

# Assessing Learning Outcomes in Higher Education: From Practice to Systematization

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**Abstract** – Accountability systems in higher education ensure that academic programs meet learning outcomes and address student cognitive and affective development. The learning outcome assessment is one of the most important elements to enhance and assure the quality of programs. In this paper, we present a “tour” of how an assessment cycle is performed in a national/public university in Qatar. The study draws on “good” practices and how a higher education institution systemizes the process of assessing learning. The approach demonstrates how learning is connected to program objectives and the curriculum through a rational, logical, conceptual, consensual, and interpretable process. Employing specification tables known as curriculum and assessment plan matrices, with tools being assessments and rubrics, learning outcomes measures can be reached. The approach as well as system calls for an institutional structure and organization which place responsibilities on all stakeholders involved in academic programs delivery. The futuristic approach and practice posit a reconceptualization of how students will be assessed, more likely a paradigm shift necessitating a change in practice and trend in which students’ success (achievement) can be based on the learning outcomes attained.

**Keywords** – Assessment, assessment cycle, learning outcomes, curriculum mapping, program assessment plan, rubrics, direct measure, and indirect measure.

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## 1. Introduction

Universities today face continuing challenges in addressing the job market needs for their students. Identifying optimal values, dispositions, and skills that are transferable to “worldly” demands is quite a challenge for many higher education institutions. Since universities rethink and restructure their systems on a regular basis, the outcome-based education system aims to bring meaning to teaching and learning and to improve graduate workforce skills [1].

Classically, university performance was promulgated by institutional indicators, covering finances, faculty credentials, student background data, graduation rates, attrition, and other strategic, and informative data [2]. A new paradigmatic shift recognizes the use and interpretation of institutional quality assurance data. While much of the data is now integrated and centered around the student ecological changes with focus on the intended learning of students [3]. Particularly, the assessment of learning or commonly known as learning outcomes ensures that what is deemed necessary for students to know is what they can acquire and demonstrate at the end of a course or a program. They represent a set of explicit statements tapping into the knowledge, skills, and competencies desired in the form of outcomes and measurable as evidence of learning.

The assessment movement has consecutively moved further in the creation of performance measures, intently organizing and centering the curricula and academic programs in higher education. Ultimately, most programs in higher education strive to meet the key graduate traits expected to reflect in the outcomes of learning [4].

The accreditation of programs encourages higher education institutions to establish outcome-based systems to hold these institutions operating the programs accountable for what they claim they do. They therefore seek self-evaluative reports on their mission, addressing student cognitive and affective learning and development [5]. As a result, universities must provide evidence of what they propose and attempt to achieve [6].

Accreditors today emphasize curriculum development and teaching as well as a set of standards based on best practices as a conformance framework that ensures adherence to content, professional or clinical standards [7]. Accreditation standards are becoming an integral part of the educational program expressed in the curriculum and learning outcomes that programs produce. Many accreditation agencies locally and globally expect the assessments of learning to be a standard component of the self-evaluative reports. The latter underlines the need for program information to be linked to student learning outcomes, particularly the types of generic learning that accreditors would seek from graduates.

An academic program may have several learning outcomes and graduate dispositions which students are expected to possess upon completion of a learning experience. Learning outcomes are derived from the vision and mission of a university [8], [9], [10], they closely align with the objectives of academic programs. This alignment ensures the validity of the preconceptualized program mission. A key feature of a program is to emphasize the close and multiple alignments of the mission, learning goals, instruction, curriculum and learning outcomes [11]. Notably, academic programs are benchmarked against both other academic programs globally and accreditation standards. The practice has led to a system and organization in a national/private university in Qatar. This article henceforth articulates an analytical account of the assessment process, organization, structure and system of learning at the institution.

## 2. Learning Outcomes

The "development of learning outcomes" notion is portrayed as a linear process that begins with program objectives and progresses through competency levels [12], [13], [14]. The learning objectives are general statements based on the program's mission and vision and their achievement rather than a philosophical positioning and abstract conceptualization. In many cases, objectives and learning outcomes are two terms interconnected and can be indiscernible [2]. While the former tend to be realized through the expected results of instruction, curricula, or programs, the latter indicate the achieved results of what is learned by students. Therefore, objectives and learning outcomes have different units of analysis. Both are rooted in behaviorism, curriculum planning movement, and the mastery learning movement [15]. The learning outcomes are traditionally result-oriented and measurable.

The imputation of the objective movement and its origin are linked to theories on "mastery learning" with reference to Benjamin Bloom's 1950s works. In most cases, learning outcomes are read as objectives and accepted practices with the intention and culmination of learning [6]. Writing the learning outcomes is one of the first steps and main requisites to assessing the quality of a program. While program learning outcomes are derived from and aligned with the program objectives, the objectives are derived from the mission and vision of the university as shown in Figure 1.

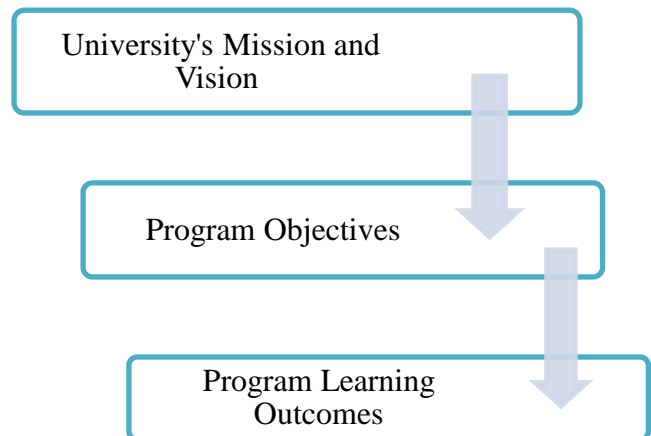


Figure 1. Writing Learning Outcomes

The construct that connects the program's mission and learning objectives is established through a process of consensus building and repetitive review and calibration involving various stakeholders as faculty, students, and external experts. The mission statement embeds values, goals, and impact. The goals might be long or short term; both types of goals are embedded in the mission statement, several objectives can be translated into possible evidence-based statements. As an example, a mission statement that explicitly states a "program shall prepare students as entrepreneurs having the highest value of honesty to compete globally and internationally in the business arena" reflecting the program's expectation. The outcomes that students are expected to achieve and be able to demonstrate at program completion are clarified by the purpose underlined in the mission statement [16]. Therefore, some objectives can be derived from the mission statement and translated into learning outcomes. For example, the first objective of a program could say: "The program shall prepare students to acquire leadership and business skills to compete globally and internationally. Similarly, a second objective could say: "The program shall instill in students ethical conduct in the field of international business".

It is then easy to extract learning outcomes from the objectives. Thus, these examples of objectives could be translated into a learning outcome by changing the point of reference from the program to the learner and what the student has to attain at the end of a course. For example, “Students demonstrate ethics in the context of international business”. Hence, to actuate the mission statement is to conceptually align it with the learning outcomes as a necessary step prior to the explicit alignment of learning outcomes to objectives as well as curriculum.

Generally, the objectives are written in qualitative language and are not necessarily measurable or explicit. As an example, programs might desire that their students gain research competencies. A training program for English teachers might particularly consider the following objective: “Provide students with the essential technical, analytical, and research skills to contribute to the knowledge base in English as a foreign language”. Thus, a learning outcome should reflect the key and thematic elements of the educational objectives. A learning outcome aligned to the objective of the previous example would consider that “Students demonstrate their ability to write a research problem and design of an experiment”. To achieve this learning outcome, students may write a research paper including a stated problem, a hypothesis, a literature review, procedures, and a design of experiment, findings, and interpretations.

When learning outcomes are achieved in a course by students, they become significantly attained, underlying that the goals of the academic program have been fulfilled. One common approach is to map academic program objectives as well as courses and course objectives to learning outcomes. The alignment of these former elements to the learning outcomes should be derived from the academic program mission.

Faculty and specialists systematically develop and assess their learning outcomes of their academic program at colleges and universities [17]. Learning outcomes of the academic program are measured directly through assessment tools. Assessment in the classroom and assessment of learning outcomes can be distinguished from one another. The goal of the learning outcome assessment in a course are distinct from those of formative evaluations in the classroom. For instance, formative assessment is conducted in class and has intrinsic criteria related to the course learning required, i.e., it can immediately indicate to the instructor whether the student has learned the material being covered. On the other hand, the assessment of learning outcomes has a broader and more general scope of assessing whether learning has occurred.

It reflects a different level of knowledge and skills than content knowledge or classroom skills. End-of-course assessments can be a useful tool to guide curriculum development and assessment for students, but these are seldom utilized to assist in indicating whether the learning outcomes in academic programs are achieved.

Assessments of learning outcomes are usually conducted by course instructors but can also be measured and conducted by administrators [18], [19]. The course instructors or academic program administrators mostly employ matrices to explicitly illustrate the domains included in the curriculum, which might then specify the curriculum covered and how it relates to the learning outcomes. The learning outcome may be listed in one dimension of the matrix details while the course curriculum may be listed in another. In general, with program improvement planning and reassessment, an ongoing evaluation of learning outcomes improves the quality of academic programs and the student learning experience. The use of conceptual tools as mapping of different using the mapping procedure [20].

### 3. Curriculum Mapping and Learning Outcomes

The definition of ‘curriculum’ in higher education literature seems to be debatable. The term “curriculum” refers to the formal materials that teachers give their students to learn certain things and accomplish certain learning outcomes. [21], [22], [23]. Arafah [24], however, provides a multi-layered definition of curriculum to include partially the intended and enacted curriculum as key features for which learning could be measured. Thus, the intention of this study is to focus on mapping the intended curriculum or the curriculum that is delivered that we want students to attain. The delivered curriculum in an academic program is a result of the intended curriculum composed of the content and lessons instructors provide to students [25]. The curriculum in any academic program must reach coherence by integrating several and key academic program components with learning outcomes embedded in the design and delivery of the curriculum [24], [26]. Higher education institutions typically provide faculty with the autonomy to design their own curriculum to be taught in a course or a unit. A set of these units makes a specific academic program. An academic program will have multiple curricula in place, with diverse knowledge and depth of content and coverage [7]. As a result, it is frequently determined that if curricula are operating as intended, they are then capable of producing the desired learning outcomes [1].

The basic goal of comparing curriculum and learning outcomes is to assess how closely expectations and student accomplishments align. This model is built on the assumption that in an educational context, the learning process oscillates between instructors and students where assessments are directional targeting the students and whether they have learned [27].

Mapping all learning outcomes to all academic program courses advances the understanding that the academic program learning objectives are being instantiated [28]. In addition, academic programs have learning hierarchies; whereas there are lower educational objectives that learning outcomes might adopt in first-year courses consecutively, there might be higher order educational objectives found in third-year or fourth-year courses. The hierarchy of educational objectives produces learning hierarchies embedded in an academic program. Gagne [15] conceptualized instructional unit maps as guides to hierarchies of learning where subordinate learning comes before the superordinate one embedded in a unit of learning. As a result, after mastering the lower levels of knowledge taxonomy (e.g., comprehension) students can advance to the higher levels of cognitive tasks (See Bloom's Taxonomy). The curriculum separates and groups subjects based on the internal logical order of courses in a program. A map of the units, i.e., curriculum against a tier-based learning outcomes can identify where the lower or higher order learning outcomes should be attained first. The use of learning outcomes grants students a broad overview or a hierarchy of competencies to acquire through academic study. Learning outcomes can be organized in a hierarchy in the same way that a course hierarchy can be formed for an academic program. If a learning outcome is addressed in a course that serves as a prerequisite for another higher-level course, it may be used again in subsequent courses where higher educational goals can be met. Many higher education institutions employ specification tables, academic program maps, or matrices to gain a conceptual knowledge of academic program plans [29]. Utilized as guides, these maps equip educators with the essential knowledge to see the courses structured in a cohesive whole with a distinct set of overall learning aims. Thus, the learning outcomes can be tracked in an academic program through a complete course of study list and a visual perspective to explore the curriculum fit of the academic program intentions.

#### **4. Learning Outcomes and Curriculum Assessments**

Many higher education institutions have established a culture and an organizational framework by producing a workable assessment regime for the courses taught [30].

The “owners” of academic programs are responsible for defining and establishing the program learning outcomes which are then agreed upon by stakeholders (faculty, community, and students). Some of the learning outcomes are generally prescribed by accreditation agencies, such as the Accreditation Board for Engineering and Technology (ABET), where program-based assessment is used to ascertain the learning of the outcomes prescribed. Academics and professionals at a specialized office at the university publish and share the assessment cycle matrix with the community. Thus, creating learning outcomes and their assessment provides a path for quality improvement [31]. Specifically, assessment plans include those elements of the academic program that address the spectrum of educational objectives in which students need to process complex information and develop specialized skills required for today's ever changing workforce market [31], [32], [33]. Despite the inconsistent way in which these outcomes are presented, they could tap into discipline-specific and cognitive levels tackling the subject matter, not specifically related to skills and competencies requisite in the program learning outcomes.

While many universities have produced discipline-specific learning outcomes for their academic programs, several professional bodies, such as engineering and medicine, mirror their outcomes with the existing accreditation standards [34]. These results also appear in non-professional academic programs that are obviously geared towards industries or professions. As a result, discipline-specific outcomes are frequently influenced by mandated accrediting bodies, cooperating institutions, and/or program advisory committees representing relevant stakeholders and workforce employers seeking proof that graduates are best prepared to enter their respective professions.

Mapping the learning outcomes to assessment is a necessary step to explicitly draw the curriculum assessment and aligning it with learning outcomes. A precursory mapping strategy describes and identifies how the courses support the degree program's educational goals and objectives. Different practices have come to the fore regarding assessment. The general practice is to use several reliable tools to assess students during study, raising issues on unifying the cognitive skills that the assessment is eliciting across different content. Most academics and teachers would agree that any academic program should seek those cognitive skills at the higher levels of educational objectives.

The micro-focus approach is to associate those assessment items and learning outcomes where mapping is utilized at several levels of an academic program review and evaluation.

Mapping also integrates the learning outcomes and curriculum components. In an academic program with a succession of courses, the outcomes recur in numerous courses at different levels and sequence,

from introductory to more advanced courses embodied at different levels of breadth and depth in the curriculum (See Table 1).

Table 1. Assessment Cycle Master Plan

	Assessment Cycle 2020-2023							
	2020/2021		2021/2022		2022/2023		2023/2024 (Not within the first cycle)	
	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023	Spring 2024
EDUC 100 Citizenship in Education						√		
ENGL 101 English I		√						
ENGL 102 English II		√						
ENGL 201 Reading Comprehension I			√					
.....								
.....								

## 5. Process

Several organizational, planning, and execution processes underpin the assessment system. This section is at the heart of the document, and it contains a description of the system, beginning with the vision/mission and goal and on to the learning outcomes and their assessment. The stakeholders, especially faculty, establish the objectives, curriculum, and instructional design process to ensure that the desired learning outcomes correspond with the curriculum. The discussion advances to describe the approach and tools used to map and assess the learning outcomes across the curriculum.

### 5.1 Organization Background

A system has been developed to assess learning outcomes of 13 academic programs offered at this national/public university. As part of licensing and accreditation, a ministerial body posited a set of guidelines for academic program assessments. These stipulate that each academic program’s learning outcomes are aligned with the academic program’s mission and mapped with its objectives. The process and structure set in this university has an assessment committee established in each unit to oversee the assessment plan and devise the necessary tools to measure the learning outcomes. In addition, an assessment office has oversight of all the assessment operations for each unit. On a semester basis, each academic program assessment committee provides the assessment cycle for each of its academic programs.

The assessment cycle indicates the alignment with specific and direct measures of program learning outcomes; assessments are collected, judged, and interpreted to align with the learning outcomes by the unit committees. Documentation includes the assessment committee meetings minutes, periodical (semester-based) reports, and modifications made to the assessment cycle.

### 5.2 The Assessment Cycle

Against this backdrop, the national/private university in Qatar undergoes the abovementioned exercises on a regular basis as part of self-study and as commensurate with national accreditation as well as external international accreditation associations such as AACSB and AAQEP.

### 5.3 The Mission

In 2020, the assessment process started for the bachelor’s degree programs at this university. The assessment cycle’s new assessment plan was based on a two-year cycle. Each academic program at its inception was developed through a mission statement.

The mission statement has the academic program purpose and its contribution to society, work mechanisms, or the system’s approach keeping in mind the target audience. The mission statements generally justify the academic program’s existence, organization conceptual framework, allocation of resources and planning.

More importantly, the mission provides a platform of discussion among faculty and administrators that leads to setting the goals of the academic programs [35]. Embedded in a generic mission statement is what the academic program aims to offer, and how it serves and assists those audiences (students). The mission statement is generally the guide that emerges in practice which faculty and administrators pull in the form of the elements derived from mission into goals [35]. Faculty write their objectives based on the key elements and themes obtained from the mission statement. The academic program's broad goals could include the expected long-term outcomes from the academic program's mission. Particularly, the knowledge, skills, attitudes, and values that students should acquire as a result of attending an academic program included in the program's objectives. They are written as a general statement denoting reasonable expectations which are clear, achievable, and assessable by the learning outcomes. Once the mission and goals for an assessment are established for a particular assessment cycle, they are "chiseled in stone" with the learning outcomes likely to stay the same throughout the assessment cycle.

#### ***5.4 Elements of a Program Assessment Plan: Learning Outcomes***

The knowledge, skills, and abilities that students should possess and be able to demonstrate after finishing a course of study or a program are known as learning outcomes [36]. For each academic program, faculty and administrators are usually engaged in program design and curriculum teaching. In order to describe what students should be able to accomplish at the end of the course, faculty and/or stakeholders write the learning outcomes in the future tense. They also write them in accordance with the course requisites and embody some 21st century essential skills such as problem-solving, analysis, decision making, social communication, effective citizenship, and others [37]. The statements are specific and concise to the extent that they identify the educational objectives and skills (e.g., whether understanding, application, or evaluation). Using measurable verbs such as "demonstrate", "apply", "plan", "integrate", etc., faculty write the learning outcomes clearly and simply. Learning outcomes are written in simple rather than bundled statements. For instance, the following is a compound statement incorporating two outcomes "Students completing a Bachelor of Education in English Language Teaching should be able to analyze text to compose meaningful conclusions and recommendations and elucidate the writing genres". More than one educational behavior is expressed, rendering it hard to assess in one assessment exercise.

Breaking or redefining the learning outcome allows for greater specificity in what is being assessed.

The assessment cycle as a structure at this university sets the guidelines and standards for which faculty embeds the assessment of learning in their coursework. For the learning outcomes, faculty are tasked with creating tools to grade the assessments. These tools might include the aspects and skills that are not tapped into the course but needed for the learning outcome. While the course uses the assessments to determine whether students have achieved and reached the knowledge required, the tool used to grade the assessment for the learning outcome might be the same or different. The assessment tool for learning outcomes draws on the notion that there is a multitude of criteria that the learning outcome may tap into. For example, for an English composition unit, students would need to develop an essay regarding an ethical issue. On one level, for instance, the English course writing skills may be assessed as standard writing conventions, such as spelling, punctuation, capitalization, grammar usage, paragraphing, or in terms of pre-writing organization, it might also include clear topic sentences, supporting ideas in a logical sequence, or strong concluding sentence. On another level, an assessment might be used to evaluate the demonstration of ethics, which includes a completely different set of abilities. The learning outcome required to demonstrate ethics is shown in Table 2 [38]. The elements in the rubric criteria presented in Table 2, which involve identifying ethical dilemmas, providing analysis, making decisions, and selecting moral actions, can be differentiated from these elements in the formative course assessment. The former is generally developed at the unit level involving faculty [37]. Although the course or module's formative assessments are developed by the instructor, the rubric with the embedded subskills and abilities is generally consensus-driven where several stakeholders reach or agree on the rubric criteria and its alignment with the tools it assesses.

#### ***5.5 Mapping the Learning Outcomes with the Objectives***

Faculty derive and formulate objectives from the academic program's mission in a clear language and unambiguously state what the academic program must achieve. In each unit at this university, a committee is established where faculty develop these objectives. This practice eventually allows for formulating learning tasks for each objective with the focus on what the student must achieve after going through the teaching of the curriculum [39]. The same committee that establishes and develops the objectives also establishes the learning outcomes.



Table 2. Rubric to assess the learning outcome “Demonstrate ethics and/or ethical practice in education.

Demonstrate ethics and/or ethical practice in education.					
Performance Area	1: Does Not Meet Expectations	2: Needs Improvement	3: Meets Expectations	4: Exceeds Expectations	Score
<b>Identification of Ethical Dilemma</b>	Provides a fallible description of the ethical dilemma(s) presented	Provides a general description of the ethical dilemma(s) presented	Provides a considerable description of the ethical dilemma(s) presented Identify and distinguish the relevant beliefs and values of involved parties.	Provides a comprehensive description of the ethical dilemma(s) presented Identify and justify a range of ethically acceptable options.	<b>1 2 3 4</b>
<b>Ethical Analysis Skills</b>	Does not provide alternative and sees the issue in shallow manner in one dimensional approach.	Begins to appraise the relevant facts and assumptions but fails to identify any alternatives.	Clarifies at least two alternatives and assessed broadly their associated consequences in detail.	Clarifies a number of alternatives and evaluates each on the basis of whether or not to meet the stakeholders’ interests	<b>1 2 3 4</b>
<b>Consequences</b>	Sees consequences only to the self or immediate environment; sees consequences to others as irrelevant; and cannot differentiate consequences of specific beliefs or actions.	Grasps both far-reaching and immediate consequences of certain beliefs and actions; acknowledges relevance of ethical concerns to others; and widens consequences to include all relevant stakeholders.	Understands the implications of ethical issues on the society; processes a good understanding of far-reaching and immediate consequences of certain beliefs and actions; highly recognizes ethical concerns to others; and includes all relevant stakeholders.	Articulates the ethical effects of particular policies and practices on the society; looks to far-reaching implications of ethical beliefs; or projects consequences into the future deeply and broadly; and shows true concern toward outcome of ethical decisions to others.	<b>1 2 3 4</b>
<b>Chooses an Action</b>	Has difficulty identifying an appropriate course of ethical action from among alternatives	Formulates clearly a general implementation plan that describes the execution of the decision	Formulates an implementation plan that describes the execution of the decision which demonstrates a thoughtful reflection on the benefits and risks of action	Formulates and recommends a ethical, rational and practical implementation plan that delineates the execution of the decision which demonstrates a thoughtful reflection on the benefits and risks of action	<b>1 2 3 4</b>

(Steedle *et al.*, 2010) [38].

### 5.6 Mapping the Learning to the Curriculum

The learning outcomes are created not based on what is taught in the classroom or what teaching materials get selected by the instructor; rather, they are based on the curriculum and its objectives. The learning outcomes are not unique or isomorphic to each objective in that one learning outcome can be aligned to several objectives. The alignment process is logical, rational, and an interpretable one where the cognitive learning objectives found in learning are more likely to be semantically close to the objectives [40]

The alignment starts from objectives to learning outcomes. When such a system is in place, “closing the loop” is essential where alignment is made between the mission and the objectives and the academic program objectives and learning outcomes. Importantly, a crucial step is to match the learning outcomes with the curriculum, making the learning outcomes a vital component of the academic program [41].

The intended curriculum is semantically approximated to the academic program courses. The courses are designed and set to align with the learning outcomes. Similarly, in the table specification, the learning outcomes could be aligned with other proxy indicators as the objectives. To illustrate Figure 2, the three-dimensional matrix reveals a set of core courses in the vertical table, e.g., “Ed 100”, “Ed 101” to “Ed 106” crossed with the learning outcomes “LO1” through “LO5.”

The faculty's responsibility is to ensure explicit alignment between the courses they teach and the content and learning outcomes of the academic program. Collaboratively and consensually, instructors ensure that the academic program curriculum intentionally and transparently integrates the intended program outcomes. More importantly, the learning outcomes are mapped to the content recognizing that distinct courses highlight and develop diverse skillsets. The mapping necessitates the recognition of “early” courses, from low-level skillsets to “higher” order cognitive skills that are more likely to emphasize all the skills intended in an academic program [42].

To facilitate this alignment, a commonly used tool is a two-dimensional data specification table termed a curriculum matrix. It could be thought of as a multidimensional table (See Figure 2) that facilitates the communication of the learning experience. The curriculum matrix is developed at the beginning of the cycle, listing all the core courses of the academic program. These courses are semantically mapped to the learning outcomes. Each course instructor takes the initiative to align the course outcomes or objectives to the program outcomes. The course instructor may additionally map the assessment questions to the course outcomes or even program outcomes. The large majority of faculty in a unit consensually agree on mapping the outcomes with the courses [1] and then on the level of assessment for the outcomes in each course.

	LO1	LO2	LO3	LO4	LO5
Ed 100	X				
Ed 101	X				
Ed 102		X			
Ed 103	X				
Ed 104		X			
Ed 105		X			
Ed 106		X	X	X	X

Figure 2. Three-dimensional curriculum matrix and specification table

It is optimal to write six to eight outcomes to effectively demonstrate the core student expectations of an academic degree program [43]. In Figure 2, the cells in the matrix are marked by an “X” that specifies the learning outcomes intersected with the intended curriculum or content covered. Typically, each course learning outcomes are identified by an academic program coordinator or instructor, who then matches the matrix cells corresponding to the outcomes. Course instructors or specialists also go through the validation procedure to establish the explicit alignment of the learning outcomes in the course or intended curriculum, thus everyone in the unit or academic program is involved in the process [1]. The practice of aligning the academic program’s learning outcomes to the curriculum is a logical process. If done methodically, it provides a clear picture as to whether the learning outcomes are covered in the curriculum.

The slanted, top table in Figure 2 reflects the learning outcomes linked (crossed) to academic program objectives. The intended learning expected to be attained by students once they have taken the courses to fulfill the degree program represents the learning outcomes. Prior to mapping the learning outcomes to the curriculum within the assessment cycle period, a specification table is created reporting the timelines of the cycle. This table, stating the learning outcomes crossed with the courses, reports when the learning outcome (semester) is going to be assessed and in which course it is going to be assessed. The reporting is made formal to all the faculty/instructors teaching in a unit, so they are aware of it.

The curriculum matrix mentioned earlier also reflects the degree of coverage of learning outcomes based on a three-tier competency framework: introduced, developed, and mastered [23] A learning outcome can represent a specific learning hierarchy characterized by a set of intellectual skills. Principally, the skill task is introduced in the early first-year courses, later developed, and mastered in theoretical and practical courses. The learning outcomes to be attained at the “introduced” level would be first-year courses that suggest lower-level skills. Generally, concepts are introduced rather than mastered in the first-year courses. The achievement of higher level skills is possible if the student has mastered subordinate skills to contribute substantially to the learning in superordinate skills [15]. To ensure comprehensive assessment and coverage, each learning outcome is measured at least three times—across the three different levels: “introduced,” “developed,” and “mastered.” This therefore includes a lower-level course, an intermediate-level course, and an upper-level course.



The same learning outcome is assessed multiple times at different levels by spreading tasks across multiple years. The assessment plan matrix indicates the learning outcome, the period of assessment, the recurrence of assessment, and the learning hierarchy in each period of assessment. For example, in the Bachelor of Education in English Language Teaching Program at the university, students are introduced to teaching models and theories in the third and fourth years. Only then in the teaching methods and practicum courses are the theories mastered and applied. Students may engage in these educational objectives in which they are able to apply and master one or more of the teaching models during the practicum course.

The curriculum map must be validated to ensure it is credible, dependable, appropriate, and confirmable. This is achieved through rounds of validity processes where diverse stakeholders come together to validate the curriculum map and agree upon the constructs stated.

### **5.7 Assessment Plan**

The assessment plan matrix mentioned in the previous section provides an overall plan of the curriculum and data collection. Known also as a master matrix, it indicates that all the curriculum of an academic program is listed and crossed by the period in which the assessment takes place. The master matrix details which learning outcome is to be assessed. These matrices might also detail the assessment method, courses to be assessed, and the owner of the assessment. Table 1 illustrates the assessment cycle, where a few first-year core courses make up the curriculum of the Bachelor of Education in English Language Teaching Program. As shown in the period between 2022 and 2024, no learning outcome is assessed in these courses. In the matrix cells, EDUC 100 is scheduled for assessment in the Fall 2020 semester. Also, ENGL 101 is assessed in the semester of Fall 2021. First-year courses learning outcomes are not measured in the academic year 3, 2022/2023 and year 4, 2023/2024. The same learning outcomes would be assessed at a higher level of competencies (i.e., developed and mastered) in “advanced” and variegated major courses to understand the way students move through different levels of competency throughout an academic program [24]. The learning outcomes are assessed at least three times during the assessment cycle at different periods depending on where the learning outcome can be best measured by the curriculum in the course. It is desirable that all courses in an academic program have at least one learning outcome being assessed during the duration of the assessment cycle.

But in most cases, there are usually more courses than learning outcomes being assessed, and thus the learning outcomes are not assessed in all the courses.

### **5.8 Tools, Measures, and Scoring**

The operationalization of the learning outcomes is the desired step that all faculty members must take to draw out the skills, competencies, and knowledge to be assessed. Once faculty members write the plan and match the curriculum courses with their learning outcomes, a systematic monitoring activity must be established to be sustained at regular intervals. The operationalization of the learning outcomes is performed by designing tools as rubrics that tackle and identify specific, knowledge, skills, and competencies on an assignment, a project, examination or an extended essay. The instructor of a course conceptually judged that the assessments align with the criteria established in the rubric, and thus a rubric is scored. Using the rubrics to measure students’ knowledge, skills, and competencies ensures operationalizing the learning outcomes. Faculty members who teach a specific course are trained in building the tools for the learning outcomes to be assessed and are required to assess the learning outcome in the course they are teaching.

In the assessment plan, assessment can be a major challenging aspect. Course instructors may use assessments (tools) to assess students’ work in the course, but they can also utilize assessments to assess their course learning outcomes. Whether the assessments are tests, assignments, projects, or extended essays, course instructors may have their own tools to score these assessments. The learning outcomes are evaluated via tools known as rubrics. The rubric is a scoring guide that evaluates and explicitly states what is expected of various task components. There are different criteria in a rubric that tap into the different levels of educational objectives. Such an artifact as the rubric is designed where one dimension takes on the criteria of learning crossed by the different levels of competencies (See Table 2 for further details). The colleges and academic programs would seek that students reach a target of “3” and above to assure that all learning outcomes are attained at a meritorious level.

Once faculty members assess the attained learning outcomes in their courses, an aggregated score for each learning outcome is calculated. The assessment data analysis identifies areas for further improvement, and finally these improvements get implemented [44]. Continuous review and effective mapping and assessment capitalize through a cycle and re-review for continuous improvement of the curriculum [46].

## 6. Conclusions and Limitations: Closing the Loop

This paper describes the assessment process of an academic program, including the structure, the process, and the organization of work. It also sheds light on the interrelations of the mission, objectives, and learning outcomes. Three key functions bring the objectives to the desired academic program level. First, the mission statements for each academic program communicate the values and goals underpinning the aims and goals of a program. Second, from the mission statement, students' dispositions and skills state what is to be attained through a program [46]. Third, as faculty members take a major role in crafting instructional activities, they align the curriculum with what is to be learned, and design the necessary tools assessing student achievement, as measurement evidence of delivering the desired curriculum [25]. This entails the alignment of outcomes when used as the assessments are actuated with students' work. Faculty and stakeholders develop learning outcomes that express what learning is intended through the curriculum and what should be achieved. Stakeholders create a system and a plan for the assessment of learning.

The course assessments are generally utilized to collect information regarding certain problems, exercises, and/or performances. The assessment plan is designed for a reporting cycle which specifies the learning outcomes to be assessed; the period, the course level, and the learning outcome to be measured. The direct measures generally use the course and classroom assessments to determine if learning outcomes have been achieved by students. Formative assessments are used as well to measure student achievement in course content and specific skills not specifically linked to competencies found in the learning outcomes. The process of identifying how students achieve the expected learning outcomes requires a set of tools, known as rubrics, detailing and specifying the behavioral criteria desired for learning. At the end of the assessment cycle, the institution may use indirect measures to acquire student and employer perceptions as to how far the skills and competencies embedded in the outcomes have been achieved. Indirect measures involve secondary data, focus groups, surveys or questionnaires that probe students, employers, alumni and other stakeholders about their experiences and opinions on what students have learned and on aspects related to instruction quality or faculty competency. Analysis of both direct and indirect measures to identify gaps, redundancy, or duplication is made at the end of the cycle.

Assessments of discipline-specific learning outcomes have been embraced by higher education institutions to compete with other providers [34]. Therefore, higher education may in the future encounter a transformational shift from formative and summative assessments to learning outcomes as a unit of measurement instead of credit hours [32]. Many higher education institutions might aggregate student results to generalize on curriculum or learning outcomes. It is foreseen that individual learning outcomes attainment is viable with the right computational systems and technologies for data collection and analysis.

## 7. Caveat: Avoiding the Pitfalls

Instead of evaluating content knowledge, academic program leaders' assessment design is expected to measure stated student learning outcomes. Program improvement and accreditation can be successfully reached if a "big picture" approach to outcomes assessment is followed [46]. An essential requirement to achieve valid student learning assessment involves a longstanding commitment on different levels, including administration, instructors, and students [42]. Successful academic programs engage and, more importantly, incentivize faculty to take leadership roles by capitalizing on three main facilitators: establishing learning communities of assessment, ensuring ongoing communication, and adopting a change initiative approach to assessments of learning outcomes [45]. Taking the factors mentioned into consideration can indeed significantly enhance the assessment process and better prepare an institution to meet the 'increasingly challenging' learning outcomes accountability system. Last, a point of caution is to consider the insufficient evidence to support the claims that systems designed to evaluate program learning outcomes have an impact on overall student learning and academic quality outputs.

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