STUDENT LEARNING OUTCOMES ASSESSMENT IN RADIOGRAPHY WITHIN THE CONTEXT OF A NATIONAL HIGHER EDUCATION QUALITY FRAMEWORK

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ABSTRACT

This article describes a process of student learning outcomes assessment for a health sciences programme in radiography at a university in South Africa. Its purpose is to demonstrate that while the process of student learning outcomes assessment is universal, it can be used both nationally and internationally. As long as underlying premises are met, assessment needs to be considered within the context of a country's unique culture, society and history. Underlying premises include understanding the institution's mission and vision, determining that the programme's mission and vision are congruent with those of the institution, and involving faculty early in the assessment process.

Keywords: educational assessment, radiography, student learning outcomes

1. INTRODUCTION

Internationally, there is a focus on student learning outcomes assessment in higher education.[1-5] However, the impetus for this assessment varies from country to country, and should be considered within a developmental framework. For example, in the United States, the impetus has come from external constituencies stressing accountability.[6-8] Prospective and current students as well as family members want to know whether student education is meeting academic standards. State and federal constituencies want assurances that the money allocated to higher education is tied to meeting educational goals.[9] Accrediting bodies are increasingly focused on measures of student outcome in addition to the educational process standards.[10-12]

Other countries also have increasing concerns about accountability and outcome measurements in higher education,[13-14] although the impetus for such interest may be unique to a particular country. In South Africa (SA) for example, a Higher Education Quality Framework has been developed to guide institutions of higher education in meeting academic standards.[15-16] This framework was created to assist institutions in acknowledging the diverse backgrounds of their prospective students and the transition from an educational system based on separation to one based on inclusion.[17-20] In addition, more emphasis is placed on developing specific skills of the student, also referred to as generic skills or critical cross-field outcomes (CCFOs).

Some of these skills include critical thinking, problem solving, academic writing, research, and presentation skills.[16,27].

This paper outlines how a radiography programme in an SA institution of higher education is developing and implementing a process for student learning outcomes assessment within the SA Higher Education Higher Education Quality Framework. The programme recognises that students from diverse backgrounds need not only to be offered the opportunity to be successful, but also to have a structure that will critically examine outcomes and make recommendations so as to support all students. All students will be held accountable for demonstrating the skills and attributes necessary to practise in their chosen profession; in this case, radiography. In order to address accountability, student learning outcomes need to be clearly articulated, explicitly taught and assessed, and benchmarked against reasonable standards of expectations.

Several years ago, under the guidance of a consultant, the faculty in the radiography programme in the School of Health Technology at the Central University of Technology, Free State (CUT) in Bloemfontein, SA began to develop a process of student learning outcomes assessment. This action was prompted by the drive to provide evidence on quality factors in teaching, learning and assessment in higher education in South Africa, an initiative of the SA Council for Higher Education.[15] The process was led by the chair of the programme and received strong support from the head of the school, as well as from the Dean of Research Development at the CUT. As noted in the literature, faculty involvement is critical to the success of an assessment project.[21-23] It was therefore important to get input and feedback from the faculty during the development and implementation phases of the project.

2. METHOD

The first step in developing the assessment model was to articulate the programme's vision and mission; and to insure that these were congruent with the vision and mission of the School and the University. The programme was also cognisant of the generic skills expected of all students graduating from institutions of higher education in SA.[24] As outlined in its strategic plan, the vision of the radiography programme was to demonstrate "excellence and innovation in radiography".[25] The programme's mission statement had five components

As a responsive academic programme in radiography we exist to:

> facilitate dedicated and career-focused expertise to quality learners in promoting academic excellence in radiography;
>
> provide knowledge and skills, and develop appropriate attitudes in radiography at the forefront of technology in human health;

undertake research that addresses regional, national, and international issues to equal global standards;

address the needs of the community to ensure upliftment (sic) through education,

research and skills development, so as to improve the quality of life; and

establish and maintain collaboration with stakeholders in radiography[25]

After much discussion, the faulty agreed on a single programme goal that encompassed their vision and mission: "To create excellent clinical radiographers who are able to practise ethically in diverse environments as valuable members of a health care team by communicating effectively, exhibiting critical thinking skills, integrating and applying knowledge, and demonstrating adaptability".[25]. The faculty members were then able to parse this goal into six components:

Communication
Critical thinking
Integration and application of knowledge and skills
Adaptability and flexibility
Teamwork
Ethics and values

These components constitute generic skills that all graduates of the programme would be expected to demonstrate. As radiographers, they must be able to communicate effectively both in writing and orally to diverse populations to include other health care providers, patients from diverse ethnic and socio-economic groups, and family members. The profession requires practitioners to exhibit critical thinking skills as contrasted with following set procedures and protocols. Prior to graduation the students would need to demonstrate that they were able to capture the didactic knowledge and skills introduced to them as part of the formal academic programme and apply those skills in the work environment. The health care environment is not stagnant; it is dynamic and diverse. Graduates of the radiography programme would be expected to exhibit the characteristics of adaptability and flexibility to respond appropriately to this environment. Health care workers must function as a team to provide optimal patent care. Prior to graduation, students would need to practise their team-building skills and demonstrate the ability to provide patient care as an integral member of a health care team. Finally, ethical behaviour and adherence to a set of core values underlies all of the expectations for a graduate of the radiography programme.

Using a framework developed by the external consultant,[26] the faculty identified competencies, teaching strategies, measurements, and benchmarks for each of the six components (see Appendix I). Competency can be defined as a behavioural objective for the stated programme goal or principle. What is it that the student is expected to demonstrate that will be used to assess goal attainment? Teaching strategies outline the pedagogical methodology to be used to educate the student to meet goal attainment. Too often marks are the only measurement used to assess goal attainment. While marks are an important component of the process of assessment, in this instance it should not be the most important evidence linked to the outcome of the assessment. Faculty members were therefore encouraged to look at using devices such as carefully developed questionnaires and surveys to obtain assessment information. Then, they were asked to realistically identify the level of goal attainment for each goal that might be expected from the cohort as a whole the first time these goals were formally assessed.

Using information from student performance, student feedback, feedback from programme graduates, and feedback from clinical sites, the faculty subsequently measured goal attainment for competencies, noting which benchmarks had been met and which had not. For those benchmarks not met, an action plan was put into place so as to facilitate goal attainment in the future.

3. RESULTS

The results of the assessment of the programme's six components indicated that the majority of the benchmarks used to determine component attainment were unmet. The only benchmark that was consistently met was the benchmark of a 90% first time pass rate for students' final clinical assessment. This benchmark was met as 100% of the students passed their final clinical assessment on the first attempt, and was used to assess goal attainment for components 1 - 4 and 6. The other benchmark that was met related to the values and ethics component. Since there were no incidences of academic dishonesty in the assessment year, the benchmark of all incidences of academic dishonesty appropriately handled was considered to be met. No other benchmarks were met (see Appendix I). However, the true value of the assessment process was in enabling the faculty to identify broad areas of concern to be addressed, rather than focusing on goal attainment.

4. DISCUSSION

In the process of assessment of student learning, the faculty identified four overarching areas of concern. First, they were not assessing students in the actual clinical setting, so they were unable to evaluate actual clinical practice behaviours and skills. Second, their method of obtaining feedback from prospective employees (clinical sites) was flawed; the questionnaire that was sent to the sites was too general and led to these prospective employees

focusing on the skills and behaviours of only one or two students and then generalising to the CUT radiography programme student body as a whole. Third, the faculty realised that if they wanted their students to exhibit specific behaviours, such as the ability to function as a member of a team, they needed to teach those skills explicitly, and then assess skill attainment both in the classroom and clinical setting. Fourth, faculty members realised that many of the benchmarks were set too high because they had not based their benchmarks on historical data or taken into account the stringent assessment system in South Africa, where a passing mark, for instance, is considered to be 50% and a distinction 75%.

Based on the overarching concerns identified through the assessment process, the Radiography programme has made some substantive changes. First, the faculty has decided to implement clinical assessment in the actual clinical environment. In addition, the programme has now employed a radiographer to visit and work with the students in the various clinical practices on a weekly basis to facilitate integration of theory and clinical practice. The "adopt-a-practice" project will also be implemented where each radiography programme member will be assigned a clinical practice to visit on a regular basis. By doing so, the faculty will be in a position to assess student attitudes and skills in an active clinical practice environment.

Second, the questionnaire sent to prospective employers has been substantially revised so as to focus on generic skills and stated student learning outcomes. The questionnaire will be sent to employers of programme graduates and graduates themselves to determine how well graduates are being prepared to function in the work environment. Data from the questionnaire will be augmented by information obtained by means of a focus group of prospective employers that will allow a facilitator to ask follow up questions when the answers received are not clear or need amplification and/or clarification.

Third, faculty members in the programme have decided to focus more specifically on the identified component goals with directed teaching, learning, and assessment activities. For example, the faculty decided that values and ethics will be explicitly addressed in the reflective reports the students are required to write. Furthermore, a specific emphasis was placed on the alignment of outcomes, teaching and assessment with Bloom's taxonomy so as to make sure that the students attain outcomes at the appropriate cognitive level.[28]. A specific teaching and assessment strategy addressing the requirement was to introduce case study scenarios.

Finally, faculty will review historical data and take into account the South African assessment system (based on the British model) to set more realistic goals for many of the benchmarks that were unmet. This would include marks on student portfolios, group work and summative assessment examinations.

5. CONCLUSION

Against the backdrop of the development of a framework for assessing quality in higher education in SA, and a focus on a system of inclusion of diverse student populations, measuring student learning outcomes is a timely action. This paper describes how one programme in one institution has taken steps to transform its student learning assessment process within this framework. It is a model that can be used by others, and highlights the importance of context in developing and implementing a student learning outcomes assessment plan.

Salient points to consider as other programmes develop assessment of student learning models include the importance of faculty buy-in and participation. In order to be effective and meaningful, assessment cannot be viewed as something constructed by administration or perhaps by only a small subset of the faculty unit as a whole. It starts from ensuring that the unit goals are congruent with the goals of the larger organisation. If this is not the case, time should be spent in considering why congruency is absent and then developing strategies to increase the fit between the mission and the unit goals. Goals should be set focusing on generic abilities rather than focusing on specific skills. For example, it is much easier to teach a student to take blood pressure readings as compared to being able to determine when this procedure might be appropriate and then conveying the results to the individual and to the health care team. Faculty members should be able to articulate goals in measurable terms, and to know in advance how goal attainment will be assessed. They should not hold unrealistic standards for goal attainment, but should review what evidence has been collected previously that might provide a starting point for a reasonable outcome. Finally, the assessment process is incomplete until the loop is closed; once feedback is attained, discussion must occur about the results of assessment to include identifying activities for change. These activities could involve the use of an appropriate variety in teaching strategies, inclusion of additional assessment measures, increased formative feedback, or perhaps reassessing the stated benchmarks.

Assessment is a tool. It should be used to enhance student learning and identify areas of strength and areas to be strengthened. Particularly in health professional education, it is important that assessment be performed before graduation so that the graduate can participate in health care as a full contributor to meeting the goal of optimal patient care.

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Appendix I

RADIOGRAPHY PROGRAMME GOAL

To create excellent clinical radiographers who are able to practise ethically in diverse environments as valuable members of a health care team by communicating effectively, exhibiting critical thinking skills, integrating and applying knowledge, and demonstrating adaptability.

Goal/ Principle	Competencies (Students will:)	Teaching Strategies	Measurements	Benchmarks	Met / Unmet	Actions Taken/ Notes
1.1 Communication	• Demonstrate effective writing skills • Communicate clearly and effectively to diverse populations • Use information technology to facilitate communication	• Provide rubrics for required papers • Provide rubrics for case study presentations • Provide rubrics for clinical assessment • Exposure to experiential learning activities • Provide rubrics for student portfolios • Provide opportunity for PowerPoint presentations	• Marks on papers • Marks on case studies • Marks on clinical assessment • Results from prospective employer questionnaires • Marks on student portfolios • Marks on PowerPoint presentations	• The Programme to have a 90% first time pass rate on students' final clinical assessment	Met 100%	No action necessary
				• 90% of prospective employers surveyed provide positive feedback on student performance	Unmet 83%	Review methods used to obtain feedback on both student and graduate performance
				• Students in the Programme to have a mean mark of 80% on their portfolios	Unmet 70%	Determine if the benchmarks were too high
				• Students in the Programme to have a mean mark of 80% on their PowerPoint presentations	Unmet 77%	Determine if the benchmarks were too high

Goal/ Principle	Competencies (Students will:)	Teaching Strategies	Measurements	Benchmarks	Met / Unmet	Actions Taken/ Notes
1.2 Critical Thinking	• Recognise and define problems • Develop multiple hypotheses • Choose effective strategies/correct solutions • Implement chosen solutions • Assess effectiveness of chosen solutions, revising if necessary	• Implement problem based learning strategies • Use reflective teaching techniques	• Marks on case studies • Ratings on clinical assessment	• The Programme to have a 90% first time pass rate on students' final clinical assessment	Met 100%	No action required
			• Results from prospective employer questionnaires	• 90% of prospective employers surveyed provide positive feedback on student performance	Unmet 83%	Review methods used to obtain feedback on both student and graduate performance
			• Marks on student portfolios	• Students in the Programme to have a mean mark of 80% on their portfolios	Unmet 77%	Determine if the benchmarks were too high

Goal/ Principle	Competencies (Students will:)	Teaching Strategies	Measurements	Benchmarks	Met / Unmet	Actions Taken/ Notes
1.3 Integration and application of knowledge and skills	• Apply didactic knowledge to clinical practice settings • Effectively practise the skills required of a competent radiographer • Correctly use a variety of equipment necessary for competent practice	• Provide opportunity to demonstrate performance in a simulated environment • Provide rubrics for clinical assessment	• Ratings on clinical assessment • Marks on student portfolios • Results from prospective employer questionnaires • Performance on summative assessment (oral and written)	• The Programme to have a 90% first time pass rate on students' final clinical assessment	Met	No action required
				• 90% of prospective employers surveyed provide positive feedback on student performance	Unmet 83%	Review methods used to obtain feedback on both student and graduate performance
				• Students in the Programme to have a mean mark of 80% on their portfolios	Unmet 77%	Determine if the benchmarks were too high
				• Students in the Programme to have a mean mark of 80% for their summative written and oral exams	Unmet 70% (written) 77% (oral)	Determine if the benchmarks were too high Discuss the need for formally assessing students in an actual clinical setting

Goal/ Principle	Competencies (Students will:)	Teaching Strategies	Measurements	Benchmarks	Met / Unmet	Actions Taken/ Notes
1.4 Adaptability and flexibility	• Apply prior knowledge and experience to new situations • Demonstrate flexibility in classroom and clinical practice settings • Practise effectively in diverse environments	• Provide opportunity to demonstrate performance in a simulated environment • Provide rubrics for student portfolios	• Ratings on clinical assessment • Performance on summative exams (oral and written) • Marks on student portfolios • Results from prospective employer questionnaires	• The Programme to have a 90% first time pass rate on students' final clinical assessment • Students in the Programme to have a mean mark of 80% for their summative written and oral exams • Students in the Programme to have a mean mark of 80% on their portfolios • 90% of prospective employers surveyed provide positive feedback on student performance	Met 100% Unmet 70% (written) 77% (oral) Unmet 77% Unmet 83%	No action required Determine if the benchmarks were too high Determine if the benchmarks were too high Review methods used to obtain feedback on both student and graduate performance

Goal/ Principle	Competencies (Students will:)	Teaching Strategies	Measurements	Benchmarks	Met / Unmet	Actions Taken/ Notes
1.5 Teamwork	• Operate effectively as a member of a health care team in diverse environments	• Provide opportunity for group work in classroom and clinical environments	• Marks on group work • Results from prospective employer questionnaires	• Students in the Programme to have a mean mark of 80% on their group work • 90% of prospective employers surveyed provide positive feedback on student performance	Unmet7 0% Unmet 83%	Determine if the benchmarks were too high Review methods used to obtain feedback on both student and graduate performance