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Research Article

Comparative Study on Patterns of Performance Assessment in Medical Schools

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Abstract

Background and objective: Medicine is a combination of health and healingthat includes diagnosis, treatment and prevention of disease and many other aspects of health. Despite the fact that many improvements have been made in medical education, medical schools continue to face many problems in facing the community, patients, doctors And students who are not compatible with the strategies of medical education. As a result, medical schools need a model and a good tool for evaluating and ensuring the quality of the program and learning process.

Method: Since there is no common model for assessing the educational performance of Iranian medical schools, the present study was conducted in three areas: performance evaluation, educational evaluation and medical education evaluation. These models were studied and their positive and negative points were compared in the performance evaluation of medical schools.

Findings**:**Organizational Performance Assessment Concepts such as continuous development, stakeholder participation, innovation, and flexibility are important. While in educational evaluation models, emphasis is placed on learning process such as learning outcomes, behavioral change, training effectiveness, and return on investment. Assessment in medical education is less than other educational fields and in recent years, based on the topics of such subjects as biomedical sciences, behavioral and social sciences, decision making, communication skills, interpersonal collaboration, medical medicine and medical ethics, is done.

Conclusion: To evaluate the performance of medical education, one can not use a performance appraisal or evaluation model or even a medical education assessment model. Since each group of these models has positive and negative points, only a combination of these models can evaluate all aspects of the performance of medical education.

Keywords**:** medical education, educational performance, medical education evaluation

Background and Objectives

The status of university as a paramount player in the global system has incrementally affected information, knowledge and ideas and higher education has contributed to more extensive economic growth and personal success[1] .By training and educating physicians, schools of medicine promote health and thus higher life and social quality, which are the major goal of medical education[2]. Therefore, all schools of medicine should actively improve their education process by upgrading their education and research program[3]. To fulfill this important task and continue dynamism and improvement, schools of medicine need an appropriate model and tool for qualitative assessment of the process of their programs and education as well as the efficiency and efficacy of their graduates in job markets. Numerous studies have discussed the necessity for these changes and radical innovations in the structure of medical education and the education process of physicians at all levels. For example, the World Health Organization (WHO) has supported the need for change in medical education. To this end, standards should be clearly defined and become meanigful, appropriate, relevant, measurable, accessible and acceptable by users

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They should first be implemented in schools of medicine and then assessed within the framework of an evaluation and credit assessment system. Implementing this process will improve the quality of low quality schools of medicine and will ultimately improve the quality of healthcare at national and international levels[2] .

For this reason, performance assessment is considered as an important and fundamental task in facilitating the efficacy of educational programs and enables education directors to identify challenges and develop the grounds for their improvement by supervising and monitoring the processes[4] .

As we should pursue a dynamic process in medical school, we should also use appropriate and up-to-date models and patterns in assessing education performance of medical departments. There are models for evaluating medical education. However, they are very limited and research shows that program assessment in medical education has developed less than other education areas[5].This study was conducted to compare models of education performance assessment to identify their strengths and weaknesses and to propose an effective model of education performance assessment in schools of medicine. Therefore, theories, models, patterns and articles were first explored in three areas includes: performance assessment of organizations; educational assessment; and education performance assessment in Iranian and international universities and schools of medicine.

Performance Assessment Models:

Sink and Tuttle Model (1989) considers organizational performance consisting of complex relations among seven performance indexes: 1. Efficacy, 2. Effectiveness, 3. Quality, 4. Quality of work life, 6. Innovation, and 7. Profitability[6].the model has a few fundamental limitations. For example, in this model, flexibility, which is a necessity in the recent decade's markets, is neglected. Another limitation of the model is neglecting the organization's customers.[4] Keegan's performance measurement matrix model (1989) takes into account various aspects of organizational performance, including financial and non-financial aspects as well as internal and external aspects in an integrative manner. However, the model fails to properly and clearly demonstrate relations among various aspects of organizational performance[6]. Fitzgerald's model (1991) solved the issue associated with Keegan's performance model by introducing indexes. The model focuses on two categories of indexes: 1. Results indexes and 2. Determinant indexes[7]. Result indexes point to the organization's performance in financial and competitive areas and determinant indexes include: quality, flexibility, resource utilization and innovation[8].

A requirement of any performance assessment system is the existence of a clear relationship between performance indexes at various hierarchical levels of an organization, such that each department attempts at reaching identical goals. A model that involves the way this relationship is developed is the performance pyramid model, which was proposed by Cross and Lynch in 1991. The model includes four levels of goals that express organizational efficacy and its internal efficiency. The pyramid's first level measures the organization's vision, the second level measures business divisions with short-term and long-term goals, the third level measures business operating systems, which bridge levels of higher indexes and everyday operational indexes and finally the fourth level measures the key index of performance in departments and work centers[6]. European Foundation for Quality Management (EFQM) introduced EFQM Organizational Excellence Model in 1991[7]. By emphasizing the bases of fundamental values, the Organizational Excellence Model has a systematic and comprehensive approach to organizational performance[9]. There are two classes of indexes or criteria in this model: Enablers cover what an organization can do and enable the

organization to achieve excellent results. Results are what an organization achieves and implementation of enables. Enablers include leadership, policy and strategy, partnerships and resources, people and processes. And results include customer results, people results, society results (social responsibility) and key performance results[4]. The main problem with using Organizational Excellence Model is that the weights of the criteria have been defined in advance, resulting in certain issues[9]. Brown's business assessment model (1996) encourages executives to pay more attention to the horizontal flows of materials and information within the organization. The model investigates within an organization the inputs, processes, outputs and outcomes to determine indexes and assess performance. Although this model is a useful method to explain the differences between input, process, output ad outcome measures, unlike previous models, the model neglects hierarchies and focuses only on the process of business[6].The performance prism model is a second generation of performance assessment models and systems and was introduced by Neely in 2001. The reason why this model is considered similar to a prism is that it breaks down the concept of organizational performance assessment and reveals its various dimensions as a prism breaks down an apparently white beam of light and reveals its complexities and components. Based on this model, a performance assessment system should be taken into consideration from five distinct but related viewpoints of organizational performance, including: stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution. The weaknesses of this model include less attention to the method of materialization of performance criteria compared to other methods of assessment and measurement systems existing in organizations and their methods of modification and changing have been almost neglected[7].

The common performance assessment model used in many organizations, including universities across the world, is Kaplan and Norton's (2000) balanced strategic management model, which assesses organizational performance based on balances score cart (BSC)[10]. By having four aspects or perspectives of measurement, the model produces a complete spectrum of performance management index (PMI) to assess achievement of strategic goals. The four perspectives include: 1. Financial, 2. Customer, 3. Internal processes, and 4. Learning and growth. An important factor for an effective BSC s to balance the four perspectives with the organization's perspective of strategic goals[11]. BSM is currently used extensively in manufacturing industries, service industries, non-for-profit and governmental organizations, etc. with excellent effects[12]. BSC is similar to a dashboard in a plane pilot cabin. It provides managers with complicated information at one glance[11]. This model helps an organization by identifying, organizing and connecting a set of balanced indexes through a major strategic plan in the assessment of performance dimensions[13]. The system facilitates comparisons in various areas and dimensions as well as comparisons in priorities over the course of time and with instructions[14]. The comparison of the characteristics of performance assessment models of organizations in the constituent dimensions and elements has been given in the section Findings and in Table 1.1.

Educational Assessment Models

In recent decades, numerous educational assessment models have been proposed, which are categorized based on one classification into models based on realization of goals, judgmental models (internal and external criteria) and decision making facilitating models. They have been briefly introduced and their major dimensions and constituents have been compared in Table 1.2.

In Tyler's goal realization model, assessment is made by comparing the expected results and the true results[15]. In CIPP or CIPPO decision making model, assessment of

program efficacy is based on the use of quantitative and qualitative indexes and it develops a significant relationship between improvement in processes and efficacy of education[16] and it identifies the weaknesses and strengths of educational processes[17]. Scerion judgmental model focuses on education consumers and proposes distinguishing summative assessment from formative assessment[18]. CIRO model, which was proposed by Warr, Bird and Rackham, focuses on four elements of context, education input, reaction of learners and other relevant individuals and education output[19]. However, this model fails to deal with the assessment of behavior change[20]. The most notable model is the Kirkpatrick model, which defines assessment as determining efficacy in an education program and divides its process into four levels: 1. Reaction, 2. Learning, 3. Behavior, and 4. Result[19]. A more advanced form of Kirkpatrick's model was proposed by Philips, who added a fifth level of return of investment (ROI) and added money or financial amounts to education values[21]. In Liderman's model, assessment is made in three stages: during the course, at the end of the course, and after education[19]. ISO 10015 standard education assessment model is based on four stages: determining education requirements, education planning and programming, education administration and assessment of education results or education efficacy[21]. And authentication model assesses the main audience including experts (external) and consumers (internal) of the program[22].

Models of Performance Assessment of Universities / Schools of Medicine

There are numerous educational assessment models that have been used in various educational fields and they enjoy extensive applications. However, the models of program assessment in medical education are very limited, which properly reminds us of the fact that research in the area of assessment of medical education has developed much less than other areas of education[5].

The performance of schools of medicine in Canada are currently assessed through a few internal revision stages every four years so as to develop the culture of constant quality improvement and ultimately improve medical education. Thus, a few standards have been determined and not only do they assess schools based on them but also they rank and give credits to schools. The standards have been designed at the following dimensions: 1. Mission, planning, organization and integrity; 2. Leadership and accreditation; 3, Academic and learning environments; 4. Faculty preparation, productivity, participation and policies; 5. Educational resources and infrastructure; 6. Competencies, curricular objectives and curricular design; 7. Curricular content; 8. Curricular management, evaluation and engagement; 9. Teaching, supervision, assessment and student and patient safety; 10. Medical student selection, assignment and progress; 11. Medical student academic support, career advising and educational records; and 12. Medical student healthservices, personal counseling and financial aid services[23]. In the United States, education assessment of medical students is mainly based on a model developed by Accreditation Council for Graduate Medical Education(ACGME). This model uses six areas of competencies: medical knowledge, patient care, professionalism, interpersonal; and communication skills, practice-based learning and improvement, and system-based practice. In the past decade, schools of medicine and institutes issuing medical permits have made new efforts for accurate, reliable and proper assessment of the competencies of medical interns and graduate physicians[24]. The World Federation for Medical Education (WFME) model has offered a set of standards in relation to training and educating physicians at all basic and specialized levels, continuous education and constant career progress. The WFME has been approved in the area of international standards in medical education by the World Health Organization (WHO) and the World Medical Association (WMA), General medical

standards include fundamental theoretical and applied framework in medicine, particularly in biomedical basic sciences, behavioral and social sciences, clinical sciences and clinical general skills, including clinical decision making skills, communication abilities, inter-career cooperation, social medicine and medical ethics. Global standards in medical education have been structured based on nine major fields and with a total of 35 minor fields as well as a complex interaction and relationship among them. The fields are defined as the main components of the structure, process and outcome of medical education and include the following: 1. Mission and outcome; 2. Educational program; 3. Assessment of student; 4. Faculty / faculty members; 5. Educational resources; 5. Program evaluations; 6. Governance and administration; and 7. Continuous renewal[25].

In Iran, the Supreme Council of the Cultural Revolution approved for the first time in 2004 a model consisting of higher education assessment indexes in the following dimensions: education, research, student, culture, credit and facilities. It presented the model to universities and higher education institutes. Universities were obliged to use these indexes in their strategic plans for performance assessment[26]..As called for by the department of education of the Ministry of Health and Medical Education, a system was developed to monitor education performance in universities of medical sciences in the country, which was used by Haghdoust et al. (2010) in their study titled "Education Ranking of Universities of Medical Sciences: Ranking Indexes Design" on performance assessment indexes. The model, which was used to rank all medical and paramedical schools of universities of medical sciences, included the following constituents: Education management, education development, governance, focus on the objectives of the country's comprehensive plan, and quality development[27]. They have been briefly introduced and their major dimensions and components have been compared in Table1.3.

Methods

Study Design and Data Collection

Differences in the type and characteristics of universities and the environment where universities are located, as well as priorities of higher education systems of countries have played a significant role in creating a variety of approaches to performance assessment of universities. It must be noted that the accountability of universities to governments and all stakeholders, globalization, which results in dynamism among university students and staff and international comparison of higher education systems, international competition among higher education institutes to create appealing multi-cultural cultural environments and university cooperation processes, and possible improvement and elimination of institutional weaknesses of universities are a few cases that need an appropriate management system of performance assessment that is compatible with the processes. Therefore, to assess the performance of schools of medicine,we should have explored and investigated various assessment methods in models and patterns, which included regular or routine assessments, which focus on investigating the quality of course subjects, academic programs or quality of performance of the educational institute[28]. the above said methods of assessment have been studied and analyzed in eight models of performance assessment of organizations (Table 1,1), ten models of education assessment (Table 1,2) and five models of education performance assessment of schools of medicine (Table 1,3). The present study's inclusion criteria were that they must have been based on one of the concepts of performance assessment and education assessment and in a university context, particularly in schools of medicine. Studies that had not been conducted in universities were excluded from the study and further references were taken into consideration that offered a model or pattern for performance assessment or education assessment of schools of medicine; studied all education stakeholders of schools, namely professors, students and

staff; and investigated the whole process of education from policy development to efficacy.

Findings:

The findings from assessment of performance assessment models of organizations indicate that as we get closer to new models, models and patterns become more complete and they constitute more aspects of the organization and its performance. The following concepts have entered into models and have been developed: continuous development, participation by stakeholders, Satisfaction of stakeholders, innovation, organizational strategies, monitoring processes, and flexibility. Performance assessment is considered an important and fundamental duty in facilitating education programs. It enables education directors to identify challenges and develop the grounds for their improvement by monitoring and supervising processes[29] For this reason, in performance assessment models from the Sink and Tuttle to the balanced scorecard have focused on monitoring processes and efficacy of measures. In the performance pyramid, EFQM and scorecard models, focus has been put on organizational strategies and visions as well as the importance of quality and its compatibility with the mission, and goals and expectations of stakeholders[30] . Satisfaction of stakeholders with performance prism, EFQM and balanced scorecard models has a high weight in organizational performance.

Without performance assessment based on key standards, it is impossible to have reform and continuous change on the path of development and to improve the quality of universities and the performance assessment system can result in an appropriate development of an organization[31]. The balanced scorecard model enables the appropriate development of an organization in all aspects through monitoring key standards relating to the aspects of stakeholders, processes, growth and learning. In addition, to have a superior and responsive higher education, we must have an appropriate performance assessment and today managers plan to create a balance between assessment of financial and operational performances.The balanced scorecard comprehensive view completes financial assessments with operational assessments related to customer satisfaction, internal processes, innovation activities and organizational improvement[32]. In the performance pyramid, EFQM and balanced scorecard models, values statements have been defined, which include vision, mission and goals that determine the organization's movement horizon. Intra- and extra-organizational processes in Keegan and Fitzgerald models and other studied models are assessed. Sink and Tuttle as well as Kegan assessment models have no indexes or relations among indexes have not been defined in them. However, in the balanced scorecard model, there are indexes and they are related to organizational strategic goals and can be tracked and improved constantly. Neely has focused on meeting the expectations of stakeholders in his performance prism model, similar to Scerion. In some models, such as EFQM, stakeholder satisfaction and indexes related to meeting the expectations and needs of stakeholders are among the main areas and are one of the major dimensions related to the performance of all organizations in the balanced scorecard.

Table 1.1. Comparing Organizations; Performance Assessment Models

Model / Component	Vision	Strategy	Efficacy	Efficiency	Process Cycle	Indexes	Indexes Relations	Innovation	Constant Improvement	Stakeholders
Sink and Tuttle Model			√	√				√		
Keegan Model			√	√				√	√	
Fitzgerald et al. Model			√	√		√		√	√	
Performance Pyramid Model	√	√	√	√		√				√
EFQM	√	√			√	√		√	√	√
Business Processes Model					√	√	√			
Performance Pyramid Model		√			√					√
Balanced Scorecard Model	√	√			√	√	√	√	√	√

In the assessment of various models and patterns of education assessment, the following findings have been achieved (Table 1.2). An educational assessment model must provide the necessary data and information for decision makers and determine its assessment criteria by specifying the general goal of the educational program[33]. Most educational assessment models fulfill this important task. However, all of them are result-based. In other words, they assess the results based on tests and performance. However, assessment must achieve a sort of value-based judgment that can be defended rather than merely make measurements and determine success of failure of the program in achieving goals[18]. A few of these models, such as CIRO and Kirkpatrick models, and thus Philips model, evaluate determining educational goals of the organization and the major goals of the education system as well as achieving the goals of the educational organization. In addition to assessing the realization of the goals, assessment provides basis to judge educational outcomes[22]. A few studied models, assess educational outcomes. An organization's educational assessment must create a significant relationship between improvement in processes and efficacy of education[16] and models like CIPO, Kirkpatrick and ISO 10015 establish such a relationship. As it is defined in all dictionaries, learning is the process of relatively permanent behavior change to acquire knowledge or skills through studying, experimenting or teaching. Therefore, assessment must also assess the whole process of education that results in behavior change. Kirkpatrick and Philips models assess behavior change in three levels and four models, including change in individuals in the organization or results that behavior change have on the society. In addition models such as CIRO, Scerion and

Kirkpatrick also assess the reaction of learners or satisfaction of stakeholders. Finally, since money or financial amounts are involved in education value and ROI must be calculated in educational activities and education system[21], Philips model assesses indexes related to financial values and covers the shortcomings of other models and patterns.

Table 1.2. Comparing Organizational Performance Assessment Models

Model / Component	Goal-Oriented	Indexes	Process-Centered	Results	Outcome	Learners Satisfaction	Behavior Change	Educational Efficacy	Effectof Organization
Tyler Model	√			√			√		
CIPO Model	√	√	√	√	√			√	
Scerion Model	√			√					
CIRO Model	√	√		√	√			√	
Kirkpatrick Model	√		√	√	√	√	√	√	
Philips Model	√		√	√	√	√	√	√	√
Liderman Model				√	√				√
ISO 10015			√	√	√		√	√	
Accreditation Model	√	√					√	√	√

The following findings (Table 1.3) were achieved from comparing various models and patterns of educational assessment of schools of medicine. In the investigated model relating to University of Alberta in Canada, policy development in schools of medicine, overall goals, resources and facilities, services provided for students, planning management as well as career promotion and counseling after education are evaluated and universities are assessed and even ranked based on these standards. However, because of the four-year medical education, it has a different structure and this can be compared with countries that have a similar structure. In this model, instead of dimensions, components and indexes, which are the characteristics of models and patterns, standards have been defined. Internal stakeholders have been dealt with but the effect of education on external stakeholders has not been assessed. Value and policy development statements in standards as well as

education process have been taken into consideration. However, the effect of education on society has not been taken into account. By ranking medical universities, the ACGME focuses mostly on determining and approving the competency of physicians and acquisition of medical qualifications after passing the general course of medicine, and thus distinguishes between good and poor physicians. It has used the results of assessment based on the above model to protect people against poorly-educated physicians and also to select talented and capable general practitioners based on assessment results and to introduce them for specialized training. This model only focuses on the process of education, effect of society and ranking and other characteristics including dimensions and indexes have been neglected. Meanwhile, only students from among the stakeholders of schools of medicine are assessed[24]. The model proposed by the WFME assesses policy development, goals and missions of schools of medicine, the whole process of medical education, medical education stakeholders, including students, faculty members and staff, facilities and resources, as well as continuous promotion and management. However, as it was mentioned, the standards do not deal with the contents, quantity and determining the indexes. The effect of education on society is not discussed in this model. Meanwhile, in all the three models, the economic efficiency of medical education is not part of the constituents of the models[2] .

In the studies of national assessments in Iran, most studies and documents have been related to assessment methods and no models have been introduced. The two models discussed above have had the following findings: In the model used by the Supreme Council of Cultural Revolution, considering the mission of universities, higher education assessment indexes have been developed in various education, research, student, cultural, credits and facilities dimensions. Therefore, it covers almost all the duties of universities and higher education assessment indexes are included in it. The important point distinguishing it from other models is its focus on financial indexes and credits. The indexes include university stakeholders, namely faculty members, students and staff. However, external stakeholders have not been taken into consideration. The indexes are mostly structural, such as the number of books written and translated, the number of faculty members, etc. Process and outcome indexes, including number of promoted students, level of student satisfaction, etc. have been less examined. The dimension of indexes is mostly of the type efficiency (number of held classes) to efficacy (working graduates), etc. Since the model is old, there are no assessment indexes of information technology and novel educational methods, such as replication. The model is related to universities and higher education centers and is not specific to physicians. The next model is the model of educational ranking of faculties, which has been developed to rank universities of medical sciences and includes five dimensions of governance, educational management transparency, educational performance, university development indexes, and movement towards fulfillment of the goals of the country's scientific comprehensive plan. Similar to the previous model, it pays more attention to structural indexes compared to outcome and processes indexes. It is not related to universities of medical sciences and is not specific to medical education.There are internal stakeholders in the model. However, there are no external stakeholders and financial efficiency is included in assessment indexes. (table1.3)

Table 1.3. Comparing Models to Evaluate Educational Assessment in Universities of Medical Sciences

Model/ Component	Value Statements	Educational Standards	Dimensions	Components	Index			Stakeholders		Effect on Society	Return of Investment	Ranking
					Structural	Process	Outcome	Internal	External			
Canadian University of Alberta Model	√	√			√	√		√				√
ACGME				√				√		√		
WFME	√	√	√	√				√				√
Higher Education Assessment Model	√		√	√	√	√		√				
University Education Ranking Model	√		√	√	√	√		√			√	√

Discussion:

Although assessment is an integral and fundamental part of the responsibilities of any university, particularly universities of medical sciences, which are responsible for coordinating, planning and implementing medical and paramedical education and wide spectrum of medical and healthcare services in the country, there are limited models or patterns for education assessment of schools of medicine. In most cases, because of the difference in medical education programs in various countries, they can hardly be compared with each other. Some countries, including the United States and Canada, absorb graduates in basic sciences and teach them physiopathology and clinical skills in four-year higher education programs, while some countries, including India, have shorter education programs and plan skill trainings for specialized programs after general medicine. Most assessment systems in universities, including schools of medicine, in various countries are either of the type of educational assessments or of the models and patterns of performance assessment of other manufacturing and service organizations. As medical education systems are different from one country to another, from one region in a country to another region in that country, or even from one school of medicine to another school of medicine[34], there are various models and patterns for assessment in any system. The reform of process in teaching, learning and assessment in general medical and higher education courses dates back to the nineteenth century and is the result of systematic reforms

of response to social demands[2]. It is obvious that the approval of the various competencies or accreditations reported by the WFME, Royal College of Physicians and Surgeons of Canada, UK General Medical Council (UK GMC) and ACGME are a reflection of ever-changing standards in medical education. The process of accreditation helps to assess, improve and identify programs by adhering to specific educational standards. Therefore, to coordinate assessment of education performance in schools of medicine or to compare schools based on accreditation assessment, we must seek to standardize medical education[34].

The model proposed by the WFME is accepted by all schools of medicine worldwide and needs to be localized in various countries. For example, universities of medical sciences in Africa have an undeveloped assessment culture and accreditation is a strategy to reduce danger. Not only is it not a goal, but also it looks more like a biopsy sample that provides the grounds for the diagnosis of the status quo. Schools of medicine in Latin America focus on institutional standards of medical education by WFME and WHO. However, in Europe, there are 442 schools of medicine whose education programs are approved by national institutes. Schools of medicine in 25 Western Europe countries must be compatible with the standards of the European Union, while these standards are not implemented in eastern Europe. Meanwhile, in 22 countries in east Mediterranean region and more than 210 schools of medicine are traditionally using instructions and assessments based on British, American, French and Italian models. Eleven countries in Southeast Asia, which account for one fourth of the world population, have around 261 schools of medicine, among whom India uses the WFME medical education standards. The rest of the countries use various local standards. The western region of the Pacific Ocean has 371 schools of medicine. In Australia and New Zealand, medical education is based on WFME instructions proposed by the Australian Medical Council (AMC)[35] .

In fact, this model has determined components but no indexes for the main dimensions, as a global set of medical education standards must not be equal to a comprehensive educational program and it should cover only the general aspects of schools of medicine and medical education. Acceptance of standards must be important for any society, country or region and standards must be developed in such a way as to recognize national and regional differences in the educational program and allow design and development by every school of medicine through respecting the logical independence of schools of medicine. Therefore, the following suggestions have been provided: - Standards should be developed through negotiation and agreement by the international community. – The value of standards should be tested in assessment studies in every region in the world. – Standards should be clearly defined and should be meaningful, appropriate, relevant, measurable, accessible and acceptable by users and standard should be prepared with the cooperation of stakeholders[34]. In Iran too, the proposed models are too old and related to all higher education centers. They are not specific to schools of medicine. Meanwhile, they focus more on general and structural indexes. In these models, professors and students are considered as the main stakeholders and other stakeholders as well as the stages of education process are not taken into consideration.

Conclusion:

Therefore, the above study revealed to the authors that one cannot suffice to performance assessment models, educational assessment models or even medical education assessment models to compare medical education assessment models with one another, as each group of these models have their own pros and cons and only an eclectic mixture of these models can encompass all the aspects of medical education performance. In addition, it is necessary for assessments to be made based on international educational standards that have become localized and standardized. A combination of the Balanced Scorecard

Performance Assessment Model, the Philips Educational Assessment Model, and the WFME Medical Education Assessment Model are recommended as a model for evaluating medical school educational performance.Medical schools by using this proposed hybrid model can measuretheir performance accurately and they can also compare their performance with other universities objectively.

In general, the results and the suggestions of the present study include the following:

Medical education stakeholders include a large group of students, professors, university staff and representatives of the society. Therefore, in the selected model, stakeholders should be one of the main dimensions of the assessment model. Thus, the balanced scorecard model is suggested. Paying attention to customers / citizens / stakeholders is one of the major advantages of this model[36].

Medical education has theoretical and applied education, which is administered in various educational environments, including faculties, hospitals, pharmaceutical centers, research centers, etc. Therefore, the assessment model should have comprehensive indexes that assess all the above said issues. On this basis, the WFME model is suggested.

Changing an ordinary person in the society to a competent physician, who manages people's births to deaths, is a great responsibility that obliges policymakers in medical education to use models for performance assessment so that they would ensure changes in the behavior and performance of physicians in the society. On this basis, the Kirkpatrick model is suggested.

As other organizations, universities should be assessed in all fundamental aspects, namely working processes, growth and learning, stakeholders and finances, so that they would move towards the expected conditions by eliminating shortcomings and weaknesses and reforming and promoting performance indexes. This way, they can achieve their main mission, which is medical education. On this basis, the balanced scorecard is suggested. Developing an integrative system of goals and indexes and improving organizational performance are among the advantages of this model that fulfill the above goal[36].

The process of medical education should be constantly assessed and upgraded from providing the appropriate grounds for education to changing the behavior and capability to solve problems and making decisions on the treatment of patients. Therefore, the Kirkpatrick model should be used.

Universities in the third millennium have also the role of income generating agencies[36]. Therefore, in the policies and educational planning of schools of medicine, this should also be taken into consideration so that education performance evaluators also take into account the financial element and income and cost management in schools of medicine. One of the main advantages of using the balanced scorecard model is its emphasis on / mixing financial and non-financial performance indexes[36].

The goal of universities in the third millennium is to facilitate commercialization of technical knowledge of medicine with other professions and careers. Medical education in universities should be based on this goal to not only identify the future needs of manufacturing, industrial and service centers but also make the knowledge and skills of the medical group compatible with these market needs[37]. Therefore, in medical education, the educational performance assessment of schools of medicine should take this important point into consideration. Thus, the balanced scorecard model, which takes into account economic / financial results, and Philips mode, which takes economic efficiency into account, are suggested[21, 36] .

Kirkpatrick, balances scorecard and WFME models focus on performance measurement indexes (PMI), based on which one can constantly monitor medical education performance.

Most studies on educational performance assessment of schools of medicine directly focus on medical education and they do not use the views of experts in education management, whose major expertise is in

educational assessment and evaluation of educational organizations' performance. It must be noted that they are one of the most reliable information sources.

Achieving cooperation between various departments, teams, regions and sections of an organization and even facilitating the comparison of organizational performance among various organizations are among the advantages of using the balanced scorecard model. It can also be effective in various educational environments and for various educational stakeholders in medical education performance assessment[36] .

In the studies of the medical group in clinical educations, only clinical faculty members have been used and in the studies of the medical group in theoretical courses, only theoretical instructors and clinical medical specialists have been used. Other specialists that are not physicians and do not work in clinical environments have not been used, including social physicians or family doctors whose specialties are related to an extensive part of stakeholders, namely the society, and the performance of physicians directly affect them. It is suggested that this group should also be surveyed in performance assessment.

Assessment has been made on this basis only in some studies on the application of such concepts as artificial intelligence, replication and human-centered characteristics of technology, cloud computing and social media in medical sciences education and assessment.

However, the emergence of the new industrial revolution in 2016 resulted in the introduction of these concepts to medical education. They should be assessed to see if they should be included in the suggested eclectic model.

Considering the structure of Iran's medical education and environmental characteristics and its geographical diseases, medical education is suggested to be standardized and localized. In addition, the effects of medical education on the society and its health should be included in the assessment criteria.

Competing Interests

The authors do not review any competitive assessment with private or non-governmental universities.

Authors' Contributions

F.S. was involved in the study design, gathering the Data, analyzing the data, and drafting the manuscript.A.K. &H.M.&L.A.revised the manuscript and data.The manuscript was translated by F.R. in English.All authors shave read and approved the final manuscript.

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