

RESEARCH ARTICLE

Progress on Progress Test: International vs Local Experience



Abdul Sattar Khan^{1*}, Abdulrahman Al Mulhem² , Shereen Refaie³ , Asma F. A. Dawood³ , Glenda Angeles³ 
and Jose Karlo Pangan³ 

¹Family & Community Medicine Department, King Faisal University, Saudi Arabia

²Surgery Department, King Faisal University, Saudi Arabia

³Bio-Medical Science Department, King Faisal University, Saudi Arabia

Abstract: This paper discusses the implementation and evolution of progress testing as an assessment technique in problem-based learning at the College of Medicine, King Faisal University, in collaboration with the University of Groningen, Netherlands. Despite the successful introduction of a local progress test, this paper notes the reluctance of students in Arab culture to embrace this method due to concerns about its impact on their grade point average. The research outlines a 5-year experience with international high-stakes progress testing based on European universities and describes the establishment of a local progress test system. A cross-sectional study design was employed to analyze the passing rates of medical students from their first to fifth year, using data from 2018 to 2020. The study population included 1450 students with a gender distribution of 50/50. The results highlight two main achievements of the local progress test system. Firstly, the development of a blueprint based on block teaching contents and curriculum learning outcomes from year 1 to 5. This blueprint served as a foundation for the assessment. Secondly, the establishment of an individual performance feedback system, facilitated by a confidential online platform using students' academic numbers. In conclusion, the research suggests that progress testing can be successfully integrated into Arab culture, serving as a comprehensive assessment tool. It emphasizes the importance of recognizing progress testing as a key knowledge assessment method in the curriculum. This paper provides insights into the process, compares international and local experiences, and offers recommendations for further improvement of the local progress testing system.

Keywords: progress test, GPA, PBL, assessment, Arab culture

1. Introduction

Progress testing is the serial or longitudinal assessment of the entire body of knowledge needed to pass the entrance exam for medical school [1]. This comprehensive, high-stakes exam evaluates whether graduate-level program learning objectives have been completed [1]. The best way to describe the progress test is as a thorough final exam that reflects the curriculum's cognitive end goals for undergraduate medicine students. It samples information from all subject areas and disciplines that are pertinent to a medical degree [2]. Particularly in problem-based learning (PBL) curricula, progress testing serves as a kind of bridge between the pre-clinical and clinical years. Progress testing gives educators a valid and reliable tool to assess learning while giving students a way to self-evaluate completion of milestones or competencies and identify knowledge gaps [3]. It also enables repeated, longitudinal assessment of student knowledge retention [4].

In other parts of the world, progress testing is not a novel concept; in fact, it is a tried-and-true, empirically supported methodology that has been used for more than 40 years in global settings [5]. However, this idea is relatively new in Saudi Arabia, having

only recently been introduced at several of the country's universities. As such, the effect of progress testing on general knowledge acquisition remains controversial. Compared to traditional medical school exams, this assessment method offers a number of benefits, such as the ability to identify and address students' learning needs, support them in evaluating their progress over time, and allow them to compare their level of knowledge with that of their peers [5].

Students in Arab cultures are typically more driven to maintain their grade point average (GPA) by obtaining high test scores. Consequently, Arab students are not particularly inclined to take progress tests because they fear it will lower their GPA [6]. As a result, establishing progress tests in Saudi medical colleges is challenging. However, the adaptation of the curriculum includes incorporating progress tests as part of continuous assessment, and they have been established in many medical schools in Saudi Arabia. Drawing from international experiences with testing has brought about both advantages and disadvantages. Despite some drawbacks, the overall benefits outweigh them. Therefore, we have decided to continue this practice locally with some modifications. This study aims to share and highlight both international and national experiences and compare the results of a progress test conducted locally with similar international progress test results.

*Corresponding author: Abdul Sattar Khan, Family & Community Medicine Department, King Faisal University, Saudi Arabia. Email: amkhan@kfu.edu.sa

1.1. International experience

We have implemented a PBL-based curriculum from the Netherlands in the King Faisal University (KFU) College of Medicine, which includes a progress test as it is conducted internationally in the Netherlands. We directly adopted the University of Göttingen progress testing, which served as a reliable and valid instrument [4] for evaluating student learning over the course of the medical school year for all Dutch medical schools. For every test, eight medical schools take part in this examination, which means that over 10,000 students take the test simultaneously. We schedule the dates for our collaboration far in advance, accounting for regional logistics as well as local and federal holidays. The exam consists of four 200-item quarterly tests with a multiple-choice question (MCQ) form of measurement [5]. As a six credit hour course, all students are permitted eight attempts to pass the progress test.

1.2. Assessment procedure

Generally, the exam is a paper-pencil test with a duration of 4 hours. A good/pass/fail mark is being identified taking into account the mean and SD of all year cohorts. The scheme of marking was followed similar to the scheme of Netherlands progress test examination system at KFU. Where 1 correct answer score = 1 and incorrect answer is calculated by using the formula: 2 options: minus 1 point, 3 options: minus ½ point, 4 options: minus 1/3 point, and 5 options: minus ¼ point. Question mark? (Do not know) = 0.

However, the assessment protocol for the KFU was adapted with some adjustments to match such as grading marks as it is included in the GPA and the addition of re-sit examinations. All students from each academic year for all levels will have the opportunity to write the examinations four [7] times and a re-sit examination if required. Each exam was scheduled with University of Groningen (UoG) considering Saudi Arabia's academic calendar. The four exams fall on September, December, February, and May with the re-sit during summer period in August. The basic principle of progress testing is that a student must pass all four, or at least pass the last two – February and May to clear the year. This will present a progressing result trend. In KFU, the combined marks will have an equivalent score (A, B, C, fail, and in progress) using a combination table.

1.3. Local experience

In our university, we experienced the international progress test, compare, and contrast our students with other European universities for at least 5 years. After having international experience, we have decided to continue the progress test with some modifications keeping view of our culture and students' requirements.

1.4. Challenges at local level

In our educational system at high school level, students are generally less independent within the learning process. Hence, we may consider that our students prefer "spoon-fed" style of teaching [6]. Additionally, the examination process encourages students to focus solely on their grades, inhibiting them from learning information outside of the set curricula. Therefore, suddenly accepting progress test as a separate examination was not an easy task for the students at medical schools. Moreover, the inclusion of the scores in the GPA raises another issue and students were afraid of losing GPA scores because of the progress test. However, some universities do not include the PT = Progress Test scores in GPA, but they are facing challenges for low attendance of the

examination. Consequently, we decided to include PT scores in GPA; hence, it motivates students for participating in examination on regular bases.

The further challenges include preparation of blue print addressing local needs like it should be relevant to the block content and preparing our students for Saudi license examination as well as international examination. There was another issue, which was the main player of the whole process of progress testing, that is, questions bank. The questions bank is already deprived even for conducting normal block examinations and the curriculum committee at college is working extraordinarily and trying to convince the faculty for making a new pool of questions for their respective subjects. In addition, the most important component was missing in the whole process of international progress testing that is feedback system and followed by a study support system at the college.

2. Literature Review

There is still a debate over PBL and the possibility that students who use it could acquire knowledge gaps, particularly in the area of basic science [5]. It was somewhat difficult to convince them that learning through PBL was appropriate. The progress-testing method, which was created in 1970 in Maastricht and Missouri [5], shows how students' knowledge is improving on a regular basis. Furthermore, by using PBL, this approach offers an external monitoring of the learning process.

In 2012, Schuwirth and van der Vleuten [8] reviewed the literature regarding the application of PT = Progress Test. Research has shown that the implementation of a longitudinal assessment approach improves students' learning behavior by discouraging pre-test learning and promoting long-term cumulative learning, or learning that lasts a lifetime. Since a single poor score cannot reverse a string of good scores, it is assumed that students feel less stress when taking the PT than when taking traditional exams. Additionally, the authors stress that the longitudinal approach improves the PT's reliability [8].

As per Wagener et al. [9], students receive feedback on their proficiency level from the PT during their academic journey. In total, 463 students, spanning the first through sixth years of the medical program at seven German medical schools, participated in the PT. Among them, 35% were men, 61.3% were women, and 3.7% did not specify their gender. The participants' average age was 24.56 years. As the academic semester in which the student was enrolled progressed, the study found that the number of correct answers increased steadily [9].

Chen et al. [10] investigated the effect of PT on stress perception in students when compared to traditional tests. The study was conducted in two stages, with each stage evaluating the change in relation to the elapsed time. In total, 864 students took part. The PT may have reduced stress for students throughout the two assessed moments, as those in the traditional group experienced significant increases in stress when taking the traditional year-end exams, whereas stress levels did not significantly increase for students in the PT group [10].

Bhakta et al. [11] analyzed the results of the fourth-year medical students' extended matching questions examination (between 2001 and 2002). The examination's question set was examined for correspondence to a one-dimensional scale using Rasch analysis. To assess the influence of the distractor options, the degree of difficulty of the intra- and inter-specialty medical and surgical questions was noted, together with the pattern of replies in each individual question. The study shed light on how students comprehend the questions and select the right response by using the information and options that

are given to them in addition to their specific expertise. The editors need this information in order to enhance the caliber of the questions that will be prepared [11].

Cecilio-Fernandes et al. [12] investigated cumulative assessment as a tool to guide students' study behavior, comparing the increase in knowledge at the end of the teaching cycles between students who participated in cumulative assessment and those who remained in the traditional method of assessment. Data from the first four Dutch inter-university PTs were used prior to the trial. A total of 62 students participated: 25 took the cumulative assessment and 37 did the traditional assessment. It was shown that over the duration of the course, students' understanding in the four PTs greatly grew. There was no variation between the two groups, suggesting that the two methods of assessment are comparable in terms of raising students' level of understanding [12].

Pinheiro et al. [13] looked into the role of PT in academic management. The students' performance in the PT applied in 2008 and reapplied without changes in 2011 was evaluated from the first to sixth years of medical school. The findings revealed that the students gained cognitive knowledge during the medical course at the two points of test application. However, the cumulative learning behavior differed between the two test application moments. In 2008, the progression occurred every 2 years of the course, whereas in 2011, it began only after the third year of the course. This study was critical for managers to understand the need for more considerations on the teaching provided and the quality of the questions created for the exam [13].

Sakai et al. [14] used the equalization test to the progress test to assess medical students' cognitive development at a Brazilian state university. From 2004 to 2007, all results of students from the first to sixth academic years were analyzed. At first, they attempted to explain the meaning of students' responses to a series of items [14].

3. Theoretical Framework

Since the progress tests are longitudinal assessments, it is anticipated that students will feel less pressure to perform well because a single poor performance cannot reverse a string of successful outcomes [15, 16]. There is a widely held belief that we can positively impact on students' learning. Progress testing was actually created for this purpose in the first place [16, 17], and there is evidence to support this beneficial effect across the board in the various implementations. The assumption is that longitudinal data collection outperforms one-time measurements in terms of predictive power for future competence and performance. While some schools adopt a more continuous approach [4] and employ regression techniques to generate predictions, others combine qualifications [15, 16] in recognition of the discrete nature of the data. Ultimately, the decision's reliability is increased by the longitudinal combination of results. Research conducted in the 1980s and beyond [18, 19] has demonstrated that sampling characteristics have a far greater impact on reliability than test structure.

4. Research Methodology

A cross-sectional design was used in this study to look into medical students' passing rates from their first year to their fifth and final year in progress testing. The analysis concentrated on the third quarter assessments of the progress test results, covering

the years 2018–2020. A cross-sectional study design was used in the research because it can give an overview of passing rates for various years of medical school. This design made it easier to examine progress test results over a predetermined period, providing insights into medical students' academic journeys. KFU's medical school has 1450 students enrolled in its first through fifth years of study, both male and female. Notably, there was a 50/50 ratio in the gender distribution. This inclusivity made it possible to conduct a thorough analysis of passing rates for various medical education stages. The institution's data bank and reports with progress test results provided the data for the study. Periodically released reports gave a thorough summary of how well students performed on the tests. Prior to analysis, all results were anonymized using codes to protect confidentiality and protect each student's privacy. In order to conduct the analysis, the progress test results from 2018 to 2020 were methodically examined, with a particular emphasis on the third quarter assessments. The passing rates for the various medical education years were computed and contrasted, revealing patterns and trends in the performance of the students over time.

5. Results

There are two main goals achieved by applying locally: development of own blueprint based our block teaching contents and establishment of the feedback system. First, we have developed a blue print based on content area [20, 21] within the curriculum and relevant to different blocks/course learning outcomes from year 1 to 5. This was done with experts for achieving the competencies from knowing to doing as a learning continuum. This is the fundamental action, which might change the whole scenario and perhaps lead to more interest from the students because they are having some good outcome while they prepare for PT and could achieve to have good scores in other exams too. The second step has been taken with this regard to the number of MCQs. We have reduced the number of MCQs from 200 to 150 and the time was reduced from 4 h to 3 h.

The second achievement is the progress test feedback system. It was established to address the need for a tangible report on the effects of student learning and the necessity of testing itself in the curriculum. This was deemed necessary by the university stakeholders to have a specific assessment and description of an individual and the cohort on specific subjects and systems in the medical curricula that can be compared to the blocks taken by the students in their particular stages in the college. Four factors play crucial roles in creating a feedback: (a) examination blue print, (b) individual performance, (c) cohort performance, and (d) report system platform [22]. The performance on each subject and system provides the framework of the report. The number of subjects and systems can be traced in the design of the blueprint. The individual performance has been computed on how the student gauged against the total number of items per subject discipline and system. In the individual report, the student and cohort percentage performances per subject are presented side by side, and a remark represented by green arrow pointing upwards if the student score is higher than that of the cohort. A red arrow pointing downwards indicates if the performance is below the cohort. Each individual performance is a personal academic evaluation and confidentiality was considered in the design of the online report system. Students receive a SMS message to inform them that the report is ready and can be accessed by logging in to the university banner system.

5.1. Results of progress test conducted by KFU vs UoG

The comparison of one quarter’s result of progress test conducted by KFU and UoG depicted that from year 1 to year 5, students’ passing rate is higher (Figure 1), for instance, in year 1, the KFU passing rate was 81% as compared to 61% passing rate from UoG examination, whereas, in year 2, this gap became wider and KFU passing rate reaches up to 87% as compared to UoG 55% passing rate. Almost similar situation is presented in all other 3 years (Figure 1). Overall average passing rate from third quarter period is almost 85% in KFU examination while from UoG was 60% (Figure 2).

6. Discussion

The progress test conducting in the Netherlands is considered an extraordinary for many reasons. It is a curriculum-independent test and

includes both formative and summative assessments. It is a rich source of information for all stakeholders, for instance, for comparing curricula and monitoring curricular changes [5]. Comparatively, PT perception has a different social and cultural impact for students at the same time and varies in every setting. Assessment like a tedious 4-hour progress testing usually is seen as purely an assessment in nature to them. As stated in Figures 1 and 2, students passing rate as UoG provided the MCQs is around 60% against the KFU home-based MCQs, which garnered an average of nearly 85% across year level. However, at this state, it is not comparable yet based on the early trends available. We may need to recognize that a number of related factors, including cultural aspects of the test scenarios and the type of MCQs based on medical background, particularly on cases within Arab insights, may have contributed to this. As a result, cultural and educational perspectives were acquired differently. However, things are changing now, brought about by their experience, students now are mindful that they have to improve their skills impact.

Figure 1
Comparative year-wise passing rate of third quarter (KFU vs UoG)

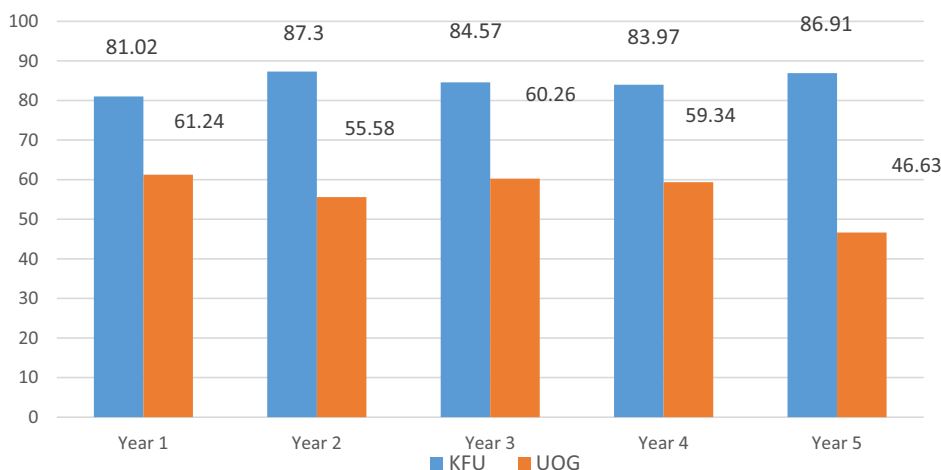
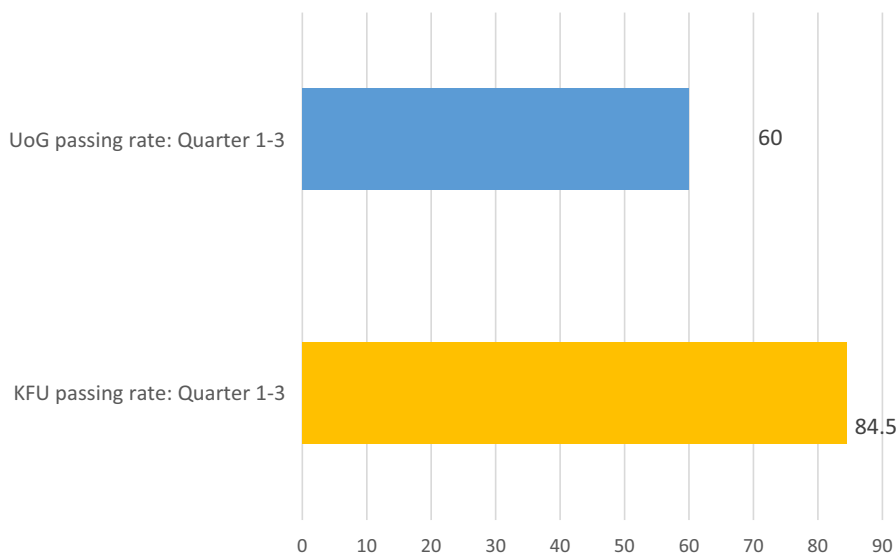


Figure 2
Comparative passing rate of 3 Quarter (KFU vs UoG)



A college [23] conducted a pilot study. Overall results show that the GPA of the progress test matters; hence, progress testing is considered a teaching tool that aids students in maintaining a steady GPA. Since we accepted this test in the same way, we are also the recipients of all these advantages. It is difficult to persuade children that these tests are not as helpful as they believe. Since the progress exam has a negative effect on their performance and could make it more difficult for them to get into postgraduate training programs, students are generally not persuaded that it should be used to decide GPA. This study revealed and endorsed that there is a significant difference in between two progress test scores, which means that there is an effect of progress test on GPA.

We must have a general understanding of the educational system in the Arab world and in Saudi Arabia in particular, in order to identify the context and redundancy surrounding the progress test [7]. Students are typically less autonomous in the learning process and are “spoon-fed” the necessary information by their teachers in secondary schools with teacher-centered educational systems [6]. Moreover, the entire examination procedure pushes students to concentrate only on their grades, which prevents them from learning anything outside of the prescribed curricula [6]. Self-directed learning, which incorporates incredibly helpful insight for a lifelong learner, is discouraged by this. It further affects students overall, particularly when subsequently entering a demanding and challenging learning environment such as a medical school [8, 24], where they have progress testing off course, which demands more hard work. It becomes challenging for many students due to the lack of academic rigor, self-motivation, and dedication to lifelong learning necessary to become a self-directed competent physician [6]. In view of this, many students underestimate the significance of the progress test, a curriculum-independent assessment, believing they are not capable of improving their academic performance on their own. Giving them personalized feedback to help them create their own plans—which should be discipline-based and include academic counseling for continued development—would be one way to address this issue.

7. Conclusion

Conclusively, the importance of the progress test as a comprehensive assessment tool in Arab culture remains significant. The progress test gradually evaluates all abilities, which are evidently applicable to both block instruction and independent learning that may be based on additional goals. It should be recognized, therefore, that this may serve as the primary, if not the sole, knowledge assessment in the curriculum [5]. After 5 years, conducting a thorough investigation to ascertain the pattern of progress and its impact on GPA is advisable.

8. Recommendations

In order to pursue further for having local PT, we need to develop a good questions bank based on blueprint with the matching of learning continuum. Issues discussed some logistics regarding printing machines and materials so it is recommended to have software through which an electronic examination can be conducted, and it will be helpful in item analysis and use for feedback system to the students. Four number of examinations internationally are conducted each year of undergraduate medical education. However, we recommend that it should be reduced to two in numbers: PT-1 after first semester and PT-2 after second

semester because one quarter studies are not enough to take PT, so there will be two exams per year makes a total of 10 examinations during the entire program. The rationale is the exhaustion of the MCQ bank. If there are four examinations, there is a high chance of repeating questions especially for the basic sciences. The soul of assessing progress is the feedback system. We have designed an online feedback system that is subject based as described earlier and recommend that all local colleges should have a similar kind of the system. However, we recommend a modified version of feedback system where students can even have item by item so they can know their deficiencies and improve their knowledge and show progress in next PT. Lastly, a remedial plan should be established at all colleges like special teaching sessions or counseling, etc., especially for those students who score below the average.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

References

- [1] Freeman, A., van der Vleuten, C., Nouns, Z., & Ricketts, C. (2010). Progress testing internationally. *Medical Teacher*, 32(6), 451–455. <https://doi.org/10.3109/0142159X.2010.485231>
- [2] Verhoeven, B. H. (2003). *Progress testing: The utility of an assessment concept*. PhD Thesis, Maastricht University. <https://doi.org/10.26481/dis.20030425bv>
- [3] Freeman, A. C., & Ricketts, C. (2010). Choosing and designing knowledge assessments: Experience at a new medical school. *Medical Teacher*, 32(7), 578–581. <https://doi.org/10.3109/01421591003614858>
- [4] Blake, J. M., Norman, G. R., Keane, D. R., Mueller, C. B., Cunnington, J., & Didyk, N. (1996). Introducing progress testing in McMaster University’s problem-based medical curriculum: Psychometric properties and effect on learning. *Academic Medicine*, 71(9), 1002–1007. <https://doi.org/10.1097/00001888-199609000-00016>
- [5] Tio, R. A., Schutte, B., Meiboom, A. A., Greidanus, J., Dubois, E. A., Bremers, A. J. A., & Dutch Working Group of the Interuniversity Progress Test of Medicine. (2016). The progress test of medicine: The Dutch experience. *Perspectives on Medical Education*, 5(1), 51–55. <https://doi.org/10.1007/s40037-015-0237-1>
- [6] Khan, A. S. (2018). ‘Spoon-fed’ versus self-directed learning in an Arab context. *Sultan Qaboos University Medical Journal*, 18(2), e247–248. <https://doi.org/10.18295/squmj.2018.18.02.025>
- [7] Dehler, G. E., & Welsh, M. A. (2014). Against spoon-feeding. For learning. Reflections on students’ claims to knowledge. *Journal of Management Education*, 38(6), 875–893. <https://doi.org/10.1177/1052562913511436>

- [8] Schuwirth, L. W. T., & van der Vleuten, C. P. M. (2012). The use of progress testing. *Perspectives on Medical Education*, 1(1), 24–30. <https://doi.org/10.1007/s40037-012-0007-2>
- [9] Wagener, S., Möltner, A., Timbil, S., Gornostayeva, M., Schultz, J. H., Brüstle, P., . . . , & Jünger, J. (2015). Development of a competency-based formative progress test with student-generated MCQs: Results from a multi-centre pilot study. *GMS Journal for Medical Education*, 32(4). <https://doi.org/10.3205/zma000988>
- [10] Chen, Y., Henning, M., Yelder, J., Jones, R., Wearn, A., & Weller, J. (2015). Progress testing in the medical curriculum: Students' approaches to learning and perceived stress. *BMC Medical Education*, 15(1), 147. <https://doi.org/10.1186/s12909-015-0426-y>
- [11] Bhakta, B., Tennant, A., Horton, M., Lawton, G., & Andrich, D. (2005). Using item response theory to explore the psychometric properties of extended matching questions examination in undergraduate medical education. *BMC Medical Education*, 5(1), 9. <https://doi.org/10.1186/1472-6920-5-9>
- [12] Cecilio-Fernandes, D., Nagtegaal, M., Noordzij, G., & Tio, R. A. (2018). Cumulative assessment: Does it improve students' knowledge acquisition and retention? *Scientia Medica*, 28(4), 31880.
- [13] Pinheiro, O. L., Spadella, M. A., Moreira, H. M., Ribeiro, Z. M. T., Guimarães, A. P. C., Almeida Filho, O. M., & Hafner, M. D. L. M. B. (2015). Teste de Progresso: Uma ferramenta avaliativa para a gestão acadêmica. *Revista Brasileira de Educação Médica*, 39(1), 68–78. <https://doi.org/10.1590/1981-52712015v39n1e02182013>
- [14] Sakai, M. H., Ferreira Filho, O. F., & Matsuo, T. (2011). Avaliação do crescimento cognitivo do estudante de medicina: Aplicação do teste de equalização no teste de progresso. *Revista Brasileira de Educação Médica*, 35(4), 493–501.
- [15] McHarg, J., Bradley, P., Chamberlain, S., Ricketts, C., Searle, J., & McLachlan, J. C. (2005). Assessment of progress tests. *medical education*, 39(2), 221–227. <https://doi.org/10.1111/j.1365-2929.2004.02060.x>
- [16] van der Vleuten, C. P. M., Verwijnen, G. M., & Wijnen, W. H. F. W. (1996). Fifteen years of experience with progress testing in a problem-based learning curriculum. *Medical Teacher*, 18(2), 103–109. <https://doi.org/10.3109/01421599609034142>
- [17] Arnold, L., & Willoughby, T. L. (1990). The quarterly profile examination. *Academic Medicine*, 65(8), 515–516. <https://doi.org/10.1097/00001888-199008000-00005>
- [18] Swanson, D. B., & Norcini, J. J. (1989). Factors influencing reproducibility of tests using standardized patients. *Teaching and Learning in Medicine*, 1(3), 158–166. <https://doi.org/10.1080/10401338909539401>
- [19] van der Vleuten, C. P. M., & Swanson, D. B. (1990). Assessment of clinical skills with standardized patients: State of the art. *Teaching and Learning in Medicine*, 2(2), 58–76. <https://doi.org/10.1080/10401339009539432>
- [20] Finucane, P., Flannery, D., Keane, D., & Norman, G. (2010). Cross-institutional progress testing: Feasibility and value to a new medical school. *medical education*, 44(2), 184–186. <https://doi.org/10.1111/j.1365-2923.2009.03567.x>
- [21] Mookherjee, S., Chang, A., Boscardin, C. K., & Hauer, K. E. (2013). How to develop a competency-based examination blueprint for longitudinal standardized patient clinical skills assessments. *Medical Teacher*, 35(11), 883–890. <https://doi.org/10.3109/0142159X.2013.809408>
- [22] Evans, C. (2013). Making sense of assessment feedback in higher education. *Review of Educational Research*, 83(1), 70–120. <https://doi.org/10.3102/0034654312474350>
- [23] Alfarhan, M., Khan, A. S., & Aldossary, S. (2019). *Progress testing in medical education still a dilemma in Arab culture*. Unpublished manuscript.
- [24] Frambach, J. M., Driessen, E. W., Chan, L. C., & van der Vleuten, C. P. (2012). Rethinking the globalisation of problem-based learning: How culture challenges self-directed learning. *medical education*, 46(8), 738–747. <https://doi.org/10.1111/j.1365-2923.2012.04290.x>

How to Cite: Khan, A. S., Al Mulhem, A., Refaie, S., Dawood, A. F. A., Angeles, G., & Pangan, J. K. (2024). Progress on Progress Test: International vs Local Experience. *International Journal of Changes in Education*, 1(2), 57–62. <https://doi.org/10.47852/bonviewIJCE42022373>