PROGRAM ASSESSMENT AND IMPROVEMENT: A CASE STUDY OF NEWLY ESTABLISHED ENGINEERING PROGRAMS

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ABSTRACT

The rapid development of science in the twenty-first century has increased the demand for highly educated professionals. This requirement has led to the creation of a large number of new universities, institutes and professional training centres. In order to match the quality of resources demand with programs offered at these universities must be monitored. Assessing the quality of any university program is a complex process that is attributed to numerous key indicators and standards. The assessment of higher education outcomes focuses on students' progress in learning, skills and attitudes. This research aims to evaluate the effectiveness of teaching and curriculum for new engineering programs. A qualitative survey has been conducted among the students of various engineering disciplines. The relative average is computed among feedback to base solid reasoning. It is observed that the mostly student are satisfied with the teaching performances of the faculty members of general courses and core engineering program courses. The analysis shows that the average accomplishment rate of all selected factors is around 80%. It is also observed that the students are satisfied with the overall program performance with an average accomplishment rate of all selected factors above 70% that is in-line with college and university strategic benchmarks. It is also very critical to evaluate the programs and teaching quality at certain periodic basis which is linked with the university strategic
plan. For this case study for newly developed programs, it’s the right time to assess the program competence and efficacy to meet market demand.

**Key words:** Program Evaluation, Program Assessment, Engineering Program, Teaching Quality.

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1. **INTRODUCTION**

The rapid development of science in the 21st century has increased the need for highly skilled professionals, which has led to the creation of a large number of new universities. Higher Education is considered as one of the most important institutions for the formation of a professional human labour force leading to the economic, social, political and cultural development of a country [1]. It is universally recognized that the quality of teaching is the most critical factor affecting student achievement. Millions of dollars are invested each year in teacher education to improve the quality of teaching. In addition, professional development programs often lack clear and direct links to classroom practice. Improving education remains a central policy goal, widely seen as crucial to improving student performance [2]. It is reported that a significant portion of students takes their decision to study in high-quality teaching university, but find it difficult to access this information [3].

Teacher quality has a significant effect on learning outcomes. The early career experience greatly increases the effectiveness of the teacher. In addition, more experienced teachers increase the learning process of students [4]. It has been reported that professional development activities reinforce the identification of teachers in teaching and the processes leading to this transformation are unclear [5]. Institutional leadership and personal motivation of teachers could greatly affect the translation of their beliefs into actual pedagogical rules [6]. Most students value good personality behaviours, teachers' response to student questions, human nature, personal experience in education, and the explanatory skills of teachers in providing scientific information [9]. Therefore, attention to the quality of higher education is needed to maximize the potential of human resources, available materials and financial resources, and to coordinate between the development of an education system and its effectiveness [10].

Quality control surveys are a valuable tool in quality management, but the most important factors are the actions that are triggered by stakeholders to improve teaching. This creates a cycle of quality management of teaching that enables the university to continuously improve the quality of teaching [7]. The second step is to develop an action plan to improve the quality of teaching. The next step is the implementation of improvements, and in the end, feedback is needed on the measures taken to improve the quality of education for all participants in the education process. The evaluation of the learning outcomes for the students has an impression of motivation for better performance, the observed shortcomings represent development opportunities. The quality of university education is influenced by the quality of the evaluation of learning outcomes. Assessment of educational outcomes compares and assesses the level of knowledge and skills acquired towards established standards. Standards are developed based on practical needs regarding the content in the field and the personal development of the student through the influence of the educational process [8]. Figure 1 shows the learning evaluation levels.
It is crucial to know if the goals for teaching activities have been achieved or not: If so, to what extent are they affected to develop the activities to compensate for the disadvantages and improve them. Evaluation is a complex process that gains a certain value according to certain criteria and standards. The assessment of higher education outcomes focuses on students' progress in learning, skills and attitudes. Education programs in any institution can provide insight into the education results. In fact, the development of the program can be defined as planning, implementation, evaluation of programs and reorganization taking into accounts the results of these evaluations. Evaluations of teaching and learning are interdependent [11]. The evaluation systematically examines the characteristics and benefits of the programs and can be implemented in all phases of a program. The purpose of the evaluation is to provide information about the effectiveness of the programs to optimize results, quality and efficiency [13]. Many pedagogical researchers and program developers have limited knowledge of formative assessment, and formative data can be underused during the development and implementation of an education program [12]. Self-assessment is required for higher education institutions [14]. Senior executives' willingness to evaluate is crucial. Prerequisites are governance, planning, transparency and cultural understanding. The evaluation must be clear, open and accountable [15].

The goal of education is the process of behavioural change. On the other hand, the evaluation process is revealing whether the expected results are achieved or not, according to the criteria in the program proposal. Hence, this research is an attempt to such evaluation of teaching and program for newly developed engineering programs. This will help the stakeholder to revisit the teaching strategies and programs to fit in the increasing demands of professional engineers in the industry.
2. RESEARCH PROBLEM

The quality of education has become important as the scenery of higher education is facing persistent changes. Choosing a reliable and quantifiable indicator for assessing the quality of teaching and the effectiveness of teaching initiatives remains demanding. This research aims to evaluate the effectiveness of teaching and curriculum for new engineering programs. It also aims to collect student-centred ideas and suggestions that may be considered in the first review of the program to meet the challenges of the local and international market.

It is crucial to know if the goals for teaching activities have been achieved or not; if this is the case, how far have they been reached to expand the activities, compensate for the disadvantages and improves them more effectively as further improvement processes in the programs can be designed accordingly. This research will help stakeholders to improve technical programs to meet the needs and goals of programs and students.

3. RESEARCH METHODOLOGY

An extensive literature review has been conducted to identify the factors normally measured to assess the quality of teaching and program assessments. The selected contributing factors are then transformed into a set of questions to acquire feedback on teaching and program evaluation of newly developed engineering programs from the students. An online questionnaire was designed that focused on two aspects (1) core courses that are offered and (2) overall program competence. The data has been analyzed using the average mean score of each factor and final ranks are made.

3.1. Data Collection and Analysis

The set of the questionnaire has been sent to current and alumni of the newly developed engineering programs. The questionnaire is categorized into two sections. The first section assesses teaching qualities of general courses and programs specific courses. The second section focuses on the assessment of overall program competence. Overall, 100 responses were collected out of which one was discarded due to incomplete data. The response rate of 65% was achieved from students including both currently enrolled students and alumni of these newly developed engineering programs. The data set was analyzed in Microsoft Excel to calculate their average mean scores and rank portfolios are made accordingly.

4. RESULTS AND DISCUSSIONS

In the teaching quality section, questions were developed to determine the qualifications, skills and materials used by instructors of both general and core courses. Figure 2 shows the complete scenario for this section.

It is observed that the students are quite satisfied with the teaching performances of the faculty members of general courses and core engineering programs. It is analyzed that an average accomplishment rate of all selected factors is around 80% which is very good and adequate for the students, faculty members, newly developed programs and university but as there is always a room for improvement so the college needs to improve low rated factors as the program’s competency can be increased.
In the program assessment section, questions were developed to determine the management, analytical and design issues to highlight the deficient areas of the programs. Figure 3 shows the complete scenario for this section.
It is also observed that the students are fairly satisfied with the overall program performance. It is analyzed that an average accomplishment rate of all selected factors is around 70%, which is quite satisfactory for the faculty members, newly developed programs, and university but as there is always a room for improvement to the college needs to improve low rated factors as the program’s competency can be improved. There are two major areas, which are given low score including lacking programs in practical knowledge and contribution of more laboratory work in the subjects to enhance student’s skills in solving
real-time tangible problems of the industry. The possible causes to these two low ranking factors are the new development of the programs as it takes time to make proper arrangements for all equipment’s in the laboratory and faculty members to get know-how with the new working environment. Both factors are very important and these can be improved designing and implementing a proper remedial plan to these problems.

5. CONCLUSION AND RECOMMENDATIONS
This research focuses on finding the teaching and program assessment of two newly developed academic programs in the engineering field. Alumni and current students were taken into consideration, as they are the best evaluators for finding the teaching quality and program assessment. Teaching quality of the new program was highly regarded and commended by students, as it is directly dependent on qualification and teaching skills of faculty members. Thus, it is suggested that university-level teacher should have professional teaching certificates which endorse teacher competence. Program quality is also highly commended by alumni. The student’s feedback is extremely important as they are current market works force. Students recommended including more practical oriented approaches and handing on the task in the programs. It is highly endorsed that each program should always be aligned with university strategic plan and the programs should be assessed after four to five years to ensure that, new students meet the market requirement and recommendation made by alumni’s and employers are incorporated in the plan.

STUDY LIMITATION
The case study location and programs are kept secret to ensure academic ethics and privacy policy. The study is conducted in the Middle East country. The authors can share these details if it is required by the publication agency.

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