

EDUCATORS' Ultimate Guide Programmatic Assessment



Benefits of Programmatic Assessment.....	2
Key Principles of Programmatic Assessment	3
Designing a Programmatic Assessment Framework	5
Assessment Methods in Programmatic Assessment.....	7
Formative Assessment Techniques.....	8
Summative Assessment Techniques	9
Collecting and Analyzing Assessment Data	10
Using Technology for Data Management and Analysis	11
Addressing Challenges and Ensuring Validity and Reliability of Assessment Data.....	12
Providing Feedback and Supporting Learners.....	13
Utilizing Assessment Data to Identify Areas for Improvement.....	14
Effective Feedback Strategies.....	14
A Case Study: Programmatic Assessment Integration.....	16
Challenges and Considerations in Programmatic Assessment	17
Faculty Development and Training	17
Ensuring Fairness and Equity in Assessment	18
Balancing Summative and Formative Assessment Purposes	19
Conclusion: Advancing Education Through Programmatic Assessment.....	20
References.....	22

Osmosis Educators' Ultimate Guide: Beginner's Guide to Programmatic Assessment

Programmatic assessment is increasingly essential in health professions education because it offers a comprehensive approach to evaluating student performance and growth. Unlike traditional assessments that often rely on single, high-stakes exams, [programmatic assessment](#) emphasizes a holistic evaluation through continuous assessment and feedback.

This approach is rooted in the belief that frequent, diverse evaluations provide a more accurate picture of a learner's progress.

Benefits of Programmatic Assessment

Programmatic assessment promotes continual growth through timely feedback and enhancing the comprehension of skills and knowledge. This approach closely aligns with the dynamic nature of healthcare, emphasizing the importance of continuous learning and adaptation.

[Programmatic assessment also stimulates autonomous motivation](#), leading to a range of positive outcomes for students, including:



Programmatic assessment allows educators to track students' progress over time, ensuring they are not only meeting but exceeding educational objectives. In doing so, it creates a supportive learning environment that prioritizes growth and excellence

Key Principles of Programmatic Assessment

Programmatic assessment relies on several foundational principles. These five principles guide the design and implementation of assessments to create a cohesive, learner-centered approach.

1. Continuous Assessment and Feedback

[Continuous assessment](#) is central to programmatic assessment, emphasizing the importance of evaluating students at regular intervals throughout their education. Instead of relying on a single high-stakes exam, students are assessed through multiple touchpoints, allowing educators to monitor progress over time.

This ongoing evaluation provides timely feedback, which helps students understand their strengths and identify areas needing improvement. Regular feedback not only supports learning but also reduces the stress associated with traditional assessments, where everything hinges on a single exam.

2. Integration of Assessment Throughout the Curriculum

Programmatic assessment is embedded within the entire educational journey rather than a standalone component. Assessments are strategically placed throughout the curriculum, closely aligning with the learning objectives of each stage of the program. This integration verifies assessment is not an afterthought, but a continuous thread woven into the fabric of the educational experience. It allows educators to assess students' progress in real time, adjusting the curriculum and instruction as needed to support their development.

3. Authentic Assessment Tasks

Authentic assessment tasks mirror real-world scenarios students will encounter in their professional practice. These tasks go beyond traditional exams and require students to apply their knowledge and skills in practical, often complex, situations.

For example, clinical simulations, case studies, and role-playing exercises are commonly used in health professions education to assess students' ability to navigate real-life challenges. Authentic assessments aid in bridging the gap between theory and practice, so students are prepared for the demands of their future careers.

4. Use of Multiple Assessment Methods

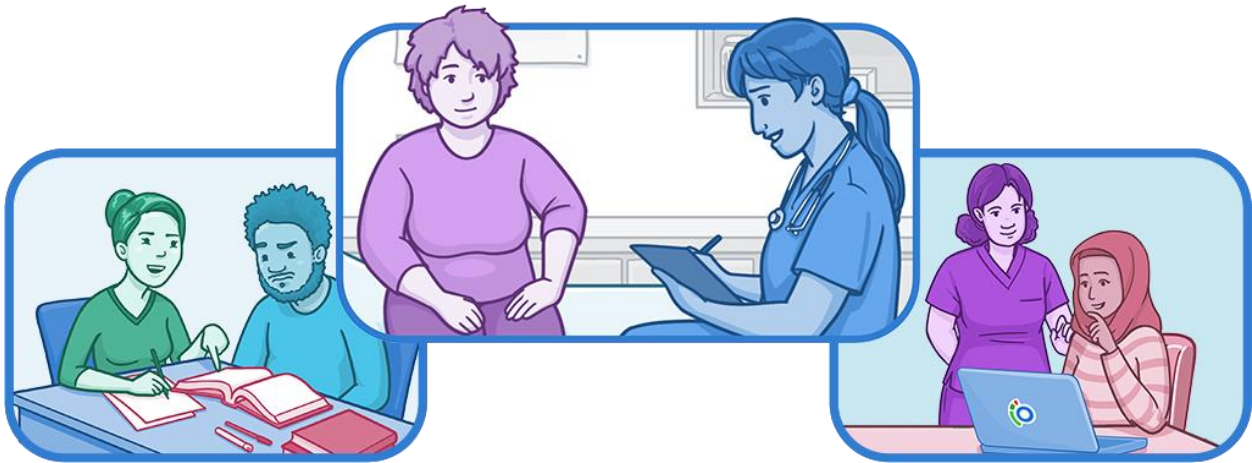
A hallmark of programmatic assessment is the use of [diverse assessment methods](#) to capture the full range of students' competencies. No single method adequately assesses all aspects of a student's knowledge, skills, and professional behavior. Therefore, a variety of assessments, including written exams, practical simulations, peer assessments, and self-reflections, are used. This multifaceted approach provides a more comprehensive and accurate picture of a student's abilities.

5. Collaboration and Involvement of Students in Assessment

Programmatic assessment promotes active student involvement in the assessment process, encouraging them to take ownership of their learning. Students are not passive recipients of evaluations; they are engaged in self-assessment, peer assessment, and reflective practices.

This involvement fosters a deeper understanding of their learning journey and helps them develop critical self-reflection skills that are essential for lifelong learning. Collaboration between educators and students in designing and implementing assessments also enhances the educational experience, making it more relevant and personalized.

These five key principles ensure programmatic assessment is a dynamic and responsive approach to health professions education, focused on continuous improvement and real-world preparedness.



Designing a Programmatic Assessment Framework

Creating a successful programmatic assessment framework in health professions education requires careful planning and a deep understanding of how assessments align with educational goals. This process involves critical steps that support student development and prepare them for the complexities of practice.

1. Establishing Clear Learning Outcomes and Objectives

The foundation of any programmatic assessment framework begins with clearly defined learning outcomes and objectives. In health professions education, these outcomes should reflect the competencies required for clinical practice, for example knowledge, clinical skills, communication, professionalism, and ethical decision-making.

Educators and students understand the goals of an educational program when these outcomes are clearly articulated. Well-defined objectives provide a roadmap for what students should achieve at various stages of their education, guiding the development of assessments that accurately measure progress toward these goals.

2. Mapping Assessment Methods to Learning Outcomes

Once learning outcomes and objectives are established, the next step is to map specific assessment methods to these outcomes. This process makes sure each assessment serves a purpose in evaluating a particular competency or set of skills. For example,

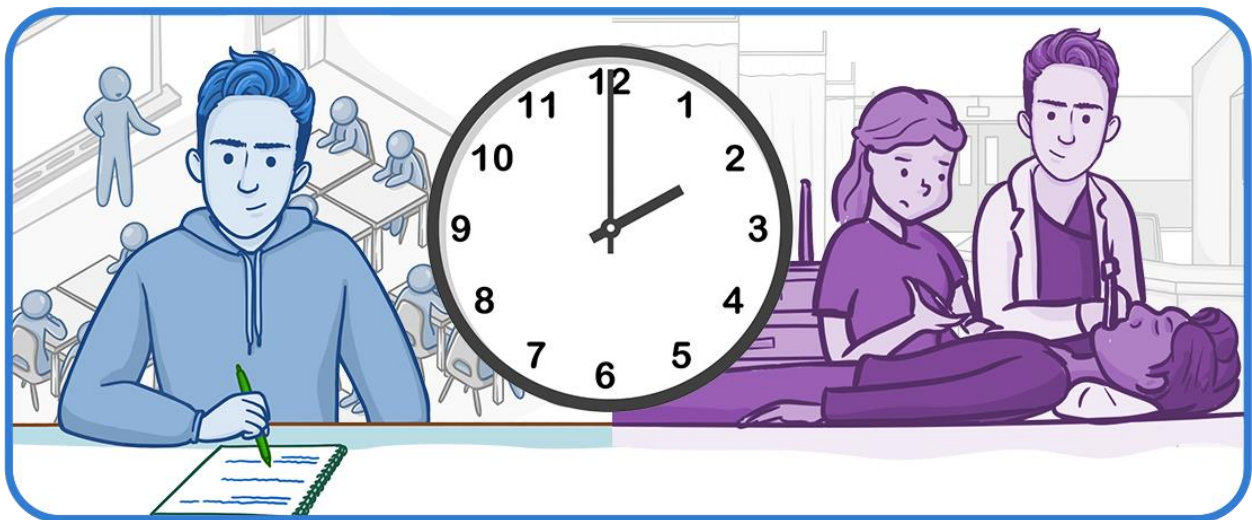
written exams may assess theoretical knowledge, while simulations and OSCEs evaluate clinical skills and decision-making abilities.

Mapping assessment methods to learning outcomes creates a balanced and comprehensive strategy addressing all aspects of a student's development. It also confirms assessments are relevant and aligned with the skills students need to succeed in their future careers.

3. Determining Assessment Frequencies and Timing

The timing and frequency of assessments are crucial elements in a programmatic assessment framework. In health professions education, it's important to strike a balance between providing frequent opportunities for feedback and avoiding overburdening students with excessive evaluations.

Continuous assessments throughout the educational program allow for regular monitoring of progress and early identification of areas needing improvement. However, the timing of these assessments must be carefully planned to align with the curriculum and provide meaningful feedback at appropriate intervals. For example, more frequent assessments may be desirable during clinical rotations to capture the ongoing development of practical skills.



4. Ensuring Alignment with Curriculum and Educational Objectives

Alignment between the assessment framework and the broader curriculum is essential to reinforce the educational goals of the program. In health professions education, this means that assessments should be integrated seamlessly into the learning activities and experiences throughout a student's training.

For instance, assessments conducted during clinical rotations should directly reflect the competencies emphasized in those rotations. This way, students are evaluated on what they are expected to learn and practice, making the assessment process more meaningful and supportive of their overall educational journey.

5. Developing an Assessment Blueprint

An assessment blueprint serves as a comprehensive guide for implementing the programmatic assessment framework. It outlines the specific assessment methods to be used, the timing and frequency of each assessment, and how each method aligns with the learning outcomes. For example, an assessment blueprint might detail the use of OSCEs, written exams, peer assessments, and portfolio reviews across different stages of the program.

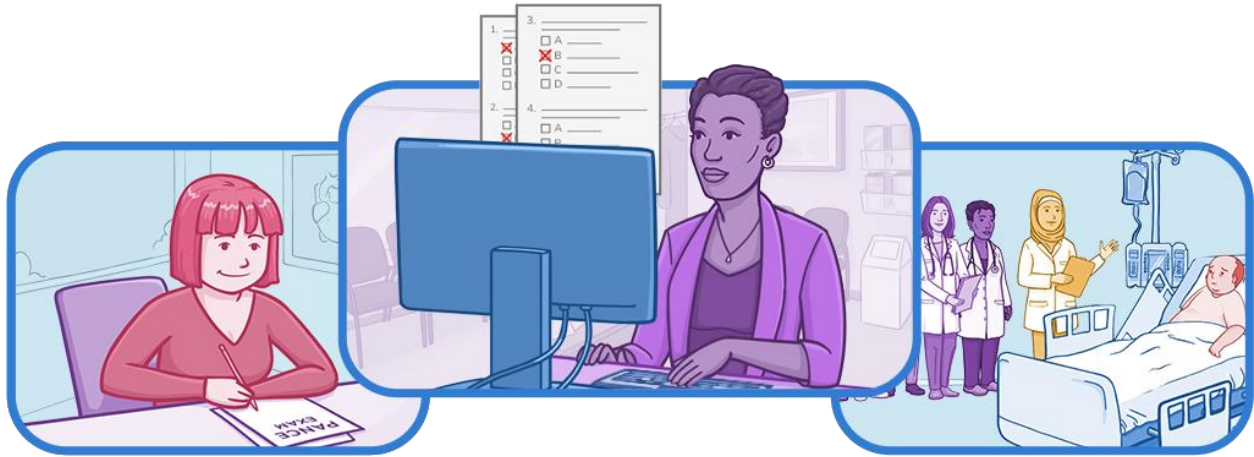
It also ensures consistency and fairness in the assessment process, providing a clear structure for both educators and students. Developing an assessment blueprint helps avoid gaps or overlaps in the evaluation process, so all essential competencies are thoroughly assessed over time.

Designing a programmatic assessment framework is a complex process that requires careful consideration of learning objectives, assessment methods, timing, and alignment with the curriculum.

Assessment Methods in Programmatic Assessment

Programmatic assessment employs a wide array of methods to provide a comprehensive evaluation of students' knowledge, skills, and professional behaviors. These methods are categorized into formative and summative assessments, each

serving a distinct purpose. Understanding and effectively utilizing these methods is key to fostering well-rounded healthcare professionals.



Formative Assessment Techniques

Formative assessments are integral to programmatic assessment, emphasizing continuous learning and improvement. These assessments are designed to provide ongoing feedback to students, helping them identify areas of strength and opportunities for growth throughout their education.

- **Feedback-Based Assessments:** Feedback is one of the most powerful tools in formative assessment. In health professions education, feedback-based assessments take many forms, such as verbal feedback during clinical rotations, written comments on assignments, or structured debrief sessions after simulations. This feedback is not merely evaluative but also constructive, guiding students on how to enhance their performance and refine their skills. Regular, specific feedback helps students develop self-awareness and encourages continuous improvement.
- **Peer Assessment:** Peer assessment allows students to evaluate and provide feedback to one another. This might involve students assessing their peers' performance during group activities, simulations, or case discussions. [Peer assessment](#) fosters a collaborative learning environment, encouraging students to critically reflect on both their own and their peers' abilities. It also helps students gain different perspectives on their work, broadening their understanding of various approaches to clinical practice.
- **Self-Assessment:** Self-assessment encourages students to reflect on their own performance and identify their strengths and weaknesses to promote a sense of agency over their learning. Self-assessment tools like reflective journals or structured self-evaluation forms help students develop critical thinking skills and cultivate lifelong

learning habits. In a field where continuous professional development is essential, self-assessment prepares students for ongoing growth throughout their careers.

Summative Assessment Techniques

While formative assessments focus on growth and development, summative assessments provide a more formal evaluation of a student's competencies at specific points in their education. Educators often use these assessments to determine whether students have met the required standards to progress in their training or graduate from a program.

- **Written Examinations:** Written exams are a traditional yet effective method for assessing students' knowledge and understanding of health professions concepts. These exams may include multiple-choice questions, short-answer questions, and/or essays to evaluate a wide range of cognitive skills. In programmatic assessment, written exams are used alongside other methods to evaluate a solid foundation to apply in clinical settings.
- **Objective Structured Clinical Examinations (OSCEs) / Simulations:** [OSCEs](#) and simulations are widely regarded as gold standards in health professions education for assessing clinical skills. These assessments involve students rotating through a series of stations, each designed to evaluate specific skills, such as patient communication, physical examination, and clinical decision-making.

Simulations may also involve high-fidelity mannequins to create realistic clinical scenarios. OSCEs and simulations provide a controlled environment where students demonstrate their ability to apply knowledge in practice, making them invaluable for assessing readiness for clinical responsibilities.

- **Performance-Based Assessments / Workplace-Based Assessments:** Performance-based assessments evaluate students in real-world clinical environments. Workplace-based assessments, such as mini-clinical evaluation exercises (mini-CEX) or direct observation of procedural skills (DOPS), allow educators to assess how students perform in authentic clinical settings.

These assessments provide insights into students' competence in real-time, highlighting their ability to manage patients, work within a team, and make

clinical decisions under pressure. Performance-based assessments confirm students can translate underlying healthcare knowledge into effective patient care.

- **Portfolio-Based Assessments:** Portfolios allow students to compile evidence of their learning and development over time. These portfolios may include case reflections, clinical logs, feedback from supervisors, self-assessments, and other documentation of a student's progress.

Portfolio-based assessments enable a comprehensive evaluation of a student's competencies, capturing both their achievements and areas for growth. This method supports the continuous nature of programmatic assessment and encourages students to take an active role in tracking their own development

In summary, formative assessments, with their emphasis on feedback and reflection, guide students through their learning journey, while summative assessments provide formal evaluations of their readiness for clinical practice. Together, these methods ensure students gain the knowledge, skills, and professionalism necessary to succeed in their healthcare careers.

Collecting and Analyzing Assessment Data

Another teaching strength of programmatic assessment is the way it [organizes data](#) based on specific qualities or skills to help make decisions about a student's progress. This process involves gathering data, leveraging technology, interpreting the results, and addressing challenges.

Implementing Data Collection Processes

Effective data collection is the foundation of a robust assessment system. In healthcare education, data is gathered from diverse sources, including written exams, clinical assessments, simulations, peer evaluations, self-reflections, etc. Implementing structured data collection processes makes sure this information is consistently and accurately recorded.

For example, during clinical rotations, faculty might use standardized forms or digital tools to document students' performance on specific competencies. Similarly, for written exams, automated systems can be used to capture and store students'

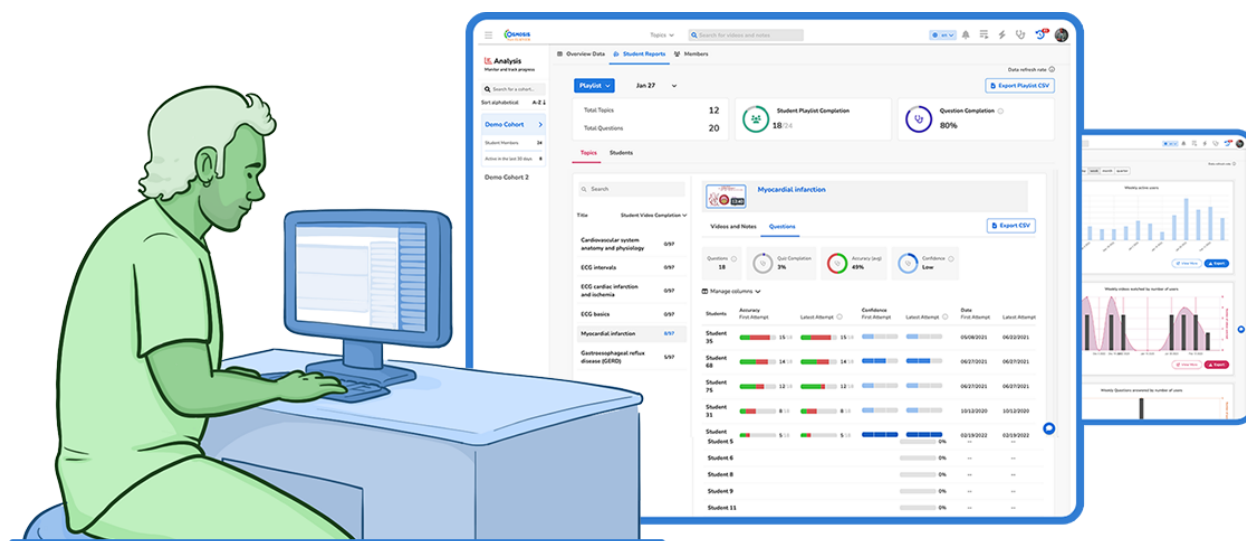
responses and scores. Consistent data collection enables educators to track student progress over time, identify trends, and make informed decisions about curriculum adjustments.

Using Technology for Data Management and Analysis

Technology plays a crucial role in managing and analyzing the vast amounts of data generated in healthcare education. Learning management systems (LMS) and specialized assessment platforms provide centralized solutions for storing and organizing assessment data. These systems give educators easy access to data, making all relevant information available for decision-making.

For example, in an OSCE, data from multiple stations can be compiled into a single platform, enabling educators to analyze performance across different competencies.

Additionally, data visualization tools, such as dashboards or graphs, help present the information in a more accessible and understandable format. These visual representations highlight patterns, such as areas where multiple students are struggling, prompting educators to investigate potential curriculum gaps or instructional challenges.



Technology also facilitates more advanced statistical analyses, such as item response theory (IRT) or generalizability theory, which is used to evaluate the reliability and

validity of assessment data. These analyses help the data accurately reflect students' competencies and is not influenced by external factors, such as inconsistent scoring or poorly designed assessment tasks.

Interpreting and Using Assessment Data to Inform Teaching and Learning

Collecting data is only the first step. Interpreting and using data to inform teaching and learning practices is where the real impact occurs. In education, assessment data provides valuable insights into both individual student performance and the effectiveness of the overall curriculum.

For example, if data analysis reveals students consistently perform well on theoretical exams but struggle with clinical skills, this might indicate a need to strengthen the practical components of the curriculum. Educators use this information to adjust teaching strategies, introduce more hands-on learning opportunities, or modify assessment methods to better align with the desired outcomes.

At the individual level, data identifies students who may be at risk of falling behind. Early identification allows for timely interventions, such as additional tutoring, mentoring, or targeted feedback. This personalized approach supports student success and assists all learners achieve the necessary competencies before advancing in their training.

Additionally, ongoing analysis of assessment data drives continuous improvement in the educational program. Healthcare educators who regularly review the data enhance the quality of their teaching and confirm the curriculum remains responsive to the evolving needs of the healthcare profession.

Addressing Challenges and Ensuring Validity and Reliability of Assessment Data

Collecting and analyzing assessment data in healthcare education is not without its challenges. Ensuring data is valid and reliable is paramount to making accurate and fair decisions about student performance.

Validity refers to the extent to which an assessment measures what it is intended to measure. For example, a clinical skills assessment should accurately evaluate a student's ability to perform procedures and interact with patients, rather than just their theoretical knowledge. To enhance validity, educators must carefully design assessment tasks that align with the learning outcomes and reflect real-world healthcare scenarios.

Reliability refers to the consistency of assessment results. In health professions education, this can be challenging due to the subjective nature of some evaluations, such as performance-based assessments or peer assessments. To improve reliability, educators implement standardized scoring rubrics, provide training for assessors, and use multiple raters to reduce bias.

Another challenge is managing the sheer volume of data generated from various assessments. This leads to issues with data accuracy and completeness. To address this, healthcare educators should establish clear protocols for data entry and management, regularly audit the data for errors, and confirm all stakeholders are properly trained in data collection procedures.

Collecting and analyzing assessment data, when done effectively, provides invaluable insights to drive educational improvements and support student success.

Providing Feedback and Supporting Learners

Providing feedback and supporting learners are critical components of a programmatic assessment approach. Feedback serves as a bridge between assessment and learning, guiding students toward improvement and helping them develop the knowledge, skills, and attitudes required for clinical practice.

Effective feedback strategies, combined with thoughtful use of assessment data, empower learners to achieve their full potential. This section explores how educators leverage assessment data to identify areas for improvement and implement feedback strategies that foster growth and development in healthcare students.

Utilizing Assessment Data to Identify Areas for Improvement

Assessment data is a powerful tool for identifying specific areas where students may need additional support or development. This data comes from a variety of sources, including written exams, clinical assessments, peer evaluations, and self-assessments. Educators gain a comprehensive understanding of each student's strengths and weaknesses when they analyze this data.

For instance, if a student's performance data indicates a consistent struggle with certain clinical procedures during simulations or OSCEs, educators identify this as an area requiring targeted intervention. Similarly, if a student excels in theoretical knowledge but faces challenges in applying that knowledge during hands-on clinical tasks, the data highlights the need for additional practical training or mentorship.

Beyond individual performance, assessment data also reveals broader trends across a cohort of students. If multiple students show deficiencies in a particular competency, it may indicate a gap in the curriculum or instructional methods that need to be addressed.

By systematically reviewing and interpreting assessment data, educators can make informed decisions that enhance both individual student outcomes and the overall effectiveness of the educational program.

Effective Feedback Strategies

Once areas for improvement are identified, [providing effective feedback](#) is essential for helping students make meaningful progress. According to programmatic assessment practice, feedback should be timely, specific, and actionable for students to understand exactly what they need to work on and how to improve.



- **Timely Feedback:** In fast-paced healthcare training environments, timely feedback is crucial. Providing feedback soon after an assessment or clinical experience allows students to reflect on their performance while the experience is still fresh in their minds. For example, after a clinical rotation or simulation exercise, immediate feedback helps students connect the feedback to their actions and behaviors during the activity. This immediacy reinforces learning and encourages prompt adjustments in practice.
- **Specific Feedback:** General feedback, such as "good job" or "needs improvement," is often not helpful for students seeking to enhance their skills. In healthcare education, feedback must be specific. For instance, rather than simply stating a student needs to improve their patient communication, a more effective approach would be to highlight specific aspects, such as maintaining eye contact, explaining procedures clearly, or actively listening to patient concerns. This level of detail gives students precise areas for development.
- **Actionable Feedback:** Feedback should not only point out areas for improvement but also provide concrete steps for how students can achieve those improvements. Actionable feedback might include recommending additional practice with certain clinical procedures, suggesting specific study resources, or advising participation in workshops focused on areas of weakness. Providing students with a clear plan of action empowers them to take proactive steps toward better performance.
- **Constructive and Supportive Tone:** Feedback in healthcare education should be constructive and supportive, fostering a positive learning environment. Criticism should encourage growth rather than discourage the student. For example,

instead of focusing solely on what a student did wrong, educators highlight what they did well and then discuss how they can build on those strengths to address areas of weakness. This balanced approach motivates students to continue improving without feeling demoralized.

- **Interactive Feedback:** Effective feedback is often a two-way conversation rather than a one-sided critique. Encouraging students to engage in the feedback process, ask questions, and reflect on their own performance deepens their understanding of the feedback and promotes [self-directed learning](#). Examples include discussing a student's reflections on a clinical encounter and collaboratively developing a plan for improvement. Interactive feedback fosters a partnership between educators and students.

Combining thoughtful analysis of assessment data with well-executed feedback strategies, healthcare educators create a supportive learning environment to help students continuously refine their skills. This approach not only addresses immediate learning needs but also equips students with the tools and mindset necessary for lifelong learning in the ever-evolving field of healthcare.

A Case Study: Programmatic Assessment Integration

The article, "[From Traditional to Programmatic Assessment in Three \(Not So\) Easy Steps](#)," outlines the University of Melbourne's decade-long transition from traditional assessments to programmatic assessment, focusing on formative feedback, electronic data integration, and curriculum renewal to improve learning and decision-making in medical education.

The implementation of programmatic assessment at the University of Melbourne took place in three transformative steps:

- **Step 1 (2012–2018):** Focused on formative assessment and feedback improvements. High-quality progress tests and feedback systems were introduced. This phase emphasized using assessments as learning tools, providing students with detailed feedback reports to guide learning.
- **Step 2 (2019–2021):** Marked by organizational changes, creation of a dedicated assessment team, and shift towards electronic assessment delivery. The COVID-19 pandemic accelerated the adoption of remote assessments and

pass/fail grading. Electronic systems helped manage assessments more effectively, improving feedback delivery.

- **Step 3 (2022):** Curriculum renewal and the permanent adoption of pass/fail grading. The new Doctor of Medicine (MD) program improved integration across different learning domains, ensuring assessment data was linked directly to intended learning outcomes.

Continuous and meaningful feedback became a cornerstone of the program, aligning with the principle that every assessment should be optimized for learning. The feedback systems helped students understand their strengths and weaknesses, promoting self-regulation and lifelong learning.

Throughout these steps, electronic data collection and feedback systems were integral to scaling up assessment processes, particularly for large cohorts. This shift facilitated better aggregation of data and improved feedback delivery to students.

The transition to programmatic assessment required significant technological investment and adaptation to the pandemic's demands. Managing large data volumes and ensuring equitable decision-making processes were key challenges.

Despite these challenges, the integration of programmatic assessment led to improved feedback processes, curriculum renewal, and stakeholder engagement, demonstrating positive progress toward a cohesive and outcome-focused assessment system.

Challenges and Considerations in Programmatic Assessment

Programmatic assessment offers numerous benefits, but it also comes with challenges. Addressing these challenges is essential to make sure the assessment process is effective, fair, and supportive of both learners and educators. The following explores key challenges and considerations, such as faculty development and training, fairness and equity, and balancing the purposes of summative and formative assessments.

Faculty Development and Training

One of the major challenges in implementing programmatic assessment is whether faculty members are adequately prepared to conduct their roles as assessors, mentors, and facilitators. In healthcare education, faculty often come from diverse clinical backgrounds and may not have formal training in education or assessment techniques.

This leads to inconsistencies in how assessments are conducted and how feedback is provided to students.



To address this, comprehensive faculty development and training programs are essential. These programs should equip educators with the knowledge and skills needed to implement programmatic assessment effectively.

Training should cover key areas such as designing assessment tasks, providing constructive feedback, and using assessment data to inform teaching. For example, faculty members benefit from workshops on how to conduct OSCEs or how to use assessment rubrics consistently across different evaluators.

Moreover, ongoing professional development is critical to keeping faculty members up to date with the latest advancements in assessment methodologies and educational technologies. In healthcare education, where both clinical practice and educational practices are continually evolving, regular training ensures faculty adapt to new challenges and maintain lofty standards in assessment.

Ensuring Fairness and Equity in Assessment

Suzane Lane's study, [*Performance Assessment: The State of the Art*](#), highlights the need to ensure fair and unbiased assessment, especially when grades are involved. Her research found performance assessment can be impacted by various cultural, ethnic, and linguistic backgrounds of students.

Factors including unconscious bias, variability in assessment conditions, and differences in how students interpret assessment tasks can affect the fairness of assessments.

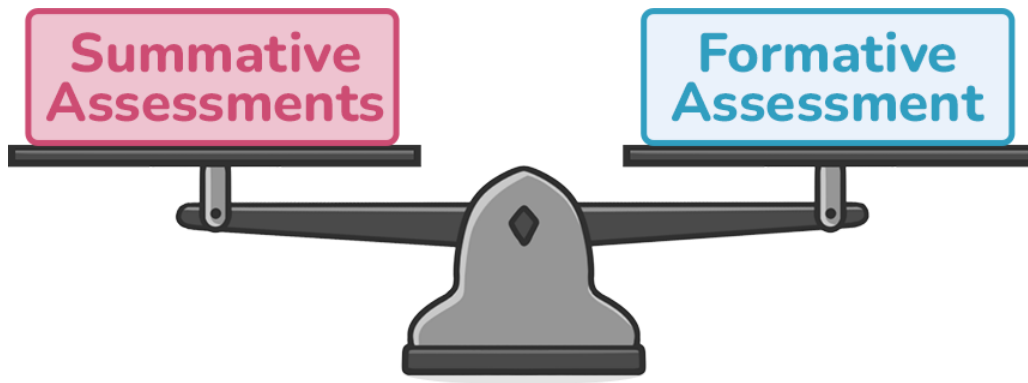
For instance, in performance-based assessments such as clinical evaluations, assessors may inadvertently allow their personal biases or past experiences with a student to influence their judgment. This leads to discrepancies in how students are evaluated, undermining the reliability and fairness of the assessment process.

To promote fairness and equity, educators should implement strategies such as standardized assessment criteria, blind grading where possible, and using multiple assessors to reduce individual biases. Additionally, offering accommodations for students with disabilities or unique learning needs creates equitable and accessible assessments for all.

Transparency is another key element of fairness. Clearly communicating assessment criteria, expectations, and processes to students confirms they understand what is required of them and how their performance is evaluated. This transparency reduces anxiety and allows students to focus on demonstrating their competencies rather than worrying about potential unfairness.

Balancing Summative and Formative Assessment Purposes

Another challenge in programmatic assessment is striking the right balance between summative and formative assessments. Both types of assessment play critical roles in healthcare education, but they serve different purposes, and finding the right equilibrium is essential for supporting student learning and program effectiveness.



For example, formative assessments can be used to guide students toward success in summative assessments, providing them with the tools and feedback needed to perform well in high-stakes evaluations.

Additionally, combining formative and summative assessments in a programmatic approach allows educators to build a more comprehensive picture of each student's abilities, reducing the likelihood that a single assessment will disproportionately impact their progress.

Overall, programmatic assessment in healthcare education presents challenges. However, addressing these challenges head-on ensures assessments not only evaluate students effectively but also support their growth as future healthcare professionals.

Conclusion: Advancing Education Through Programmatic Assessment

Programmatic assessment offers a robust framework for evaluating and supporting healthcare students throughout their education. Through focusing on continuous assessment, authentic tasks, and comprehensive data analysis, this approach prepares students for the demands of healthcare practice. Despite the challenges, programmatic assessment holds immense potential for enhancing learning outcomes and advancing health professions education.

We hope the information in this guide helps you develop and administer programmatic assessment for your institution or course. If you have questions about how to gain support for programmatic assessment in your program, let's connect!



References

- Kusurkar RA, Orsini C, Somra S, Artino AR Jr, Daelmans HEM, Schoonmade LJ, van der Vleuten C. The Effect of Assessments on Student Motivation for Learning and Its Outcomes in Health Professions Education: A Review and Realist Synthesis. *Acad Med*. 2023 Sep 1;98(9):1083-1092. doi: 10.1097/ACM.0000000000005263. Epub 2023 Aug 25. PMID: 37146237; PMCID: PMC10453393. <https://pubmed.ncbi.nlm.nih.gov/37146237/>
- Lane, S., & Stone, C. A. (2006). Performance assessment in education: Origins, approaches, and implications. *Educational Measurement: Issues and Practice*, 25(4), 6-20.
- https://edpolicy.stanford.edu/sites/default/files/publications/performance-assessment-state-art_1.pdf
- Ryan, A.; Judd, T. From Traditional to Programmatic Assessment in Three (Not So) Easy Steps. *Educ. Sci*. 2022, 12, 487. <https://www.mdpi.com/2227-7102/12/7/487>
- Ryan A, O'Mara D & Tweed M. (2023). Evolution or revolution to programmatic assessment: Considering unintended consequences of assessment change. *Focus on Health Professional Education: A Multi-Professional Journal* 2023, 24(2), 185–195 <https://fohpe.org/FoHPE/article/view/703>
- Schwartz, Lambert W. T., 1*, et al. "Current assessment in medical education: Programmatic assessment." *Journal of Applied Testing Technology*, vol. 20, no. S2, 2019, pp. 2–10. [Current Assessment in Medical Education: Programmatic ...Journal of Applied Testing Technologyhttps://www.jattjournal.net › article › download](https://www.jattjournal.net › article › download)
- Schuwirth L, van der Vleuten C, Durning SJ. What programmatic assessment in medical education can learn from healthcare. *Perspect Med Educ* 2017;6(4):211–215 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5542889/>
- Tanveer MA, Mildestvedt T, Skjærseth IG, Arntzen HH, Kenne E, Bonnevier A, Stenfors T, Kvernenes M. Peer Teaching in Undergraduate Medical Education: What are the Learning Outputs for the Student-Teachers? A Systematic Review. *Adv Med Educ Pract*. 2023 Jul 11;14:723-739. doi: 10.2147/AMEP.S401766. PMID: 37455859; PMCID: PMC10349571. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10349571/>
- Van der Vleuten C, Schuwirth L, Driessen E, Dijkstra J, TigelaarD, Baartman LKJ, & Tartwijk J. (2012). A model for programmatic assessment fit for purpose. *Medical Teacher*. 34. 205-14. 10.3109/0142159X.2012.652239. <https://pubmed.ncbi.nlm.nih.gov/22364452/>
- Zayyan M. Objective structured clinical examination: the assessment of choice. *Oman Med J*. 2011 Jul;26(4):219-22. doi: 10.5001/omj.2011.55. PMID: 22043423; PMCID: PMC3191703. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3191703/>