

# Institutional Assessment Plans and Rubrics for Establishing Graduate Engineering Programs: A Practical Example

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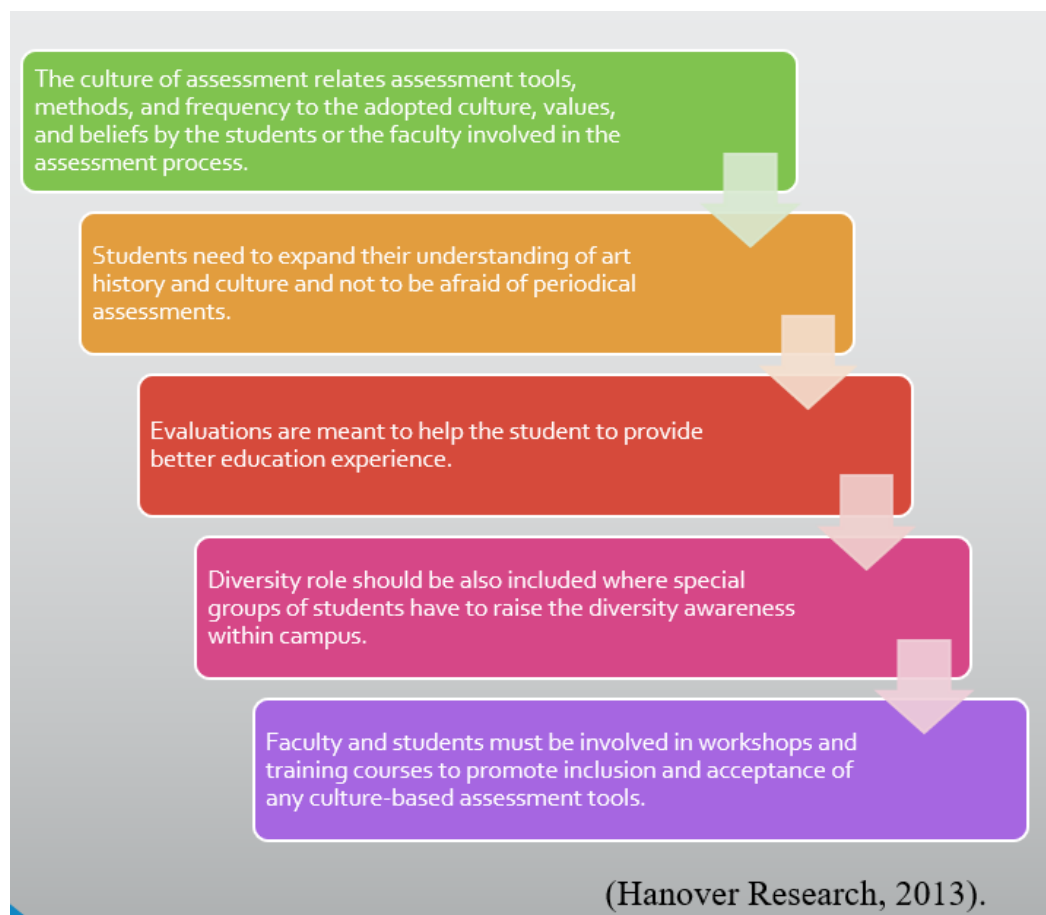
## **Abstract**

*Institutional assessment plans are designed to provide a better education experience through investigating activities, abilities, and other indicators to check student's success and methods validity. However, effective cultural characteristics require good engagement and open communication. Here, we show a practical example of the application of the various assessment techniques to improve the student's performance and establish new graduate engineering programs in higher institutions. Rubrics must be designed to assess faculty members in the university as well as the program curriculum. Faculty should be qualified for teaching graduate-level with decent technical skills for curriculum development to initiate intended graduate programs. Gathering information about each rubric criterion from the university should be considered via evaluating campus culture, faculty attitudes, funding, and technology infrastructure. These criteria must be assessed from either the university websites, assessment reports, or long-term assessment goals as a guideline. Using the provided 'VALUE Institute Template' would greatly help in refining the assessment; critical thinking ability prepares undergraduate students for graduate studies. The proposed assessment plan will cover the following domains: diversity, course satisfaction, admission and advising, academic writing/support, curriculum change, and knowledge availability to understand the students' motivation towards learning. Moreover, effective teaching, good delivery, syllabus formatting, and classroom interactions are all some of the general aspects that can be evaluated. Data collection can be done through distributed questionnaires and/or face-to-face interviews where program directors shall take the lead in this initiative. Implementing the outcomes assessment in the institution will help in improving the student's performance and keep the educational programs up to date. The opportunity of having an MS program in the engineering department (to be implemented in the future) would not be possible without maintaining the continuous evaluation and analysis of the assessment tools for the university to become a world-class university.*

**Keywords:** Institutional assessment; evaluation; higher education; student performance; graduate program

### 1. Introduction

The culture of assessment can be defined as the understood concepts and methods of assessments widely known by the faculty and staff with shared beliefs to have continuous improvement. The culture of assessment and campus culture can impact on the student's performance and/or the overall assessment process. In universities, there should be open communication and faculty involvement in the improvement process by making everyone feel that they have ownership of the adopted experimentation and assessment methods to have successful inclusion of all the different parties [1]. Evaluations are meant to help the student to provide a better education experience. Diversity role should be also included where special groups of students must raise diversity awareness within the campus. Faculty and students must be involved in workshops and training courses to promote inclusion and acceptance of any culture-based assessment tools (Figure 1) [2]. Activities, abilities, and other indicators should be investigated to check their impact on the success of the students and check the validity of the assessment tools. Effective cultural characteristics regarding the assessment in the institution involve good engagement and open communication between faculty, administration, and students. For example, in the medical school at King Abdulaziz University (KAU), twenty-four faculty and 142 students from the 4<sup>th</sup> and 5<sup>th</sup> clinical years participated voluntarily to overcome possible cultural challenges the may hinder the evaluation process through focus group discussions (FGD) and questionnaires. The culture of assessment has been developed



**Figure 1.** Development of Adopted Methods for Culture of Assessment.

by having open communication between faculty and students; hence, giving the chance to understand the students' needs, culture differences, and apply the appropriate assessment methods. The other cultural characteristic regarding assessment that might have been ineffective includes the need to understand that students may experience mental anxiety from unbalancing study load and training due to the gap between learning theories and assessment practices. This may be perceived from the false perception that 'learning is teacher-centered' according to the past learning and assessment experiences. Thus, the ineffective cultural characteristic may be regarded as wrong perceptions about learning and how assessment should take place [3]. Possible plans should take into consideration that learning must be student-centered for a better culture of assessment in the institution and at the classroom levels. Students need to expand their horizon and their understanding of knowledge and culture and not to be afraid of periodical assessments since evaluations are meant to help the student to provide a better education experience. Here, we show a practical example of the application of the various assessment techniques to improve the student's performance and establish new graduate engineering programs in KAU-Rabigh.

## 2. Mission and Vision Statements

The mission and vision statements considered for the institutional assessment in KAU are as the following:

**Mission:** Improve students' discipline-specific knowledge, skills and learning abilities, and other problem-solving and communication skills as well as the faculty staff capabilities and program curriculum via utilization of various assessment rubrics and tools to evaluate the progress towards establishing graduate programs and/or the possibility of having an MS program in the engineering department. **Vision:** The university administrators should seek their faculty progress in teaching, knowledge delivery, and development to become more knowledgeable about the current situation of the faculty (and curriculum) and whether it is possible to initiate the MS program or not; by doing so, having faculty with acquired skills and qualified for curriculum development and teaching graduate-level courses must be the adopted vision for initiating such graduate programs and becoming a world-class university with clear educational-oriented goals and better students learning opportunities.

## 3. Culture of Assessment Plan Outline

Gathering information about each rubric criterion from the university will be considered as the following: (1) campus assessment culture from looking at the university annual assessment reports, checking the diversity, and identifying the shared values and beliefs; (2) faculty attitude towards assessment from understanding faculty/student interactions and possible engagement and open communications reported in the report; (3) administrator attitude towards assessment from the leadership approach; (4) perceived value of assessment from interviewing students, faculty, and understanding their thoughts about the assessment process; (5) respect towards assessment as a method of improving teaching and learning from relating how respectful are the students as mentioned in the reports and how cooperative are they with the faculty to implement the assessment plan; (6) time commitments to assessment from checking on the given timeline for the assessment process and whether the plan is carried annually or semi-annually with a quality time; (7) staffing for assessment from checking on the hidden values of the hired staff and how they are treated

by university leaders; (8) funding for assessment from contacting the university student affairs centers and checking for possible grants and funds devoted for the assessment process; (9) infrastructure (technology) for assessment from identifying the assessment tools and technological equipment utilized to effectively improve assessment; as shown in Table 1.

**Table 1.** Common Criteria of Assessment Culture Rubric Utilized in Information Gathering.

Criteria	Likert Scale			
1. campus culture,	1 Attitudes, beliefs, and knowledge are not shared.	2 Slightly common knowledge.	3 Students feel to be involved.	4 Greatly enhanced diversity and shared knowledge.
2. faculty attitude,	1 Negative attitudes towards students.	2 Few engagements with leaders.	3 Better interactions and open communication.	4 Open communication/good engagement with the students and leaders.
3. administrator attitude,	1 Unapproachable.	2 Top-down leadership	3 Feeling the importance of faculty.	4 Giving the complete chance for everyone to talk freely!
4. perceived value of assessment,	1 Students feel overwhelmed.	2 Faculty explain the reasons.	3 Administrators/ faculty give awareness.	4 Everyone becomes very engaged in the assessing process.
5. respect towards assessment as a method of improving teaching and learning,	1 Less respected assessment shows careless management.	2 Unrelated improvement might be confusing.	3 Faculty becomes responsible for teaching.	4 Complete understating of testing and improvement.
6. time commitments to assessment,	1 Very poor results.	2 Better analysis.	3 Improved quality of testing.	4 Students will have a developed education from the better analysis.
7. staffing for assessment,	1 Non meet personnel needs.	2 Become part of the staff.	3 Leaders have crew for tests.	4 Students evaluated progressively.

8. funding for assessment, and	1 Unproductive analysis from short funding.	2 Faculty becomes motivated.	3 Enhanced assessments from funding.	4 Excess funding ensures workability of assessment tools.
9. infrastructure (technology) for assessment, etc.	1 Quite bad evaluations from poor time quality.	2 Leaders will think about technology.	3 Faculty/leaders become more excited.	4 Students will be tested in short times with quick analysis.

Each of the nine items discussed will be evaluated according to the gathered information to support our assessment plan rubric. Thus, each of these criteria will be assessed from either the school websites, assessment reports, or long-term assessment goals as a guideline for us to relate our findings to previous analysis. FGD and other qualitative data gathered from engaging faculty with students will be considered. Also, other quantitative data that were gathered for the assessment based on the analysis of distributed questionnaires from previous studies will be another way to compare our data with. Previously made surveys and/or performed interviews will be taken into account for data gathering and comparison purposes. Some university people (administrators and faculty) might be contacted to gather data about the student’s performance, campus diversity, shared values, faculty interactions, and other areas which will help us to answer some of the selected questions that would lead into filling up the rubric with the best outcomes for better assessment plan. Each of the criteria will be measured according to the collected data, available reports, and possible findings related to that point; then reported in the rubric accordingly from less important (1) to a highly recommended criterion (4).

**4. Student Assessment Tools**

It is critical to include different aspects of the assessment plan of the institution from the following: assessment of faculty delivery and knowledge; assessment of students’ performance and understanding; and assessment of current engineering programs and the possibility to extend our plans to include MS degree in engineering. Application of “The American Association of College and University (AAC&U)” rubrics by university leaders using the provided ‘VALUE Institute Template’ would greatly help in refining the assessment process. The rubrics should be designed to assess the critical thinking value for undergraduate students in higher education institutions to make them prepared for such possible graduate studies [4]. Diversity plays a key role in determining the students’ education and that less diverse classrooms and/or campus will hinder our goals to deliver good education quality to our students (Mohamad Karkouti, 2016). Also, curriculum change and reform will be the second priority that will be assessed periodically to allow our leaders to investigate the importance of the taught subjects, materials, and their relation to the possibility to extend our plans and establish graduate engineering programs [6]. The third priority will be knowledge availability and easy accessibility of information. Students should be able to find any required information and/or new findings for their intended study using the internet [7].

The need for such effective rubrics to evaluate the student's abilities and motivate them to explore possible issues and problems exist on-campus is very critical. Students in the institution (KAU-Rabigh) are usually good communicators and volunteers and open for discussions with faculty and administrators to improve the overall assessment tools in the institution. However, there are still many aspects need to be addressed like critical thinking and abilities to identify current problems for the present students and the incoming ones. The suggested rubric can be helpful for the faculty members to be applied in classrooms where undergraduate students take part in exploring issues regarding assessment and culture of assessment. Critical thinking would allow students to increase their awareness and be able to explain the found issues for further analysis. Instructors can also use the rubric to check for the credibility of the sources of the data which would identify the student position as well. Different students' perspectives have to be evaluated seriously to reach fruitful outcomes reflecting the students' needs to fulfill them by the administrators. Our students need to become good critical thinkers besides their acquired good communication skills to have a complete understating of what can be changed for a better culture of assessment. According to Grant et al. [8], critical thinking capabilities must stand as the top goal of undergraduate education where the assessment of students' skills should involve evaluation of their evolving critical thinking abilities. A sample of 176 students has been previously examined for the change in their critical thinking skills at the University of Colorado Boulder (UCB) or Colorado College (CC) employing a Critical-thinking Assessment Test (CAT). CAT instrument is an effective tool for assessing the critical thinking skills of the students across higher education institutions [8]. It is feasible to apply CAT for the incoming students in classes to emphasize the impact of learning on critical thinking or student engagement and communication.

## 5. Performance Outcomes

The assessment plan will cover the following domains: diversity, course satisfaction, admission and advising, academic writing/support, curriculum change, knowledge availability, and other major/program-related assessment to understand the students' motivation rrrrrrs learning and give them directions and guidelines from proper and regular assessments (using the provided 'VALUE Institute Template') [4].

- 1) **Excellent Diversity:** Diversity plays a key role in determining the student's education where less diverse classrooms and/or campus will hinder our goals to deliver good education quality to our students (Mohamad Karkouti, 2016). The assessment of the diversity component in the university should allow faculty and university leaders to investigate the missing parts required for enhanced diversity. Diversity can be on campus or also can be related to diversity in curricula. The university should seek instructional diversity as well as cultural diversity as explained before by Bohmer [9]. Cultural diversity will make the students feel safe to share their ideas and feel more involved in the campus activities while instructional diversity goals include satisfying all class groups and ensure the proper participation from students without the fear to say different and/or uncommon ideas related to the course work.
- 2) **Improved Course Satisfaction:** Course satisfaction should also be investigated by both faculty and university leaders to check for the student's suggestions and create a continuous development in the taught courses' materials.

- 3) Smooth Admission and Advising:** Admission and advising will be the other focus in the rubric and assessment plan adopted by the university. The admission office should implement advising sessions to the prospective students and there should be a 24/7 website or email communication for any inquiries or questions regarding the admission process.
- 4) Enhanced Critical Thinking:** Critical thinking should be also investigated to allow students to increase their awareness and be able to explain the found issues for further analysis. Instructors can also use the rubric to check for the credibility of the sources of the data which would identify the student current progress as well. Our students need to become good critical thinkers besides their acquired good communication skills to have a complete understating of what can be changed for a better culture of assessment.
- 5) Improved Academic Writing and Support:** According to Grant et al. [8], academic writing and support for the students should be evaluated by the university leaders from contacting faculty members and understand the current situation and progress in the students' performance. Faculty staff must keep an eye on the writings of their students and see how scientifically their students can write to have proper guidelines, workshops, or advice given to them to improve their writing skills.
- 6) Initiated Curriculum Change:** Curriculum change and reform will be assessed periodically to allow our leaders to investigate the importance of the taught subjects, materials, and their relation to the possibility to extend our plans and establish graduate engineering programs [6].
- 7) Increased Knowledge Availability:** Knowledge availability and easy accessibility of information will be taken seriously since students should be able to find any required information [7].

Implementing the outcomes assessment in the institution will help in improving the student's performance and keep the educational programs up to date. KAU (Rabigh Branch) should create a clear plan and rubrics for assessing students in various domains related to their education and the mission/vision of the university. In a higher education institution, students who create good relations with others are turned out to be more successful in life as well as in their education journey [10]. The assessment of the diversity component in the university should allow faculty and university leaders to investigate the missing parts required for enhanced diversity. The plan and rubrics will contain several planned activities and gatherings to bring students together along with the faculty and administration staff for better communication and a developed understanding of the possible diversity issues that exist on campus. Diversity and other studied domains will be evaluated and assessed for both the students and faculty from a scale of (0) to (5) where 0 refers the minimum and 5 refers to the maximum scores representing how strong is the student/faculty attitude oriented towards diversity. The other assessment domain (course satisfaction) should also be investigated by both faculty and university leaders to check for the student's suggestions and create a continuous development in the taught courses' materials. Moreover, admission and advising will be the other focus in the rubric and assessment plan adopted by the university. Lastly, academic writing and support for the students should be evaluated by the university leaders from contacting faculty members and understand the current situation and progress in the students' performance.

## 6. Instructor and Program Evaluation Process

Assessment tools and practices can be utilized and planned carefully in the university to have successful engineering programs. The development of an assessment plan requires understanding the university requirements and guidelines as well as the student needs and instructors' abilities to have successfully implemented programs and assessment tools that would satisfy everyone. At KAU, we plan to open a new engineering program (MS in Chemical Engineering), using the studied rubrics and available assessment tools, it would be very useful for the university to evaluate the progress towards this program and the possibility of having an MS program in the department (to be implemented successfully in the future).

**Goals and Objectives:** Assessment rubrics must be designed to assess faculty members in the university as well as the program curriculum to fit international education standards and the student needs. The overall goal of the plan is to evaluate the current professors' abilities and skills to teach graduate-course levels in the suggested MS program in chemical engineering. Professor evaluation is very important for improving the students learning where the university administrators must monitor their faculty progress in teaching, knowledge delivery, and development. Then, the university would become more knowledgeable about the current situation of the faculty (and curriculum) and whether it is possible to initiate the MS program or not.

**Assessment Plan for the Engineering Program:** The designed assessment plan should be aligned with the program goals and the whole university mission. The selections of rubrics criteria and the scoring guidelines are both very critical stages to improve the selected rubrics scores quality. The objective of the university should involve providing different assessment rubrics for the department and with different criteria that will take care of the needs of that department and what the faculty must acquire to be qualified and successful educators. The department may have a different vision, but would finally align its vision with the whole university scope. Teaching skills and curriculum development for graduate-level courses should be evaluated from different aspects. Other important criteria considered in the assessment include faculty interactions, syllabus and curriculum formatting, and knowledge delivery; (Table 2).

**Assessment Methods:** Effective teaching, good delivery, syllabus formatting, and classroom interactions are all some of the general aspects that can be involved in the assessment rubrics for any department. Gathered feedback from either students or faculty can be used to identify the specific criteria for the suggested program where those criteria will be also considered in the evaluation process to enhance the results. The 'Face to Face Evaluation Rubric' can be utilized to check for the presentation quality as it covers different criteria including faculty knowledge of the subject, his communication skills to deliver the materials information, method of presentation and motivation for teaching, evidence of preparation, and professional conduct [11]. All of these would help in convincing the management to establish the MS program once they realize the existence of the desired qualifications in the department faculty. Any faculty should have the bare minimum of knowledge (or degree) that show eligibility of the faculty member to teach such a course [12]. The face-to-face rubric will help a lot in seeing the communication skills of the faculty and how class interactions are carried out to deliver the course information in a graduate-level. On the other hand, the 'Online Faculty Teaching Evaluation' is more related to the faculty professional etiquette and interactions with students but not teaching [13]. The faculty can be evaluated online by the students to



check for his behavior towards students for the whole semester. A respectful manner is a must and every faculty member is expected to be treating his students in a good manner while respecting their ideas and providing clear guidelines and expectations for the student learning [14]. This is important to sustain good relationships between advisors and their students to have successful graduate programs from good mentoring. Grading and faculty availability for discussion with students about the given feedback is also another key criterion to be considered.

**Data Collection:** Data collection may be done through interviews and most likely via questionnaire surveys distributed to students to check for the faculty performance, curriculum, and other suggested ideas about opening the new MS program. Collected data should be shared with the Deans so that they have a chance to go back and look at the history of the university employees to take the correct actions aligned with both student's success as well as the university mission/vision (this will help a lot in deciding about initiating the graduate-level program). Again, the data can be collected from attending in class or through online surveys distributed for students; assessment should be performed electronically by the management only in professional meetings at the end of the semesters (twice a year). Collected data must be considered to reconsider hired faculty and whether they can be replaced and/or given certain workshop courses and training before trying to initiate the MS program to be successfully established. The whole rubric will be very useful for the success of the students *via* improving the teaching and communication of faculty; hence, allowing the university to decide about the MS program after deep analysis of collected information.

**Table 2.** Evaluation Rubric for Faculty Abilities and Motivation.

Evaluation Rubric for Establishing New MS Engineering Program: Criteria	Does Not Meet Expectations (Unacceptable) 0 point	Below Expectations (Poor/needs improvement) 1 point	Meets Expectations (Satisfactory) 2 points	Exceeds Expectations (Good) 3 points	Greatly Exceeds Expectations (Exceptional) 4 points
Evaluator: (Administrators or Student)	Faculty Abilities/Skills and Professional Interactions				
Current professors' abilities and skills to teach graduate-course levels in the suggested MS program in chemical engineering.					
Knowledge delivery and development for noticeable progress in the field.					
Teaching skills and curriculum development for graduate-level courses.					
Syllabus and curriculum formatting, to be aligned with the program goals and the whole university mission.					

Classroom interactions, communication skills with students, and knowledge delivery according to the asked questions for extra explanations.					
Evaluator: (Administrators)	Faculty Abilities/Skills to Conduct Research and Teach				
Motivation for teaching students.					
Evidence of preparation and grasp of knowledge.					
Professional conduct, and ability to do research.					
Teaching methods and its alignment with the university mission and MS program.					
Relationships between advisors and their students to have successful graduate programs from good mentoring.					

**Recommendations for the Change:** Program directors should take the lead in this initiative where the rubrics and finalized assessment tools and methods (as discussed earlier) should be approved before giving the directions to evaluators to check on the progress of the faculty members and suggested graduate courses/syllabi. University management can also give feedback to the department in every single semester based on the students’ comments and the received evaluation reports for better performance from faculty and overall improved education quality. Also, both students and administrators can be involved in the online rubric where the management can check for collaboration and adherence of faculty to course policies and the plan of initiating new programs. A semi-annual assessment would be better and more accurate than annual evaluations. Classroom evaluation is the most important measure besides the behavior and interaction measures which would show how instructors are professional in both knowledge and communication skills; giving us the full opportunity to establish the new MS program in the department with successful outcomes.

### 7. Implementation and Evaluation Plans

The assessment rubric should contain distributed survey questions at the end of the semester to be filled by every student. The survey should indicate questions related to the course development and student satisfaction with the course content or instructional delivery. Faculty members should collect students’ answers by the end of the semester to develop the course materials and improve the satisfaction of the coming students. On the other hand, the first-year experience of the students should be another domain of interest in the assessment rubric. The plan must contain how freshmen students dealt with possible

challenges in the university from monthly interviews with the new/incoming students. Data collection can be carried out by either student affairs individuals or even by the faculty members who are teaching those students. Regular interviews (of about 10 min each) will give the opportunities for the educators to convey the students' message to the faculty members or even to the students of the consequent years. Assessment of the students' behavior and understanding their needs from the beginning will help the university to understand the current and possible struggles that might face freshmen students due to their transition from high schools to universities.

The admission office should implement advising sessions to the prospective students and there should be a 24/7 website or email communication for any inquiries or questions regarding the admission process. Those questions can be used by educators to address common problems to be added in the assessment plan to enhance the education quality. Advising must be also taken seriously where the plan should contain sections about how an advisor would take care of his students. Proper guidelines will include that advisors have to devote weekly times to their students to discuss their progress and report any education-related problems. One-on-one interviews and survey questions will be the methods to collect the data in the advisement session [8][8][8][10]. The academic support will be also considered to ensure the completeness of the assessment rubric where most of the development is devoted to the students for better learning experiences. All the mentioned guidelines, instructions, assessment domains, and data collection methods should comply with the university mission/vision as an attempt to satisfy national or regional accreditation standards and become a world-class university!

## **8. Data Presentation**

It would be very useful for the university to evaluate the progress towards initiating the graduate program and the possibility of having an MS program in the engineering department (to be implemented successfully in the future). Assessment rubrics must be designed to assess faculty members in the university as well as the program curriculum to fit international education requirements and the student needs. The overall goal of the plan is to evaluate the current professors' abilities and skills to teach graduate-course levels in the suggested MS program in chemical engineering. Professor evaluation is very important for improving the students learning where the university administrators must monitor their faculty progress in teaching, knowledge delivery, and development. Faculty must acquire proper interpersonal/teaching skills to be successful professors, and able to collect data for evaluation and future analysis. Presenting the data to the management is also critical to reach proper solutions and take forward actions in the improvement process. Evaluations will be done during the semester with annual and semi-annual reports to show the results. The method of data collections will be done from distributed survey questions, face-to-face interviews and/or FGD for the analysis of:

- (1) Teaching skills and curriculum development for graduate-level courses.
- (2) Faculty interactions, syllabus and curriculum formatting, and knowledge delivery.
- (3) Student satisfaction, performance, academic skills, and knowledge availability.

Data will be analyzed in group meetings with brainstorming sessions devoted to providing proper actions towards the change. Teaching skills and curriculum development for graduate-level courses should be

evaluated from different aspects. Other important criteria considered in the assessment include faculty interactions. The 'Face to Face Evaluation Rubric' can be also utilized to check for the presentation quality as it covers different criteria including faculty knowledge of the subject, his communication skills to deliver the materials information, method of presentation and motivation for teaching, evidence of preparation, and professional conduct. Any faculty should have the bare minimum of knowledge (or degree) that show eligibility of the faculty to teach such a course with its formatted syllabus and curriculum and/or knowledge delivery methods.

Faculty evaluation in classrooms is the most important measure besides the behavior and interaction measures (Table 3 for results as an example) which would show how instructors are professional in both knowledge and communication skills; giving us the full opportunity to establish the new MS program in our department with successful outcomes.

**Table 3.** Example of the Evaluation Rubric for Faculty Abilities and Motivation (Results).

Evaluation Rubric for Establishing New MS Engineering Program: Criteria	Does Not Meet Expectations (Unacceptable) 0 point	Below Expectations (Poor/needs improvement) 1 point	Meets Expectations (Satisfactory) 2 points	Exceeds Expectations (Good) 3 points	Greatly Exceeds Expectations (Exceptional) 4 points
Evaluator: (Administrators or Student)	<b>Faculty Abilities/Skills and Professional Interactions</b>				
Current professors' abilities and skills to teach graduate-course levels in the suggested MS program in chemical engineering.		#			
Knowledge delivery and development for noticeable progress in the field.					#
Teaching skills and curriculum development for graduate-level courses.				#	
Syllabus and curriculum formatting, to be aligned with the program goals and the whole university mission.					#
Classroom interactions, communication skills with students, and knowledge delivery according to the asked questions for extra explanations.	#				
Evaluator: (Administrators)	<b>Faculty Abilities/Skills to Conduct Research and Teach</b>				
Motivation for teaching students.				#	
Evidence of preparation and grasp of knowledge.					#
Professional conduct, and ability to do research.				#	
Teaching methods and its alignment with the university mission and MS program.				#	
Relationships between advisors and their students to have successful graduate programs from good mentoring.		#			

## 9. Maintenance

The assessment plan will be maintained with continuous evaluation and analysis of the collected data. The below areas should be investigated periodically to see the quality of the proposed assessment plan in improving the student/faculty skills:

- Changes in the communication skills, and delivery methods of the faculty members.

- Course delivery and in-class activities for enhanced communication and interactions. For example, in-class group assignments would greatly help in understanding the course materials and pave the way for initiating the MS programs.
- Student/advisor relationship for improved communication qualities. For example, undergraduate students should be encouraged to build-up professional relations with their senior-project advisor for the possibility to continue in the MS program once it is approved.

Assessment tools must be aligned with the university mission/vision and must be as effective as possible following the standards and principles of good assessment practices for students learning (e.g. understating of learning, providing explicit goals, involving the community, and promoting the change) [15].

Assessments methods such FGD will be used to collectively gather qualitative data from engaging faculty with students. Moreover, an implemented 'Face to Face Evaluation Rubric' can be utilized to check for the presentation quality [11]. Any faculty should have the bare minimum of knowledge (or degree) that show eligibility of the faculty to teach such a course [12]. On the other hand, another rubric on 'Online Faculty Teaching Evaluation' will be used to check for the faculty professional etiquette and interactions with students but not teaching [13]. The faculty can be evaluated online by his students to check for his behavior towards students for the whole semester [14]. Collected data must be considered in rehiring faculty where the whole rubric will be very useful for the success going side-by-side with the university mission/vision to establish the intended graduate programs [15].

## 10.Reflection

Assessing the different suggested domains will certainly allow university leaders to understand the current students/faculty skills and their progress towards the possibility of initiating new graduate-level courses and/or programs. The assessment plans with the inclusion of the three different assessed domains as diversity; curriculum reform and change; knowledge availability and easy accessibility would make it much easier for our educational leaders to decide on the current progress achieved and what else is remaining to reach the university goals and open the intended graduate programs. Moreover, these areas are important because curriculum development and diversity or inclusion of students will improve the education quality and ensure the students are getting the up-to-date knowledge from different perspectives or viewpoints according to the present cultures in the university. Students should become more familiar and engaged in the class discussions; while faculty members will be also motivated to provide the latest available knowledge in the field. Graduate programs can be initiated after careful evaluation and consideration of the current curriculum and after ensuring that the current knowledge and/or articles [online] are easy to be accessed and available for all the university students; which would ensure the success of the prospective graduate students.

The suggested methods and rubrics can be helpful for the faculty members to be applied in classrooms where undergraduate students take part in exploring issues regarding assessment and culture of assessment. Critical thinking would allow students to increase their awareness and be able to explain the found issues for further analysis. According to Grant et al. [8], critical thinking capabilities must stand as the top goal of undergraduate education where the assessment of students' skills should involve evaluation of their

evolving critical thinking abilities. Directions must be provided to evaluators to check on the progress of the faculty members and suggested graduate courses/syllabi. The semi-annual assessment would be better and more accurate than the annual evaluations to establish the new MS program in our department.

## 11. Conclusions

We have discussed higher education assessment plans and evaluation methods meant to provide the student with better education experience. Activities, abilities, and other student indicators should be investigated to check their impact on the students' success as well as the validity of the assessment tools. Effective cultural characteristics involve good engagement and open communication. We show a practical example of the application of the various assessment techniques to establish new graduate engineering programs. Having faculty with acquired skills and qualified for curriculum development and graduate-level teaching is critical and must be the adopted vision for initiating graduate programs. The rubrics should be designed to assess the critical thinking value for undergraduate students to make them prepared for such possible graduate studies. Also, rubrics should be capable of assessing faculty members in the university as well as the program curriculum to fit international education standards. Program directors should take the lead in this initiative by implementing the outcomes assessment in the institution for the possibility of having an MS program in the engineering department (to be implemented successfully in the future). The overall assessment process would greatly help the institution in becoming a world-class university with clear educational-oriented goals and better students' learning opportunities.

## 12. Acknowledgement

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