Abstract- The quality assurance has become an important activity in the organizations. One major aspect of the quality is the improvement of the systems. This paper introduces the Model for Improvement which provides a framework for quality improvements and discusses its application in the context of higher-education programs.

Index Terms- Model For improvement, quality assurance, higher-education, academic accreditation.

I. INTRODUCTION

The quality assurance has received big attention in the education context in general and especially in higher-education contexts. The ministry of education in Saudi Arabia has encouraged the academic accreditation by creating the National Commission for Academic Accreditation & Assessment (NCAAA) [1] that defines a general framework for the quality assurance of postsecondary institutions and the programs they offer. The ministry has been also fostering the international academic accreditation as a way to insure a wide recognition of the national quality standards and to overcome the lack of specific quality criteria for specialized fields like the Accreditation Board for Engineering and Technology (ABET) [2] Computing Accreditation Commission (CAC) criteria for computing programs and the Accreditation Council for Pharmacy Education (ACPE) [3] criteria for pharmacy programs.

The accreditation frameworks insure that the fundamental practices, procedures, and resources are available and well established in a given accredited entity to produce qualified outputs. However, these frameworks do not give clear methods and practices for the continuous improvement cycle that should be followed. The accreditation organization let the accredited entity choose the right continuous improvement process according to their needs.

On the other hand, the Model for Improvement [4] has proving its power to maintain good improvements in several fields. This paper tries to define a clear roadmap to use the Model for Improvement in the higher-education context with the respect of the general accreditation criteria of postsecondary programs.

The paper is organized as follow: next section will introduce the Model for Improvement, section III shows how to use the model in the context of higher-education programs, and section IV will conclude the paper.

II. THE MODEL FOR IMPROVEMENT

The Model for Improvement is introduced in [4] and provides a framework for the improvement activity to achieve better outcomes of the organizations. The model is based on three fundamental questions:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What changes can we make that will result in improvement?

The first step while performing an improvement is to clearly answer the above questions. The answers draw a view of the predicted future, how to know that is better than the current status of the organization, and the detailed actions to be performed to reach goals. Once these points are specified, the quality team starts the application of the actions using a quality cycle. The authors of the Model for Improvement recommend the use of the Plan - Do - Study - Act Cycle [5] for that purpose (see Error! Reference source not found.).

The answer of the first question of the model defines the aims of the organization. The answer of the second question results in the definition of a set of performance indicators to measure the achievement of the changes in order to show whether the change results are improvements or no, and in case of improvement to show its quality and its quantity. The performance indicators measure the impact of any change in the system and give a clear view of the current situation. The answer of the third question requires a brainstorming that leads to develop efficient changes that would probably improve the current reality. Note that the model for improvement focuses on the importance of the change. A change is a key of any improvement. A good choice of a change leads to a good improvement and a bad change may lead to a disaster.

The authors of the model recommend the implementation of the changes step by step until reaching the aims defined in the answer of the first
question. Error! Reference source not found. shows an example of application of the quality cycle over time; the first cycle is to test the change in a small scale, the second is to implement the change in order to be a part of how things are done day-to-day, and the first step is to spread the change in a large scale so that it affects the whole system.

Each cycle is composed of four phases: Plan, Do, Study, and Act. The plan phase defines an objective to be achieved toward the aim, figures out the questions that should be answered, predicts the results (why?), and plans a way to answer the questions (who, what, where, when). The Do phase is for carrying out the plan and observing it (document problems and unexpected situations). The Study phase summarizes what was learned which includes the analysis of the data and the comparison with the predictions. The Act phase is to describe the satisfaction of the cycle and to decide whether a next cycle is required.

**III. THE APPLICATION OF THE MODEL FOR IMPROVEMENT IN THE HIGHER-EDUCATION PROGRAMS**

This section discusses the application of the Model for Improvement in the context of higher-education programs. There are several situations where we can apply the model. In this section we will analyze how to reach a strategic planning goal and how to improve a study plan. For each of these two goals, we will answer the questions of the models and give a roadmap to apply the Plan-Do-Study-Act cycle.

**A. The model for improvement in the strategic planning**

A common strategic plan is composed by a long-term vision, a short-term mission (about 5 years), and a set of goals. In order to apply the model for improvement, the strategic planning committee should answer the questions of the model:

What are we trying to accomplish? For a given strategic goal, the answer of this question determines the strategies and initiatives that should be done in order to reach the goal.

How will we know that a change is an improvement? For each strategy defined in the previous answer, the committee will provide a set of performance indicators used to measure the achievement of each strategy and the impact of any change in the current system.

What changes can we make that will result in improvement? The answer of this question will specify for each strategy a set of changes needed to perform a strategy.

Error! Reference source not found. summarizes the structure of the strategic plan after the application of the model for improvement.

Since the strategic plan will result on a big number of changes, the stakeholders of the changes could be overlapped, the required time of the changes could be different, and the resources are limited, the strategic planning team should organize these changes in order to realize them in an optimized and fast way using few resources. For that purpose, the team is called to apply the quality cycle several times for each strategic goal as follow:
Cycle 1: test the changes in a small scale. For example, the university could choose only one college in order to test a given change, the college could choose one program, and the department could choose one course.

Cycle 2: if the test results were good, the second cycle will implement the change in that small scale. This will include the change in the day-to-day procedures which leads to the addition or the update of human resources, processes, forms, dates, etc.

Cycle 3: spread the change to affect the whole organization. This means to spread the change to all the colleges for the university-level strategic plan and all the courses for a departmental strategic goal that affects the courses.

**B. The model for improvement to improve a study plan**

The improvement of the study plan is one of the most important and recurrent task in a higher-education program. The sciences are developing very fast, the industry sectors are growing and following these developments and the academic study plan must be up to date in order to feed the labor market with the suitable and outstanding human resources ready to contribute as soon as they are hired. For that purpose, the study plan must be improved continuously with a rigorous process to reflect the needs of the society. The answers of the questions required by the model for improvement could be as follow:

What are we trying to accomplish? Make the study plan up to date with the developments of the corresponding science. It must prepare the students to be ready for the labor market needs.

How will we know that a change is an improvement? A good study plan could be measured based on its outcome and on the quality of the process used during the improvement. Representative performance indicators are: the percentage of students who get employed after 6 months of their graduation and the number of society entities that contributed in the improvement of the study plan.

What changes can we make that will result in improvement? The study plan could be improved by adding new pertinent courses, removing obsolete ones, and updating good courses. These tasks should be done after reviewing the study plan by all the stakeholders.

The improvement cycles could be defined as follow:

Cycle 1: create a links with representatives from the community and create a review panel. They include consultants from the academic and the industrial sectors especially those who hire the students of the actual program and who's the department seeks to be in relation with them.

Cycle 2: conduct periodic review of the study plan using the review panel created by the previous cycle. At the end of each review, analyze the comments of the review panel and deduce the recommendations to update the study plan.

Cycle 3: implement the changes on the study plan in small scale during one academic term, observe the result and decide whether to spread the changes or no.

Cycle 4: approve the changes and spread them for the whole courses.

Cycle 5: In order to measure the impact of the changes, a feedback from the employers should be collected. This task require the creation of a database of Alumni, contact them after two or three months of their graduation, collect the names of their employers, define an employer survey, contact the employers, and ask them to answer the survey.

Cycle 6: analyze the survey results, deduce the recommendations, and decide whether to keep the current study plan until the next review by the consultants or change it accordingly.

The cycles 2-6 should be repeated continuously in order to keep the study plan up to date. The cycle 1 should be repeated also but less frequently. Note that the changes should be analyzed based on the target stakeholders also. For example, the database of the alumni should include more details required by other changes and other cycles. While contacting the Alumni for example, other changes might require additional information. In this case, the information required by each stakeholder should be combined and the intervention dates should be organized in order to make the contact with the alumni more efficient.

**CONCLUSION**

This paper introduced the model for improvement which is considered as an efficient, robust, and flexible model to conduct any improvement whatever the field. Then, we have shown how to use the model in the context of higher-education. We have demonstrated the use of the model with two major examples that are recurrent in the quality improvement process.

Several works remains in this context. First, the effectiveness of the model should be proved by its application in the reality. Second, the application of the model as a vehicle of the total quality assurance process should be studied. For examples how the model should react when the improvement cycles overlap or conflict on one or more parameters (time, target, stakeholders, and resources)?

**REFERENCES**