

*Full Length Research Paper*

## Progress test: A review to motivate their use in pharmacy schools in Brazil

Alberto Malta Junior<sup>1\*</sup>, José Lucio Martins Machado<sup>2</sup>, Maria Jutta Shadeck<sup>3</sup>, Anabel Fonseca Ferrari<sup>3</sup> and Carlos Fernando Collares<sup>4</sup>

<sup>1</sup>Pharmacy School, Faculty of Juazeiro do Norte, Ceara, Brazil. Student of the Master Program in Management of Technology and Innovation in Health of the Hospital Sírio Libanês, São Paulo, São Paulo, Brazil.

<sup>2</sup>Botucatu Medical School, Universidade Estadual Paulista – UNESP, Brazil.

<sup>3</sup>Undergraduate Medical Student of Universidade Municipal de São Caetano do Sul, Brazil.

<sup>4</sup>Department of Educational Development and Research, Maastricht University, Maastricht, The Netherlands.

Received 15 August 2016, Accepted 22 November, 2016

**Progress Test (PrT) is a longitudinal assessment strategy in which tests composed of contents from all the curriculum are periodically applied to all students of a course. Such strategy allows measurement of deep, long-lasting meaningful learning as well as early detection and remediation of underperforming students. It was introduced more than forty years ago, and it has been used in several health schools in the world, especially medicine. Assessment of students' knowledge gain and its application over the course is a challenge. PrT has become a relevant method to monitor the development of the student through graduation. There is no culture of using longitudinal assessments in Brazil's pharmacyschools. This scenario is an opportunity for use of PrT. The objective of this work is to make a literature review about how progress test has been used in context of education. The authors also discuss the possibilities of PrT's application in Pharmacy undergraduate courses in Brazil. PrT has a long history of use by various institutions in the world. Most user experiences come from medical schools, but there are articles showing the application of PrT in dentistry and psychology schools. PrT has been shown to be an effective assessment tool in a problem-based (PBL) and traditional curricula. PrT is recommended as a tool to longitudinal assesses growth in knowledge. Pharmacy schools may develop their own framework for PrT collaborations, which could optimize the educational utility of student's assessment instruments as tools to enhance learning.**

**Key words:** Progress test, assessment, knowledge.

### INTRODUCTION

The Progress Test (PrT) is a longitudinal assessment strategy in which tests composed of contents from all the curriculum are periodically applied to all students of a

course, with the expectancy that a progressive proportion of answers will be right (Vantini and Benini, 2008). Such strategy allows measurement of deep, long-lasting

\*Corresponding author. E-mail: [farmacia@fjn.edu.br](mailto:farmacia@fjn.edu.br). Tel: +55 88 2101-2777.

meaningful learning as well as early detection of underperforming students. Information obtained from progress testing results also serve as a quality assurance tool for institutional stakeholders to help prioritize efforts on curricular governance and faculty development (Verhoeven et al., 2002). It has been introduced more than forty years ago, and it has been practiced in various health schools in the world, especially medicine (Vleuten et al., 1996; Verhoeven et al., 1999; Finucane et al., 2010; Freeman et al., 2010; Bennett et al., 2010). PrT was developed in the context of problem based learning (PBL), but its use was not restricted to PBL programmes (van der Vleuten et al., 2004; Verhoeven et al., 2005). The PrT values the knowledge acquired during the period of graduation, not individual curricula (Nouns et al., 2012).

It is expected that the curriculum of the faculty can produce a solid knowledge to the student. A well-developed curriculum should ensure the development of cognitive, psychomotor and affective skills (Al Alwan et al., 2011). The Ministry of Education published in Brazil the pharmacy courses curriculum guidelines in 2002. This guide has been published to meet the training needed in the face of increased pharmacist insertion in health services, especially public health. It is intended that the final objectives of a curriculum must relate to the reality of where the pharmacist works, after all, the quality of pharmaceutical services depend on the quality of learning to preparing individuals for the several changes and challenges (Ogaji et al., 2016). In addition to this, the amount of pharmacy courses has multiplied and this fact demands capable assessment tools to qualify learning and harmonize the knowledge taught in institutions. Currently most of the pharmacy courses in Brazil adopt assessment methodology focused on tests at the end of each module. This use promotes the short-term memorisation or unrelated facts rather than promotes deep learning. PrT has become a relevant method to monitor the development of the student through graduation (Langer and Swanson, 2010; Al Alwan et al., 2011; Gold et al., 2015).

The central question who guided this review was: What contribution can the progress test give for learning to the schools of pharmacy in Brazil?

The aim of this work is to make a literature review about how progress test has been used in context of education. The authors also discuss the possibilities of PrT's application in Pharmacy courses in Brazil.

## MATERIALS AND METHODS

To accomplish this literature review, the authors used the SCOPUS® database. It is one of the largest abstracts and citation database of peer-reviewed literature in the world. The keywords used for research in Scopus® were progress test delimited by inverted commas. This search was conducted in April of the year 2016.

In Scopus® database we select as inclusion criteria all the

the original articles and reviews on the progress test in higher education; articles or reviews written in *english or portuguese*, published between 1990 and 2015; subject area included was only medicine, dentistry, social sciences, psychology and nursing. There were exclusion criteria: Notes, conference paper and book chapter. The search in database brought articles not related to progress test and was not considered to analysis. Some articles with terms "progress" or "test" isolated, appeared on search results and it was excluded as well.

## RESULTS

The search finds 128 documents. After applied exclusion criteria, 65 articles were eligible to analysis. The main results are presented in Table 1. To make it easier to understand, it were analyzed considering the following criteria:

1. PrT as assessment tool through graduation
2. PrT as assessment tool through post-graduation
3. Investigation about standards to PrT
4. Practices to application of PrT
5. PrT used in collaboration
6. PrT as instrument to comparison

## DISCUSSION

The number of pharmacy schools in Brazil is growing. This scenario demands instruments to ensure that the pharmacist is being well formed. For any course of university education, it is important to monitor how it develops the cognition of students. It is argued that the assessment of this growth needs to mix formative assessment elements to improve performance, or summative, for accountability purposes and making decision (Schauber and Nouns, 2010). The relationship between an educational program and the method of evaluation is vital because the tests and examinations lead student learning (Verhoeven et al., 1999). The PrT is a real possibility to assess gain of knowledge by students. Besides that, for students who have submitted to a PrT there were more consistent and significant progress in academic's results when compared to students without it. That is because students tested continuously tend to retain knowledge more effectively (Schaap et al., 2012).

The set of articles present the evidence that PrT is a valuable method to assess and monitor the student's advancement (Boshuizen et al., 1997; Verhoeven et al., 2002; Dijcks et al., 2003; Rodrigues and Catarina, 2007; Löwe et al., 2008; De Champlain et al., 2010; Nouns et al., 2012; Al Alwan et al., 2011). Most studies describe experiences of the use of PrT in medical schools, but it is also used in other courses such as psychology, dentistry or nursing (Finucane et al., 2010; Norman et al., 2010; Muijtjens et al., 2008; Schaap et al., 2012; Ravesloot et al., 2012; Sangestani et al., 2013; Postma and White,

**Table 1.** Main results of application of progress test.

Objective/Reference	Main results
<b>PrT as assessment tool through graduation</b>	
To understand the influence of PrT in students' behaviour and students' perceptions (Berkel et al., 1994)	PrT support learning processes meaning oriented in contrast to repetition oriented learning. When both progress tests and block tests are summative used, PrT is not seen by students as an effective method to develop a meaningful learning
To measure if there are differences in kinetics and acquisition of knowledge among students from three countries (Albano et al., 1996)	Perhaps Prt is not the most appropriate method for assessing students in international exchanges. Despite this, the authors consider that the PrT can be used to measure the gain of cognition in areas such as basic sciences.
To describe the experience of the Personal Progress Index as a PrT at the McMaster University (Blake et al., 1996)	PrT was well accepted by the students as a means of measuring growth of knowledge. The analysis of PPI scores allows us to identify students with learning problems.
To evaluate the impact of PrT on the scores on a Clinical Reasoning Test (CRT). To investigate how PrT scores contributes to the CRT scores through the years (Boshuizen et al., 1997)	PrT is a relevant instrument for monitoring the student's progression. It correlates with the CRT scores, specially in clinical sciences. Despite this, there are questions that depend on the school's aim and policy.
To evaluate the extension of study between academics of a medical school in first and later years (Hurk et al., 1999)	PrT was used as a parameter to evaluate the behavior of students related with dimension of learning.
To study the progression of knowledge in students over the course in a medical school's problem-based curriculum through PT scores (Verhoeven et al., 2002).	PrT scores of 21 years reveal a growth in knowledge related to training time.
To explore whether students are still gaining knowledge about basic sciences through the years (O'Neill, 2000)	PrT was used for summative assessment of knowledge. The researchers observed an advancement in the basic Science scores evaluated by PrT
To analyze relation to peer-rated competence of students with the relevance of written longitudinal tests, block tests and OSCEs (Dijcks et al., 2003)	Progress test is a valuable tool to predict a profile of functioning student
To confront the consistency of different dimension of self-directed clinical learning (Dornan et al., 2003)	There was no association between results on PrT with self-reported real patient learning instrument. Probably because PrT covers knowledge and seems less effective to this measure
To measure the quality of undergraduate education between medical students in psychiatry and behavioral sciences (van Diest R et al., 2004).	Conclusions after application of PrT point a significant increase in knowledge growth for psychiatry and behavioral sciences. The measurements were made between the 1 <sup>st</sup> year and the end of the 6th year among academics
To plan and administer a competence test throughout the Sheffield undergraduate medical course related to musculoskeletal system knowledge gain (Basu et al., 2004)	An adaptation of PrT was used to measure gain of knowledge. Authors found an adequate knowledge about musculoskeletal medicine between students after application of PrT
To implement the PrT as periodic evaluation; assess whether the knowledge gain has continuity; to check for loss of knowledge in the area of basic sciences at the end of the course (Tomic et al., 2005)	The authors showed that it was possible the implementation of PrT; there was progressive knowledge gain from first to last year in all tests; the knowledge related to basic sciences were kept
To analyze models of learning, training and progress evaluation (Vantini and Benini, 2008)	The authors summarize questions about learning, progression of the students, competence, responsibility, continuity and assessing progression. PrT is discussed as a method that assesses the comprehensive knowledge and its progression.

Table 1. Cont'd.

To compare the level of knowledge of graduate students with a university degree with to the ones with college degree (Cohen-Schotanus et al., 2008).	Analysis of results from a PrT revealed that there were no differences between the groups of evaluated students
To discuss the implementation of PrT in medical schools in Germany (Nouns and Georg, 2010)	PrT was proposed by students, who looked for meaningful learning in undergraduate education. The study showed that it is possible to compare knowledge between schools within a context of cooperation. The longitudinal application of PrT contributed to the understanding of formative assessment and improved the quality of examinations
To study long-term effect of PrT on student learning (Norman et al., 2010)	The implementation of a formative PrT has a beneficial consequence for performance in a national licensing examination. The introduction of the PrT in an institution reduced failure rate by ¼
To evaluate the PrT as a predictive factor to identify behaviour of knowledge in medical students related to basic and clinical Science (Alwan et al., 2011)	Results of PrT have showed that students performed better in clinical sciences than the basics'. In this experiment the results were used to modify the curriculum
To analyze perceptions and preparations by medical students for the PrT (Wade et al., 2012)	Students elected three major factors around PrT: PrT's capacity to assess behavior of knowledge, to assist clinical learning and its importance for exam preparation
The objective of this study was characterized by the development of knowledge among first-year psychology students (Schaap et al., 2012)	PrT scores showed that the growth of knowledge was different among the students. Nevertheless, due to some limitations, researchers receive this result with caution
To compare the performance among students in development and retention of knowledge in the basic medical sciences (Nouns et al., 2012)	PrT allows understanding the advance of knowledge in both traditional and PBL reformed medical curriculum.
To investigate relations between student characteristics and academic achievement (de Koning et al., 2012).	Department of Psychology uses the PrT as a central method of assessment. Based on PrT results, authors concluded that three factors are strong predictors of academic development: students observed learning activities across the course, conquests in secondary education and during the first two bachelor years, as well as in their verbal abilities
To report the innovative use of the National Board of Medical Examiners Comprehensive Basic Science Examination as a PrT throughout the preclerkship medical curriculum (Johnson et al., 2014)	This work demonstrated the use of the CBSE as a PrT has an important role as an evaluation method
The objective of this study was to evaluate the stress and student learning by comparing the PrT with traditional forms of assessment (Chen et al., 2015)	A low sense of stress was achieved with the application of PrT. For the other hand this research found no evidence that PrT enhances learning.
To make a literature review investigating the result of different learning environments. (Schauber et al., 2015).	PrT was used as indicator of academic achievement. This work showed that there was a better performance of students through the time, but PT was not able to detect application of knowledge.
To share the experience of building PrT in an undergraduate dental programme (Ali et al., 2015)	PrT features: Being applied to students from all 4 years; also, realized twice a year; it is a formative assessment in years 1 and 2 and summative in subsequent years; each test adopts 100 single best answer multiple-choice items; among the options there is a 'don't know' option; it uses negative marking and 0 for 'don't know' answers. PrT has validity and reliability to assess growth in knowledge through the undergraduate program

Table 1. Cont'd.

<b>PrT as assessment tool through post-graduation</b>	
To evaluate extension of post-graduation training in general practice on the acquisition of knowledge of trainees (Kramer et al., 2003)	Application of PrT allowed showing that post-graduation training promotes an increase in knowledge between students. The gain of knowledge in a 3-year program is better than in a 2-year program
To investigate the behavior of the residents of anesthesia relating affective-motivational variables with study strategies (Rodrigues and Catarina, 2007)	The growth of the knowledge of the basic sciences among residents of anesthesia was associated with anxiety related to the activities of study, results, motivation to study, the individual improvement and to the ability in choosing main ideas from subject matters
To measure the effect of a 1-year resident training program in clinical research (Löwe et al., 2008)	Use of the PrT shows growth on research knowledge
To verify the validity and reliability of a national PrT in postgraduate Obstetrics and Gynecology training (Dijksterhuis et al., 2009)	The results of this study were not satisfactory. The PrT has not presented validity and reliability
To investigate the quality and validity of PrT in postgraduate radiology training (Ravesloot et al., 2012)	The study finds that PrT is a valuable method in medical specialty education. For the other hand, the study doesn't allow to relation visual skills with knowledge. Reliability and construct of validity were found by researchers
<b>Practice to application of PrT</b>	
To review the application and some results of PrT after 15 years of experience (Vleuten et al., 1996)	PrT has a central role of PBL program. It magnifies the student-centered learning. Several universities in the Netherlands have been using the progress test. The domain of knowledge by students of Maastricht is equal to other institutions that do not have progress test. The multiple-choice questions are more reliable. Progress test was developed in the context of PBL, but it can be used in traditional educational programs
To inspect methods which have been used to assess the outcomes of single tests, and to advice best practices (McHarg et al., 2005)	Authors recommend that the norm referencing is better than criterion referencing; number-right marking is less recommended than negative marking; discontinuous scale is better than a continuous scale.
To evaluate the use of questions with short answers (Rademakers et al., 2005)	The authors consider that to adopt short answer questions is relevant to formulate and implement PrT. The time and costs of question plan and marking the answers are acceptable. The process will be simplified with adoption of computerizing
To describe a development of a web-based tool to give feedback to students (Muijtjens et al., 2010)	The study showed that the Progress Test Feedback (PRoF) system was developed in two years, it was tested in several schools and it has many features. Although the authors consider the system useful for teachers and students, they understand that it takes more evidence to prove the integration of summative and formative assessment
To discuss aspects of the development of the PrT (Ricketts et al., 2010).	This work raises questions about how best to apply the test. Two aspects are considered in the article: cost and reliability. The reliability increases with the size and the test frequency. On the other hand, discusses choose larger and less frequent testing as the best way forwards. This aspect can reduce the global costs for the test. However, the analysis did not link the issues of cost and reliability to educational impact and acceptability.

Table 1. Cont'd.

To investigate if multiple choice tests are fair to students in medical schools with specific learning disabilities (Ricketts et al., 2010b)	The authors analyzed a series of PrT questions applied to a group of students including those with some disabilities. They concluded that when the test is adequately prepared, there are no problems to students with learning disabilities
To evaluate whether a variant of PrT could recognize poor performing students (Kerfoot et al., 2011)	According to the authors, PrT developed by e-mail together with a cycle of reviews with the materials of study seems to be an important tool to use for improving gain of knowledge
To evaluate acceptance of formative assessment comparing computer-based with paper-based assessment (Karay et al., 2012)	The PrT application in computed-based format was well accepted by the students.
<b>Investigation about standards to PrT</b>	
To investigate application of standards (relative or absolute) for approval or disapproval and check for a substantial increase of the variation in the failure rate per test (Muijtjens et al., 1998)	The use of fixed absolute standards in progress tests developed in a norm referenced setting is precarious because of the variations in difficulty of different tests. The authors recommend: constructing a test by selecting items from a bank of items of known difficulty, which enables measurement and control of the test difficulty, or 2) a more expressive standard setting procedure which is based on item judgment by a panel of experts
To investigate standards for the PrT (Verhoeven et al., 1999)	Graduated students as judges are a useful method for development of a progress test. However, viability was a problem detected in the search
To describe the steps and approaches necessary to achieve effective peer review and to produce tests of consistent high quality (Verhoeven et al., 1999b)	The authors explain the approach to produce highest possible quality items for progress test.
To characterize the reliability and credibility of Angoff procedure and do a comparison of the standards (Verhoeven et al., 2002b)	The use of a panel of writers as judges is not feasible to obtain a reliable passing score. The established passing score seems less credible. The political acceptability of a panel from recently graduated students seems doubtful. A better standard can be obtained from a mixed panel (item writers and graduates)
To demonstrate a statistical method used in context of PT, called the cumulative deviation method and which is intended to elicit trends in longitudinal knowledge growth across the undergraduate curriculum and that can be used for benchmarking (Muijtjens et al., 2008)	The findings support the feasibility of using the method of average cumulative deviation. This method compares schools' performance on student knowledge, reveal the impact of curricular changes on knowledge gain, and diagnose strengths and weaknesses of current or developing curricula
To purpose a new standard setting for PrT (Ricketts et al., 2009).	This study showed that the development of standards for the PrT represents a challenge. Authors demonstrated that successive evaluation of students' performance can produce a rich source of information. This action helps set standards setting for PrT
To study the basis of equating in context of PrT (Langer and Swanson, 2010).	Equating is a statistical process that controls differences in the difficulty among forms, so that, the scores can be used interchangeably. PrT must produce a true assessment of what you want to measure. Authors discuss a usage of a hybrid equating design as a potential solution for development of the PrT
To discuss the use of blueprint to enable increasing and new opportunities for feedback in context of PrT (Coombes et al., 2010)	The blueprint covers questions on the curriculum and gives possibilities to monitoring the quality of test. Associated to this fact, the PrT can provide a very important source of feedback to learners.

Table 1. Cont'd.

To investigate the use of PrT in clinical education through growth of knowledge and impact of recent training (De Champlain et al., 2010)	The study helps to show the importance of equated scores because of its capacity in promoting an assessment of growth without the confounding effects; and because it explains the mechanism how clinical knowledge grows
To analyze the use of procedure for cross-institutional benchmarking between institutions which use PrT (Schauber and Nouns, 2010)	Cross-institutional comparisons can be made using the cumulative deviation method. The model seeks to interpret standards and clarify the differences of the data obtained in the PrT. Nevertheless, the method has limitations, for example, it does not discriminate partly depending on the structure of the data
To analyze the reliability and credibility of several panels of judgement to PrT (Anderson et al., 2011).	This study found out that identifying the best judges for standard setting is paramount to successful implementation of a progress test. Alumni and mixed faculty-alumni judge panels had difficulty producing credible student outcomes. Judge panels should be preferred when established progress test criteria.
To investigate a Bayesian statistical approach used for reducing error in PrT (Ricketts and Moyeed, 2011)	The statistical approach from this study produced a best estimate of scores and smaller standard error of values. The simplicity of the method facilitates its use along the large cohorts of students and frequent tests
<b>PrT used in collaboration</b>	
To report the progress test and its convenience for cross-institutional cooperation (Vleuten et al., 2004)	The economic benefit is one of the advantages of sharing materials among schools. This allows a construction of the PrT with more quality. Sharing achievement contributes to educational quality
To evaluate the potential of international sharing of PrT (Verhoeven et al., 2005).	The PrT is an important methodology to evaluate medical schools. Evidences show that sharing test material saves resources and seems to be a viable strategy
To investigate whether there is discrimination between items of PrT used for inter-curriculum comparison (Muijtjens et al., 2007).	The researcher found that it may not be appropriate to make comparisons between results on identical tests from students of different schools when tests are composed by staff of one of the schools only. The authors concluded that the source of the bias items has a propensity to compromise the reliability and fairness of comparison. The solution to this problem must involve the provision of equal number of items by the schools. Another proposal is to make a more rigorous review
To detail various stages of PrT development in collaboration to the National Board of Medical Examiners (NBME) (Swanson et al., 2010).	This work shows that it is feasible to develop the PrT in the UK on taken items from the United States Medical Licensing Examination (USMLE). The use of the same blueprint helps to improve the comparison over time. Furthermore, the use of multiple test forms and involving experts are also important considerations. The authors recommend caution when using materials from other countries due to cultural characteristics, laboratory units, terminologies, care protocols and drug formularies
To describe collaborative banks with questions for PrT, methods used to validate and adapt questions and to make comparisons among questions from different sources (Freeman et al., 2010).	This work shows that transferring questions from one institution to another is not a simple task. There are issues related to curricular and cultural differences. The effective use of questions from external banks needs an amount of work to adapt them to local conditions

Table 1. Cont'd.

To report advantages and disadvantages of the collaboration in PrT (Schuwirth et al., 2010)	The authors consider that collaboration in Netherlands in context of PrT is adequate, but there is some riskiness. The main advantages are: the possibilities for curricular comparisons, opportunities for conducting research, cost reduction and reach of many students by application of PrT. Some disadvantages are: conceptual differences about what items are good quality and regulatory issues of each institution.
<b>Instrument to Comparison (between curricula, methods of learning...)</b>	
To compare the academic performance of two medical schools with two different learning method (Verhoeven et al., 1998)	PrT was used to comparison between two curricula. There were no significant differences in cognitive performance for curricula.
To compare scores on knowledge of two cohorts of students from two curricula (old and new) in their final year (Peeraer et al., 2009)	This study evaluated the effect of curriculum change from a medical school. PrT was used as instrument to measure scores. No significant differences were found between two curricula (old and new)
To compare behavior of students between two curricula (Van Der Veken et al., 2009).	PrT was used to measure the learning between integrated medical curriculum (ICMC) and conventional medical curriculum (CMC). The differences obtained in ICMC medical students were attributed to the stronger emphasis on clinically relevant basic sciences in the first years and to the stronger integration of basic and clinical sciences in the ICMC.
To compare the increase of knowledge among students of a new and another long-established school using the PrT (Finucane et al., 2010)	The level of knowledge acquisition is similar between these groups of students. There is feasibility in inter-institutional and international collaboration in PrT. This type of collaboration can be offered as a useful quality assurance tool.
To study methods for educational evaluation between schools (Muijtjens et al., 2008b).	The study shows that single-point benchmarking, among three schools that used PrT produces questionable results. For the other hand, the better method seems to be benchmarking based on longitudinal data and cumulative deviations
To evaluate the results of a competency-based active learning curriculum (CBAL) compared to the existing active learning curriculum (AL) (Kerdijk et al., 2013)	Based on PrT results, this research could not prove that competency-based education is better than traditional form for students. Authors recommend further studies
To confront the influence of PBL and lecture-based learning (LBL) to the learning development of students (Sangestani et al., 2013)	Results of PrT showed that students in PBL group experiments more rapid progress of learning than the other lecture-based
To measure knowledge retention in schools with PBL curriculum and traditional curriculum (Heijne-Penninga et al., 2013)	PrT was used as an assessing method to evaluate performance of students in three medical schools. PBL curriculum is better than the traditional curriculum. The use of closed and open-book tests contribute to the long-term knowledge retention
To describe the progress of the clinical reasoning skills using PrT results (Postma et al., 2015).	PrT was used to compare case-based learning against lecture-based teaching. Case-based learning seems to contribute to accurate clinical decisions more than lecture-based teaching.

2015; Ali et al., 2015). Development of PrT in post-graduation training seems possible, but in this revision showed that there is a need for further studies (Kramer et

al., 2003; Rodrigues and Catarina, 2007; Löwe et al., 2008; Dijksterhuis et al., 2009; Ravesloot et al., 2012).

The authors have discussed aspects of the practice of



PrT as the type of questions, reference criteria, use of internet-based tools and costs (Vleuten et al., 1996; McHarg et al., 2005; Rademakers et al., 2005; Muijtjens et al., 2010; Ricketts et al., 2010; Ricketts et al., 2010b; Kerfoot et al., 2011; Karay et al., 2012).

Several articles present procedures for the achievement of standards for the PrT. Statistical methods, bank of items, better judges for the questions and quality of test are discussed (Verhoeven et al., 1999b; Muijtjens et al., 1998; Muijtjens et al., 2008b; Ricketts and Moyeed, 2011; Anderson et al., 2011; De Champlain et al., 2010; Langer and Swanson, 2010). Despite this development of standards for the PrT represents a challenge (Ricketts et al., 2009).

Collaborative studies about PrT show mainly the economic benefit (Vleuten et al., 2004; Verhoeven et al., 2005). The PrT can be used for comparison purposes, but there are existing error sources that need to be considered (Swanson et al., 2010; Muijtjens et al., 2007; Freeman et al., 2010; Schuwirth et al., 2010).

For comparison purposes, PrT has several features. The studies show that PrT can be used for comparing types of curricula such as problem based versus traditional learning (Verhoeven et al., 1998; Nouns et al., 2012), problem versus lecture based learning (Sangestani et al., 2013), to evaluate effectiveness of curriculum change (Peeraer et al., 2009); to measure transition of a conventional to an integrated contextual medical curriculum (Van Der Veken et al., 2009), infer performance results among students from different schools (Muijtjens et al., 2007), and comparison of curricula (Muijtjens et al., 2008; Muijtjens et al., 2008b).

Although most studies have been conducted in developed countries, PrT has been applied in countries with few resources (Aarts et al., 2010; Mardiasuti and Werdhani, 2011). Some experiences involving the PrT has been carried out in Brazil, that is a developing country. Studies about application of PrT in Brazilian medicine schools (Tomic et al., 2005; Sakai et al., 2011) demonstrate the possibility of implementation and execution of it.

The use of continuous assessment has emerged as a proposal to improve student learning and develop educational programs in Pharmacy Schools (Plaza, 2007; Szilagyi, 2008; Begley et al., 2013). The Accreditation Council for Pharmacy Education recommends that pharmacy schools can use evaluations that can achieve desired educational objectives. In this context, progress test has been used as both formative assessment as summative (Duncan-Hewitt et al., 2007; Szilagyi, 2008; Anderson Jr and Nelson, 2011; UCL, 2014; Karimi et al., 2014).

The Pharmacy courses in Brazil are guided by a national curriculum guideline (Brazil, 2002). This guideline establishes the profile for formation of the pharmacist. Several institutions have discussed the improvement of the teaching of pharmacy in Brazil (ABERFABIO, 2013).

Despite these efforts, the pharmaceutical education still has been very influenced by memorization and repetition of content often disconnected from the reality. In addition, the absence of methodologies like problem based learning left a void for critical and reflexive constructions in the learning process (Almeida et al., 2014; Blouin et al., 2008).

The last Pan American Conference on Pharmaceutical Education in 2014 defended the adoption of a competency-based curriculum. Knowledge is an important cognitive component needed to develop competencies (OPAS, 2014). The PrT is a tool to assess knowledge and can fill this need. Pharmacy schools can adapt the PrT to provide assessment that measure the final objectives of their curricula and start an era of evaluation that guides learning and contributes to the quality of education.

## Conclusion

There is much evidence about the use of the PrT as an evaluation method to enhance learning in graduation and even pos-graduation. The literature also records studies which seek to qualify the design and implementation of the PrT, presenting proposals for standards, common practices, experiences in collaboration and showing features of the PrT used as comparison tool between types of curricula, learning methods etc. Although most studies describe experiences in medical schools, there are descriptions of the application of the test in other courses in the health area. It was not detected in this review study the use of this test in pharmacy schools. However, we advocate that the PrT can be used by the schools of pharmacy in the same way as is already the case in other courses.

## Conflicts of Interests

The authors have not declared any conflict of interests.

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