

Making a Positive Effect on the Credentialing Exam Pass Rate

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Programs accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT) must maintain proper documentation regarding student achievement, known as *program effectiveness data*. One of the 3 parameters of program effectiveness data requires that each program's 5-year average credentialing exam pass rate must be 75% or more within 6 months after graduation for radiography, radiation therapy, and magnetic resonance, and within the next testing cycle after graduation for medical dosimetry.¹ Standard 1, Objective 1.6 of the JRCERT Standards focuses on accountability by requiring that programs publish this data on their websites.²

Various circumstances, including events beyond anyone's control, might influence this component of a program's data. Standard 6, Objectives 6.1 and 6.2 encourage programs to evaluate their effectiveness data continuously and ensure that benchmarks are met annually. Programs must develop an action plan to address the shortcomings when they fail to meet the criterion. This process should always involve the program faculty and communities of interest, such as members of advisory committees and institutional administrators.² Building a synergistic faculty instructional team and incorporating specific targeted strategies help programs maintain their existing satisfactory performance or make a solid comeback from unfavorable pass rates.

The Faculty Instructional Team

Synergy among a program's faculty predicts student improvement and success.³ Focusing on developing a solid faculty instructional team is essential. Each faculty team member must commit to collaborative communication and possess a like-minded focus on the program and student success. In most cases, each faculty member is assigned a set of courses in

the program's curriculum and then given autonomy regarding which pedagogical choices they use to convey that course material. Faculty members should consider eliciting input from one another before incorporating substantial content changes or teaching innovations. In addition, faculty members should ensure institutional and programmatic goals are monitored after implementation to proactively revise curricula, if necessary.

Targeted Strategies

When faculty incorporate specific interventions throughout every course in the curriculum, student cohorts are exposed to a more cohesive and elevated approach to their education. Consistent practices at the departmental level also provide structure and invoke a sense of confidence in the students.

Faculty and Student Relationships

Meaningful relationships between students and faculty might result in vast benefits for students at any academic level. Fostering a sense of mentorship and community in the classroom has been shown to develop trust, enhance learning, and provide motivation, leading to increased academic achievements. Students desire involvement from their instructors, and instructors are perfectly positioned to create an environment that empowers and supports students.⁴ According to Ayllon et al, 3 psychological support areas can improve student achievement⁵:

- autonomy support – Instructors must encourage students to reflect on their needs and express their perspectives.
- competence support – Instructors must provide a structure that fosters students' competence through clear and concise communication,

ongoing guidance, monitoring progress, and promptly providing constructive and informative feedback.

- relational support – Instructors must be available, connecting students with resources and promoting professional behaviors in all learning environments.

Promoting Self-Efficacy

Aiding students in understanding self-efficacy is equally essential. Self-efficacy relates to how students gauge their capabilities and is known to influence their choices and efforts to achieve academic goals significantly.⁵ Students with a strong sense of self-efficacy are likely to possess the ability to be challenged naturally by unsatisfactory outcomes. They set out to make and attain their own goals. Conversely, many struggling students need self-efficacy-building strategies and other self-evaluation tools incorporated into their instruction to develop a high level of these skills.⁶ In the radiography education setting, hands-on laboratory practice is an excellent opportunity to provide detailed feedback and frequently highlight the student's progression. When positive, the student can recognize the efforts that contributed to their success. When negative, instructors can teach students to use those mistakes as learning opportunities.

Goal Setting

Setting goals is not the end-all in achieving student success. "It is the activities that the students will participate in during the learning process that have the potential to positively influence student achievement."⁷ Whether instructor-led or self-determined, goals promote awareness and accountability. Students with a goal naturally engage in metacognitive behaviors, including monitoring their learning and becoming advocates for future successes, ultimately strengthening their focus on achieving the next goal.⁶

As an example of a performance goal policy, program faculty might consider creating an academic performance goal or minimum acceptable grade policy throughout their curriculum to improve content knowledge. This strategy involves defining a threshold grade or percentage to achieve on major assessments, followed by a required remediation activity for any student

who does not meet the specified grade requirement. Depending on the sponsoring institution's policies, programs might determine the remediation parameters per student per assessment or a standardized assignment could be implemented in an individual course or applied to the program courses. This performance goal strategy aims to have the students revisit content to better understand and increase their knowledge of the material before progressing to the next content area (ie, chapter or unit).

To incorporate elements of the remediation assignment that enhance student self-efficacy and self-evaluation, consider specific components such as reflecting on their initial answer choice, determining why they might have chosen the incorrect response, and evaluating their time commitment for preparation. This strategy does not require changing the original grade or score of the evaluation; however, the positive effect of incorporating a goal and related remediation tool will become evident on the student's future comprehensive assessments, including the required credentialing exam. See **Box 1** for an example of a performance goal policy for a radiologic technology program.

Test-Enhanced Learning: Practice Makes Perfect

The primary goal in the health sciences program is how students eventually will be able to retrieve and transfer knowledge applicable to skills required of health care professionals in a clinical environment. However, conquering the required credentialing exam comes first.

For decades, numerous studies have established the benefits of testing. Most assessments are high-stakes summative evaluations of retained knowledge instead of alternative low-stakes informative assessments. Informative assessments are equally necessary to gain critical feedback for future learning. Combining these 2 types of assessments can benefit students' ability to retrieve information and ultimately achieve success in a comprehensive educational program.⁸

A systematic study by Bae et al assessed the practice and benefits of combining several retrieval-based learning strategies.⁹ The forms considered included free recall, practice quizzing, test generation, and keywords, and their effect on long-term retention (see **Box 2**).

Box 1

Example of a Performance Goal Policy

The radiologic technology program coursework is designed to provide students with a structured, comprehensive curriculum that prepares them for a career as a professional health care provider. Students must develop and maintain a solid knowledge base of all course material and competencies to be successful. Therefore, the program has established a performance goal for all coursework and assessments in all McLennan Community College radiologic technology courses of an 80% or higher. Students who do not achieve the minimum grade of 80% must complete a remediation activity assigned by the course instructor immediately after assessments.

The activity requirements will vary with customization according to factors such as the student's needs, the purpose of the assignment, and the content, and the instructor will maintain all completion records. Students who fail to complete the required remediation activities will receive an incomplete (I) grade for the course, regardless of an overall passing grade point average, until all work is submitted. An incomplete in any system must be resolved before the start of the following semester, or the resulting grade will convert to an F, and the student will not pass the course.

Each retrieval-based strategy alone benefits the long-term memory of learned information; however, their combined use has been proven significantly more effective, mainly when used repetitively.⁹

Stress often has a large part in students' performance on the credentialing exam day. Like team sports, disaster drills, or military combat training, repetitive exercises and continual retrieval practice can help alleviate some of the effect stress can have on retrieving information during an exam. Klier and Buratto assessed some of the benefits of retrieval-based learning and the effects of stress during testing.¹⁰ For complex content, such as radiation physics or radiobiology, research suggests that retrieval-based education has a favorable effect because of the storage strength gained by the student during learning.¹⁰ However, content that is easy to learn and requires less effort to recall will be less affected by this strategy.¹⁰ Incorporating opportunities for students to retrieve learned material requires deep consideration on the instructor's part. Whether simulation-style testing

Box 2

Retrieval-Based Learning Strategies⁹

Free recall – periodically pausing to write down all studied material about a topic

Keyword – generating recall cues from the text (eg, creating mnemonics)

Practice quizzing – using low-stakes assessments more frequently

Test generation – developing test-type questions from notes or text

in the controlled environment of the educational laboratory or testing that uses traditional multiple-choice questions, deliberate practice recalling learned material is essential in each learning phase.⁸

Conclusion

Faculty instructors can affect the outcomes and success of their students through individual and collective actions, with a combined collaborative and synergistic team approach often having the most influence. Creating instructor-student relationships in a supportive student environment enhances productivity, self-efficacy, and self-awareness. When all these efforts are combined with specific targeted strategies, such as goal setting, test-enhanced learning, and other retrieval-based methods, programs likely will see a positive effect on their credentialing exam pass rate data.

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