Development of a Rubric to Measure Radiography Programmatic Assessment Plan Quality

Rebecca G. Hamm

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DEVELOPMENT OF A RUBRIC TO MEASURE
RADIOGRAPHY PROGRAMMATIC
ASSESSMENT PLAN QUALITY

by

Rebecca G. Hamm, B.S., M.Ed., R.T.(R)(CT)

A Dissertation Presented in Partial Fulfillment
of the Requirements of the Degree
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ABSTRACT

This dissertation attempts to fill an existing gap in the literature concerning radiography programmatic assessment and provide a method of self-assessment for programs to create and evaluate their programmatic assessment plan. There is limited radiography-specific literature concerning programmatic assessment plans, and what does exist concerns general assessment best practices and some other allied health or health science related empirical research. Assessment plans are a necessary part of accreditation by the Joint Review Committee on Education in Radiologic Technology (JRCERT), which is required by many programs. However, education for many radiography program assessment plan contributors is limited in this area, and JRCERT citations concerning assessment plan standards are numerous. In order to mitigate this problem, this dissertation study created a rubric to evaluate the quality of radiography programmatic assessment plans. The methodology for this study was the Delphi technique to both develop and validate the rubric. The Delphi panel was made up of radiography programmatic assessment plan experts and consisted of multiple rounds to gain consensus for each of the rubric’s criteria and indicators. A finalized rubric is presented in Appendix D.
APPROVAL FOR SCHOLARLY DISSEMINATION

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Author Rebecca Hamm

Date March 29, 2023
DEDICATION

This dissertation is dedicated to my grandmother and to my daughters. My grandmother, Linda, has passed on, but her words of wisdom and encouragement reside with me always. To my daughters - Rayleigh, Taylor, Laura, and Hallie - I hope that I gift my perseverance to each of you. Please take this dissertation as proof that you can accomplish anything you set your mind to. I hope you always dream big and never stop aiming for your goals.
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CHAPTER 1

INTRODUCTION

An assessment plan, if meticulously constructed, can yield meaningful results and information to programs to promote continuous improvement (Hatfield, 2009; Lasley, 2018; Leggett & Eatmon, 2017; Schans, 2019), but this begs the question: How does one create a quality assessment plan? Assessment is an important aspect of the work of educational leadership and administration, and those in leadership should be proficient in creating goals, outcomes, measurement tools, benchmarks, timeframes, and responsible party assignments (Eatmon, 2015; Hatfield, 2009, 2013; Lasley, 2018).

Radiography program administration is no exception as the only programmatic accreditor for radiography programs in the United States, the Joint Review Committee on Education in Radiologic Technology (JRCERT), requires an assessment plan as a part of their standards (Joint Review Committee on Education in Radiologic Technology, 2020). However, as sources have expressed, assessment plans are a common problem area that results in citations or areas of noncompliance for many radiography programs (Hatfield, 2014; Schans, 2019), which demonstrates a need for radiography program administrators to better understand how to develop and evaluate a quality assessment plan.

Background of the Problem

Similar to assessment planning, accreditation agencies focus on improvement (Driscoll, 2006). This makes the choice for accreditation agencies to include assessment
plans as a portion of their standards an appropriate requirement. According to Hatfield (2013), regional accrediting agencies began requiring assessment plans because of demands for accountability in education, and programmatic accrediting agencies subsequently followed. The assessment movement has gained momentum since its inception and has become a requirement of the Council on Higher Education Accreditation (CHEA) (Council for Higher Education Accreditation, 2021; Hatfield, 2013). Therefore, as long as assessment plans remain an accreditation requirement, it is necessary for educational administrators to have expertise in creating assessment plans (Hatfield, 2013).

One such organization that recently began requiring assessment plans because of the changes by CHEA and its recognition is the Joint Review Committee on Education in Radiologic Technology (JRCERT) (Joint Review Committee on Education in Radiologic Technology, n.d.). After implementation and further revisions of the standards, the assessment plan now lies in Objective 6.3 of the JRCERT 2021 Radiography Standards (Joint Review Committee on Education in Radiologic Technology, 2020). Radiography Objective 6.3 requires that “the program has a systematic assessment plan that facilitates ongoing program improvement” (Joint Review Committee on Education in Radiologic Technology, 2020, p. 47). Now, as required within a standard, radiography programs must have assessment plans for compliance and continued accreditation by the JRCERT.

Earning accreditation from the JRCERT is not only an aspiration for many programs but a stipulation for students to earn their registration and state licensure. The American Registry of Radiologic Technologists (ARRT) regulates the radiography registry and national certification exams for graduates. The ARRT requires that students
graduate from accredited programs. Thus, radiography programs seeking to earn or maintain JRCERT accreditation must meet JRCERT Radiography Objective 6.3.

**Statement of the Problem**

The problem this study sought to address was the limited guidance on how to create a programmatic assessment plan specific to radiography. As demonstrated in the previous section, programs seeking JRCERT accreditation must have a programmatic assessment plan. However, the development of an effective programmatic assessment plan is a difficult process and one that many practitioners who transition to higher education are not prepared to perform well (Hicks, 2016). Palomba and Banta (2001) recommend the use of model assessment plans and guidance documents in order to effectively create assessment plans for accreditation purposes, and Hatfield (2014) outlines several available resources from the JRCERT. Despite this information, the issue of JRCERT findings related to assessment plans persists (Hatfield, 2014; Hicks, 2016; Schans, 2019).

**Purpose of the Study**

The purpose of this study was to create a rubric that can provide a framework to create and a method to evaluate radiography programmatic assessment plans. Rubrics are an objective method of evaluation that can be used to set expectations for success on a project, to evaluate a project, and to give feedback concerning the quality of a project (Schmidt, 2020). This study utilized JRCERT publications, existing assessment literature, and a panel of radiography programmatic assessment experts to create a rubric to evaluate radiography programmatic assessment plans. Literature review and the modified Delphi technique were employed as the methodology for development and validation of
the rubric. The rubric was then employed by radiography program administrators in
rubric testing to establish its relevance and usefulness to leadership. Utilization of this
rubric will hopefully increase the quality of radiography programmatic assessment plans.

**Significance of the Study**

The significance of this study is the creation of a tool that can assist radiography
program leadership with development and evaluation of radiography programmatic
assessment plans. The study is of importance to radiography program leadership in
radiography such as program faculty and administrators. In many instances, the
educational backgrounds of radiography program faculty do not support assessment
planning or data collection and analysis related to educational programs (Hicks, 2016).
Given the abundance of findings related to assessment plans (Hatfield, 2014; Schans,
2019), it is assumed that programs have a need for more assessment guidance and
information (Palomba & Banta, 2001).

**Research Questions**

An effective rubric to measure the quality of an assessment plan must contain
criteria and indicators to determine whether those criteria are met. Therefore, this study’s
research questions were:

1. What criteria should be used to measure the quality of a radiography
   program’s assessment plan?
2. What indicators should be used to determine whether these criteria have been
   met?
Assumptions

Assumptions for this study included those made regarding expertise. It was assumed that those with at least 5 years of assessment plan experience are knowledgeable about JRCERT 2021 Standards for an Accredited Educational Program in Radiography and criteria that can effectively measure radiography programmatic assessment plans. For snowball or nomination sampling, it was also assumed that selected participants knew and were able to distinguish expertise among their peers.

Delimitations

Delimitations of the study were to the subject of radiography program assessment and the utilization of only radiography programmatic assessment experts. This delimitation was necessary due to the specified subject and needs of the study outcomes. Let it also be recognized that the study delimitations that consequently limit the study’s generalizability to other program assessment also increased content validity of the resulting rubric as supported by Green (2014), Hsu and Sandford (2007), and Lawshe (1975).

Limitations

Limitations of the study included those within sample selection, study design, and data analysis. While non-probability sampling limits representativeness and increases sampling bias (Parker et al., 2019), it was a necessary method for this study as there was no known pool of radiography program assessment experts from which to perform random sampling. The trade for this limitation, however, was that the selected participants are known within the expert field and identified by their peers as knowledgeable and credible individuals, which contributed to the validity of the resulting
rubric as supported by Green (2014) and Hsu and Sandford (2007). The Delphi study design is imperfect and has been described as non-scientific (Vernon, 2009). Reliability in Delphi studies is considered weak as the ability to recreate an expert panel is limited. However, the design has merit especially in areas with little to no previous empirical research and in which the purpose does not fit with other study methods (Avella, 2016; Green, 2014; Hsu & Sandford, 2007); such was the case in this study. Data analysis techniques used in this study and other Delphi studies do not discover whether the results were accurate; rather, they discover whether the results are popular (Vernon, 2009). However, if the source is reputable and greater than the majority agree indicated by transparent analysis values, it is hoped that the researcher can assume credibility with confidence.

**Theoretical Framework**

The foundation for all General Systems Theory can be traced back to Aristotle’s dictum that the “whole is greater than the sum of its parts” (Frye & Hemmer, 2012, p. 5). Systems are, by their nature, a collection of multiple components; therefore, any comprehensive study of systems theory must focus on the relationship between the whole and its component parts (Ceric, 1969; Frye & Hemmer, 2012; Jokela et al., 2008). With its roots in the early 20th century, much of today’s scholarship around this relationship between individual parts within a system and the system itself is often attributed to Austrian biologist Ludwig von Bertalanffy (Frye & Hemmer, 2012).

Bertalanffy looked at General Systems Theory from his position as a biologist; however, he did generalize principles beyond his field and posit into the broader field of all the sciences the understanding that “the fundamental character of the living thing is in
its organization,” (Bertalanffy, 1972, p. 410). From there, Bertalanffy proposed his General Systems Theory, wherein he noted, “there exist models, principles, and laws that apply to generalized systems or their subclasses, irrespective of their particular kind, the nature of their component elements, and the relationships or ‘forces’ between them” (Frye & Hemmer, 2012, p. 5). The influence of General Systems Theory on the evaluation can be seen in its careful attention to the relationship between plan components and the whole of the assessment plan as well as the components’ relationships to the program’s context (Frechtling, 2007).

General Systems Theory embraces the idea that change is an inherent part of the system (Frye & Hemmer, 2012). Assessment plans not only embrace change, but, by their very design, measure change. When using General Systems Theory to evaluate, the assessment becomes goal-oriented (Ceric, 1969; Jokela et al., 2008). General Systems Theory is limited by its goal-oriented approach as some components are analyzed more deeply than others and some factors may be missed altogether (Ceric, 1969; Jokela et al., 2008). Frye and Hemmer (2012) note, however, that with the inclusion of continuous feedback loops through data analysis, a dynamism can be created that can be beneficial to program evaluators, particularly in education.

Theoretical frameworks are derived from an existing theory in the literature that has already been tested and validated by others and is considered a generally acceptable theory in the scholarly literature (Grant & Osanloo, 2014). General Systems Theory is well-founded in both evaluation and education literature (Frye & Hemmer, 2012). A system is the sum of all of its components’ interactions among and between components rather than the sum of the components itself (Ceric, 1969; Frye & Hemmer, 2012; Jokela
et al., 2008). In General Systems Theory evaluation, a complex system is broken down into components, but those components individually can be evaluated for a more holistic view of the system (Ceric, 1969; Jokela et al., 2008) or in this case, programmatic assessment plan. By applying this theory to program assessment, the quality of each component of the assessment plan builds the quality of the entire assessment plan.

**Definition of Terms**

The following list provides essential definitions for the purpose of this study.

**Assessment plan contributors:** any person who helps create, implement, or evaluate a programmatic assessment plan

**Benchmark:** the desired result of an outcomes measurement tool

**Citation:** term used by the JRCERT to describe a program’s weakness as identified in their agency’s report of findings (ROF) that leads to an unmet standard

**Goal:** a statement of a program’s generalized intention, JRCERT requires the use of goals to group outcomes and requires goals concerning three specific subjects (Joint Review Committee on Education in Radiologic Technology, 2020)

**Health science program:** any program, which trains healthcare professionals to work in the healthcare setting; examples may include pharmacy, dental hygiene, nursing, medical laboratory science, physical therapy, occupational therapy, and speech language pathology; also referred to as an allied health program

**Measurement tool:** instrument of measure for outcomes in an assessment plan, may be used to measure both quantitative and qualitative data
**Outcome:** a statement of a program’s specific intentions; when focused on student learning, often called a student learning outcome (SLO); also termed objectives and competencies in some other texts (Hatfield, 2009)

**Programmatic assessment plan:** a document describing the systematic process of evaluating a program through collection of data relevant to the mission of the program

**Radiography program:** a program whose purpose is to educate students in the art and science of medical imaging using radiation

**Radiography programmatic assessment plan:** a systematic process of evaluating a radiography program
CHAPTER 2
REVIEW OF LITERATURE

Introduction

There have been few previous empirical research studies performed related to health science programmatic assessment or to radiography programmatic assessment. However, there was much that still needed to be described in this chapter to inform the study. The following sections comprise a deeper analysis of the background of the problem and purpose of the study, review of recommended practices in assessment plans, relevant literature to the topic, theoretical framework, and justification for the study.

Benefits of Radiography Program Assessment Plans

A major concern and reason for the initial development of assessment plans is often an accreditation requirement (Eatmon, 2015; Hatfield, 2009). As mentioned, the Joint Review Committee on Education in Radiologic Technology (JRCERT) requires a programmatic assessment plan as a part of Radiography Objective 6.3 (Joint Review Committee on Education in Radiologic Technology, 2020). Due to state licensure and American Registry of Radiologic Technologists (ARRT) requirements, most programs are required to have JRCERT accreditation so that their students can take national registry and state licensure examinations.

While accreditation is certainly an excellent reason for the development of an assessment plan, Leggett and Eatmon (2017) state that programs should focus on
“continuous quality improvement” (p. 545) rather than simply utilizing the time and opportunity to focus on compliance. Hatfield (2009) and Lasley (2018) suggest that conformity to accreditor needs and not to the program’s needs lessens the value of an assessment plan.

While JRCERT accreditation is certainly the primary goal of many radiography programmatic assessment plans, the following discusses the value and purpose of a radiography program assessment plan outside of simply meeting JRCERT 2021 Radiography Objective 6.3.

Effective assessment is defined by many of its proponents as the key to program success (Allen, 2004; Eatmon, 2015; Hatfield, 2013). For both the program and student learning, the benefits of effective assessment are numerous. The greatest benefit is being able to identify areas where improvement is needed; however, assessment can also reveal areas of strength (Palomba & Banta, 2001). This information can be used in many ways to promote continuous program improvement. Building an assessment plan focusing only on accreditation minimizes all other possible benefits from assessment as the assessment plans are then not thoughtfully created and conformed to the program’s values (Hatfield, 2009, 2013; Leggett & Eatmon, 2017).

Some benefits of quality assessment planning as described below include continuous improvement, external rapport, curriculum development, and administrative support.

To complete the assessment cycle or “close the loop,” the program must analyze the data received (Leggett & Eatmon, 2017). Analysis of the data is where the advantage of data collection work truly begins. Data give an objective view of how the program and
its students are performing. Visualization of outcomes in this way when properly measured is reputable and allows programs to visualize clearly what is going well and what is not. This is valuable information that can be used to justify keeping or making changes to faculty, courses, course assignments, or curricula leading to continuous improvement (Hatfield, 2009; Lasley, 2018).

Many accrediting agencies require and are proponents of transparency in educational institutions and their programs (Hatfield, 2013; Palomba & Banta, 2001). An assessment plan provides just the information needed for the purpose of transparency in the form of data that can be readily shared with stakeholders (Lasley, 2018). While weaknesses may be difficult to share, it is important that programs meet this requirement for compliance purposes (Hatfield, 2013). As stated before, the assessment plan is also an excellent resource for program strengths (Palomba & Banta, 2001). These strengths can be used to promote recruitment, bring acclaim from administration, and advertise programs. In addition, it is a requirement of JRCERT Radiography Objective 6.2 that radiography programs share this information with communities of interest (Joint Review Committee on Education in Radiologic Technology, 2020). Promotion of transparency in upward or even downward trending times can be beneficial to programs by establishing a rapport with these external parties (Palomba & Banta, 2001).

When building curriculum or evaluating an existing curriculum, an assessment plan is an invaluable resource. An assessment plan includes the goals and expected outcomes for the program and is, therefore, an excellent foundation for the entire curriculum plan (Hatfield, 2009; Lasley, 2018). By establishing curriculum on the assessment plan, which is framed on the program’s values, programs can expect complete
alignment and a curriculum that supports the program’s main initiatives (Hatfield, 2009; Lasley, 2018; Leggett & Eatmon, 2017). In addition, student learning outcomes, which are an essential component of an assessment plan, form an excellent foundation for course objectives ensuring coverage of all topics necessary to reach the program’s goals (Hatfield, 2009; Lasley, 2018).

Measurements such as those from assessment plans can be used as evidence and justification for various purposes including for requests from administration (Hatfield, 2009). When additional funding or support for program improvements are needed, administrators will likely want to see evidence of need. When areas of needed improvement have been identified in assessment, data from the plan can provide exactly the evidence needed for justification of administrative support (Hatfield, 2009; Palomba & Banta, 2001).

While compliance with accreditation standards is certainly important for programs, there are many other underlying benefits that are the basis of accreditation agencies requiring an assessment plan and data analysis (Hatfield, 2009, 2013; Leggett & Eatmon, 2017). Rather than completing assessment for only compliance with JRCERT, Leggett and Eatmon (2017) state that assessment plans should be built with focus on continuous quality improvement because “the quality of the data determines its value to the program” (p. 545). In contrast, Hatfield (2013) purports student learning as the focus of assessment because “focusing on student learning makes assessment meaningful” (p. 639). Eatmon (2015) offers the “garbage in, garbage out” (p. 678) principle meaning that no amount of analysis can provide the information programs need without the right measurements of the right outcomes and goals. Program assessment plans must be
thoughtfully created to be effective tools for program improvement, and if performed correctly, the gains from the effort are boundless (Hatfield, 2013; Leggett & Eatmon, 2017).

**Radiography Programmatic Assessment Plans**

Hatfield (2009) states that there are two types of program-level assessment plans: program effectiveness and student learning. The program effectiveness assessment plan focuses on outcomes of the program as a whole such as retention rates, job placement rates, and registry/board pass rates (Hatfield, 2009; Schans, 2019). A student learning assessment plan focuses on how well the students are retaining information in the courses and meeting course or program objectives (Hatfield, 2009; Schans, 2019). While these may overlap in some ways, they are usually distinguishable, and the type of assessment plan depends on the audience. For instance, higher education administration may only be interested in program effectiveness information as an overview, but program faculty may be more interested in a student learning assessment (Palomba & Banta, 2001). Many programmatic accreditation agencies, however, including the JRCERT (Joint Review Committee on Education in Radiologic Technology, 2020), require a combination of both types for their assessment plan (Hatfield, 2009).

Because the JRCERT requires both types and radiography programs must have both types, a radiography programmatic assessment plan should include program effectiveness and student learning.

**Programmatic Assessment Plan Components**

The programmatic assessment plan should be able to fulfill both of the purposes discussed in the previous section. To do so, the assessment plan must follow all JRCERT
guidelines and possess certain qualities. As one of the main objectives is to identify areas of improvement, one could say that if the assessment plan data are not able to demonstrate any problems, then the problem may be with the assessment plan (Hatfield, 2009; Palomba & Banta, 2001). By visualizing the plan holistically and fragmentally, program leaders may be able to identify issues that undermine the assessment process and skew findings (Palomba & Banta, 2001).

According to Eatmon (2015), Hatfield (2013), and Lasley (2018), the programmatic assessment plan must be simple and easy to use for data collectors, data analyzers, and all persons who may view its results. Palomba and Banta (2001) and Hatfield (2009) claim that utility of the process is essential for full and beneficial participation by responsible parties and that complexity of the plan often decreases rather than increases value. Palomba and Banta (2001) recommend thinking of the programmatic assessment plan as a report card for the radiography program and to consider what benchmarks, measurements, outcomes, and goals communities of interest would be interested in viewing. There are various formats used for organization of the programmatic assessment plan and its data, but Palomba and Banta (2001) recommend a matrix so that the process is “systematic rather than haphazard” (p. 17).

Alignment is a key concept in assessment planning and curriculum building (Hatfield, 2009; Palomba & Banta, 2001). All JRCERT accredited programs must have a program mission, and according to Radiography Objective 6.3, the plan should measure the attainment of its mission (Joint Review Committee on Education in Radiologic Technology, 2020). To best measure fulfillment of the mission, all of the program’s assessment plan goals should align with the mission, all of the outcomes should align
with the goals, and all of the measurement tools should align with the outcomes (Hatfield, 2009; Palomba & Banta, 2001).

Specific to health sciences and practical fields, Palomba and Banta (2001) suggest that the programmatic assessment plans include a balance of what students need to know and what they need to be able to do. As health science programs create practicing professionals upon graduation, programs must prepare students for entry-level careers in their field and test both knowledge and clinical ability (Palomba & Banta, 2001). The plan components should each reflect expectations of entry-level professionals with some conformity to the individual program’s values and needs (Hatfield, 2009; Palomba & Banta, 2001).

According to Palomba and Banta (2001), reflection on the programmatic assessment plan should occur regularly. The JRCERT requires that the program hold a formal review of the assessment plan and process at least every 3 years (Joint Review Committee on Education in Radiologic Technology, 2020). During the review, the program should evaluate not only the components of the plan but the plan in its entirety (Palomba & Banta, 2001). In doing so, administrators should assess whether the plan is simple and makes sense (Eatmon, 2015; Hatfield, 2013; Lasley, 2018), wholly aligns with the program’s mission, meets radiography program knowledge and ability expectations, and matches current and future radiography practice standards (Hatfield, 2009; Palomba & Banta, 2001).

Goals

There are various formats that assessment plans can use. Programmatic assessment plans do not always incorporate goals, but this is meant to simplify matters
when organizing the assessment plan in a matrix format by allowing outcomes to be grouped within goals. The JRCERT requires accredited programs to organize outcomes or student learning outcomes (SLOs) into groups that measure their goals. JRCERT Radiography Objective 6.3 requires some specific goals concerning clinical competency, communication, and critical thinking (Joint Review Committee on Education in Radiologic Technology, 2020). This means that programs must include at least three goals in their assessment plans. The JRCERT does also recommend that programs consider goals “in relation to ethical principles, interpersonal skills, professionalism, etc.” and “additional professional content for higher degree levels” (Joint Review Committee on Education in Radiologic Technology, 2020, p. 47). In addition, as Palomba and Banta (2001) recommended, each component must align. This means that the goals should align to the mission of the program and the outcomes should align with the goals.

To be most effective for continuous quality improvement, the assessment plan and each of its components should set high expectations for the program, faculty, and students rather than expectations that can be achieved easily (Hatfield, 2009; Palomba & Banta, 2001). This does not mean setting the unattainable; rather, it means setting goals that are representative of high achievement in the field at the program’s expected level. The goals should be written to represent expectations of entry-level radiography professionals but also expectations well-beyond simple knowledge and into application and dissemination. In all respects, the assessment plan should also reflect appropriate and current practice standards (Palomba & Banta, 2001). For radiography, practice standards are created and revised by the American Society of Radiologic Technologists (ASRT) and are viewable digitally on its website for reference (American Society of Radiologic
Technologists, 2021). By using the ASRT Radiography Practice Standards to create radiography programmatic assessment plan goals, program administrators can ensure that students are reaching entry-level expectations (Palomba & Banta, 2001).

**Outcomes**

Outcomes are where the generalized goals become specific (Hatfield, 2009; Palomba & Banta, 2001). Outcomes state the exact expectation of the program, faculty, or students. Hatfield (2009) and Palomba and Banta (2001) claim that when outcomes are well-written, they can provide a solid foundation for an assessment plan. Hatfield (2009), Eatmon (2015), and Lasley (2018) recommend avoiding complexity when writing outcomes and describe well-written outcomes as specific, clear, and measurable. When related specifically to the student learning aspect of assessment, an outcome is referred to as a student learning outcome (SLO). Hatfield (2009) gives an example of a student learning outcome as a simple statement of “<<students/graduates>> will be able to <<action verb>> <<something>>“ (p. 3). While complex sentence structures may be tempting, keeping outcomes simplistic allows them to be more universally understood and for the appropriate tools to be chosen to best measure the outcome (Hatfield, 2009; Palomba & Banta, 2001).

JRCERT Radiography Objective 6.3 states that there must be at least two outcomes per goal (Joint Review Committee on Education in Radiologic Technology, 2020). This means that with a minimum of three goals and two outcomes per goal, there must be a total of at least six outcomes. The objective also states, however, that programs of higher levels (bachelor’s or master’s degree programs) should consider additional professional content. Hatfield (2009) recommends starting small with a concise six-to-
eight outcomes; however, Eatmon (2015) gives examples of three-to-five outcomes per goal.

While the JRCERT requires the three specific goals (clinical competency, communication, and critical thinking), the outcomes are where programs may differ and demonstrate their individual values and expectations related to these areas. These outcomes should again align with current practice standards and align with the program’s mission, values, and goals (Hatfield, 2009; Palomba & Banta, 2001). Outcomes should be chosen based on the knowledge, skills, and values that faculty and other communities of interest have determined collectively are important (Palomba & Banta, 2001). Hatfield (2013), Lasley (2018), and Palomba and Banta (2001) also recommend that programs consider employer and entry-level expectations of graduates as future employees. Echoing that respect, the JRCERT recommends in Radiography Objective 6.3 that programs “engage faculty and other communities of interest in the development or revision of its goals and student learning outcomes” (Joint Review Committee on Education in Radiologic Technology, 2020, p. 47).

When choosing the action verb for an outcome statement, assessment plan contributors must consider the expected student thinking skill levels (Hatfield, 2009). Programmatic goals and outcomes will likely reflect what students will be able to do at the end of their programs and will not be formative (Hatfield, 2013). Therefore, the expectation is beyond basic understanding and into application, synthesis, and demonstration of information and skills or demonstration of higher-order thinking skills (Hatfield, 2013; Schans, 2019). Expectations must also be appropriate to the degree level of the program as well (Eatmon, 2015).
Measurement Tools

The tools used to measure the outcomes in an assessment plan are vital instruments that should be chosen and utilized with care (Hatfield, 2009; Palomba & Banta, 2001). As the data collection component of the plan, there are many quality factors to consider. Measurement tools are discussed in more detail in the “Quality of Measurements” section.

Benchmarks

JRCERT Radiography Objective 6.3 simply requires that each measurement tool have a benchmark to “determine level of achievement” (Joint Review Committee on Education in Radiologic Technology, 2020, p. 47). Palomba and Banta (2001) suggest that benchmarks be set as aspirational but achievable. This means that benchmarks that are above the national average would be common; however, benchmarks will be dependent upon the outcome and the measurement tool chosen as well as the time frame in some cases. Eatmon (2015) also suggests setting outcomes and benchmarks that are higher than minimum expectations. Other than the two benchmarks for program effectiveness data outlined in the next section, programs are free to choose the benchmark appropriate to their program level and selected outcomes or measurement tools. Programs must address any unmet benchmarks annually during data analysis with a response or action plan (Joint Review Committee on Education in Radiologic Technology, 2020).

JRCERT Radiography Objective 6.1 that requires collection of the program’s 5-year average credentialing examination pass rate, 5-year job placement rate, and annual program completion rate sets particular benchmarks for two of these measures (Joint Review Committee on Education in Radiologic Technology, 2020). JRCERT requires a
5-year average credentialing examination pass rate of not less than 75% at first attempt within 6 months of graduation, a 5-year average job placement rate of not less than 75% within 12 months of graduation, but the annual program completion rate benchmark is set by the program.

**Time Frames**

Trending data is an important concept in assessment (Joint Review Committee on Education in Radiologic Technology, 2020; Eatmon, 2015; Hatfield, 2009; Leggett & Eatmon, 2017). Leggett and Eatmon (2017) refer to looking at data points over time as longitudinal trend analysis. The intention is to be able to visualize positive and negative trends over multiple cohorts so that a single data point is not the basis of change. Hatfield (2009) refers to trending as either stable over time, equal across measures, consistent, increasing, or decreasing. Hatfield (2013) and Eatmon (2015) state that measurement tools for the purpose of program assessment should be utilized during the end of a program or its last semesters to best demonstrate its program outcomes. However, assessment can also be used to demonstrate growth. Lasley (2018) suggests that programs can measure growth across semesters with the same group of students or across cohorts by utilizing multiple time frames. No matter the time frame method, Leggett and Eatmon (2017) recommend looking for a consistent trend over several data points, generally at least three cohorts, before programs decide that change is warranted.

**Responsible Parties**

While the parties ultimately responsible for the programmatic assessment plan are program administrators and faculty, Hatfield (2009) and Palomba and Banta (2001) recommend stakeholder or community of interest involvement. Communities of interest
for radiography programmatic assessment are any persons who might have an interest or concern related to the radiography program outcomes. Thus, communities of interest could be administrators, faculty, students, graduates, employers, or clinical faculty.

JRCERT Radiography Objective 6.3 does not require that responsible parties are outlined within the programmatic assessment plan; however, it does state that the program should “engage faculty and communities of interest” meaning that these persons must have a role in the radiography programmatic assessment plan (Joint Review Committee on Education in Radiologic Technology, 2020, p. 47). JRCERT requests several times throughout JRCERT Radiography Standard 6 that these communities of interest are involved in program effectiveness, assessment planning, assessment evaluation, and assessment data analysis (Joint Review Committee on Education in Radiologic Technology, 2020).

Involving communities of interest does not necessarily mean having them formally collect data for the assessment plan. Rather, the intention is to receive their input in creation of the plan, let them know what the goals and outcomes are, permit them to see the aggregated data, and allow them to assist with creation of action plans concerning the data (Hatfield, 2009; Palomba & Banta, 2001). When faculty and communities can achieve consensus in their assessment efforts, this can be an excellent foundation for assessment success (Palomba & Banta, 2001).

Which communities of interest should be involved is the prerogative of the radiography program, however, Hatfield (2009) recommends that the assessment plan be a collective effort of all faculty regardless of rank. Palomba and Banta (2001) suggest that faculty be involved in every aspect of assessment. Faculty involvement creates
ownership and loyalty to the plan (Hatfield, 2009; Palomba & Banta, 2001). In addition, faculty are more likely to frame their courses around the assessment goals making the assessment effort a part of their daily work rather than a separate effort when they are personally involved (Palomba & Banta, 2001). Hatfield (2009) also cautions against faculty determining individually the meaning of goals and outcomes and states that faculty must all agree on the aims of assessment for group involvement to work effectively.

Students and graduates as communities of interest should not be undervalued as well. Current students perhaps have the greatest stake in outcomes of the program, and alumni are often concerned with the program’s reputation for their future careers. Students and graduates can provide valuable input in assessment planning and analysis (Bloxham & Boyd, 2007; Palomba & Banta, 2001). An insider’s perspective gives a fresh look at the data and can give ideas for changes to be made in the process or interventions in the program (Palomba & Banta, 2001).

According to Hatfield (2009, 2014) and Palomba and Banta (2001), strong administrative support underlies the success of assessment in many cases. Administrators have a stake in the outcomes of the program and would likely be interested in the assessment process due to its ties with JRCERT accreditation. Administrators can demonstrate support of assessment by allocating staff and resources to programs for their efforts, but they may also be directly involved in the process by being present and contributing at assessment meetings as a part of the communities of interest (Hatfield, 2009; Palomba & Banta, 2001).
Quality of Measurements

Although assessment plans are not true empirical research projects, there are several practices within empirical research that are valuable when collecting data and can apply to collecting assessment data as well. For example, validity and reliability are necessary qualities for measurement tools in an assessment plan (Schmidt, 2020). Program administrators should also consider the type and number of measurement tools to be used in their assessment plan as well as other factors (Hatfield, 2009; Leggett & Eatmon, 2017).

Validity and Reliability of Assessment Data

Validity is of particular concern in assessment plan measurement tools. Validity is the extent to which data collectors are measuring what they expect to measure. Care should be taken that the selected measurement tools adequately measure the selected outcome. If an outcome is not measurable or is incorrectly measured, the resulting data are not beneficial to the program (Leggett & Eatmon, 2017). In addition, assessment plan creators must be mindful of interference of other concepts being measured (Hatfield, 2009). For instance, utilizing an exam to measure one concept that is within the exam’s content does not measure only the intended concept (Hatfield, 2009). In this case, perhaps using specific questions within the exam that more directly assess the outcome would be more appropriate. Some threats to validity might include: inadequate explanation of the measurement tool or how to use it (Schmidt, 2020), reactivity of data collectors or participants (Jacques, 2021), and measurements from only a single source (Leggett & Eatmon, 2017).
Reliability is the ability of a measurement tool to measure consistently. When choosing an instrument, assessment plan contributors should consider an instrument’s reliability. The ability of an instrument to measure information consistently is important especially when the instrument may be used by multiple persons, which is referred to as its inter-rater reliability (Schmidt, 2020). According to Schmidt (2020), for a measurement tool to be most reliable, the tool must be easy to use with clear instruction as appropriate no matter the user.

An excellent tool that is recommended by Hatfield (2009, 2013), Lasley (2018), and Schmidt (2020) is a rubric. According to Schmidt (2020), rubrics can “add reliability, validity, and transparency to assessments” and “decrease subjectivity in evaluations” (p. 210). Rubrics that are clear and easy to use produce consistent results, and as measurement tools in an assessment plan, the collected data can be more readily trusted between raters and amongst multiple students and cohorts (Hatfield, 2009). Whether utilizing a rubric or some other measurement tool, time should be taken to explain to all data collectors the tool and how to use it (Schmidt, 2020). Schmidt (2020) recommends giving some training and quality examples to data collectors prior to implementation of a new measurement tool.

Reactivity of data collectors or participants refers to changes that may occur in data because the data collectors or participants know that the data are being collected and that the results may have an impact on the program (Jacques, 2021). When possible, the participants and data collectors should not know that the data being collected will be used for the program’s assessment plan (Jacques, 2021). However, this may not be possible
when data collectors such as faculty or clinical instructors are involved in the assessment process.

Triangulation is collecting data from multiple sources, using multiple data collectors, or using multiple data analysis techniques (Leggett & Eatmon, 2017; Natow, 2020). In terms of assessment plans, using multiple sources can mean selecting multiple measurement tools for a single outcome and ensuring that those measurement tools come from different sources, time periods, locations, or perspectives (Green, 2014; Natow, 2020). In radiography programs, some examples of various sources might be assessments from coursework, assessments from clinical rotations, and surveys from employers or students. Alternatively, triangulation can be used by measuring differing cohorts or the same cohort over a period of time (Lasley, 2018; Leggett & Eatmon, 2017). As data will be used to make important decisions regarding the program, Palomba and Banta (2001) recommend using a variety of perspectives and state that external sources “provide enrichment” to assessment programs (p. 19). Hatfield (2013) also recommends radiography programs utilize both classroom and clinical measures. Using triangulation to measure an outcome results in: increased construct validity, increased trustworthiness of the data, and thus increased value of the data (Natow, 2020).

**Direct and Indirect Measures**

Direct measures are those assessing student performance on knowledge or skill examinations and are considered best for demonstrating student learning (Palomba & Banta, 2001). Leggett and Eatmon (2017) delineate direct measures for radiography programs as internal direct (evaluations by program faculty) and external direct (evaluations by clinical faculty). Both are considered appropriate to measure student
learning and can be used in triangulation as multiple sources. In contrast, indirect measures are surveys or focus groups that collect data on reflections of student learning or the program. In the student learning portion of an assessment plan, Hatfield (2009), Leggett and Eatmon (2017), and Palomba and Banta (2001) recommend using only direct measures. As Hatfield (2009) states “just because a student has reported being satisfied with their experience in the program doesn’t necessarily correlate with how much that student learned” (p. 4). However, indirect measures do have a place in radiography assessment plans. JRCERT Radiography Objective 6.3 requires that programs also measure graduate and employer satisfaction as a part of program effectiveness data (Joint Review Committee on Education in Radiologic Technology, 2020). While programs may want graduates and employers to be satisfied, this indirect measure is not valid for measuring student learning outcomes (Hatfield, 2009).

**Qualitative and Quantitative Data**

Both qualitative and quantitative data can provide valuable information in an assessment plan. While changes in quantitative data may be more easily visualized during data analysis, this should not diminish the value of qualitative data (Palomba & Banta, 2001). Assessment data collectors may also be able to translate qualitative data into quantitative for visualization through the use of software or tools such as rubrics (Schmidt, 2020). Ultimately, administrators should focus on choosing measurement tools that are easy to use and best measure the intended outcome (Palomba & Banta, 2001).

**Number of Measurement Tools**

According to JRCERT Radiography Objective 6.3, program assessment plans are required to have at least three goals, two outcomes per goal, and two measurement tools
per outcome (Joint Review Committee on Education in Radiologic Technology, 2020). This equates to a minimum of 12 measurement tools for a programmatic assessment plan for student learning outcomes. While two measurement tools per outcome is the minimum requirement, to most effectively use triangulation as discussed in a previous section, three or more tools are necessary (Leggett & Eatmon, 2017; Natow, 2020). More sources of information equate to more trustworthy data (Leggett & Eatmon, 2017; Natow, 2020); however, the assessment plan should not have so many measurement tools that it becomes cumbersome for data collectors and analyzers to use (Hatfield, 2009).

**Accreditation Requirements**

The only specific measurement tools required by the JRCERT are under Radiography Objective 6.1 for program effectiveness assessment. JRCERT Radiography Objective 6.1 requires collection of program effectiveness data to include: 5-year average credentialing examination pass rate, 5-year job placement rate, and annual program completion rate. These may be outlined under a radiography programmatic assessment goal or as a separate measurement tool entirely (Joint Review Committee on Education in Radiologic Technology, 2020).

**Choosing a Measurement Tool**

Identifying or constructing adequate measurement tools is an essential part of the assessment plan process. When choosing an assessment activity, administrators should consider ones that have validity and adequately measure the intended outcome. As previously discussed, the outcomes should demonstrate higher-order thinking skills and thus the measurement tools should also measure higher levels of learning. To do so,
measurement tools that are within the end semesters of the program are most appropriate as these are when the intended outcomes are being met (Hatfield, 2009).

Bird et al. (2005) describe in the last of their special issue series a guide to outcomes assessment planning as well as implementation of their established conceptual model in a case study. Their findings of the case study indicated that programs should utilize organizational techniques such as conceptual models. Bird et al. (2005) also indicate that although programs may be tempted to develop or purchase new instruments for program assessment, programs should consider first mining the wealth of data already existing for assessment purposes. In either case, programs should choose their instruments carefully to best measure their intended outcomes.

McCann and Schneiderman (1995) surveyed dental hygiene program faculty to gather information about their assessment programs. This study revealed weaknesses in assessment methodology mostly related to their instruments or measurement tools. Dental hygiene faculty indicated low percentages of validation in instruments being used for assessment programs and concern about the quality of data being collected due to this. This study outlines the importance of a single component of the assessment plan in the overall quality of an assessment program.

Assessment plan contributors should ensure that assessment activities have value to participants and data collectors beyond the assessment plan and select activities that “make their own contribution to learning” (Palomba & Banta, 2001, p. 17). Palomba and Banta (2001) also suggest that measurements and the subsequent data collected be written in a way that respects the identity of individual participants, both students and faculty. Lastly, to detect changes in outcomes, whether positive or negative, the measurement
tools must be sensitive to those changes to be able to visualize them. Measurement tools should be thoughtfully considered before implementation into an assessment plan and evaluated regularly for its validity and reliability relative to the outcome it is measuring.

**Previous Assessment Rubrics**

Hicks (2016) completed a dissertation in practice study on the outcomes assessment practices specifically of accredited radiography programs after identifying the need for more research on the topic. Hicks (2016) calls the framework and the methodology meta-assessment. The study used a pilot-tested meta-assessment rubric to perform an exploratory case study approach to analyze 10 radiography programmatic assessment plans meeting sample criteria. The rubric that was developed based on general assessment plan literature covered four basic components of a radiography assessment plan based on current JRCERT Radiography Standards: goals, outcomes, measurement tools, and benchmarks. These four components served as the criteria and four measurement levels were composed for each criterion. Multiple indicators were included within each measurement level for each criterion.

Hicks (2016) identifies weaknesses in the knowledge and expertise of radiography programs and the abilities to create quality programmatic assessment plans with the given knowledge from the JRCERT. Hicks states that there is a lack of education in this area for many who are practically educated such as in radiography. Hicks proposes the use of the study’s developed rubric as a self-assessment tool for the purpose of determining areas of weakness and increasing overall quality of radiography programmatic assessment plans.
The indicators used in Hicks’s (2016) rubric are comprehensive of what the literature has determined to be evaluative for each of the components, but the combination of all quality factors related to a rubric component into a single criterion makes the rubric difficult to use. In addition, there is not much information specific to radiography or health science program assessment included in the rubric. Limitations of the study are the lack of external validation of the meta-assessment rubric, delimitation of the study to associate degree programs, and a small sample size that is common in a qualitative case study design (Hicks, 2016; Merriam & Tisdell, 2015).

Health Science Program Assessment Model

Kinnon and Friedrich-Nel (2010) describe their outcomes assessment model and its application in a South African radiography program. The goals of the assessment plan were to hold students accountable to specific outcomes and to measure their success against reasonable similar standards. This study is limited because of its application from allied health to radiography specifically, but the results seem to have been successful for its case study. Findings are otherwise very specific to the program and its needs, and the researchers do not directly address factors that affect the quality of the assessment plan in this study.

Justification for Study

Current literature and documents give very little guidance for an assessment plan that serves as a minimum standard for its compliance. While JRCERT Radiography Objective 6.3 provides some information on topics that should and could be covered in the assessment plan, it leaves the opportunity for program administrators to insert their own values by selecting some goals, outcomes, measurement tools, and benchmarks that
are meaningful to the programs (Joint Review Committee on Education in Radiologic Technology, 2020). Palomba and Banta (2001) caution against accrediting agencies imposing too much structure because a part of the benefit of assessment is in customizing the plan to the program’s values. JRCERT’s use of broad direction is an advantage for those with expertise in assessment who are able to create and evaluate a quality assessment that is tailored to their program’s needs, but it can be a disadvantage for those without expertise in assessment attempting to create or evaluate an assessment plan. Some programs may be tempted to formulate assessment plans that only address the immediate need of accreditation, making the effort give minimal benefit to the program (Palomba & Banta, 2001). As previously stated, Hatfield (2014) and Schans (2019) identify assessment as a common area of JRCERT citation. Hatfield (2013) and Palomba and Banta (2001) identify the need for faculty development and resources in order for assessment to be implemented effectively. Palomba and Banta (2001) also recommend the use of guidance information and model assessment plans to assist programs in their own assessment plan development.

This study was intended to create a rubric to evaluate the quality of assessment plans to address a common JRCERT citation area and improve the quality of radiography programmatic assessment plans as effective tools for improvement of radiography programs. According to Schmidt (2020), rubrics can help with understanding of expectations and how quality of work can be improved. Schmidt (2020) is referring to the use of rubrics as an assessment tool in the classroom or a measurement tool in an assessment plan, but rubrics can be used to assess any work including the assessment plan itself such as Hicks (2016) suggested. As made apparent by the literature, this is an
area of need for many radiography programs. This study builds upon but is also different from Hicks in both methodology and purpose. A rubric, which addresses specific criteria that affect the quality of radiography programmatic assessment plans and indicators for evaluation of those criteria, could allow assessment plan evaluators even without the necessary expertise in assessment to critique their assessment plans and would be more user-friendly than existing rubrics.
CHAPTER 3

METHODOLOGY

Introduction

The process of educating and preparing healthcare providers such as radiologic technologists is a complex process that involves many different didactic and clinical educators and learning that occurs in the classroom and at various clinical sites. The complexity makes a quality programmatic assessment plan even more necessary to identify areas for improvement. However, the complexity also makes an assessment plan more difficult to create. According to sources, the assessment plan is one of the areas in which most accreditation citations for radiography programs occur (Hatfield, 2014; Schans, 2019).

When implemented correctly, assessment is defined by many of its proponents as being one of the keys to program success (Allen, 2004; Eatmon, 2015). With the right goals, objectives, outcomes, measurement tools, and benchmarks, administrators can gather data to determine strengths and areas of improvement. However, building a quality programmatic assessment plan that focuses on the program’s values is the first step (Allen, 2004; Eatmon, 2015; Hatfield, 2013).

These topics bring forth the question of what makes a quality radiography programmatic assessment plan. The literature as discussed in Chapter 2 is limited concerning radiography programmatic assessment specifically. The Joint Review
Committee on Education in Radiologic Technology (JRCERT) Radiography Objective

6.3 guidance documents leave expectations broad and prescribe basic categories and a few specific goal topics (Joint Review Committee on Education in Radiologic Technology, 2020). Because of the importance of assessment planning, the complexity of radiography program assessment, and the lack of existing radiography-specific information, the purpose of this study was to design an appropriate rubric to measure quality of radiography program assessment plans. To do so, the study must answer the following research questions:

1. What criteria should be used to measure the quality of a radiography program’s assessment plan?
2. What indicators should be used to determine whether the radiography program assessment plan criteria have been met?

**Delphi Methodology**

Assessment plans in general are complicated with multiple measurements, which makes measuring an assessment plan’s quality even more intricate. As stated previously in the literature review, there is little empirical research specifically concerning radiography assessment. To create a rubric to measure radiography program quality required expertise from reputable sources. Complex studies with clear purposes in which there is little to no empirical literature can benefit from an exploratory-type study such as the Delphi technique (Avella, 2016; Green, 2014; Hsu & Sandford, 2007; Vernon, 2009). The Delphi technique is an iterative process that occurs to gain consensus or agreement among experts concerning a topic through multiple, typically two to four, rounds of questions (Avella, 2016; Green, 2014; Hsu & Sandford, 2007; Meijering et al., 2013).
The Delphi technique or Delphi Panel technique was first developed by the RAND Corporation in the 1950’s to predict outcomes from nuclear weapon usage in war (Vernon, 2009). According to RAND mathematicians who developed the Delphi technique, there are two things upon which predictions are based: knowledge and speculation, with opinion in between the two (Avella, 2016). Key factors of the Delphi technique are the removal of group interactions or discussions, the purposeful anonymity of the participants, and feedback to participants (Avella, 2016; Vernon, 2009). Due to group dynamics, the results from studies that involved face-to-face discussions were often found to be less accurate than those without discussion (Avella, 2016; Vernon, 2009). The Delphi technique has precedence for use in education and social science studies (Green, 2014; Hsu & Sandford, 2007; Vernon, 2009), in health sciences including radiography (Vernon, 2009), in assessment research (Hsu & Sandford, 2007), and in the measurement of accreditation standards (Riegel, 2019).

The greater the knowledge of the individuals in the study, the more valid and accepted the predictions or outcomes. This study utilized group expertise and consensus over multiple rounds to provide empirical evidence and support of the rubric criteria and indicators. The Delphi technique is known for its flexibility and simplicity of design, which supports changes needed to effectively create the rubric for this study (Avella, 2016; Vernon, 2009). The Delphi technique is also an excellent method for long distances between participants, for busy participant schedules, and for researcher cost effectiveness as data can be gathered online and at the participants’ convenience (Vernon, 2009).

The Delphi study performed was for the purpose of agreement on criteria that should be used to measure quality of a radiography programmatic assessment plan and
for establishing indicators for measuring whether the quality criteria are met. To establish quality criteria and indicators, this study used a modified Delphi process. Typically, the first round of Delphi consists of an open-ended questionnaire or interview; however, it is acceptable and common practice to modify the first round by using a structured questionnaire based on review of the literature, which is then referred to as a modified Delphi (Avella, 2016; Hsu & Sandford, 2007; Vernon, 2009).

Sample Selection

The sample of study participants for Delphi studies are experts in the research area, and expertise in Delphi studies as defined by the individual study and the subject matter (Green, 2014; Hsu & Sandford, 2007). For this study, an expert was defined as someone with specialized knowledge of radiography programmatic assessment and at least 5 years of experience in radiography assessment. This is a very broad definition, which can encompass a diverse group of experts with various perspectives related to the topic and add to the credibility of the study (Green, 2014). However, expertise rather than representation is the top priority in Delphi studies. Because the goal of the Delphi is not to generalize results to other expert panels but to create expert-accepted results for a specialized area, a homogeneous group of experts can work to the benefit of the study (Avella, 2016; Vernon, 2009).

Participants were selected based on nominations, which is common practice for Delphi studies (Hsu & Sandford, 2007). The nomination sampling practice is a non-probability sampling technique (Kirchherr & Charles, 2018; Parker et al., 2019). While nomination sampling has been called into question as a reputable form of research participant sampling (Kirchherr & Charles, 2018), it was a necessary and logical part of
this study. The intention of this Delphi study was not to generalize the sample population to all other similar populations (Avella, 2016); the purpose was to create a valid rubric for measuring radiography assessment plans. Therefore, a representative sample of all experts in the field was not necessary. In addition, the expertise needed for this study was specific; there are a limited number of persons who could be selected as participants, and there are no known lists of such experts, which made non-probability sampling necessary to contact the target participants (Avella, 2016).

To limit researcher bias during Delphi study expert selection, it is recommended that expertise, although defined, is ultimately determined by colleagues or a third-party (Avella, 2016). As suggested by Avella (2016) and Green (2014), participants who could also be considered stakeholders in the outcome of the rubric or those that would be most motivated to see its success were selected initially. This initial selection was made based on positions within the leading institutions for radiography assessment. These initially selected stakeholders were JRCERT accreditation site visitors or staff who evaluate assessment plans or coordinate assessment planning workshops.

Thereafter, the initially selected experts served as sampling seeds to recommend additional participants through nomination, which resulted in the initially selected experts serving as the third-party selectors. Selected experts who responded to participate initially and subsequently were asked if they wanted to nominate others who would fit the expert criteria, and those nominated individuals were contacted to participate. This process continued until the panel reached its target size.

The target panel size was 20 participants. Most Delphi studies consist of between 15 and 20 participants (Hsu & Sandford, 2007). Because of the length of a Delphi study,
there is concern of non-response or incompleteness of the study by participants, which could devalue the study and the resulting rubric (Hsu & Sandford, 2007). To combat attrition, potential participants were informed during recruitment of the estimated time and effort commitment so that only those participants who agreed to the commitment accepted the nomination.

**Panelist Risks and Benefits**

The risks for participants involved in the study were considered minimal with the only concern being confidentiality of the expert panel (Avella, 2016; Vernon, 2009). Panelists’ identities were known only to the researcher and kept confidential. Participant information for the Delphi study was kept in Qualtrics with only the researcher knowing the login. Exported data were anonymized. In keeping with Delphi practices, only aggregate information was sent to participants between rounds (Green, 2014; Hsu & Sandford, 2007).

The only benefits for participants in Delphi studies including this one were self-fulfillment and possibly expansion of their own knowledge on the subject (Green, 2014; Hsu & Sandford, 2007; Vernon, 2009). However, as many of the experts may be interested in the product of this study, the resulting rubric was also considered a benefit to them for future use.

**Data Collection**

Depending on the type of questions asked to the expert panel in a Delphi study, it may be defined as quantitative or qualitative (Avella, 2016). This study included collection of both quantitative and qualitative data. Data were collected using Qualtrics software. Quantitative data collected during the process was through a questionnaire sent
to participants, which included Likert-type scale questions. Qualitative data were also collected in the questionnaire through open-ended questions. These questions were reviewed for researcher bias or steering by the three dissertation committee members who served as a third-party as recommended by Avella (2016).

During the Delphi study, data collection occurred at intervals. This is due to the iterative nature of the Delphi technique and the process to create consensus amongst participants (Green, 2014; Hsu & Sandford, 2007). As recommended by Hsu and Sandford (2007), study participants were given 2 weeks to respond to each round. Reminders were sent to the panel experts within the 2-week time frame including: the original email, email reminder 1 week prior to deadline, and email reminder 3 days prior to deadline. The number of panel members varied between rounds depending on the number of responses received within the given time frame, which is acceptable according to Avella (2016). Rounds 1 and 2 met the target panel size of 20, however, Round 3 had only 19 participants. Data analysis occurred for 2 weeks between each round to minimize the time between rounds, allow for accurate and complete analysis, and keep participant interest peaked (Green, 2014; Hsu & Sandford, 2007).

**Delphi Round 1**

The first round asked participants to rank criteria and indicators on a Likert-type scale. Participants were asked in questionnaire form whether they are extremely dissatisfied, dissatisfied, satisfied, or extremely satisfied with each item. The use of a Likert-type scale is common in Delphi studies and is often used to translate abstract ideas to quantitative data (Green, 2014). The terminology used in Likert-type scales for Delphi studies is various and is typically used for measuring ranking and amount of favorable or
unfavorable responses (Avella, 2016; Hsu & Sandford, 2007). As stated by Green (2014) and Lesmond et al. (2016), some experts recommend an even number of options on the questionnaire such as the four chosen. By having an even number of possible responses, the participant must choose a side rather than the middle or neutral option, which may be beneficial to this study’s objective of inclusion or alteration of items. Favorable responses were initially satisfied or extremely satisfied, and unfavorable responses were dissatisfied or extremely dissatisfied. Respondents who chose an unfavorable response were prompted to respond to an additional open-ended question: “What revision do you suggest to make this item satisfactory?” All participants were also given the opportunity to provide additional comments on the criteria and indicators.

During analysis of the first round data, it was determined that only extremely satisfied responses would be considered favorable. This was due to respondents choosing satisfied responses but providing suggestions for improvement under additional information. This change was implemented for all future rounds and communicated to participants prior to the second round.

**Delphi Round 2**

After data collection and analysis from the first round, Round 2 began. A key aspect of the Delphi technique is the review of previous round results with each subsequent round (Avella, 2016; Vernon, 2009). If changes were warranted based on analysis, some items were revised and reflected in the questionnaire. The questionnaire with the addition of first round data were sent to respondents to attempt consensus of criteria and indicators in this round. For each item, response percentages, n-values, and anonymized comments were shared with all panelists. By giving the results and responses
of the other experts to the participants, the panel members were given the opportunity to change their previous viewpoints in light of the opinions and comments of others.

**Delphi Round 3**

After data collection and analysis from the second round, Round 3 began. The questionnaire with revisions was sent to the panelists with the data from Round 2. Following data analysis of the third round, the study was complete as consensus was achieved as defined by analysis terms. Once a consensus of all items was achieved, the development of the rubric was also complete.

The Delphi technique is defined as a consensus development technique (Avella, 2016; Vernon, 2009). Note, however, that consensus does not mean 100% agreement (Avella, 2016). In fact, with percentage data analysis techniques, the average limitation for defined agreement by Delphi studies is approximately 70% (Avella, 2016; Green, 2014).

**Rubric Development**

Draft rubric criteria and indicators were initially created from literature on general assessment, health science assessment, and radiography assessment best practices. Because of the lack of in-person exercises to begin the draft of the rubric and the large amount of time involved, a modified Delphi technique, which gave initial direction and a starting draft to the expert panel was determined to be most useful in ensuring that objectives of the study were met easily and quickly (Avella, 2016; Vernon, 2009). See Appendix A for the draft rubric used to start the modified Delphi in Round 1. Next quantitative and qualitative data were used to refine and validate the criteria and indicators.
Quantitative Data

For quantitative data, a raw choice count was utilized to deliver data to the experts between rounds (Hsu & Sandford, 2007; Vernon, 2009). However, Lawshe’s content validity ratio (CVR) was used to determine consensus of the quantitative data (Lawshe, 1975).

Lawshe’s CVR, shown in Figure 1, is a mathematical process of determining the content validity ratio of abstract ideas based on expert panel responses (Lawshe, 1975). This method utilizes the number of favorable and unfavorable responses and the number of responses in total to determine whether the idea meets statistical significance. Lawshe (1975) describes the method in his article to formulate job requirements and indicators to determine whether these requirements have been met, which is similar to this study. Lawshe utilizes expert panels in the form of those who know the job as the participants similar to the planned expert panel who know radiography programmatic assessment. In this method, responses are taken from the panel, compiled, given a CVR, and determined to have significance if they reach the minimum CVR value. The CVR values range from -1 to 1. A CVR value of -1 indicates that no experts responded favorably. A CVR value of 0 indicates that half responded unfavorably and half favorably, and a CVR value of 1 indicates that all experts responded favorably. CVR values are calculated using the formula shown below in which \( n_e \) is the number of panelists who respond favorably, and \( N \) is the total number of panelists (Lawshe, 1975). Ayre and Scally (2013) give a chart, which indicates the minimum Lawshe CVR values based on the size of the expert panel.
Figure 1

*Lawshe’s Content Validity Ratio Formula*

\[
\text{CVR} = \frac{n_e - N_2}{N_2}
\]

*Note.* Taken from Lawshe (1975, p. 568).

In this study, favorable responses were planned to be those marked *satisfied* or *extremely satisfied* by panelists. However, after Round 1 data were analyzed, this was changed to only *extremely satisfied* being accepted as a favorable response. This was due to panelists responding with *satisfied* but indicating suggested changes under the additional information comment section. According to Lawshe’s minimum CVR values chart (Lawshe, 1975, p. 568), with a panel size of 20 experts, a CVR value of at least 0.42 is required to achieve consensus. The CVRs for each criterion and indicator were calculated after each round. During analysis, if an item did not achieve consensus or a CVR value of 0.42, the item was revised. Revisions were made based on expert panelists’ suggestions for revision and additional comments. After all criteria and indicators achieved consensus, the study was complete.

*Qualitative Data*

Qualitative data responses were also collected and included as feedback during rounds to assist in achieving quantitative data consensus results. The qualitative data collected during rounds included revision suggestions for items when panelists responded unfavorably and any additional comments provided. All panelists were given the anonymized comments between rounds along with the survey (Avella, 2016; Vernon, 2009).
Validity and Reliability

With the Delphi technique, the question of validity lies with three factors: expert selection, panel size, and research process (Avella, 2016). The process itself, although flexible, is extremely simple, and its validity lies within its simplicity and source of data (Avella, 2016; Green, 2014; Vernon, 2009). As long as the process is implemented rigorously, inaccuracies are attributed to the researcher or the expert panel but not to the process (Avella, 2016; Vernon, 2009).

During expert selection, care was taken to set the criteria, which will describe the expert, and select the participants so that any researcher selection bias was avoided and those that were qualified were selected. In avoidance of bias, third-parties and colleagues were used during expert selection through the use of nomination sampling. As Green (2014) indicates, the source of the information often is much more significant than the results, which outlines the importance of selecting those that are truly knowledgeable about the subject matter, radiography programmatic assessment. According to Lawshe (1975), if the experts are perceived as true experts, then there can be no higher authority to establish content validity.

Because of the diversity and small size of Delphi expert panels, analysis techniques may not be as reproducible or reliable as some other research study methods (Avella, 2016; Green, 2014). It may be difficult for another researcher to assemble a panel, which is similar enough to the one from this study especially given that much of the experts’ information is not divulged, and other expert panels may utilize different terms in criteria and indicators than the ones chosen for this study. However, according to Green (2014), it may be assumed that persons with similar expertise using the same
process would have similar results. Green (2014) suggests four things to increase Delphi study reliability:

1. Panel numbers should be stable throughout rounds.
2. Amount of time between rounds should be kept to a minimum.
3. Questions should be clear and concise.
4. Feedback given should include reasons and should avoid only using averages of only responses significant to the study.

Each of these four were implemented and adhered to when possible for increased reliability of this study. As described, reminders were sent to increase participation and decrease attrition. As recommended by Green (2014) also, only 2 weeks were given for responses and a maximum of 2 weeks for analysis of data between rounds. Questions were reviewed by the dissertation committee and chair to ensure ambiguity was minimal if not avoided altogether. Feedback included qualitative data gathered from the panel as well as choice counts from each response instead of only providing favorable responses or those significant to the study.

**Researcher Bias**

According to Avella (2016), the role of the researcher in a Delphi study is initially as the planner and later as the facilitator but never as contributor. However, when the modified Delphi technique is used, the first draft of the product introduced to the panel is created by the researcher; a systematic process must be implemented to develop the draft product to minimize this influence.

When the methodology is carefully designed and implemented using accepted Delphi technique practices, the risk of researcher bias is minimal (Avella, 2016). In this
study, the methodology was carefully planned. During the expert selection process, job
titles and third-parties in the form of colleagues were used to prevent bias. However, the
researcher may have known relationships with the expert panel members. This may occur
only because there are a limited number of experts qualified for the study (Avella, 2016).
Efforts were taken to select expert panel members who did not have a relationship with
the researcher to prevent this bias; however, casual acquaintances were not excluded as
supported by Avella (2016). During the study, communication with the expert panel was
limited to prevent contribution or leading by the researcher. Only that which came from
the expert panel was recorded, and clarification was requested as needed. Communication
was through written, electronic means that can be internally audited and, as suggested by
Avella (2016), was only between the researcher and each panel member separately.

Researcher bias can also be exhibited through the chosen method of modified
Delphi as the researcher imposes ideas on the expert panel (Avella, 2016). As a
systematic process, development of the first round rubric in the modified Delphi was
taken strictly from the literature to keep the researcher’s bias limited. All criteria and
indicators for the initial rubric have literary references included for verification (see
Appendix A). To further limit researcher bias, the use of open-ended questions
throughout the rounds allowed the expert panel to give their opinions on the literature-
based topics and, therefore, limited the influence that this modified technique had on the
outcomes.

Rubric Testing

According to Lowe (2019) and Hassan et al. (2006), a pilot study can be used to
determine the suitability of an intervention or tool prior to its use in a larger scale study.
Similar to a pilot study, a rubric test was performed in this case to preliminarily determine the suitability of the final rubric for use by radiography program leaders and with plans to perform a larger scale project in the future. The purpose of the testing was to establish its relevance to radiography program leadership, determine how the rubric might best be used, and discover its strengths and weaknesses as a program leader’s tool. Data in the form of quotations from rubric testing were used to prove these points, and the results of this testing are listed in Chapter 4, Rubric Testing Results.

To perform this test, a small group of radiography program leaders known to the researcher were recruited as participants. Five were contacted to participate, and four accepted. The four participants were program directors from various radiography program types and locations although they were all from the same state. The program directors came from both public and private institutions and led programs with multiple degree levels. Each participant was sent the rubric at least 2 weeks in advance of the scheduled interview to give adequate time to utilize the rubric to measure the quality of his/her own program’s assessment plan.

The rubric created through this study was tested using a semi-structured interview process. The interview questions were reviewed by a third-party for clarity prior to use. The third-party in this instance was the dissertation chair. Notes were taken by the researcher during the interviews of the participant comments. As recommended by Merriam and Tisdell (2015), following the interview, the test participants were sent records of the interview notes for member checking to ensure that their comments were an accurate reflection of the interview. Confirmations were received from all four participants.
CHAPTER 4
RESULTS

Study Details

The study purpose was to create an instrument that allows radiography program administrators and assessment leaders to measure the quality of their radiography programmatic assessment plans. This chapter presents findings from the research beginning with the initial instrument creation. Next, there is a discussion of results from three rounds of surveying the Delphi panel, focusing on the feedback received and changes made to the instrument. Then, the rubric testing results will be presented. Finally, the chapter will conclude with an interpretation of the results from all phases of the research.

The qualitative data were analyzed by comparing the original rubric criteria to the feedback. Then changes were incorporated based on feedback into each successive update of the instrument. Feedback was also presented to the Delphi panel, in conjunction with the updated instrument, to ensure that the suggestions and comments were interpreted correctly. Finally, the quantitative data were analyzed to determine Lawshe’s CVR. Determination of Lawshe’s CVR ensured the validity of each rubric criterion and indicator.

Initial Rubric Creation

The first step in the process was the creation of the initial rubric, which was based on a review of the literature regarding programmatic assessment, Joint Review Committee on Education in Radiologic Technology (JRCERT) Radiography Standards, and work by several
authors. From this review, a draft of the rubric components and subsequent criteria and indicators were created. Literary references were listed with the developed criteria and indicators. The rubric was then reviewed by the dissertation committee for refinement with minor terminology and grammatical changes needed. Appendix A presents the initial instrument used in Delphi Round 1 and all literary references.

**Delphi Round 1**

The survey sent to panelists asked how satisfied they were with each criterion and indicator from the initial rubric with the response options of *extremely dissatisfied*, *dissatisfied*, *satisfied*, and *extremely satisfied*. If the panelists were not *satisfied* or *extremely satisfied*, the survey prompted the panelist to provide their suggestions for revision. The survey also provided the opportunity for panelists to give additional comments.

A total of 21 panelists participated in Round 1. The Content Validity Ratio (CVR) was calculated for each rubric criterion and indicator using the formula in Figure 1. In this formula, “ne” stood for the number of participants who responded to the satisfaction question as *extremely satisfied*, and “n” stood for the total number of Delphi panel participants (Lawshe, 1975). With a Delphi panel size of 21, Ayre and Scally (2013) suggested that a researcher have a CVR of 0.429 for an item to be validated. Of the 46 criteria and indicators that panel members were asked to evaluate in Round 1, nine criteria and four indicators had a CVR of 0.429 or higher, so they were validated. Thirty-three criteria or indicators did not meet the required minimum CVR and were rewritten based on qualitative feedback from panel members.

Surveying in Round 1 provided feedback to help refine the language within the rubric criteria and indicators as well as change the meaning based on the panelists’ expertise and experience. Appendix B presents the instrument after Delphi Round 1.
**Delphi Round 2**

The survey sent to panelists asked again how satisfied they were with each criterion and indicator from the next rubric draft with the response options of extremely dissatisfied, dissatisfied, satisfied, and extremely satisfied. If the panelists were not extremely satisfied, the survey prompted the panelist to provide their suggestions for revision. The survey also provided the opportunity for panelists to give additional comments. In addition, the panelists were given feedback from the previous rounds to view with the question. This feedback included choice counts, revision suggestions, and additional comments. All data were anonymized.

A total of 20 panelists participated in Round 2. The CVR was calculated for each rubric criterion and indicator using the formula in Figure 1. In this formula, “ne” stood for the number of participants who responded to the satisfaction question as extremely satisfied, and “n” stood for the total number of Delphi panel participants (Lawshe, 1975). With a Delphi panel size of 20, Ayre and Scally (2013) suggested that a researcher have a CVR of 0.5 for an item to be validated. Of the 33 criteria and indicators left to validate that panel members were asked to evaluate, 30 criteria or indicators had a CVR of 0.5 or higher, so they were validated. Three indicators did not meet the required minimum CVR and were re-written based on qualitative feedback from panel members.

Surveying in Round 2 provided feedback to further clarify meaning and correct errors within the rubric criteria and indicators. Appendix C presents the instrument after Delphi Round 2.

**Delphi Round 3**

The survey sent to panelists asked again how satisfied they were with each criterion and indicator from the second rubric draft with the response options of extremely dissatisfied,
dissatisfied, satisfied, and extremely satisfied. If the panelists were not extremely satisfied, the survey prompted the panelist to provide their suggestions for revision. The survey also provided the opportunity for panelists to give additional comments. The panelists were given feedback from the previous round to view with the question. This feedback included choice counts, revision suggestions, and additional comments. All data were anonymized.

A total of 19 panelists participated in Round 3. The CVR was calculated for each rubric criterion and indicator using the formula in Figure 1. In this formula, “ne” stood for the number of participants who responded to the satisfaction question as extremely satisfied, and “n” stood for the total number of Delphi panel participants (Lawshe, 1975). With a Delphi panel size of 19, Ayre and Scally (2013) suggested that a researcher have a CVR of 0.474 for an item to be validated. All three indicators that panel members were asked to evaluate achieved a CVR of 0.474 or higher, so they were all validated.

Surveying in Round 3 validated the remaining three rubric items. Appendix D presents the finalized instrument after Delphi Round 3.

**Study Results Description**

Below are the study results. The results are separated in sections by the assessment plan components: Plan-General, Goals, Outcomes, Measurement Tools, Benchmarks, Time Frames, and Involved Parties. Within each section are the criterion and indicator pairs presented individually and numbered. Each iteration of a pair is shown in sequence by Delphi rounds until the pair reached validation. The round in which the pair both achieved validation is notated with (Final). Each Delphi round results include a table with the rubric criterion and indicator pair as introduced to the panelists during that round, panelists’ feedback from the round, and a discussion of any revisions made. Panelists’ feedback is presented as raw data without
corrections or revisions to substance, grammar, or mechanics; the only edits made were using a
capital letter to begin each comment and an endmark to conclude each comment to ensure
consistent formatting.

**Component: Plan-General**

**Pair 1**

**Round 1.** Below is information from Round 1. Table 1 displays the criterion and
indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from
the panelists during the round and revision discussion are presented.

**Table 1**

*Plan-General Pair 1 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
<th>plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Simplistic and Utilitarian</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Persons may not understand “utilitarian”. Perhaps “useful” could be used.

Indicator Revision Suggestions:

- I think it needs to be broken down into 2 different indicators. One is simple to use for the program, and the other being understandable for those trying to interpret the plan, such as accrediting agency, assessment coordinator, etc.

Additional Comments:

- Easy to follow.

- This is an excellent description. Plans that are too cumbersome/wordy will not be implemented or implemented well. All parties must be able to understand the plan.
• Honestly, I’m not sure people will ‘appreciate/understand’ the use of the word “utilitarian.” I would recommend “Simplistic and Useful.” I am okay with the indicator language.

• Overall, I am okay with this, but to me the word “simplistic” is not appropriate. Maybe something like “understandable” would be better?

• I don’t love the word “simplistic” here, but it is acceptable.

• Does not address the requirement for the plan, itself, to be in compliance

• When using this tool holistically, perhaps an external peer review might also be beneficial.

**Round 1 Revision Discussion.** Comments indicated that the criterion terminology was the issue. Taking the suggestion under criterion, the term “utilitarian” was changed to “useful.” In the additional comments, “simplistic” was not favored as well. Although no direct suggestions were given, this was also changed to “understandable.”

No changes were made to the indicator. Although there was one revision suggestion, the majority of the additional comments were positive and pointed toward the criterion being the reason for its lack of validation at this stage. It was decided to look for further comments such as the one given in future rounds before making such a drastic change as splitting into two criteria and indicators as suggested.

**Round 2.** Below is information from Round 2. Table 2 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 2

*Plan-General Pair 1 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Understandable and Useful</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- I would like to see understandable and useful broken into 2 separate questions. The plan may be simple, but not necessarily understandable and individuals may not be able to evaluate appropriately.

Indicator Revision Suggestions:

- Same rationale as that for criterion. Two separate questions. Understand should be changed to understandable.

- I agree with the comments about the word simplistic. It was changed to simple, but I think that word is still not quite right. Maybe straightforward instead?

Additional Comments:

- Much improved!

*Round 2 Revision Discussion.* Both the criterion and indicator were validated in this round and, thus, required no revision.

*Round 3 (Final).* Below is information from Round 3. Table 3 presents the final validated criterion and indicator pair presented to the panelists. No additional comments were provided in Round 3.
Table 3

Plan-General Pair 1 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Understandable and Useful</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
</tr>
</tbody>
</table>

Pair 2

Round 1. Below is information from Round 1. Table 4 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 4

Plan-General Pair 2 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Knowledge and Application</td>
<td>Plan demonstrates a balance of what students need to know and what they need to be able to do using both course and clinical knowledge.</td>
</tr>
<tr>
<td></td>
<td>Balance</td>
<td></td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Knowledge and Application.

Indicator Revision Suggestions:

- Remove balance.

- Plan demonstrates a balance of what students know and how they are able to apply it, with consideration to didactic and clinical content.

Additional Comments:

- Good for outcomes data.

- RADS is an intricate dance of “book” knowledge and “application” knowledge. The plan must include both for students to be successful.
• Perhaps separating the indicator into separate indicators based on course knowledge and clinical knowledge.
• Does not address the requirement for the plan, itself, to be in compliance with the Standards. Does students reference “all” students?
• What metric could be used when doing a self-evaluation? I like the concept, but could there be a ratio of comprehension vs application and/or comparison of didactic vs clinical tools.

**Round 1 Revision Discussion.** Revisions for both criterion and indicator were taken directly from the panelists’ suggestions. This included the removal of balance in the criterion and clarification of language in the indicator. Additional comments were either supportive of these changes or not considered a priority compared to the direct suggestions.

**Round 2.** Below is information from Round 2. Table 5 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 5**

*Plan-General Pair 2 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Knowledge and Application</td>
<td>Plan demonstrates a balance of what students know and how they are able to apply it, with consideration to didactic and clinical content.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

• Plan demonstrates a balance of student’s knowledge and application.
• Is this an attempt to evaluate formative assessment? If so, it seems fine to leave both. I wasn’t sure if it is how didactic knowledge is actually applied in lab and clinicals.
I feel this one measure is attempting to measure two things, knowledge and application. I feel it should be separated into one measure per SLO.

Indicator Revision Suggestions:

- Ok now.
- If this is an attempt at measuring formative assessment, perhaps the criterion should be divided out. I am not sure if it is trying to evaluate progression in student learning or if it is evaluating both didactic and clinical application. Please clarify.
- Trying to figure out what else would be measured (other than didactic and clinical). Indicator is wordy.
- Plan demonstrates a balance of what students need to know and the application of these skills, with consideration to the didactic and clinical content.
- Feel this one measure is attempting to measure two things, what students know and how to apply it, and then each of those would be matched to didactic and then clinical, so that is actually 4 measures. I feel it should be separated into one measure per SLO.

Additional Comments:

- Please clarify the intent of this evaluation tool.
- I think the language us appropriate.
- The revised indicator presumes that the assessments are on what student know versus what they need to know, which strays from Paloma & Banta.
- Knowledge and Application should be separate because is is possible to master one and not the other.
**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 6 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.

Table 6

*Plan-General Pair 2 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Knowledge and Application</td>
<td>Plan demonstrates a balance of what students know and how they are able to apply it with consideration to didactic and clinical content.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- Not crazy about the pronoun “it” what is “it” referring too?
- N/A.
- Consider removing the “,” after “it”.
- Very nice.

**Component: Goals**

**Pair 1**

**Round 1.** Below is information from Round 1. Table 7 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
### Table 7

*Goals Pair 1 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Generalized Statement of Accomplishment</td>
<td>Goals are written in a generalized form and written to represent what will be accomplished. Student learning goals state what the students accomplish, not the program.</td>
</tr>
</tbody>
</table>

**Criterion Revision Suggestions:**

- Generalized statement of accomplishment sounds like it refers to one goal--is this supposed to address all goals? If so, I would say it needs to be reworded to make that more clear.

- I think this could be re-written to Generalized Statement of Student Learning. Not sure that “accomplishment” is a term common in the field or best practices.

**Indicator Revision Suggestions:**

- Unclear on what is truly meant by “generalized form”.

- Identify if the first mention of Goals in first sentence whether program or university if not the student.

**Additional Comments:**

- Important to distinguish between program and specific student learning goals.

- I like the addition of “what the students accomplish, not the program.” Sometimes we lose sight of what we are really assessing.

- Would it make a difference to add something like: “...what will be accomplished by the end of the program”? Goals are timed across the entire program... outcomes are specific to the timeframe of the data being collected to measure the specific outcome. I’m probably splitting hairs and reading too much into the indicator.
Round 1 Revision Discussion. The suggested revision was used to change “Accomplishment” to “Student Learning” in the criterion. As revision suggestions for the indicator were not clear, the additional comment suggesting that the indicator be more specific by stating “what will be accomplished by the end of the program” was used.

Round 2. Below is information from Round 2. Table 8 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 8

Goals Pair 1 Round 2

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Generalized Statement of Student Learning</td>
<td>Student learning goals are written in a generalized form and written to represent what will be accomplished by the end of the program. Goals state what the students accomplish, not the program.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Can you just have the criterion, “Goals for Student Learning”?
- Consider removing “Generalized.”

Indicator Revision Suggestions:

- Can you revise to “Goals for student learning are written holistically and represent what the student will accomplish upon graduation. Goals state what the student will accomplish, not the program.”
- Perhaps using the term broad rather than generalized? That way, it speaks to the more broad and large picture view when writing goals.

Additional Comments: None provided.
**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 9 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 9**

*Goals Pair 1 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Generalized</td>
<td>Student learning goals are written in a generalized form and written to represent what will be accomplished by the end of the program. Goals state what the students accomplish, not the program.</td>
</tr>
<tr>
<td></td>
<td>Statement of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student Learning</td>
<td></td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- Used the term “written” twice back to back.
- N/A.
- Yes, this is well worded.

**Pair 2**

**Round 1.** Below is information from Round 1. Table 10 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 10**

*Goals Pair 2 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Alignment to</td>
<td>Goals align directly to the program’s mission and values.</td>
</tr>
<tr>
<td></td>
<td>Mission</td>
<td></td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions: *None provided.*

Additional Comments:

- Yes, should help you achieve the mission.
- I rate the indicator only as satisfied due to the use of the word “directly”. Will ‘purest’ see that and think “I cannot ‘directly’ link my communication goal to my mission of being a competent entry level medical imaging professional? Does the indicator lose any meaning if it has “directly” omitted? Again, I am being hypercritical - that is how my brain works.
- Our goals do not directly align with the Mission of the program or university.
- This one gave me pause as to whether institutional mission should also be considered.
- This may need explanation for new program directors / assessment coordinators.

**Round 1 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. Although no suggestions for revision of the indicator were made, additional comments demonstrated that the word “directly” may have been the cause. The indicator was reworded to exclude this term.

**Round 2.** Below is information from Round 2. Table 11 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 11**

*Goals Pair 2 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Alignment to Mission</td>
<td>Goals align with the program and institution's mission and values.</td>
</tr>
</tbody>
</table>
Indicator Revision Suggestions: None provided.

Additional Comments: None provided.

Round 2 Revision Discussion. The criterion was validated in Round 1, and the indicator was validated in this round. Thus, no revisions were required.

Round 3 (Final). Below is information from Round 3. Table 12 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.

Table 12

Goals Pair 2 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Alignment to Mission</td>
<td>Goals align with the program and institution’s mission and values.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.
- Consider changing “program” to “program’s”.
- Yes.

Pair 3

Round 1. Below is information from Round 1. Table 13 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 13

Goals Pair 3 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions:

- Indicate for programs.

Indicator Revision Suggestions:

- Not really following the limited list.

Additional Comments:

- Basics for programmatic accreditation.
- This clearly lays out what programs are required to assess.
- My only reason is b/c I don’t remember if your opening introduction stated that this is intended to be used by ‘only’ JRCERT - accredited educational programs. If it is meant to add to the assessment literature, specifically in medical imaging - or allied health, I’d recommend a rewrite. I don’t think there are any specific competencies (don’t think ARRT) that a medical imaging professional should demonstrate other than those published by JRCERT goals. Nursing has many bodies of work that indicate what a BSN, MSN, DNP should be able to do upon completion and they incorporate those in their curriculum. If this rubric meant to be used as ‘best practice’ for JRCERT accredited programs, then I’m okay with this. I’d want to see how JRCNMT, JRCDMS, or JRCCVT accredited medical imaging programs could use the rubric also.

Round 1 Revision Discussion. Both the criterion and indicator were validated in this round and, thus, required no revision.

Round 2 (Final). Below is information from Round 3. Table 14 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Rounds 2 and 3 to indicate the need to send it to the panel again.
Table 14

Goals Pair 3 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
</tr>
</tbody>
</table>

Round 2 Additional Comments: None provided.

Round 3 Additional Comments:

- N/A.
- Do we need to include that these goals need to be separated. As in, we wouldn’t want 1 goal for all three areas?

Pair 4

Round 1. Below is information from Round 1. Table 15 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 15

Goals Pair 4 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of interest to stakeholders or communities of interest.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: None provided.

Indicator Revision Suggestions:

- Evaluate “of interest”. Sometimes what’s of interest may not be feasible or even appropriate.
Additional Comments:

- Needs to tie in to overall mission but I agree that is important.
- As stated earlier, communities of interest need to understand the plan and must let the institution know what they need.
- Straight-forward.
- Should there be something in this one that explicitly states relevance to the profession?
- I am not sure that this would be inherently known by someone that views the assessment plan. Anecdotally, its typically the PED and patient care/soft skills.
- I like this criterion and indicator, but curious how will be measured. I also think it needs moved up before alignment of mission to goals since it is a broader topic.

**Round 1 Revision Discussion.** No revision suggestions were made to the criterion and no additional comments requested a change. It was assumed that the indicator was the cause of the criterion’s lack of validation, and no revisions were made. Indicator suggestions for revision comments were unclear. An additional comment suggested the inclusion of “relevance to the profession,” so this change was made to the indicator.

**Round 2.** Below is information from Round 2. Table 16 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 16**

*Goals Pair 4 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of relevance to the profession and of interest to stakeholders or communities of interest.</td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions:

- Consider changing the criterion to only state “Relevant.”

Indicator Revision Suggestions:

- Again, I feel the indicator, is asking about two separate items, relevance to the profession and interest to stakeholders. Because you can have one and not the other. I feel the indicators should be separated.

Additional Comments:

- A review of the mission and goals with stakeholders and communities of interest could be the measure.

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 17 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 17**

**Goals Pair 4 Final**

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of relevance to the profession and of interest to stakeholders or communities of interest.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.
- Yes.
Pair 5

Round 1. Below is information from Round 1. Table 18 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 18

Goals Pair 5 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Additional Professional</td>
<td>Additional professional content included as appropriate to degree level.</td>
</tr>
<tr>
<td></td>
<td>Content</td>
<td></td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Again, specific to the JRCERT. Can this one and previous be combined to “competencies expected” (i don’t really like that word b/c our professional folk will confuse it with ARRT competencies). This is where JRCERT is more prescriptive than other accreditors. For example, ACEN uses “end of the program student learning outcomes”. I’m rambling.

- Is this really about content? or is it about goals that are beyond the required?
  Everyone can have content, but it is having a goal that measures an outcome beyond what is required.

- This seems to indicate that “additional content is required. Maybe delete this criterion?

Indicator Revision Suggestions:

- Additional professional content (i.e., XXX, XXX) included as appropriate to degree level. I think examples need to be offered.

- Same as above.
Additional Comments:

- Good criteria for bachelors level.
- Very broad.
- From a higher level assessment (literature) perspective, I’d have to recommend deletion. From a specific (Assessment 101-JRCERT) perspective, I understand its purpose.
- This may need additional description for programs less familiar with the new Standards 2021.
- Is this a requirement or optional? JRCERT Standards has this as optional criteria; however, this reads more as an institutional requirement.

**Round 1 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. An indicator revision suggestion demonstrated a need for the inclusion of examples for the additional professional comment. These examples were taken from the original indicator reference, the 2021 Standards for an Accredited Educational Program in Radiography (2020).

**Round 2.** Below is information from Round 2. Table 19 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 19**

*Goals Pair 5 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Additional Professional Content</td>
<td>Additional professional content included as appropriate to degree level (e.g., ethical principles, interpersonal skills, professionalism, etc.)</td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions:

- Every level should be professional.
- Optional Professional Content.
- I think “additional professional content” is too broad. What exactly do you want to measure?
- Perhaps change “additional” to either “optional” or “elective.”
- So, I’m struggling here with this one. Additional professional content sounds like it is evaluating the curriculum and not the assessment plan. Is there a way to make it more clear what you are referencing?

Indicator Revision Suggestions:

- Include every level.
- I do not like “appropriate to degree level” which makes distinctions between graduates. They will all work together, and entry level pay is the same (where I live).
- As a BSRT program, this is kind of unofficially expected. I would pick one and measure it. You have 3 examples listed. Again, they can be proficient in one and not another.
- Same as my previous comment. This sounds like an evaluation of the curriculum and not the assessment plan.

Additional Comments:

- Since many recommended deletion and the decision was made to keep the content, I recommend labeling optional professional content since the only reference is the JRCERT.
- I really like the examples that were added.
- Each indicator should seek to measure one item.
- I like the aspect of aligning additional professional content to specific degree levels.
- I think this definitely needs to be included for those higher-level programs. Lower-level programs can choose to omit this.

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 20 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.

**Table 20**

_Goals Pair 5 Final_

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Additional</td>
<td>Additional professional content included as appropriate to degree level</td>
</tr>
<tr>
<td></td>
<td>Professional</td>
<td>(e.g., ethical principles, interpersonal skills, professionalism, etc.)</td>
</tr>
<tr>
<td></td>
<td>Content</td>
<td></td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- Is it professional content or experiences or activities or all three?
- N/A.
- Yes.

**Pair 6**

**Round 1.** Below is information from Round 1. Table 21 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 21

Goals Pair 6 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Expectations</td>
<td>Goals set high expectations for the program, faculty, and students rather than expectations that can be easily achieved. Expectations represent current entry-level radiography roles and ASRT Practice Standards</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Goals vs Expectation.

Indicator Revision Suggestions:

- “High expectations” does not equal entry level roles and ASRT Practice Standards.”
  
  Entry level roles and practice standards are the minimum expectations of a technologist.

- Is it really about the faculty in the program? Or is it about student learning outcomes?
  
  To me it’s about the student’s achievement and not the faculty or program. Yes, it takes the faculty to help the students, but it is about the students.

- This is a bit contradictory. This is a student learning outcome plan, yet it mentions high expectations for program and faculty. This may confuse individuals new to the assessment process. Should this be aligned with the benchmarks instead?

Additional Comments:

- May be harder to evaluate - too many variables in reference to expectations.

- Maybe using levels of indicators to set a more concrete idea of high expectations or connects to the idea of formative and summative assessment?

**Round 1 Revision Discussion.** Because criterion suggestions for revision were unclear and no additional comments were given concerning the criterion, no revisions were made.
Panelists’ comments indicated that the indicator was confusing and contradictory because the first and second statements were not congruent. The language was added to clarify the meaning of the indicator. In addition, the panelists disagreed with the inclusion of faculty and the program because of the assessment focus - student learning, so faculty and program were removed from the indicator.

**Round 2.** Below is information from Round 2. Table 22 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 22**

*Goals Pair 6 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Expectations</td>
<td>Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards. Goals should, however, set high expectations for the students rather than expectations that can be easily achieved.</td>
</tr>
</tbody>
</table>

**Criterion Revision Suggestions:**

- I’m not sure “expectations” is the correct criterion. This is not really a term used in best practices for assessment. Benchmark is more traditional.
- I am not sure that “expectations” is the best term. Maybe “achievability”.
- Perhaps the criterion could be something along the lines of “Alignment to professional practice standards and entry-level practice”.

**Indicator Revision Suggestions:**

- Change expectations to benchmarks for continuity.
- Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards.
Need to specify the expectation and how it will be measured.

Spelling of minimum. Consider reversing the two sentences.

Still seems a little wordy when assessing.

Additional Comments:

- I really struggled with this one. I don’t have any suggestion(s) and I think my reasoning for struggling is knowing what so many goals look like. Simply copied from the JRCERT examples.

- Spelling error (minimum). If the goal is a generalized statement of what will be accomplished, and the minimal expectation is entry-level radiography roles and the ASRT Practice Standards, is the second sentence needed given the subjectivity?

- My first thought when someone said the phrase “high expectations” was not appropriate (paraphrasing), I immediately disagreed. I appreciate the rewording of the indicator.

**Round 2 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. Reversing the sentences was suggested in the previous round, but that did not seem to clarify as intended. The indicator was revised from this round to reflect one of the panelist’s suggestions verbatim as well as fixing the spelling error with the removal of the second sentence.

**Round 3 (Final).** Below is information from Round 3. Table 23 presents the final validated criterion and indicator pair. Next, the feedback from the panelists during the round and revision discussion are presented.


Table 23

Goals Pair 6 Round 3 & Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Expectations</td>
<td>Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions:

- Expectation for technical skills? Academic? both?

Additional Comments:

- The deletion of the 2nd sentence from Draft 2 makes sense and is consistent w/ participants’ feedback.
- I agree with using the phrase, ‘at a minimum’ but I wonder if some programs will not raise their expectations beyond the minimum and challenge those students to be better than the average? Just my thoughts.
- Much better.

Round 3 Revision Discussion. The criterion was validated in Round 2, and the indicator was validated in this round. Thus, no revisions were required.

Component: Outcomes

Pair 1

Round 1. Below is information from Round 1. Table 24 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 24

*Outcomes Pair 1 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Outcomes are specific, clear, and measurable, avoiding complexity. Student learning outcomes are written to state what students will accomplish.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Should this also include attainable and timeframes to align with SMART acronym?

Indicator Revision Suggestions:

- The first sentence is redundant. I would remove and reword the second sentence to “Student learning outcomes are written to state what students will accomplish and how they will be measured.”

- Avoiding complexity seems ambiguous. Delete that portion. Perhaps you should also mention that each outcome is singular and avoids “and” statements. The second sentence duplicates a previous indicator and can be removed.

- Will there be specific descriptors or values when evaluating the plan? Perhaps the criterion could be separated to better identify which items are acceptable and which need refined. Is it measurable; What is the timeframe in which data is being collected (formative vs summative), etc.

Additional Comments:

- Outcomes can be very difficult to write - including this information tells programs exactly what they need to do.

- I like the criterion and indicator, but wonder if breaking the outcomes out more into specific and clear and one outcome and measurable as another would be helpful especially to individuals new to assessment?
• Program and faculty to me are not the focus. The student is the focus.

• Not sure about the “avoiding complexity part.

**Round 1 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. The indicator suggestions were various and not all could be incorporated. Taking direct suggestions as much as possible, the terminology was changed to reflect the outcome measurability, addition of “avoiding ‘and’ statements,” and removal of redundancy from criterion language.

**Round 2.** Below is information from Round 2. Table 25 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 25**

*Outcomes Pair 1 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Outcomes avoid complexity. Each outcome should be singular and avoid “and” statements. Outcomes are written to state what students will accomplish and how they will be measured.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions:

• Remove complexity because this is unclear.

• How outcomes are measured? Or student accomplishments? Or are these one and the same?

• Each outcomes should be singular and avoid “and” statements. Outcomes are written to state what students will accomplish.

• Maybe change complexity to ambiguity

• I think breaking the outcomes out separately would be beneficial when evaluating.
Additional Comments:

- Remove outcomes avoid complexity. Additionally, the outcome must be measurable; however, how they will be measured does not need to be in the outcome.

**Round 2 Revision Discussion.** The criterion was validated in Round 1. The indicator was revised to reflect the panelists’ suggestions to remove “complexity” and reworded to reflect a direct suggestion.

**Round 3 (Final).** Below is information from Round 3. Table 26 presents the final validated criterion and indicator pair. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 26**

*Outcomes Pair 1 Round 3 & Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Each outcome should be singular and avoid “and” statements. Outcomes are written to state what students will accomplish.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions: *None provided.*

Additional Comments:

- I didn’t have any issue with the word “complexity” but yield to the group.

**Round 3 Revision Discussion.** The criterion was validated in Round 1, and the indicator was validated in this round. Thus, no revisions were required.

**Pair 2**

**Round 1.** Below is information from Round 1. Table 27 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 27

Outcomes Pair 2 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Appropriate for End of Program Expectation Levels</td>
<td>Outcome verbiage appropriate for degree level and summative evaluation at end of program. Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Outcomes are not necessarily end of program goals, there should be an opportunity for intervention.

Indicator Revision Suggestions:

- I would omit the first sentence.
- Outcomes are not necessarily end of program goals, there should be an opportunity for intervention.
- We were asked by the JRCERT to include formative as well as summative outcomes; please verify this is now appropriate.

Additional Comments:

- Is “into” really the right word here? Should it be “at”?
- Not all outcomes are written for End of Program Expectation Levels as they are usually based on curricular mapping and measured accordingly. While I agree that there should be outcomes relative to end of program expectation levels, this is not realistic for all programs and all outcomes.
- I like it specifically addressing summative assessment, but will there be a similar criterion and indicator for formative assessment with timing of some data collection early in the program?
Round 1 Revision Discussion. Panelists’ comments indicated a dislike of the use of “end of program” in both the criterion and indicator to allow for formative evaluation. “End of program” terminology was removed and “formative” was added in the indicator. The first sentence was not omitted as suggested to allow for the addition of formative assessment as was suggested by two other comments. The sentences were instead re-ordered in the indicator for clarification of meaning and importance.

Round 2. Below is information from Round 2. Table 28 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 28

Outcomes Pair 2 Round 2

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Expectations</td>
<td>Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills. Outcome verbiage appropriate for degree level and formative or summative evaluation.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Change to student learning outcome.
- Maybe instead of Expectations, use a term that encompasses the formative and summative evaluation timeframes?

Indicator Revision Suggestions:

- Reword to “Student learning outcome may include comprehension but measures mostly application or higher level skills.”
- Remove formative assessments.
● Outcome expectations are beyond the basic understanding, moving towards application, synthesis, and the demonstration of knowledge and skills. Verbiage appropriate for terminal award and evaluation methods.

● I think being more specific regarding the formative and summative evaluation would be helpful, this seems to be an area where newer faculty struggle.

● “...beyond basic understanding”? Should it just be “basic understanding”, aligning the with the goal’s expectations of Practice Standards, at a minimum?

Additional Comments:

● I disagree with the inclusion of formative assessment. A programmatic assessment plan should be about end of the program learning outcomes measured from a summative approach. Formative assessments are more appropriate for classroom level assessments at an individual student level.

● Most indicators are written in a plural format vs. singular; recommend to rewrite as a plural indicator.

Round 2 Revision Discussion. Both the criterion and indicator were validated in this round and, thus, required no revision.

Round 3 (Final). Below is information from Round 3. Table 29 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.
Table 29

Outcomes Pair 2 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Expectations</td>
<td>Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills. Outcome verbiage appropriate for degree level and formative or summative evaluation.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- Still too wordy. Again, expectation of what exactly? Pass rate? Graduation rate?
  - Passing a course? Clinic level?
- N/A.
- Nice.

Pair 3

Round 1. Below is information from Round 1. Table 30 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 30

Outcomes Pair 3 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty and other communities of interest have determined collectively are important</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- How does this differ from “Relevance to Communities of Interest”? 

Indicator Revision Suggestions:

- I don’t think this is necessary. Redundant as previously noted.
• This brings in knowledge and skills which then misaligns with the criterion. Amend either the sentence or the criterion.

Additional Comments:

• Also include accreditation requirements?

• The communities of interest piece is important - if programs are not preparing students for CT, and the surrounding hospitals need those skills, then the programs are doing the surrounding area a disservice.

• This is good b/c it would allow faith-based institutions to add SLOs specific to service.

**Round 1 Revision Discussion.** The criterion was not revised in this round as the only revision suggestions were for the indicator. To avoid the redundancy as noted by the panelists, the “other communities of interest” piece was removed.

**Round 2.** Below is information from Round 2. Table 31 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 31**

*Outcomes Pair 3 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty have determined collectively are important.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

• Not a fan of this criterion; not sure it adds value to assessment plan.

• Optional, Demonstrate Program Values.

• Perhaps change to Outcome Selection.
Indicator Revision Suggestions:

- Remove collectively?
- Remove knowledge and skills as this is specific to program values.
- I like this, but perhaps differentiating it more from the previous outcomes related to program missions and values would be helpful.

Additional Comments:

- This is program specific and will depend on the program and should be considered optional, not required.

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 32 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 32**

*Outcomes Pair 3 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty have determined collectively are important.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Pair 4**

**Round 1.** Below is information from Round 1. Table 33 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 33

Outcomes Pair 4 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Alignment to Goals and Mission</td>
<td>Outcomes align directly with the goals and program mission.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- This mentions goals and mission. A mission alignment criterion was already included. I suggest that one is only goals and outcomes.

Indicator Revision Suggestions:

- See above.

Additional Comments:

- Same comments regarding the use of ‘directly.’

- I’m satisfied with the indicator and criterion, however, because we have no control of the University’s mission, our mission and goals do not align.

- This criterion and the previous one seem to be somewhat redundant. Shouldn’t the program mission align with the program values?

- Clear and understandable.

Round 1 Revision Discussion. The criterion and indicator suggested revisions were difficult to accommodate due to the rubric’s current layout by component. Instead, the additional comments were used, which supported a move away from language associated with alignment to the mission. This information was used to alter the indicator as well as to distinguish this indicator from the one under goals so that it was not a duplication. The term “directly” was also removed as indicated by the additional comment.
**Round 2.** Below is information from Round 2. Table 34 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 34**

*Outcomes Pair 4 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Alignment to Goals</td>
<td>Outcomes support the chosen goals.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Replace chosen with specified goals.
- I feel it is redundant. Outcomes should align with goals.

Indicator Revision Suggestions:

- Outcomes align with the goals.
- Not needed.
- Instead of support, consider Outcomes are aligned with the respective goal.
- I think there needs to be more information in the indicator regarding how outcomes and goals alignment can be demonstrated.

Additional Comments:

- This is better and more succinct.

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 35 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.
Table 35

Outcomes Pair 4 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Alignment to Goals</td>
<td>Outcomes support the chosen goals.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

Pair 5

Round 1. Below is information from Round 1. Table 36 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 36

Outcomes Pair 5 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals \</td>
</tr>
<tr>
<td></td>
<td></td>
<td>while avoiding complexity of the overall plan. JRCERT requires at least \</td>
</tr>
<tr>
<td></td>
<td></td>
<td>two outcomes per goal.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: None provided.

Indicator Revision Suggestions:

- Just because some goals may only have one outcome. One may find themselves with an irrelevant poor quality outcome just to meet a specific number required.

  Consideration of good measurement tools must be taken into account.

- Change “accurately measure” to provide multiple vantage points to demonstrate achievability of the stated goals. I do think “accurate measures” should also be considered but it looks like you already have that later in the survey:)
Additional Comments:

- Including the JRCERT number is important - there is no “wiggle” room.
- Outcomes should be specific and clearly link with each outcome.

**Round 1 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 2 (Final).** Below is information from Round 3. Table 37 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Rounds 2 and 3 to indicate the need to send it to the panel again.

**Table 37**

Outcomes Pair 5 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals while avoiding complexity of the overall plan. JRCERT requires at least two outcomes per goal.</td>
</tr>
</tbody>
</table>

Round 2 Additional Comments:

- Ok but wordy not necessary to include “accurately.”
- Make outcomes plural to align with the rest of the rubric. (Number of outcomes appropriate to...).

Round 3 Additional Comments:

- N/A.
Component: Measurement Tools

Pair 1

Round 1. Below is information from Round 1. Table 38 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 38

Measurement Tools Pair 1 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Validity</td>
<td>Measurement tools adequately measure the selected outcome without interference of other concepts. Should be sensitive to changes into changes related to the outcome.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: None provided.

Indicator Revision Suggestions:

- The second sentence doesn’t make sense; I would omit.
- Last sentence is confusing. Changing to “should be sensitive to changes related to the outcome” is still confusing to me.
- I am confused by the final sentence, “Should be sensitive to changes in to changes related to the outcome”. I cannot make a suggestion without some clarity.
- Measurement tools... outcome. I’m not dissatisfied with the indicator, but what is meant by “without interference with other concepts”?
- Last sentence might need rephrasing.
- Last sentence modification, somewhat confusing.
- I don’t understand the 2nd sentence. Is it “should be sensitive to changes in relation to the outcome.”?
- Second sentence is unclear.
• Wording is unclear: “should be sensitive to changes in to changes related to the outcome.”

• I am not sure what you mean “without interference of other concepts”. Typo in next sentence. Remove “…to changes related to the”. I am also not sure what this means.

Additional Comments:

• I feel like something should be added regarding that the tool should specifically measure student learning. Programs should not measure something simply because they can, for example, why measure whether or not students show up on time to clinicals? This is not specifically a product of learning, however, programs may argue that it is a predictor of ethical behavior.

• Measurement tool or the specific portion thereof, adequately measures the selected outcome.

• The 2nd sentence in indicator is not clear in meaning.

• Last sentence does not make sense--typo? However, based on what you are trying to say, I think it might be difficult to really know this.

• It would be satisfactory if the wording was fixed: “changes in to change related…” them off.

Round 1 Revision Discussion. As criterion nor additional comments did not indicate changes to the criterion, no revisions were made. I removed “without interference of other concepts” as suggested. Most other comments were due to a grammatical error, which was also fixed and provided clarification in the revised indicator.
Round 2. Below is information from Round 2. Table 39 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 39**

*Measurement Tools Pair 1 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Validity</td>
<td>Measurement tools adequately measures the selected outcome. Should be</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
<td>sensitive to changes related to the outcome.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions:

- Grammar: measurement tools adequately measures (plural/singular mix) - remove one of the “s.”
- Unsure what the second sentence means or if it is even necessary.
- Remove “s” on “measures.”
- Cannot provide a suggestion as the meaning of the second sentences is still unclear.
- Measurement tools...measure...

Additional Comments: *None provided.*

**Round 2 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. As suggested because some panelists were unclear on the meaning despite changes from the previous round’s feedback, the second sentence was removed.

**Round 3 (Final).** Below is information from Round 3. Table 40 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.
Table 40

*Measurement Tools Pair 1 Round 3 & Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Validity</td>
<td>Measurement tools adequately measures the selected outcome.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions:

- Maybe use accurately instead of adequately? Adequately can be misinterpreted.
- Define adequately. Also, using the word “tools” assumes you are measuring more than one tool.
- Remove the s on measures.
- Measurement tools adequately measure the selected outcome.
- Remove “s” on measures.

Additional Comments:

- Grammatical error is still present.

**Round 3 Revision Discussion.** The criterion was validated in Round 2, and the indicator was validated in this round. Thus, no revisions were required, however, the grammatical error was fixed after this round.

**Pair 2**

**Round 1.** Below is information from Round 1. Table 41 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 41

Measurement Tools Pair 2 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions: *None provided.*

Additional Comments:

- Very important!
- Ease of use is important.
- Being easy does not make it reliable. How is that related?

**Round 1 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 2 (Final).** Below is information from Round 3. Table 42 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Rounds 2 and 3 to indicate the need to send it to the panel again.

Table 42

Measurement Tools Pair 2 Final

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
</tr>
</tbody>
</table>

Round 2 Additional Comments: *None provided.*

Round 3 Additional Comments:

- N/A.
- Consider “Measurement tool consistently measures the outcome.”
**Pair 3**

**Round 1.** Below is information from Round 1. Table 43 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 43**

*Measurement Tools Pair 3 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Higher-Order Thinking</td>
<td>Measurement tools are appropriate for measuring higher-order thinking skills.</td>
</tr>
<tr>
<td>Tools</td>
<td>Skills</td>
<td></td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions:

- Perhaps this is where you should mention various levels of Bloom’s taxonomy are included demonstrating consideration for higher-order thinking skills.
- What about assessing formative assessment done early in the program with student learning levels at lower levels?

Additional Comments:

- It is “easy” to come up with tools that measure lower-order skills; having this indicator makes it very clear what the JRCERT is looking for and what programs should be assessing.
- My only thought is - does it correspond appropriately to the SLO as a higher-order tool?

**Round 1 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.
**Round 2 (Final).** Below is information from Round 3. Table 44 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Rounds 2 and 3 to indicate the need to send it to the panel again.

**Table 44**

*Measurement Tools Pair 3 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
</tr>
</tbody>
</table>

Round 2 Additional Comments: *None provided.*

Round 3 Additional Comments:

- N/A.
- I don’t feel as though there is a clear direction as to what “higher-order thinking skills” are.

**Pair 4**

**Round 1.** Below is information from Round 1. Table 45 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 45**

*Measurement Tools Pair 4 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Measurement Tools per Outcome</td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. 3 or more recommended for data triangulation. JRCERT requires 2 measurement tools per outcome.</td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions:

- I feel 2 tools per outcome is adequate.

Indicator Revision Suggestions:

- Same reason as previously stated. Some outcomes are limited to one or two measurement tools.
- I feel 2 tools per outcome is adequate.
- At our last site visit, I was told that we had more than we needed - that two is plenty. Please verify that this is appropriate.
- If all programs start using 3 tools, it may be burdensome to be collecting more data points which may decrease the likelihood of truly evaluating it holistically.

Additional Comments:

- If there are only two, one tool should be from early in the program and the other should be from later in the program so that we see some sort of a formative and summative assessment of the same SLO. Just an opinion. But I do agree with the 3 recommended for triangulation, however that is a lot for some programs.
- I recognize that JRCERT requires at a minimum two per outcome... and three are recommended. Could those two sentences be reversed so that the ‘required’ is first then the ‘recommended’? I think that would flow better.
- So 3 for triangulation and 2 for JRCERT--which is appropriate? what is the goal here? 2 or 3?
- A description or example of data triangulation would be helpful.

**Round 1 Revision Discussion.** The criterion was validated in this round and, thus, required no revision. The researcher felt that the direct revision suggestions for the indicator
were of the understanding that the rubric was intended to measure the minimum requirements rather than its intended purpose of increasing the quality of the plan. A few of the additional comments agreed with the 3 or more statements, so it was kept. For clarification, the suggestion that the two sentences in the indicator be reversed to demonstrate importance was used.

**Round 2.** Below is information from Round 2. Table 46 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 46**

*Measurement Tools Pair 4 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Measurement Tools per Outcome</td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. JRCERT requires 2 measurement tools per outcome. 3 or more tools per outcome is recommended for data triangulation.</td>
</tr>
</tbody>
</table>

**Indicator Revision Suggestions:**

- Perhaps combine the last 2 sentences to a parenthetical (minimum of 2 measurement tools).
- Is there a subject/verb agreement issue in the last sentence?
- Three instead of 3. You could put Three (3).
- I would just remove the first sentence. The JRCERT has determined the number that is “adequate”.

**Additional Comments:**

- The use of three tools does not necessarily lead to triangulation, especially if not appropriate for the SLO. Looking at the plan holistically will better determine triangulation of data.
**Round 2 Revision Discussion.** The criterion was validated in Round 1, and the indicator was validated in this round. Thus, no revisions were required.

**Round 3 (Final).** Below is information from Round 3. Table 47 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 47**

*Measurement Tools Pair 4 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Measurement Tools per Outcome</td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. JRCERT requires 2 measurement tools per outcome. 3 or more tools per outcome is recommended for data triangulation.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Pair 5**

**Round 1.** Below is information from Round 1. Table 48 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 48**

*Measurement Tools Pair 5 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions: *None provided.*
Additional Comments:

- This is important, as clinical faculty see the students on a daily basis and can correlate skills with learning.
- I really like the differentiation between the external and internal sources.
- Hmmm….so when you say “sources” you are referring to who is measuring? what about the types of measures? direct and indirect or types of tools--not really sure this would be appropriate for all types of outcomes.
- Will interrater reliability be addressed as part of external personnel?

Round 1 Revision Discussion. Although both the criterion and indicator were not validated in this round, no suggestions for revisions were provided and additional comments were unclear. It can be assumed that many panelists selected satisfied, which did not require a revision suggestion in this round, but not extremely satisfied, which was the benchmark for validation. Without clear suggestions, no revisions were made at this time.

Round 2. Below is information from Round 2. Table 49 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 49

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Switch out terms multiple sources with measurement tools.
- Perhaps change to multiple data points instead of “sources” so it is more definitive.
Indicator Revision Suggestions:

- Change “mix” to “combination” so sounds more formal.

Additional Comments: *None provided.*

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 50 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 50**

*Measurement Tools Pair 5 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Pair 6**

**Round 1.** Below is information from Round 1. Table 51 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 51**

*Measurement Tools Pair 6 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Direct/Indirect</td>
<td>Direct measures used in student learning. Indirect measures minimally or only as appropriate.</td>
</tr>
<tr>
<td>Tools</td>
<td>Measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Criterion Revision Suggestions:

- Remove indirect measures.

Indicator Revision Suggestions:

- Remove indirect measures as a possibility.
- 2nd sentence, more specific.
- Direct measures evaluate products of students’ work and provide direct evidence of their learning. Indirect measurements capture students’ or others’ perception of learning or attitudes towards learning. (I don’t have my assessment books with me so that’s kinda a mosh of Googling and my own verbiage.)
- Indirect measures can provide a lot of value and may be a very valuable secondary source of information to support triangulation. For example, does the student perceive that they learned xyz, or that they can do xyz. They may show they can but lack the confidence, which is helpful to know. I guess maybe specific that the majority of measures should be direct, but indirect measures can be used as appropriate.
- You may wish to reowrd. Both are valuable tools used in the appropriate circumstances. You may also want to include examples of each of them.

Additional Comments:

- I am asking the question - does each type of measure need to be defined?
- Indirect measures are particularly useful for gathering program effectiveness data (graduate surveys, etc.).
- Unsure of these ‘definitions’. I’d recommend something more common.

**Round 1 Revision Discussion.** Panelists appeared to be split on their opinions about this pair. Some were in favor of the complete removal of indirect measures while others indicated
that indirect measures should be used more often. The researcher decided to clarify the meaning of the measurement types as suggested for revision and hoped that the opinions might be more consistent once these feedback comments were seen in the next round.

**Round 2.** Below is information from Round 2. Table 52 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 52**

*Measurement Tools Pair 6 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Direct/Indirect Measures</td>
<td>Direct measures (i.e., student assessments) primarily used. Indirect measures (i.e., student perceptions) used minimally or only as appropriate.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Add “student” left column to identify measures.

- Consider creating separate criteria for Direct Measures, and Indirect Measures.

Indicator Revision Suggestions:

- Include employer surveys as an example of indirect measure since it can be a valuable tool to triangulate what the community of interest says about the graduates.

- I think divide these out will create clarity. But I am ok with it if the consensus supports it.

Additional Comments: *None provided.*

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.
**Round 3 (Final).** Below is information from Round 3. Table 53 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 53**

*Measurement Tools Pair 6 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Tools</td>
<td>Direct/Indirect Measures</td>
<td>Direct measures (i.e., student assessments) primarily used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indirect measures (i.e., student perceptions) used minimally or only as appropriate.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Component: Benchmarks**

**Pair 1**

**Round 1.** Below is information from Round 1. Table 54 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 54**

*Benchmarks Pair 1 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages, when appropriate.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Aspirational.
Indicator Revision Suggestions:

- If the benchmark is too aspirational, it may never be achieved.

Additional Comments:

- Absolutely! Benchmarks should be above minimum expectations. I also recommend that benchmarks not be calculated as averages because the lower scoring students get figured in. What I like to calculate is what percentage of students met the benchmark or scored higher, then it’s a much truer accounting of what is actually happening.
- Benchmarks can also be risen over time.
- Why “when appropriate”? when is it not appropriate?
- Perhaps defining minimum expectations.

Round 1 Revision Discussion. The criterion revision suggestion was unclear and none of the additional comments pointed to a cause, so no revisions were made to the criterion. The indicator revision suggestion was also unclear. However, one additional comment did suggest the removal of “when appropriate” and this revision was made to the indicator.

Round 2. Below is information from Round 2. Table 55 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 55

Benchmarks Pair 1 Round 2

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions:

- Subjective per instructor.
What if national average is (subjectively) high? Would performing at the national average be considered bad?

Additional Comments:

- As long as the benchmark relates to a measurement tool and not students (i.e. % of students in a class).

**Round 2 Revision Discussion.** The criterion was validated in Round 1, and the indicator was validated in this round. Thus, no revisions were required.

**Round 3 (Final).** Below is information from Round 3. Table 56 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 56**

*Benchmarks Pair 1 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.
- I like this one a lot.

**Component: Time Frames**

**Pair 1**

**Round 1.** Below is information from Round 1. Table 57 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.
Table 57

Time Frames Pair 1 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Frames</td>
<td>Trending</td>
<td>Time frames are set to be able to collect data over incremental time periods and demonstrate trending, generally should collect data for at least 3 cohorts for trending purposes.</td>
</tr>
<tr>
<td></td>
<td>Capability</td>
<td></td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Separate timeframes and trending. Timeframes should be when the data is collected based on student learning or opportunities to learn (ideally, curricular mapping timeframes).

Indicator Revision Suggestions:

- Remove “to be able.”
- Is the time frame really about trending? Or is the time frame when you will collect the data? Trending is about multiple sets of data being compared over time.
- Separate timeframes and trending.
- Not sure if you should be so prescriptive with 3 cohorts. What if they are looking at the same data point within a cohort such as first year vs second year, etc.

Additional Comments:

- I kicked this around a bit - I considered four at a minimum but then wondered if I was just being picky. It will be interesting to see what others responding the survey think.
- These are two different categories combined into 1. Timeframes are when the data should be collected or assessed, not to demonstrate trending but to demonstrate student learning or to identify areas of improvement. The resulting data/analysis should be what is trended.
Round 1 Revision Discussion. The criterion revision suggestion meaning was unclear as headings are components of the assessment plan and criteria are descriptors of the components. No revisions were made to the criterion based on a lack of suggestions. The indicator was revised using revision suggestions to remove “to be able” and to include the option of triangulation using points in time rather than cohorts.

Round 2. Below is information from Round 2. Table 58 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 58

Time Frames Pair 1 Round 2

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Frames</td>
<td>Trending</td>
<td>Time frames are set to collect data over incremental time periods for the purposes of demonstrating trends, generally should collect data from at least 3 points in time or 3 cohorts for trending purposes.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- Time Frames have to do with when the data is being collected, not the trending of the collected data. Perhaps Data Collection would be more appropriate of a Criterion.

Indicator Revision Suggestions:

- Time frames are set to collect the data at a specific point or time in the program.
  Remove the rest.
- ...trends; generally…
- Might omit the part starting with “generally”. Trending varies with program structure and tools used.
Additional Comments:

- Does the name of the component need to change? If this is about analysis and trending of data, then it should not be labeled timeframes. If timeframes is correct, then remove trending from the criterion and the indicator. Trending occurs during analysis of the data, not the gathering of the datapoints. The number of points or cohorts will depend on the program and what is actually being measured. (Perhaps I am the one confused.)

**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 59 presents the final validated criterion and indicator pair presented to the panelists. Not enough additional comments were provided in Round 3 to indicate the need to send it to the panel again.

**Table 59**

*Time Frames Pair 1 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Frames</td>
<td>Trending Capability</td>
<td>Time frames are set to collect data over incremental time periods for the purposes of demonstrating trends, generally should collect data from at least 3 points in time or 3 cohorts for trending purposes.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

- Consider: ...trends; generally.
Component: Involved Parties

Pair 1

Round 1. Below is information from Round 1. Table 60 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 60

Involved Parties Pair 1 Round 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions: *None provided.*

Indicator Revision Suggestions:

- “Ranks” can mean numerous things in HigherEd -- consider amending.

Additional Comments:

- Important!
- Yes!!! I appreciate this indicator.
- Everyone in the department, if possible, should help throughout the process. It helps faculty understand why things have to be done a certain way (i.e. transparency).
- This is critical - various ranks and experiences should be involved in all phases of collection, etc.
- Is adjunct faculty included?

Round 1 Revision Discussion. The criterion was validated in this round and, thus, required no revision. While a revision suggestion indicated the need to change the term “ranks,”
the panelist did not state what this term should be changed to. Instead of removing the term entirely, “or positions” was added to clarify the meaning.

**Round 2.** Below is information from Round 2. Table 61 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 61**

*Involved Parties Pair 1 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks or positions are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
</tr>
</tbody>
</table>

Indicator Revision Suggestions:

- Can it be shortened to say, “All faculty are involved in the assessment process.” Not all faculty may be collecting data, but should be involved in the planning and analysis.
- I would consider rewording the term ranks, perhaps using “All program and clinical faculty”. This could be more inclusive of clinical faculty and adjunct ranks and positions are defined by the institution. Maybe instead of saying “all”, use the term “multiple”.

Additional Comments: *None provided.*

**Round 2 Revision Discussion.** The criterion was validated in Round 1, and the indicator was validated in this round. Thus, no revisions were required.

**Round 3 (Final).** Below is information from Round 3. Table 62 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.
Table 62

*Involved Parties Pair 1 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks or positions are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Pair 2**

Round 1. Below is information from Round 1. Table 63 displays the criterion and indicator pair given to the panel in Round 1 based on a literature review. Next, the feedback from the panelists during the round and revision discussion are presented.

Table 63

*Involved Parties Pair 2 Round 1*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Communities of Interest Involvement</td>
<td>Communities of interest are involved in assessment planning, assessment evaluation, and assessment data analysis.</td>
</tr>
</tbody>
</table>

Criterion Revision Suggestions:

- It is difficult to involve communities of interest in the process.

Indicator Revision Suggestions:

- It is difficult to involve communities of interest in the process.
- Communities of interest are engaged in assessment planning, assessment evaluation, and reviewing of assessment data analysis.
Additional Comments:

- This is not always easy. Information should be provided to the communities of interest and results discussed for planning and analysis.
- Yes!!!
- As involved as they are willing.
- Our data is shared with our Communities of Interest, that is the extent of their involvement.
- Not sure how involved they can really be with all of this but okay.
- It’s a stretch to label communities of interest responsible for assessment planning, assessment evaluation, and assessment data analysis. Anecdotally, most programs are fortunate to have these individuals interested in PED.
- How will this be measured? Review of meeting minutes??

**Round 1 Revision Discussion.** The criterion revision suggestion was unclear and none of the additional comments pointed to a cause, so no revisions were made to the criterion. The indicator was revised based on a panelist’s suggestion verbatim.

**Round 2.** Below is information from Round 2. Table 64 displays the criterion and indicator pair given to the panel in Round 2 based on revisions from Round 1. Next, the feedback from the panelists during the round and revision discussion are presented.

**Table 64**

*Involved Parties Pair 2 Round 2*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Communities of Interest</td>
<td>Communities of interest are engaged in assessment planning,</td>
</tr>
<tr>
<td></td>
<td>Involvement</td>
<td>assessment evaluation, and reviewing of assessment data analysis.</td>
</tr>
</tbody>
</table>


Criterion Revision Suggestions:

- I think it flows better if worded “Involvement by Communities of Interest.”

Indicator Revision Suggestions:

- Our communities of interest are not involved in our assessment evaluation or planning. We share the data with them. They make suggestions about what they would like to see from our students, but that is all.
- Communities of interest are involved in the sharing of the analysis but not really the other aspects.
- Consider changing “assessment data analysis” to “outcome data and plans for improvement”.
- Engagement would be wonderful, but in reality it may just need to be that they are “included”. You can’t force engagement, but you can include them.

Additional Comments:

- The indicator is well-written; however, I find it challenging to get Communities of Interest involved beyond PED.
- I saw a lot of comments stating this isn’t possible - this is part of accreditation and has to happen. We have an advisory board meeting with our communities of interest every year. It’s not that we always follow what they want, but we consider what they say and implement new things as needed.
- I think this is a good indicator, but it is difficult to engage communities of interest in all of these aspects.
- True, this is challenging...
**Round 2 Revision Discussion.** Both the criterion and indicator were validated in this round and, thus, required no revision.

**Round 3 (Final).** Below is information from Round 3. Table 65 presents the final validated criterion and indicator pair presented to the panelists. Additional comments provided in Round 3 did not indicate the need to send it to the panel again.

**Table 65**

*Involved Parties Pair 2 Final*

<table>
<thead>
<tr>
<th>Component</th>
<th>Criterion</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved Parties</td>
<td>Communities of Interest</td>
<td>Communities of interest are engaged in assessment planning, assessment</td>
</tr>
<tr>
<td></td>
<td>Involvement</td>
<td>evaluation, and reviewing of assessment data analysis.</td>
</tr>
</tbody>
</table>

Round 3 Additional Comments:

- N/A.

**Rubric Testing Results**

A testing of the rubric was conducted using four program directors from various radiography programs. The purpose of the testing was to establish its relevance to radiography program leadership, determine how the rubric might best be used, and discover its strengths and weaknesses as a program leader’s tool.

The following quotes from the test participants support the relevance and usefulness of the rubric to radiography program leadership. These responses were in answer to the questions, “Do you feel that the tool is relevant to your work as an administrator?” and “What did you learn about your program’s assessment plan by using this rubric?”
• Yes, the completeness of the tool makes it useful for administrators. I found that this rubric pointed out that I may be weak in the area of involving communities of interest. That is something I plan to look into further.

• Yes, this tool is useful for me as an administrator to use, but it is also useful to help train new faculty about assessment and the expectations of our assessment planning.

• Yes, any process improvement tool that can be able to identify weaknesses is always helpful for administrators. It reminded me of things that I needed to be cognizant of with my assessment plan and check up on some areas to ensure we are meeting those criteria.

• Yes. How it is relevant depends on how it is used, however. I learned that I am meeting all of these requirements.

The following quotes give examples of when the participants thought the rubric might be most useful and are in response to the question, “How do you think that you would use this rubric?”

• Most likely we might use this tool when evaluating the assessment plan annually.

• This rubric would be great when developing a new plan. I would use this in our annual review. During the meeting, I would like each of my faculty to have taken down their responses to the rubric and discuss their different viewpoints.

• With adaptations to make it more like a form, this could be used annually at our meeting for evaluation of the assessment plan. The team could go through the rubric together to summarize with instantaneous follow-up and action plans. This could also be useful in the process of collecting information for self-study before a site visit as well as interim reports.
• To determine whether my assessment plan is meeting the necessary criteria. Likely right before a site visit, but it could also be useful while making or after making an initial assessment plan for a program.

The following quotes list the study participants’ thoughts on the strengths of the rubric and are in response to the question, “What are the rubric’s strengths in your opinion?”

• The rubric does a good job of covering all aspects or components of the assessment plan.

• The rubric’s organization. I like how it is specifically categorized and separated by components. This allowed me to consider each part individually. I also like that it included involved parties.

• Organization. The rubric provides a variety of metrics and criteria that point to program improvement.

• The rubric is organized and used to cover the breadth of an assessment plan. The rubric is thought through so that every aspect of the plan is reviewed.

The following quotes demonstrate the participants’ thoughts on the weaknesses of the rubric and are in response to the question, “What challenges or concerns might one encounter using the rubric?”

• Interpretation of the meaning of some criteria or indicators could be a challenge to users. The evaluation may be condensed in some areas, but overall, it’s not too overwhelming.

• Some areas would benefit from elaboration and clarification of meaning.
• Aesthetically the form is plain and somewhat lacking. The form could also benefit from a further explanation of the indicators and reference points to be able to determine how to meet the criteria.

• I see one area that needs clarification or elaboration - time frames… but that is the only one.

**Interpretation of Results**

In Round 1 of the Delphi panel, participants assisted with the revision of 33 of the 46 rubric criteria and indicators with over 150 comments. The majority of the feedback was regarding issues of clarity and terminology with some focusing on disagreement with the content of the criterion or indicator. Feedback was used to help solve these issues. In Round 2 of the Delphi panel, participants validated 30 criteria and indicators as well as assisted with the revision of three other indicators. The majority of the feedback was still regarding issues of clarity and terminology that remained uncorrected with previous revisions. Feedback also corrected grammatical errors found in the rubric. Finally, in Round 3 of the Delphi panel, participants validated the remaining three indicators completing the rubric’s validation and the Delphi study.

The modified Delphi study technique and a panel of experts were used to validate each of the criteria and indicators as well as the rubric as a whole. Experts completed three rounds of surveys, during which consensus was reached on all 46 rubric criteria and indicators as defined by Lawshe’s CVR (Lawshe, 1975). The rounds included 21, 20, and 19 panelists, respectively, but the decline in panelist numbers did not drastically change the minimum CVR for consensus.

Rubric testing was able to accomplish its purpose by establishing the rubric’s relevance to program leadership, determining its best uses, and discovering its strengths and weaknesses. The results of the test indicate that the rubric is both relevant and useful to radiography program
leadership. The rubric can be useful in several phases of assessment planning, but as a regular tool, it may be most useful during annual assessment plan evaluation. The strengths of the rubric are its organization and its inclusion of all the criteria needed to evaluate each of the components. Weaknesses include the need for explanation or elaboration in some areas and its visual appeal.
CHAPTER 5

DISCUSSION AND CONCLUSION

Discussion

Radiography program administrators who understand assessment are better able to make effective plans for their programs that output the data needed for program improvement. The purpose of this research was to discover the qualities that a radiography programmatic assessment plan should possess. The criteria and indicators critiqued by the Delphi panel comprise the final rubric, which can be used by administrators as a self-assessment tool during the creation or evaluation of a radiography programmatic assessment plan. This chapter consists of research question discussions, recommendations for professional practice, and recommendations for future research. Discussions will also incorporate literature and findings from the Delphi study and rubric testing.

Research Question 1

Research question 1 asked, “What criteria should be used to measure the quality of a radiography program’s assessment plan?” The literature review revealed that, while there are certain qualities that an assessment plan, in general, should have, more of the qualities were related specifically to the individual components of the assessment plan (Palomba & Banta, 2001; Schmidt, 2020). Therefore, to begin the development of the rubric, the researcher began with the components of the assessment plan and found criteria that should be used to measure the
qualities of those components. All of the criteria derived from the literature, although some were renamed, became a part of the final rubric.

During round revisions, Delphi panelists’ comments in many instances altered the criteria terminology for clarification of meaning, however, some rubric testing participants indicated that this may not be enough. Some stated that the terms still needed further clarification, explanation, or examples. This is consistent with the literature that indicates a wide variance and misunderstandings related to assessment terminology (Palomba & Banta, 2001).

In rubric testing, many comments were given that indicated the tool was well-organized and effectively covered all aspects of the assessment plan. This is likely due to the breakdown of the rubric into its components and the criteria that were guided by the General Systems Theory theoretical framework. While General Systems Theory has foundations in program evaluation, most applications of the theory were used to develop evaluation tools. A unique application of theory in this study was the addition of a meta-evaluation element by creating a tool that evaluates the radiography programmatic assessment plan. As described in General Systems Theory, a complex system is broken down into components, but those components individually are weighed to assess the entire system (Ceric, 1969; Jokela et al., 2008). In this study, the radiography programmatic assessment plan is being broken down into its components, and those components are measured separately by the rubric. Application of this theory to this study’s rubric means that by meeting criteria, each component of the assessment plan builds the quality of the entire assessment plan.

**Research Question 2**

Research question 2 asked, “What indicators should be used to determine whether these criteria have been met?” As criteria for each of the assessment plan’s components were drafted
in the literature review, the indicators of quality related to the components were also discovered for the initial rubric. Some verbiage related to the indicators was specifically outlined by literature or accrediting body documentation, however, others had to be derived from multiple references. All references are listed in the initial rubric in Appendix A. These indicators were drafted by the researcher and refined by the Delphi panel before a validation could be reached.

While most revisions were related to terminology or clarification, there were some instances where the Delphi panel disagreed with the literature such as in the direct/indirect measures measurement tools criterion or aspirational but achievable benchmark criterion. While the panel did meet consensus on these, not all were in agreement with the final indicator. The suggestions and additional comments demonstrated a difference in understanding and thoughts related to assessment planning even among the experts in the field. Despite the refinement that occurred to the indicators, the rubric testing participants did still indicate a need for clarification, explanation, or examples in some areas.

**Recommendations for Professional Practice**

In professional practice, radiography program leadership must be proficient in program evaluation and assessment for continuous improvement of programs as well as accreditation. Quality programmatic assessment begins with an in-depth understanding of assessment planning and each of the components of an assessment plan. Literature indicates that assessment planning is a problem area for many educational leadership professionals (Palomba & Banta, 2001) including radiography program leadership (Hatfield, 2014; Schans, 2019). The rubric developed during this study can be a valuable tool to radiography program leadership by providing the details needed to create and evaluate their programmatic assessment plans.
Recommendations for professional practice include best uses for the resulting study’s rubric. The instrument may be used at various stages of a program’s development and accreditation cycles. When programs are first developing assessment plans, the rubric may be used as a guidance document to assist with ensuring all components are included and meet criteria. The Joint Review Committee on Education in Radiologic Technology (JRCERT) requires that the assessment plan is evaluated at least every 3 years and that the program provides documentation of this process (Joint Review Committee on Education in Radiologic Technology, 2020). Some rubric testing participants suggested that the instrument would be best used during this evaluation process. Assessment plans are a requirement for JRCERT Standard Six and are reviewed as a part of a program’s self-study by the program, the JRCERT staff, and even the site visitors (Joint Review Committee on Education in Radiologic Technology, 2020). Programs may wish to utilize the rubric prior to the accreditation document review processes.

The rubric can be employed as is for an evaluation tool; however, as one rubric testing participant commented, he/she would prefer additions such as program information, notes sections, and an action plan area to make it a more useful and “aesthetically pleasing” tool. These modifications could be utilized to facilitate discussions and provide documentation of program actions taken based on indicators not being met for the program’s assessment plan.

Involvement of communities of interest, stakeholders, and faculty is an important aspect of the assessment planning process, and these individuals should also be a part of the assessment plan evaluation process (Joint Review Committee on Education in Radiologic Technology, 2020; Palomba & Banta, 2001). Another test participant indicated that he/she would utilize this rubric as a part of their existing annual assessment plan evaluation meeting. By giving the rubric to
involved parties prior to an assessment plan evaluation meeting, the program’s discussion could then be based on met and unmet responses to the criteria.

While the intention of the researcher was to create a resource for faculty, the focus was not necessarily on the resulting rubric becoming a training tool. However, as one rubric testing participant pointed out, this rubric can also be used during training of new faculty. This strategy could introduce new faculty to assessment plan expectations and engage them in programmatic evaluation.

Overall, there are many ways that this tool can be used to improve the quality of radiography programmatic assessment plans and increase the knowledge of radiography program leadership. The researcher looks forward to publishing the tool and encouraging its use within the radiography education field.

**Recommendations for Future Research**

Practitioners transitioning into education roles often experience a lack of knowledge concerning program evaluation and assessment planning (Hicks, 2016). Future studies could be used to further clarify rubric criteria and indicators. Research could also elaborate by expanding the indicators into multiple rating scales. Other research studies should be used to modify the rubric created during this study or create a new rubric for other areas of medical imaging and for other health professions’ programmatic assessment. Further research is also needed to discover what interventions or training could assist transition of a practitioner to an educator and program leader in health sciences proficient in programmatic assessment.

**Conclusions**

The study’s findings demonstrated the criteria and indicators that may be used to measure radiography programmatic assessment plans. The resulting rubric may be used at multiple time
periods to assist program leaders with the development and evaluation of a radiography program’s assessment plan and improve the quality of data produced by their plans. The simplistic but extensive design of the tool is its strength according to testing, and it is hoped that this makes the rubric practical for novices and experts alike. The publication of the rubric will provide an additional and concise resource for radiography program administrators to use at various stages of programmatic assessment plan development.

Although delimited to radiography program leadership, this study adds to the body of literature on educational leadership. It provides a program evaluation tool for leaders with many criteria that can be used for practical programmatic assessment in other health science programs. This study sought to fill a gap in not only the literature but in the practicing radiography education professional’s field. This need was recognized by personal experiences of the researcher and further noted by the limited learning resources and empirical research specific to radiography program and health science program assessment. The creation of this tool gives a valuable instrument to radiography program leadership and fulfills a critical need.
REFERENCES


https://moodle.latech.edu


Joint Review Committee on Education in Radiologic Technology. (n.d.). About JRCERT.

https://www.jrcert.org/about-jrcert/


APPENDIX A

INITIAL RUBRIC
Initial rubric presented to the panel in Round 1 based on Literature Review.

<table>
<thead>
<tr>
<th>Component</th>
<th>Criteria</th>
<th>Indicator</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Simplistic and Utilitarian</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
<td>(Eatmon, 2015; Hatfield, 2009, 2013; Lasley, 2018; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>Knowledge and Application Balance</td>
<td>Plan demonstrates a balance of what students need to know and what they need to be able to do using both course and clinical knowledge.</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td>Goals</td>
<td>Generalized Statement of Accomplishment</td>
<td>Goals are written in a generalized form and written to represent what will be accomplished. Student learning goals state what the students accomplish, not the program.</td>
<td>(Hicks, 2016)</td>
</tr>
<tr>
<td></td>
<td>Alignment to Mission</td>
<td>Goals align directly to the program's mission and values.</td>
<td>(Hatfield, 2009; Hicks, 2016; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
<td>(Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td></td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of interest to stakeholders or communities of interest.</td>
<td>(Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>Additional Professional Content</td>
<td>Additional professional content included as appropriate to degree level.</td>
<td>(Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
<td>References</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Expectations</td>
<td>Goals set high expectations for the program, faculty, and students rather than expectations that can be easily achieved. Expectations represent current entry-level radiography roles and ASRT Practice Standards</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001)</td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Outcomes are specific, clear, and measurable, avoiding complexity. Student learning outcomes are written to state what students will accomplish.</td>
<td>(Eatmon, 2015; Hatfield, 2009; Hicks, 2016; Lasley, 2018; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>Appropriate for End of Program Expectation Levels</td>
<td>Outcome verbiage appropriate for degree level and summative evaluation at end of program. Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills.</td>
<td>(Hatfield, 2013; Hicks, 2016; Schans, 2019)</td>
</tr>
<tr>
<td></td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty and other communities of interest have determined collectively are important</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>Alignment to Goals and Mission</td>
<td>Outcomes align directly with the goals and program mission.</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals while avoiding complexity of the overall plan. JRCERT requires at least two outcomes per goal.</td>
<td>(Hatfield, 2009; Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td></td>
<td>Measurement Tools</td>
<td>Validity Measurement tools adequately measure the selected outcome without interference of other</td>
<td>(Leggett &amp; Eatmon, 2017; McCann &amp; Schniederman, 1995;</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
<td>References</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>concepts. Should be sensitive to changes in changes related to the outcome.</td>
<td>Palomba &amp; Banta, 2001</td>
</tr>
<tr>
<td>Reliability</td>
<td></td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
<td>(Schmidt, 2020)</td>
</tr>
<tr>
<td>Higher-Order Thinking Skills</td>
<td></td>
<td>Measurement tools are appropriate for measuring higher-order thinking skills.</td>
<td>(Hatfield, 2009)</td>
</tr>
<tr>
<td>Measurement Tools per Outcome</td>
<td></td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. Three or more recommended for data triangulation. JRCERT requires two measurement tools per outcome.</td>
<td>(Hicks, 2016; Natow, 2020; Leggett &amp; Eatmon, 2017; Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>Multiple Sources</td>
<td></td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
<td>(Hatfield, 2009; Leggett, 2017; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td>Direct/Indirect Measures</td>
<td></td>
<td>Direct measures used in student learning. Indirect measures minimally or only as appropriate for JRCERT employer and graduate satisfaction measures.</td>
<td>(Hatfield, 2009; Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>JRCERT Required Measurement Tools</td>
<td></td>
<td>JRCERT Radiography Standard 6.1 requires collection of program effectiveness data to include: 5 year average credentialing examination pass rate, 5 year job placement rate, and annual program completion rate</td>
<td>(Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
<td>References</td>
</tr>
<tr>
<td>--------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages, when appropriate.</td>
<td>(Eatmon, 2015; Palomba &amp; Banta, 2001)</td>
</tr>
<tr>
<td></td>
<td>JRCERT Required Benchmarks</td>
<td>JRCERT requires a 5 year average credentialing examination pass rate of not less than 75 percent at first attempt within 6 months of graduation and a 5 year average job placement rate of not less than 75 percent within 12 months of graduation.</td>
<td>(Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>Time Frames</td>
<td>Trending Capability</td>
<td>Time frames are set to be able to collect data over incremental time periods and demonstrate trending, generally should collect data for at least 3 cohorts for trending purposes.</td>
<td>(Eatmon, 2015; Hatfield, 2009, 2013; Leggett &amp; Eatmon, 2017)</td>
</tr>
<tr>
<td>Responsible Parties</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001; Joint Review Committee on Education in Radiologic Technology, 2020)</td>
</tr>
<tr>
<td>Communities of Interest Involvement</td>
<td>Communities of interest are involved in assessment planning, assessment evaluation, and assessment data analysis.</td>
<td>(Hatfield, 2009; Palomba &amp; Banta, 2001; Joint Review Committee on Education in Radiologic Technology, 2020)</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

RUBRIC AFTER ROUND 1
Rubric draft with revisions from data in Round 1 and presented to the panel in Round 2.

Highlighted components indicate those already validated in Round 1 and not revised.

<table>
<thead>
<tr>
<th>Component</th>
<th>Criteria</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Understandable and Useful</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
</tr>
<tr>
<td>Knowledge and Application</td>
<td></td>
<td>Plan demonstrates a balance of what students know and how they are able to apply it, with consideration to didactic and clinical content.</td>
</tr>
<tr>
<td>Goals</td>
<td>Generalized Statement of Student Learning</td>
<td>Student learning goals are written in a generalized form and written to represent what will be accomplished by the end of the program. Goals state what the students accomplish, not the program.</td>
</tr>
<tr>
<td></td>
<td>Alignment to Mission</td>
<td>Goals align with the program and institution's mission and values.</td>
</tr>
<tr>
<td></td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
</tr>
<tr>
<td></td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of relevance to the profession and of interest to stakeholders or communities of interest.</td>
</tr>
<tr>
<td></td>
<td>Additional Professional Content</td>
<td>Additional professional content included as appropriate to degree level (e.g., ethical principles, interpersonal skills, professionalism, etc.)</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards. Goals should, however, set high expectations for the students rather than expectations that can be easily achieved.</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Outcomes avoid complexity. Each outcome should be singular and avoid &quot;and&quot; statements. Outcomes are written to state what students will accomplish and how they will be measured.</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills. Outcome</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
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<td>----------------------------</td>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>verbiage appropriate for degree level and formative or summative evaluation.</td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty have determined collectively are important.</td>
</tr>
<tr>
<td>Alignment to Goals</td>
<td>Outcomes support the chosen goals.</td>
<td></td>
</tr>
<tr>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals while avoiding complexity of the overall plan. JRCERT requires at least two outcomes per goal.</td>
<td></td>
</tr>
<tr>
<td>Measurement Tools</td>
<td>Validity</td>
<td>Measurement tools adequately measures the selected outcome. Should be sensitive to changes related to the outcome.</td>
</tr>
<tr>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
<td></td>
</tr>
<tr>
<td>Higher-Order Thinking Skills</td>
<td>Measurement tools are appropriate for measuring higher-order thinking skills.</td>
<td></td>
</tr>
<tr>
<td>Measurement Tools per Outcome</td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. JRCERT requires 2 measurement tools per outcome. 3 or more tools per outcome is recommended for data triangulation.</td>
<td></td>
</tr>
<tr>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
<td></td>
</tr>
<tr>
<td>Direct/Indirect Measures</td>
<td>Direct measures (i.e., student assessments) primarily used. Indirect measures (i.e., student perceptions) used minimally or only as appropriate.</td>
<td></td>
</tr>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages.</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
<tr>
<td>--------------------</td>
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</tr>
<tr>
<td>Time Frames</td>
<td>Trending Capability</td>
<td>Time frames are set to collect data over incremental time periods for the purposes of demonstrating trends, generally should collect data from at least 3 points in time or 3 cohorts for trending purposes.</td>
</tr>
<tr>
<td>Involved Parties</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks or positions are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
</tr>
<tr>
<td></td>
<td>Communities of Interest Involvement</td>
<td>Communities of interest are engaged in assessment planning, assessment evaluation, and reviewing of assessment data analysis.</td>
</tr>
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</table>
APPENDIX C

RUBRIC AFTER ROUND 2
Rubric draft with revisions from data in Round 2 and presented to the panel in Round 3. Highlighted components indicate those already validated in Round 1 and 2 which were not revised.

<table>
<thead>
<tr>
<th>Component</th>
<th>Criteria</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Understandable and Useful</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
</tr>
<tr>
<td></td>
<td>Knowledge and Application</td>
<td>Plan demonstrates a balance of what students know and how they are able to apply it with consideration to didactic and clinical content.</td>
</tr>
<tr>
<td>Goals</td>
<td>Generalized Statement of Student Learning</td>
<td>Student learning goals are written in a generalized form and written to represent what will be accomplished by the end of the program. Goals state what the students accomplish, not the program.</td>
</tr>
<tr>
<td></td>
<td>Alignment to Mission</td>
<td>Goals align with the program and institution's mission and values.</td>
</tr>
<tr>
<td></td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
</tr>
<tr>
<td></td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of relevance to the profession and of interest to stakeholders or communities of interest.</td>
</tr>
<tr>
<td></td>
<td>Additional Professional Content</td>
<td>Additional professional content included as appropriate to degree level (e.g., ethical principles, interpersonal skills, professionalism, etc.)</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards.</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Each outcome should be singular and avoid &quot;and&quot; statements. Outcomes are written to state what students will accomplish.</td>
</tr>
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<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Expectations</td>
<td>Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills. Outcome verbiage appropriate for degree level and formative or summative evaluation.</td>
<td></td>
</tr>
<tr>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty have determined collectively are important.</td>
<td></td>
</tr>
<tr>
<td>Alignment to Goals</td>
<td>Outcomes support the chosen goals.</td>
<td></td>
</tr>
<tr>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals while avoiding complexity of the overall plan. JRCERT requires at least two outcomes per goal.</td>
<td></td>
</tr>
<tr>
<td>Measurement Tools</td>
<td>Validity</td>
<td>Measurement tools adequately measures the selected outcome.</td>
</tr>
<tr>
<td></td>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is easy for data collectors to use.</td>
</tr>
<tr>
<td></td>
<td>Higher-Order Thinking Skills</td>
<td>Measurement tools are appropriate for measuring higher-order thinking skills.</td>
</tr>
<tr>
<td>Measurement Tools per Outcome</td>
<td>The number of measurement tools is appropriate to adequately measure the outcome. JRCERT requires 2 measurement tools per outcome. 3 or more tools per outcome are recommended for data triangulation.</td>
<td></td>
</tr>
<tr>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program faculty) and external (clinical faculty) personnel.</td>
<td></td>
</tr>
<tr>
<td>Direct/Indirect Measures</td>
<td>Direct measures (i.e., student assessments) primarily used. Indirect measures (i.e., student perceptions) used minimally or only as appropriate.</td>
<td></td>
</tr>
<tr>
<td>Benchmarks</td>
<td>Aspirational but Achievable</td>
<td>Benchmarks should be set to aspirational but achievable levels that are above minimum expectations or national averages.</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
<tr>
<td>-----------------</td>
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<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Time Frames</strong></td>
<td>Trending Capability</td>
<td>Time frames are set to collect data over incremental time periods for the purposes of demonstrating trends, generally should collect data from at least 3 points in time or 3 cohorts for trending purposes.</td>
</tr>
<tr>
<td><strong>Involved Parties</strong></td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks or positions are involved in assessment planning, assessment data collection, assessment evaluation, and assessment data analysis.</td>
</tr>
<tr>
<td><strong>Involved Parties</strong></td>
<td>Communities of Interest Involvement</td>
<td>Communities of interest are engaged in assessment planning, assessment evaluation, and reviewing of assessment data analysis.</td>
</tr>
</tbody>
</table>
APPENDIX D

FINALIZED RUBRIC
The finalized rubric as validated by the panel in Round Three.

<table>
<thead>
<tr>
<th>Component</th>
<th>Criteria</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan - General</td>
<td>Understandable and Useful</td>
<td>Plan is in a simple format that is easy to use and understand for all parties who might use or view the assessment plan.</td>
</tr>
<tr>
<td>Knowledge and Application</td>
<td>Plan demonstrates a balance of what students know and how they are able to apply it with consideration to didactic and clinical content.</td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Generalized Statement of Student Learning</td>
<td>Student learning goals are written in a generalized form and written to represent what will be accomplished by the end of the program. Goals state what the students accomplish, not the program.</td>
</tr>
<tr>
<td></td>
<td>Alignment to Mission</td>
<td>Goals align with the program and institution's mission and values.</td>
</tr>
<tr>
<td></td>
<td>JRCERT Required Goals</td>
<td>Goals concerning clinical competency, communication, and critical thinking included.</td>
</tr>
<tr>
<td></td>
<td>Relevance to Communities of Interest</td>
<td>Plan utilizes goals that are of relevance to the profession and of interest to stakeholders or communities of interest.</td>
</tr>
<tr>
<td></td>
<td>Additional Professional Content</td>
<td>Additional professional content included as appropriate to degree level (e.g., ethical principles, interpersonal skills, professionalism, etc.)</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>Expectations should represent, at a minimum, current entry-level radiography roles and ASRT Practice Standards.</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Specific, Clear, and Measurable</td>
<td>Each outcome should be singular and avoid &quot;and&quot; statements. Outcomes are written to state what students will accomplish.</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>Expectation of outcome is beyond basic understanding and into application, synthesis, and demonstration of information and skills. Outcome verbiage appropriate for degree level and formative or summative evaluation.</td>
</tr>
<tr>
<td></td>
<td>Demonstrate Program Values</td>
<td>Outcomes chosen based on the knowledge, skills, and values that faculty have determined collectively are important.</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Alignment to Goals</td>
<td>Outcomes support the chosen goals.</td>
</tr>
<tr>
<td></td>
<td>Outcomes per Goal</td>
<td>Outcome number appropriate to accurately measure goals while avoiding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>complexity of the overall plan. JRCERT requires at least two outcomes per</td>
</tr>
<tr>
<td></td>
<td></td>
<td>goal.</td>
</tr>
<tr>
<td>Measurement</td>
<td>Validity</td>
<td>Measurement tools adequately measure the selected outcome.</td>
</tr>
<tr>
<td>Tools</td>
<td>Reliability</td>
<td>Measurement tool is able to consistently measure the outcome. The tool is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>easy for data collectors to use.</td>
</tr>
<tr>
<td></td>
<td>Higher-Order</td>
<td>Measurement tools are appropriate for measuring higher-order thinking</td>
</tr>
<tr>
<td></td>
<td>Thinking Skills</td>
<td>skills.</td>
</tr>
<tr>
<td></td>
<td>Measurement Tools per</td>
<td>The number of measurement tools is appropriate to adequately measure the</td>
</tr>
<tr>
<td></td>
<td>Outcome</td>
<td>outcome. JRCERT requires 2 measurement tools per outcome. 3 or more tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>per outcome are recommended for data triangulation.</td>
</tr>
<tr>
<td></td>
<td>Multiple Sources</td>
<td>Measurement tools are a mix of evaluations from both internal (program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>faculty) and external (clinical faculty) personnel.</td>
</tr>
<tr>
<td></td>
<td>Direct/Indirect Measures</td>
<td>Direct measures (i.e., student assessments) primarily used. Indirect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>measures (i.e., student perceptions) used minimally or only as appropriate.</td>
</tr>
<tr>
<td></td>
<td>Aspirational but</td>
<td>Benchmarks should be set to aspirational but achievable levels that are</td>
</tr>
<tr>
<td></td>
<td>Achievable</td>
<td>above minimum expectations or national averages.</td>
</tr>
<tr>
<td></td>
<td>Trending Capability</td>
<td>Time frames are set to collect data over incremental time periods for the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>purposes of demonstrating trends, generally should collect data from at</td>
</tr>
<tr>
<td></td>
<td></td>
<td>least 3 points in time or 3 cohorts for trending purposes.</td>
</tr>
<tr>
<td>Involved</td>
<td>Faculty Involvement</td>
<td>Faculty of all ranks or positions are involved in assessment planning,</td>
</tr>
<tr>
<td>Parties</td>
<td></td>
<td>assessment data collection, assessment evaluation, and assessment data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>analysis.</td>
</tr>
<tr>
<td>Component</td>
<td>Criteria</td>
<td>Indicator</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Communities of Interest</td>
<td>Communities of Interest Involvement</td>
<td>Communities of interest are engaged in assessment planning, assessment evaluation, and reviewing of assessment data analysis.</td>
</tr>
<tr>
<td>Involvement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E

IRB APPROVAL
MEMORANDUM

TO: Dr. Dustin Herbert, hebertd@cloudlatech.edu; Rebecca Hamm, rebecca.gibson219@gmail.com

FROM: Dr. Walter Buboltz, Professor/Elsa L. Smith Endowed Professor, buboltz@latech.edu

SUBJECT: Human Use Committee - Review DECISION

DATE: April 27, 2022

In order to facilitate your project, an EXPEDITED REVIEW has been completed for your proposed study:

HUC No.: 1415, 22-088

TITLE: Development of a Rubric to Measure Radiography Programmatic Assessment Plan Quality

HUC DECISION: Exempt from full review

According to the Code of Federal Regulations Title 45 Part 46, your research protocol is determined to be exempt from full review under the following exemption category(s):

It has been determined that your study meets the requirements for exemption 45 CFR §46.104(d) (2) (i):

(2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

(i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

Additional comments from Reviewer: Names of Delphi participants are deidentified. Participant information is removed and coded to protect anonymity. Only aggregate information in the form of opinions is reported. Communication is one-on-one between the researcher and each participant. No treatments or forms of remediation are offered.

Thank you for submitting your Human Use Proposal to Louisiana Tech's Institutional Review Board.