Furse. (620) [REDACTED]; bailey.furse@washburn.edu

Consent

By signing this form, I am attesting that I have read and understand the above information, and I give my consent to participate in this action research study.

Name (Printed): _____ Date: _____

Signature: _____ Date: _____

E-mail address: _____

Appendix C

Post-Radiographic Examination/Procedure Feedback Survey Questions

1. Indicate your school status:
 - 1st year
 - 2nd year

2. **How important** was it that you received feedback specific to the radiographic examination/procedure you just completed?

Not at all Important	Not so Important	Somewhat Important	Pretty Important	Extremely Important
1	2	3	4	5

3. On a scale from 1-10, to what degree did the feedback you received, specific to the radiographic exam/procedure you just completed, **enhance your understanding** of the radiographic exam/procedure?

1 = Not at all Helpful

5 = Somewhat Helpful

10 = Very Helpful

1	2	3	4	5	6	7	8	9	10
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4. Overall, how would you **rate the feedback method** used following the radiographic exam/procedure you just completed? (A feedback method refers to the technique used to deliver feedback.)
 - Poor (1)
 - Below Average (2)
 - Average (3)
 - Above Average (4)
 - Excellent (5)

5. What did you **LIKE** about the feedback you received specific to the exam/procedure you just completed?

6. What did you **DISLIKE** about the feedback you received specific to the exam you just completed?

Anonymous Online Survey for Feedback Model #1 – Pendleton’s Rules

<https://s.surveypal.com/ysk7nd8x>

Anonymous Online Survey for Feedback Model #2 – One Minute Preceptor

<https://s.surveypal.com/5yevk2ii>

Anonymous Online Survey for Feedback Model #3 – SET-GO

<https://s.surveypal.com/jagbsxjx>

Appendix D

Frequencies and Descriptive Statistics of Survey Questions 2-4

Question Number	Feedback Model	Number of Responses	Question Scale	Rating Frequencies	Mean (Standard Deviation)
2	Pendleton's Rules	8	5-point scale (1=Not at All Important, 5=Extremely Important)	87.5% Extremely Important 12.5% Pretty Important	4.88 (.354)
	One Minute Preceptor	6		83.3% Extremely Important 16.7% Pretty Important	4.83 (.408)
	SET-GO	10		20% Extremely Important 40% Pretty Important 40% Somewhat Important	3.8 (.788)
3	Pendleton's Rules	8	10-point scale (1=Not Helpful, 5= Somewhat Helpful, 10=Very Helpful)	50% 10 Very Helpful 12.5% 9 25% 8 12.5% 6	8.88 (1.458)
	One Minute Preceptor	6		83.3% 10 Very Helpful 16.7% 8	9.67 (.82)
	SET-GO	10		30% 10 Very Helpful 30% 9 10% 7 20% 6 10% 2	7.8 (2.57)
4	Pendleton's Rules	8	5-point scale (1=Poor, 5=Excellent)	62.5% Excellent 37.5% Above Average	4.62 (.518)
	One Minute Preceptor	6		100% Excellent	5.0 (.000)
	SET-GO	10		60% Excellent 30% Above Average 10% Average	4.5 (.707)

Note. The number of completed surveys per feedback model varied due to patient volume.

Appendix E

Themes of Likes Emerging from Post-Examination/Procedure Open-Ended Question #5

Themes	Responses Per Model	Illustration of Response Items
Enhancing & Testing Knowledge	Pendleton's Rules (5)	<p>“The feedback provided me with a greater understanding of the exam and...overall I felt enhanced my learning process.”</p> <p>“During the exam, she asked me questions about knowing if it is a good image and how I can tell if it is.”</p> <p>“The lateral femur is sometimes a difficult exam for me so understanding why I need to put a small angle on the projection is helpful.”</p>
	One-Minute Preceptor (3)	<p>“Bailey gave me examples and showed me with positioning on how I could get a better grashey and y-view for the shoulder. I am a visual learner so I like that she showed me how she would've positioned the patient.”</p> <p>“I liked that we talked about the reasons why we do certain projections.”</p>
	SET-GO (4)	<p>“[Bailey] altered feedback to show/explain on images which increased my understanding of criteria.”</p> <p>“Heightened my understanding of the exam.”</p>
Opportunities for Improvement	Pendleton's Rules (6)	<p>“I like that [Bailey] gave specific examples of how I could improve moving the c-arm...”</p> <p>“I liked the feedback because it helped me think about what I did good and what I could work on for my exam.”</p> <p>“It required me to walk back through the exam and think of...what I could improve on.”</p>
	One-Minute Preceptor (3)	<p>“She agreed with my and gave me ways to improve...”</p> <p>“[Bailey] gave me feedback on things I could work on.”</p>
	SET-GO (1)	<p>“It helped me see what improvements I needed to make for better imaging and why.”</p>

Positive Experience	Pendleton's Rules (3)	<p>"I liked her giving me positive feedback as well because I feel like people need to hear what they are doing well."</p> <p>"I like that she...let me know what I did well to help with my confidence in the OR."</p>
	One-Minute Preceptor (2)	<p>"She told what I did well which, as a student helps with my confidence."</p> <p>"I liked how positive it [feedback] was."</p>
	SET-GO (1)	<p>"It helped to validate what parts I felt I did good or needed improvement on."</p>
Image Analysis Review	SET-GO (5)	<p>"Helps us review if we have a good image, if everything we need to see on the image is there, and reviews correct positioning."</p> <p>"Helps me understand when we have a good image, review where to center, and to know what we are looking for [image evaluation criteria]."</p> <p>"We touched on anatomy that should be seen and how it should be seen, which is always good to review."</p>
Group Effort	SET-GO (4)	<p>"I liked being a part of a group conversation and hearing the other students' feedback as well."</p> <p>"I liked that I had another student to bounce off of when speaking on the exam. I think it was extremely useful and helped me to notice things that I did or didn't do that I did not realize/notice on my own."</p>
Active Role in the Feedback Process	Pendleton's Rules (3)	<p>"I liked that...it was an active conversation where my input was helpful and seemed to be taken into account."</p> <p>"I enjoyed this feedback style where both the student technologist and the registered technologist discuss it together, rather than just being told what I did wrong."</p>
Preparing for Professional Practice	Pendleton's Rules (1)	<p>"It [feedback]...gave me a better understanding of my responsibility as a technologist."</p>

Note. Positive insights collected from question that asked, "What did you LIKE about the feedback you received specific to the exam/procedure you just completed?"

Appendix F

Themes of Dislikes Emerging from Post-Examination/Procedure Open-Ended Question #6

Themes	Responses	Illustration of Response Items
Difficulty Reflecting	Pendleton's Rules (1)	"I'm not a super confident technologist, so it was tough to think of what I was proud of in the exam."
Repetitive	SET-GO (2)	"I felt like it was repetitive but helpful..." "It being a chest exam, it was a little repetitive/needless to go into depth on what the exam is for and what you are looking for in each image, but it was also a very nice refresher and made me pick my brain a bit."
Difficulty Paying Attention	SET-GO (1)	"I didn't pay as good of attention when I was watching the exam vs. performing."

Note. Negative insights collected from question that asked, "What did you DISLIKE about the feedback you received specific to the exam/procedure you just completed?"