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| RESEARCH ARTICLE

Progress Testing: Considerations in Navigating its Use and Value for Programs in the Health Professions in Saudi Arabia

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| ABSTRACT

Progress testing is a formative assessment method gaining popularity in the oversight of undergraduate professional health programs to track learning and performance trajectories. In contrast to the typical cumulative evaluations, progress tests enable the continuous assessment of learners' progress. It also allows educators to see where learners may be struggling, and offer constant feedback as they progress through the course, achieving competency-based learning goals. This scientific review focuses on the significance of progress testing as a method of assessing learners' mastery of content, and in promoting a culture of accountability and improvement in the professional health education ecosystem.The scope of this scientific review was generated through a snowballing sampling approach of literature that evolved from a shared collaborative interest in the purported value of progress testing. The focus of the scientific review included analyzing publications, peer-reviewed studies, and systematic reviews from PubMed, Scopus, and Google Scholar. The review progressed and emerged as a comparative assessment of the state of progress testing globally, particularly amongst certain G20 and Scandinavian nations, and with specific reference to the increasing number of such tests in use locally in medical and pharmacy courses in Saudi Arabia. The key findings, while noting how the literature was navigated as a scientific inquiry, include how progress testing is defined within the global community, its uses and value, emerging trends, essential lessons that can be derived from integrated progress testing, the benefits and limitations of its adoption in professional health education frameworks. Local adaptations in the use of progress testing suggest that it can facilitate progressive monitoring of learners, creating options for remedial intervention when required. Furthermore, an understanding of inter-institutional collaboration, the fostering of effective sharing of related resources, and how the uptake of assessment strategies can be managed in ways that are responsive to national healthcare contexts, emerges. Progress testing is expanding in Saudi Arabia in tandem with other global regions, bringing with it recommendations that guide related educational practice, including ensuring the consistency of progress tests, integrating IT solutions for efficiency and convenience, and highlighting improvement in linkages with competency development, particularly in practice-oriented healthcare disciplines. These approaches contribute towards creating a quality healthcare education system, preparing learners for clinical practice, and offering them a quality education that adheres to national as well as international approaches associated with rapidly developing healthcare ecosystems. Adopting the relevant strategies has the potential to enhance the quality and efficiency of professional healthcare education, the competency of future healthcare practitioners, and ultimately the quality and safety of healthcare rendered to a nation.

| KEYWORDS

Progress testing, Formative assessment, Competency-based learning, Learner progress, Healthcare practitioner competency

| ARTICLE INFORMATION

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Introduction

Progress testing contrasts with traditional types of testing, in that the primary focus is on cumulative results, as progress testing is employed as a form of formative assessment to assess learning progress over a period with variation in all levels of curriculum coverage (Wrigley et al., 2012). In contrast to the summative evaluation of knowledge at a particular stage within a definite course unit, progress testing allows for the constant review of learners' knowledge retention and growth in terms of entire programs; this

characteristic is especially valuable in professional health education, where the sum of the acquired and applied knowledge is highly significant (Neeley et al., 2016).

This review presents a detailed evidence-based appraisal of progress testing where the purpose, antecedents, and utility of the said approach are elaborated, particularly within professional health education. Moreover, it addresses the critical aspects of implementation, namely the frequency and the structure of assessment, as well as the action plan for those learners who experience difficulties. Another aspect emphasized within the review is comparing the extent of progress testing implementation across different countries and between governmental and private institutions. This approach aids in determining the considerations that must be made when adapting the test to countries with no such tests.

An example in the healthcare domain is the Pharmacy Curriculum Outcomes Assessment (PCOA), an objective assessment designed in the United States to measure learners' performance (National Association of Boards of Pharmacy [NABP], 2018). Progress testing benefits learners in all professional years since it offers the school information to be used in performance and curriculum analysis. It assists in the early detection of learning deficiencies, whereafter intervention measures to enhance learner development and academic progress are instituted. However, when adapting such tests in countries like Saudi Arabia, considerations should include cultural and translation bias, logistical problems arising from administration and score difficulties, and that the utility of the testing procedure is not easily understood. Therefore, despite having numerous benefits to medical learners and schools in evaluating their knowledge, progress testing may not be easily standardized and adopted in other countries because of issues related to cultural and translation bias and difficulties in administration and scoring.

According to Tio et al. (2016), the foundation of progress testing can be traced back to the medical education programs adopted at the University of Missouri and Maastricht University in the 1970s as an addition to project-based learning (PBL) approaches. PBL was implemented at McMaster University and intended to foster active, self-directed learning and reduce reliance on memorization. Progress testing then emerged as another methodology that was useful in tracking learners' knowledge evolvement and flexibility in PBL environments. Since then, the practice has gone global, proving its effectiveness and versatility despite the differences in educational systems.

This review also explores the possibility of incorporating progress testing across several global systems of professional health education, such as in the Netherlands, Canada, and Saudi Arabia, among others. Every country has targeted its model to serve local standards and healthcare demands, contributing a perspective on the efficacy of this rating system. The progress tests introduced across multiple Saudi Arabian institutions are aligned with both international trends and Saudi educational priorities and demonstrate how progress testing can aid quality assurance and benchmarking on a national scale (Wrigley et al., 2012).

Based on the comparisons, this review concludes with recommendations to institutions that are interested in adopting or enhancing progress-testing solutions in their organizations. Thus, it serves to emphasize the importance of progress testing not just as a method of assessment of learner mastery of content but as a means of promoting a culture of accountability and improvement in professional health education across the globe.

Defining Progress Tests

Progress tests in medical schools have gained increasing prominence in health professional programs because they improve learners' learning and outcomes. According to Chen et al. (2015), progress tests are assessments that test learners in a program against graduate outcomes. Unlike summative tests conducted at the end of a unit, progress tests, as formative assessments, offer periodic evaluations of learner knowledge and skills, allowing timely identification of strengths and weaknesses, providing feedback, and informing instructional adjustments (Ali, et al., 2018; Ali, 2024). The tests are generally not yet standardized within the global context; however, key characteristics include 60-150 multiple-choice questions designed to assess progress in attaining the cognitive skills expected at the end of undergraduate medical education (Tio et al., 2016). Progress tests have evolved in the Netherlands to four batches of 200-item tests yearly, assuring high reliability across every learner cohort. They are preferred because they provide rich feedback to learners on their knowledge growth and medical schools' curriculum effectiveness (Tio et al., 2016). Therefore, progress tests are essential tools for medical learners' journey to acquire the necessary skills, either technical or non-technical.

Progress tests are different from traditional formal tests in many ways. Wearn et al. (2023) assert that unlike formative tests, such as conventional formative tests that are sometimes informal and teacher-centered, progress tests are standard and structured, criterion-referenced, and aligned with specific learning objectives. Specifically, the assessments are designed to be standardized across all learners to ensure that every participant is evaluated under similar conditions and criteria. However, medical institutions have not yet managed to standardize the tests, which has led to challenges in ensuring the reliability of the tests. Notably, reliability concerns arise because different learners have varying standards, and standardized tests aim to objectively measure learner

knowledge and progress (Plessas, 2015; Van der Vleuten et al., 2018). Traditional assessments vary widely in format and structure and may include quizzes, essays, or oral tests, and are often tailored to specific conditions based on teachers' preferences.

Criterion-referenced means that progress tests are assessed against specific learning objectives and competencies to determine whether learners have met predetermined standards of knowledge and skills (Wearn et al., 2023). Traditional assessments are norm-referenced because learners' performance is compared against the performance of their peers, thereby leading to intense competition and more focus on relative performance rather than mastery of content. Progress tests are typically introduced in years 2 and 4, whereas years 3 and 5 take traditional high-stakes assessments.

Uses of Progress Tests

Progress tests are essential in various healthcare programs, including nursing, medicine, and pharmacy. Their employment aligns with these programs' complex and knowledge-intensive nature, as identifying knowledge gaps is essential for learner success. Yavuz (2016) indicates that progress tests help to determine the growth of functional medical knowledge for each learner, which enables more reliable and valid decision-making regarding moving to the next study phase. They help evaluate learners' knowledge and understanding of critical concepts, track learner progress over time, identify individual learners' strengths and weaknesses, and assess the curriculum for improvement (Neeley et al., 2016). Moreover, Neeley et al. (2016) also indicate that progress tests play a crucial role in maintaining standardization and assuring quality in professional health education, providing learners with feedback on their performance, identifying areas for improvement, and enhancing program accountability. As such, the progress test comes with numerous benefits to the healthcare education community.

The progress tests are comprehensive, longitudinal, and cross-sectional. They are comprehensive because their blueprint covers an entire curriculum, including basic sciences, clinical sciences, and public health topics, to ensure a thorough evaluation of learner competencies (Chen et al., 2015). They are longitudinal because they are administered several times throughout the medical curriculum, usually 2 to 4 times yearly, to help continuously assess knowledge growth and retention (Plessas, 2015). They are also cross-sectional, as learners take the tests at multiple-year levels. The cross-sectional design helps assessors compare knowledge levels between different cohorts at a single point in time. It also helps to demonstrate how learners have progressed in knowledge acquisition based on the curriculum. Benefits associated with progress tests are that they have led to increased emphasis on progress assessment and proved effective against binge learning, providing reliable predictive validity for future competence or knowledge retention (Herrmann et al., 2020). Numerous studies have evaluated the advantages and disadvantages of introducing formative tests. Table 1.0 below summarizes the strengths and challenges of progress tests as identified in the literature.

Table 1.0 Tabulation of key points pertaining to strengths and challenges of progress tests

Strengths	**References reviewed**
Progress assessments: • Support deep learning through iterative assessments that enable continuous reinforcement of key knowledge areas. • Enhance knowledge retention through repeated exposure to core content across multiple testing intervals. • Foster rapid remediation by highlighting areas where learners need support, allowing for timely intervention and strategy adjustment. • Facilitate curriculum improvement, enabling educators to identify content gaps and adjust educational approaches accordingly. • Enable early identification of high and low performers, supporting tailored teaching strategies and improving learner outcomes. • Promote benchmarking and best practices by allowing comparisons between institutions, fostering improvements in educational standards. • Provide psychometric insights by assessing test reliability and fairness, ensuring no group is disadvantaged.	Green and Heales (2023); Wrigley et al. (2012); Neeley et al. (2016); Tio et al. (2016); Albekairy et al. (2023); Al Alwan et al. (2011); Plessas (2015); Katajavuori et al. (2017); Van der Vleuten et al. (2018).
Challenges	
• Demands greater levels of administrative control and quality checks, which may require much dedication from various individuals and organizations. • Omission to pass conversion to grades and progression thresholds may influence the time taken to administer tests, as well as the overall motivation of the learner.	Green and Heales (2023); Al Alwan et al. (2011); Wrigley et al. (2012); Neeley et al. (2016); Plessas (2015); Van der Vleuten et al. (2018);

• The need for norm-referenced assessments within psychometric evaluation contexts increases the demand for fair item analysis, which is time-consuming. • Thus, cultural factors and demographics influencing test-taking behavior affect the standardization of tests across cultures due to the differences in the collectiveness and individualness of learning between cultures.	Khan et al. (2024); Katajavuori et al. (2017).

Therefore, although progress tests improve the effectiveness of health profession learners in the study process by allowing deep understanding, knowledge retention, and support for underperforming learners, the tests face challenges such as being difficult to administer, expensive to fund, and challenging to use in determining whether a learner can proceed with their course. Notwithstanding, the growing recognition of the use of progress exams in healthcare professional education stems from their ability to evaluate the performance of both learners and programs. Progress tests evaluate learners by tracking individual learners' performance throughout the curriculum, highlighting gaps in learning from learner and curricular perspectives, offering learners actionable feedback through in-depth score reports, evaluating a program against another program, and assessing whether a program is accomplishing its goal (Albanese & Case, 2016). Additionally, progress exams can contribute to predicting future performance and provide information about the readiness of interviewees for the licensure exam, provide the experience required in the licensure exam, help assess a program's learning outcomes, and evaluate learners' readiness for internships that include knowledge assessments. In summation, progress exams play a significant role in medical education because they provide guidance on progress achieved in the medical education journey.

Initial Critical Analysis of the Literature

A critical literature analysis of progress tests shows that while the benefits are recognizable, as put forward in the reasons for introducing the tests, numerous studies have revealed mixed results regarding their reliability and validity. According to Plessas (2015), some studies show a positive correlation between progress exam scores and other measures of learner performance, but others have questioned the predictive validity of these exams for clinical competence or future success in healthcare practice. Some studies have highlighted a threat to validity, especially when comparing results across different institutions that may have different education contexts and standards (Plessas, 2015). The literature analysis also reports inconsistent test content and format across different institutions and healthcare disciplines. Neeley et al. (2016) have argued that this variability makes it hard to compare results at a broader level and reach meaningful conclusions. As a result, the study recommends standardization of test content and format to enhance the compatibility and generalizability of results across institutions.

Other studies also report that progress tests primarily focus on assessing factual knowledge rather than higher-order thinking and problem-solving, with some authors arguing that failure to evaluate these competencies may lead to learners not developing the necessary skills for complex clinical situations (Albanese & Case, 2016). Zhai et al. (2021) have also revealed progress tests are sensitive to "construct-irrelevant variance". Construct-irrelevance variance means that factors unrelated to the learner's actual knowledge can influence test scores. For instance, poorly constructed items, ambiguous wording, or biases in item selection can negatively affect the study's results. Moreover, developing and administering progress tests is resource-intensive because developing new tests for each administration requires significant time and effort from faculty, which can strain institutional resources (Zhai et al., 2021). Therefore, the weaknesses related to progress tests need to be addressed to make them effective and promote skills development among medical learners.

Criteria for Implementation

Implementing progress tests in health professional schools requires consideration of certain factors. The analysis of the guidelines for implementing the progress assessment, PCOA, provided by the NABP, reveals that schools and colleges interested in implementing PCOA must first execute the memorandum of understanding (MOU) with NABP (NABP, 2018). The schools must also submit complete registrations and have the facilities for PCOA administrations. Further, the criteria for implementation include aspects such as alignment with learning objectives, test constructions, administering procedures, and feedback mechanisms (Bierer et al., 2015). Schools and colleges ensure the configuration of learning objectives by aligning them with competency statements, which are the foundation of the PCOA and are reviewed every five years. Each competency statement is weighed using a survey. Alamro et al. (2022) also reveal that another important criterion for progress tests is independence of the curriculum stage. Consequently, the criteria for progress test implementation are ensuring complete registration, aligning with learning objectives, ensuring independence of curriculum, and ensuring that it is administered more than once annually.

Frequency of Progress Tests

Determining the proper frequency for progress tests is necessary to ensure the success of programs. Albanese and Case (2016) posit that progress test designers use different testing frequencies, typically two, three, or four tests per year, and different test

sizes, with the number of items ranging from 100 to 250. Short progress tests underrepresent content and affect the test validity while reducing the number of tests in a year decreases total sampling opportunities and validity. However, Vispoel et al. (2018) employ the generalizability theory and report that the lower the value of the standard error of measurement (SEM), which balances the number of tests yearly and the number of items per test, the more accurate the results. For example, a test with 200 items delivered twice per year in Germany had an SEM value of 3.02, while another test with 200 items delivered four times a year had an SEM value of 2.45 (Plessas, 2015). The impact of test frequency on learner performance is very complex. Research has demonstrated that while frequent testing can enhance learning by promoting spaced repetition and distributed practice, excessive testing may lead to burnout and increased workload (Chou et al., 2019). Therefore, although there is a positive relationship between frequent testing and improved outcomes, the optimal frequency varies depending on factors such as the number of tests per year and the number of items per test.

Remedial Actions for Repetitively Failing Learners

Schools and colleges use various strategies to help struggling learners improve their areas of weakness. Gray and Toms (2018) recommend adopting a holistic approach consisting of assessment-based referral, a diagnostic meeting, an agreed management plan, and a follow-up appraisal that addresses complex multiple and interlinked factors leading to chronic learner underperformance. The study found that holistic remedial therapy was associated with increased knowledge acquisition among struggling learners. Bierer et al. (2015) also discuss various strategies underperforming medical learners can use to improve their performance. They state that early identification of knowledge gaps using progress tests can help identify at-risk learners early in their program and provide timely intervention. Tailored remedial plans, such as additional tutoring, targeted workshops, or modified curricula, can help address the identified knowledge gap (Reberti et al., 2020). Finally, providing support services, such as counseling and study skills workshops, are necessary to help learners develop effective learning strategies and improve performance (Bierer et al., 2015). Institutions are advised to employ a holistic approach in which progress tests are administered, support is provided, and tailored planning to improve the performance of underperforming learners is offered.

Differences between Governmental and Private Institutions

Government and private institutions have different implementation experiences and perceptions of progress tests. The two types of institutions differ in aspects such as structure of approach and resources. Government institutions have more structured approaches to progress test implementation, established frameworks, standardized testing procedures, and dedicated resources for developing and administering assessments. This structure helps government institutions to achieve consistency and comprehensive evaluation practices across programs. Contrastingly, private institutions reveal variability in the evaluation strategies because of the diverse practices associated with the frequency format and feedback mechanism. The two types of institutions also have different learner demographics and institutional priorities. Chou et al. (2019) indicate that while government institutions serve a broader demographic, facilitating equitable access to education, private institutions prioritize profitability and marketability, which may pressure learners to focus on performance metrics. Finally, they differ in terms of accountability and decision-making process. Government institutions are accountable to the public, while private institutions are flexible in decision-making and strategies, which leads to differences in progress test implementation. Therefore, government and private institutions differ regarding resources, demographics, accountability, and decision-making.

Saudi Experiences with Progress Testing: Literature Review and Analysis

In Saudi Arabia, progress testing has become an essential part of professional health education, especially in programs for doctors and pharmacists. Progress assessments have been used by organizations like the Qassim College of Medicine and several pharmacy schools throughout the Kingdom to evaluate learners' knowledge over time and make sure that it complies with both national and international best practices. Specific emphasis is placed on the Saudi Arabian campaigns. The following plan adheres to the Saudi Ministry of Health's Vision 2030, which seeks to improve the education and training of healthcare professionals and the issuing of licenses. Hence, this focus on Saudi Arabia highlights the specificity of the progress testing framework in the country. The results of critical studies that shed light on the use, difficulties, and advantages of progress testing in Saudi professional health education are summarized in this study.

Table 2.0 Key findings from studies on progress testing in Saudi Arabia

Study	Focus	Key Findings
Al Alwan et al. (2011)	Diagnostic use of progress tests within a project-based learning (PBL) curriculum.	Assessment through progress tests in PBL settings was useful in identifying knowledge deficits and enhancing the PBL curriculum.
Alamro et al. (2023)	Longitudinal study on medical learner progress testing over 10 years.	Provided concrete evidence of the positive change in the performance of the learners over time, proving the efficacy of the concept of progress tests.
Albekairy et al. (2023)	Correlation between cumulative grade point average (GPA) and progress test scores in pharmacy learners.	The correlation between progress test scores and GPAs confirms that progress tests are indeed useful in determining academic performance.
Albekairy et al. (2023)	Evaluation of a unified national progress test among Saudi pharmacy colleges.	The unified test allowed for benchmarking across different institutions and gave ideas for curriculum standardization and enhancement.
Alkatheri et al. (2019)	Implementation of an ACPE-accredited PharmD curriculum with progress testing.	Implementation of progress testing helped improve the quality of education and learner satisfaction in the PharmD track in an ACPE-accredited program.

Review of Milestones in Saudi Experiences with Progress Testing

1. Implementation of Diagnostic Tool in Problem-Based Learning Curriculum

In a study of the effectiveness of progress testing in assisting a diagnostic process within a PBL curriculum at the King Saud bin Abdulaziz University for Health Sciences, Al Alwan et al. (2011) noted that it can benefit learners and educators. They also found that progress tests successfully pinpointed the academic difficulties faced by the learners, helping the faculty modify the content of the curriculum to suit learners better. The PBL model incorporated strategies such as active learning, which was supported by the progress tests because they provided learners with consistent feedback on their progress and helped them prepare for clinical positions.

2. Longitudinal Effectiveness

A 10-year longitudinal study of progress testing conducted by Alamro et al. (2023) showed an overall improvement in learner performance over time in Saudi medical schools. A noteworthy feature of the study was that the assessment testing went through several cycles, highlighting the progressive growth in learners' knowledge and skills. It enabled educators to track learners' progress frequently and gave an account of learners' competencies for curriculum improvement as well as learner-specific interventions.

3. The Imperative to Correlate the Proposed Interventions with Academic Performance.

Albekairy et al. (2023) sought to establish an association between progress test scores and cumulative grade point averages (GPAs) in the context of pharmacy learners. The positive correlation identified in this research strengthens the argument for using progress testing to predict academic performance. It also assists in proving progress tests are beneficial as measures of knowledge and have the capacity to predict learner performance in the program. The study observed that learners, especially in the initial phases of the program, record disparate scores, indicating the necessity to develop conclusive intervention measures to assist learners who are performing poorly.

4. National Unified Progress Test for Pharmacy Learners

Albekairy et al. (2023) examined the consequences of employing a common progress test across several Saudi pharmacy colleges. This unified testing framework, of course, enabled institutions to benchmark results, which provided a positive foundation for standardizing educational quality. This way, the progress made within each institution could be compared to that of other institutions in order to determine areas of strength as well as areas that require improvement. Mustering such synergy helped to standardize educational outcomes so that learners across institutions met certain common competency levels.

5. Curriculum Integration with ACPE Accreditation

In a study by Alkatheri et al. (2019), the authors described the successful implementation of progress testing in the context of an ACPE-accredited PharmD program. It focused on progress tests within a strict academic framework with

curricular goals meeting international benchmarks. This integration was instrumental in enhancing the quality of education as well as the satisfaction level of learners. The format of progress testing further contributed to making the curriculum conform to international accreditation standards as it reinforced the credibility of Saudi pharmacy education on the global level.

Expanded Review of Literature: Applied International Benchmarking

Analysis of the results of the progress testing of professional health education programs from different countries revealed both similarities and differences in the goals and objectives of educational institutions worldwide, as well as the demands of healthcare programs in particular regions and the availability of resources. Education in health professions, including medicine, pharmacy, and nursing, utilizes progress testing as one of the formative assessment tools during learners' teaching practice, providing timely feedback to learners and instructors regarding knowledge retention and identifying areas for improvement. The benchmarking examples from G20 and Scandinavian countries illustrate the range of approaches: the Dutch Medical Licensing Examination can extend assessment strategies, while the North American Pharmacist Licensure Examination establishes standards for pharmacy specialists in the United States. In Switzerland, the adoption of the European Hematology Exam (EHA) as part of its final assessment toward specialization of hematologists has revealed the ability of progress testing to encourage continuous learning of trainees and specialists. The EHA's longitudinal test was inspired by the Swedish Hematology Association in 2013. It was found to help specialist trainees and specialists in Switzerland to understand their strengths and weaknesses in their areas of specialization (Wondergem et al., 2022). Although there is limited information regarding the use of progress tests in Scandinavian countries, existing information reveals that countries, including Denmark and Norway, also use progress tests to ensure their medical specialists gain the required knowledge. Unlike countries such as the US and the UK, Scandinavian countries, including Norway, have a new formative assessment tool for their medical learners to help them master non-technical tools, which is considered a fundamental part of training new physicians.

Regarding the new tool, Prydz et al. (2024) found that using the formative tool resulted in a better performance level by medical learners. Moreover, Andreassen and Malling (2019) reveal that although Denmark has implemented competency-based medical education and employs mini-clinical evaluation exercises and objective structured assessments of technical skills to formatively assess their post-graduate medical learners, the implementation of formative assessment has not been effectively achieved. The case reflects the variability in knowledge and scale of formative assessment implementation in different countries. On the other hand, there is little information on formative assessments in Swedish medical schools, further demonstrating variation between countries. These examples demonstrate different experiences regarding using formative assessments in different countries, offering insights into the demands of adopting the test in varying regions.

As Neeley et al. (2016) stress, professional health education programs should be more adaptable, pointing to the fact that constant progress testing helps learners interact with the changing standards of healthcare and fosters the adaptability required in today's globalizing healthcare markets. Wrigley et al. (2012) also recommend that progress testing should be in concordance with competency-based education so that learners can acquire skills and knowledge that meet healthcare standards at the national and international levels. This comparative analysis demonstrates that progress testing is a highly effective approach to advancing the development of professional health education and promoting the compliance of national healthcare systems with international standards, as well as contributing to the enhancement of the quality of education worldwide.

Learner-Centered Approach to Progress Testing

The literature on progress testing has also touched on the role of a learner-centered approach in assisting learners in gaining skills and knowledge. For example, Wrigley et al. (2012) recommend employing progress testing and competency-based learning to encourage swifter skills development in medical learners. Dole et al. (2016) further emphasize transitioning the pedagogical approach from a teacher-centered to a learner-centered approach to equip medical learners with the necessary skills that align with the problems of the 21st century. A learner-centered approach supports progress testing aims and goals because it helps learners gain a more profound and sustained understanding of their education content and to develop critical skills, enabling learners to reveal their strengths and work on their weaknesses (Dole et al., 2016). In other words, the learner-centered approach allows learners to gain the required skills because its constituents, such as problem-based learning and project-based learning, have been found to effectively enhance knowledge acquisition. Emerging evidence shows that inquiry-based learning, like problem-based learning and project-based learning, is associated with more profound and sustained learning that transfers to new situations and problems (Dole et al., 2016). However, for learners to gain and acquire the skills necessary to practice learner-centered pedagogy, they require well-trained instructors who are conversant with learner-centered teaching pedagogy. Liu et al. (2024) affirm that instructors can have these skills by providing a practical assessment that can inform them about all important domains and identify individual faculty's strengths and weaknesses. In addition to having a practical assessment, Tractenberg (2021) also recommends clinical instructors use the Assessment Evaluation Rubric (AER) as a valuation method for the learners to

support the alignment of assessment with learning in higher education rather than aligning assessment with teaching content, which supports teaching- or teacher-centered instruction. AER supports a learner-centered approach by enabling the evaluation of various assessment features, such as their alignment with learning goals, effectiveness as formative or summative tools, reflection of a systematic approach to cognitive complexity, and clarity of instructions and results for meaningful interpretation. The above analysis reveals that a learner-centered approach to learning is the most effective learning method for ensuring learners' acquisition of knowledge.

Progress Testing and Stress

Progress tests, in addition to enabling learners to evaluate their strengths and weaknesses, are associated with lower stress levels than traditional high-stakes examinations. Chen et al. (2015) verified the claim by assessing the stress level between two groups, one that had taken a progress test and another that had taken a traditional high-stakes test, while controlling for the level learning approach. The study noted that learners who participated in progress testing had lower stress levels than those who participated in traditional high-stakes examinations. Chen et al. (2015) suggested that the reason for the outcome was that progress testing pushed the learners for deeper learning approaches rather than surface approaches to learning. The former approaches have been found to positively correlate with learning and learners' GPA and reduce stress by encouraging deep learning tactics. The study further found that traditional high-stakes examination encourages surface learning, a significant predictor of progress testing scores, and increased stress (Chen et al., 2015). An earlier study by Van der Vleuten et al. (1996) similarly found that progress tests reduced learner stress due to the nature of the examination; it does not require learning for a particular test. The design avoids the negative washback that usually occurs with objective tests, leading to the learning of facts and disrupting the functioning of tutorial groups. Van Berkel et al. (1994) further highlight the ability of progress testing to reduce stress by demonstrating that it is designed to provide learners with maximum freedom in their learning while still ensuring valid content coverage within the professional domain. Therefore, progress testing reduces stress because it is developed to provide maximum freedom to learners, supports learners in preparing for exams, and encourages deep learning.

Progressive Assessment of Learner Development

The literature also shows that progress tests provide learners with varying progressive assessment of their development rather than relying on a 'single point end' examination as in summative assessment. Albanese and Case (2016) indicate that, as a longitudinal assessment administered throughout the academic years, progress tests help track learners' growth over time and offer a comprehensive view of their capabilities unlike a one-time examination. Under progress tests, learners experience less anxiety or examination-related stress because their overall evaluation is based on cumulative results from multiple assessments (Green & Heales, 2023). As a longitudinal assessment, progress tests encourage learners to learn continuously, leading to consistent study habits rather than cramming before exams. Finally, Albanese and Case (2016) indicate that the progress test has better predictive variability regarding future performance and competence. It combines multiple assessments, enabling educators to make more reliable decisions regarding learner readiness to advance their studies. Its ability to offer multiple perspectives based on various assessment methods, including peer evaluation and self-assessment, provides more insight into learners' learning and growth (Gonçalves Cristóvão et al., 2024). Therefore, a progress test is better than a single-point, end-of-course examination since it reduces stress and anxiety, positively influences studying habits and leads to better knowledge retention.

International Perspectives on the Implementation of Progress Tests

Table 3.0 below provides more detail about how progress tests for health professionals are being set and implemented in other countries, grouping them into sub-categories of local and national licensing examinations and their agencies. Preliminary testing has evolved into a critical evaluation not only of knowledge acquisition but also of educational processes with reference to the needs of each country's healthcare systems and licensing.

These frameworks are designed to produce high-quality healthcare professionals in compliance with national standards; this provides the context for understanding the importance of progress testing in establishing consistency and rigor in the health education system within Saudi Arabia.

Table 3.0 International experience with progress testing

Country	Health Professional Category	Progress Test Name	Licensing Exam Name	Progress Test Provider	Reference Source
Canada	Medicine	Personal Progress Index (PPI)	PPI Formative Assessment	University of Missouri-Kansas City School of Medicine and the University of Limburg	Blake et al., (1996)
United Kingdom	Medicine	Objective Structured Clinical Examination (OSCE)	Clinical and Professional Skills Assessment (CPSA)	General Medical Council	Furmedge et al., (2016)
Netherlands	Medicine	Dutch Progress Test of Medicine	Dutch Medical Licensing Examination	Dutch Medical Association (KNMG)	Tio et al., (2016)
USA	Medicine	Comprehensive Basic Science Examination (CBSE)	United States Medical Licensing Examination (USMLE)	The National Board of Medical Examiners (NBME)	Wright & Baston, (2017); NBME, (2024)
Brazil	Medicine	The Individual Progress Test of Gynecology and Obstetrics Residents (TPI-GO)	Teste de Progresso	Brazilian Medical Education Association	De Sá et al., (2021)
Denmark	Medicine	Mini Clinical Evaluation Exercise (mini-CEX)	Mini-CEX	Danish Medical Schools, such as the University of Copenhagen	Batra, et al., (2022)
Switzerland	Medicine	European Hematology Exam (EHA)	The Progress Test of the European Hematology Association	EHA Campus	Wondergem et al., (2022)
Norway	Medicine	Personal Progress Index (PPI)	Norwegian Medical Licensing Exam	Norwegian Medical Association	Prydz et al., (2024)

Recommended Considerations when Navigating the Use of Progress Testing

The comprehensive review and analysis of global and local literature recommends that institutions use specific strategies to implement progress tests effectively. Concerning the identified benchmarking insights, a strong emphasis on integrating progress tests with particular learning outcomes within the programs offered emerged as a priority, which was especially relevant to Saudi Arabia's healthcare training programs, which are increasingly adopting competency-based progress testing under the Saudi Vision 2030 initiative. Countries like the Netherlands and Canada have developed successful longitudinal assessment models, demonstrating how frequent, structured evaluations enable learners to build on knowledge progressively and apply concepts in real-world contexts across professional practice fields (Albanese & Case, 2016; Tio et al., 2016). This longitudinal approach is beneficial as it fosters consistent skills development, particularly when aligned with Saudi health programs aiming to enhance workforce readiness through competency-based objectives.

To support Saudi institutions to implement progress tests effectively, aligning these tests with competency-based objectives is crucial, ensuring that assessments measure workplace-relevant competencies (Katajavuori et al., 2017). Providing timely, constructive feedback allows learners to recognize their strengths and areas for improvement, which is vital in optimizing their

learning experience (Lillis et al., 2014). Saudi institutions should also consider offering support services based on test results to help learners address identified weaknesses promptly, as recommended by studies on best practices in progress testing (Chou et al., 2019). Finally, it is essential to balance the number of items in a progress test and the frequency of testing to maximize impact, particularly for learners struggling with chronic underperformance (Khan et al., 2024).

Building on these global insights, Saudi Arabia could consider establishing a standardized assessment framework that allows for comparative analysis with international benchmarks. Collaborative efforts across institutions can enhance consistency, facilitate coordination, and transfer good practices. By creating a single assessment framework and adopting shared question banks and standardized exam formats, Saudi institutions can optimize exam quality and comparability (Plessas, 2015). Additionally, aligning progress tests with real-world demands by incorporating competency-based assessments that extend beyond factual knowledge to evaluate clinical reasoning, problem-solving, communication skills, and professionalism aligns with findings by Neeley et al. (2016). This approach prepares learners for challenges they may encounter in clinical settings.

Moreover, leveraging digital testing solutions offers advantages in terms of accessibility and security, as seen in international studies (Meng et al., 2023; Plessas, 2015). The use of computer-based testing and adaptive algorithms could improve test accuracy and provide secure, scalable solutions. Integrating innovative question formats such as simulations and case scenarios would enhance test authenticity, ensuring assessments are aligned with practical applications. Regular formative tests within the curriculum also allow learners to identify gaps in their knowledge and self-reflect, which could be particularly beneficial within the Saudi healthcare education system (Yavuz, 2016).

Additionally, for effective implementation of formative tests in Saudi Arabia, the literature reveals the need to consider aspects such as cultural and translation bias, especially when adopting formative assessment from a different region, such as the US, to assess medical learners in Saudi Arabia. The literature also recommends the need for progress testing to align with the teaching approach employed (Andreassen & Malling, 2019). On the aspect of the teaching approach, studies show that the learner-centered approach is the most suited when using progress testing because of benefits such as enabling deeper learning and fundamentally altering how educators assess their learners' education. Notably, by emphasizing formative assessment, authentic tasks, clear outcomes, and active engagement, educators can create a more responsive and effective learning environment that supports all learners in achieving their educational goals. Experiences from countries like Denmark demonstrate the importance of aligning progress testing with competency-based education. According to Andreassen and Malling (2019), a competency-based learning education requires an effective assessment that can document competencies through high-quality assessments at the end of the training, to judge whether a trainee has achieved the desired level of competence and can demonstrate that certain standards of proficiency have been attained. Progress tests should be aligned with competency-based education, which is currently popular worldwide because it employs tools effective for direct observation, objective structured assessment for technical skills, multisource feedback, and retrospectives done during or after assessment (Andreassen & Malling, 2019). These formative assessments enhance trainees' learning and performance and ensure an acceptable level of competence among trainees so that they can meet minimum requirements. Therefore, Saudi Arabia should consider implementing competency-based education and progress testing to achieve the desired results for its medical learners.

For a comprehensive view of learners' long-term progress, progress exams should be longitudinal, offering insights into learners' development over time. When progress tests align closely with competency-based goals, institutions can better assess the readiness of graduating learners for clinical practice (Plessas, 2015). Additionally, institutions should consider continuous quality improvement by conducting psychometric analyses to ensure test reliability, validity, and fairness (Neeley et al., 2016). By regularly reviewing and updating exam content in alignment with the evolving standards in healthcare, Saudi Arabia can ensure that its progress testing systems remain current and effective. These improvements will enable progress exams to capture learners' growth and support ongoing enhancements in healthcare training programs. Finally, although cross-institutional collaborations are considered difficult to implement due to cultural and translational biases and administrative issues, they are worth considering, especially in developing countries, to help solve the problem of inadequate resources for progress test implementation. Additionally, studies show that cross-institutional collaboration creates shared item banks and test frameworks, hence reducing individual costs. Although the cost may not be a serious challenge to Saudi Arabia, encouraging such collaborations can facilitate learner mobility because the test can provide standardized measures of learner knowledge, which would help learners exchange or recognize qualifications across borders. Therefore, considering cross-institutional collaboration, especially with other Gulf Cooperation Council countries, can help in the movement of people and better analysis of learner knowledge because of the effective management of resources.

Conclusion

Progress tests support health professional schools and colleges to analyze learners' academic performance. An essential asset in the healthcare sector, this literature review has focused on providing an increased understanding of progress tests and how they enhance learner experience and provide valuable insights for educators. Progress tests help learners interact with the material over

time and develop deeper comprehension by encouraging continual learning. Furthermore, these tests function as an essential means of providing feedback, hence enabling both learners and educators to understand progress. The progress test achieves these goals because it can track individual and program performance, providing actionable feedback and highlighting gaps in learner experience. The critical analysis of progress tests has revealed mixed results, with researchers highlighting essential areas that require further research and clarification. The implementation of progress tests requires schools and colleges to sign an MOU, align with learning objectives and test constructions, and administer procedures and feedback mechanisms. The analysis also shows a positive relationship between frequent testing and improved outcomes. However, the optimal frequency varies depending on factors such as the number of tests per year and the number of items per test. Thus, to address the issue of underperformance, institutions and schools need to employ a holistic approach using progress tests, providing support, and offering tailored planning to improve the performance of underperforming learners. Researchers have also recommended standardization of tests, including competency-based assessments and regular formative assessments, the use of technology, longitudinal assessment, psychometric analysis, and continuous quality improvement to ensure programs remain effective. Therefore, to improve outcomes, institutions must ensure precise alignment with learning objectives and program outcomes, provide timely feedback, and balance the frequency of delivery and number of items in progress tests.

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