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GOOD PRACTICES

Establishing a Culture of Assessment in a New US Pharmacy School: Lessons Learned

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Abstract

Purpose: **This article describes the development and implementation of an assessment culture in a US pharmacy school, highlighting the associated challenges.**

Method: **The school employed various strategies to foster an assessment culture, including meticulous planning, analyzing best practices, providing resources and financial support, and ensuring stakeholder participation. Faculty and staff received training and professional development, and an assessment committee was formed to oversee the implementation process. The committee's role was to utilize assessment results for decision-making and improving student learning outcomes. Regular feedback and progress reports were provided to stakeholders to ensure a smooth and efficient assessment process.**

Results: **Effective leadership, faculty buy-in, collaboration, shared accountability, and adequate resources were identified as crucial for establishing and maintaining an assessment culture. The assessment outcomes led to significant improvements in instructional design, delivery methods, and assessments across ten specific courses. The school also achieved program-level advancements in strategic planning, admissions processes, and faculty development initiatives.**

Conclusion: **Sustaining an assessment culture requires a well-developed assessment plan, active participation from faculty and students, sharing of results with stakeholders, using results for program enhancement, and compliance with accreditation standards. This study serves as a valuable resource for other educational institutions seeking to develop and implement assessment plans aligned with their program goals and accreditation requirements.**

Keywords: Assessment, Assessment culture, Assessment plan, Pharmacy education, Program assessment, Student learning outcomes

1. Introduction

Assessment entails the collection, analysis, and communication of data to evaluate the efficacy of institutions, programs, and instruction [1,2]. The significance of assessment is consistently increasing, calling for comprehensive guidance on best practices in higher education [3]. Establishing an assessment culture within an organization involves prioritizing the utilization of assessment methodologies and seamlessly integrating them into the organizational framework [3]. Such an approach should be rooted in established principles that align with the organization's culture and values [3,4].

The establishment of an assessment culture in higher education is driven by various motivations, including external pressures for institutional accountability [1,5,6], as well as internal aspirations for enhanced student learning outcomes [1,4,7]. Assessment data plays a crucial role in supporting faculty professional development, informing program and curriculum enhancements, and identifying areas where institutional resources can be effectively allocated for maximum impact [1,4,7]. Furthermore, many accreditation agencies mandate the implementation of a comprehensive assessment plan within educational institutions [8]. By aligning their assessment programs with accreditation requirements, institutions can showcase their dedication to continuous improvement and accountability to stakeholders [8]. For example, the Accreditation Council for Pharmacy Education (ACPE) places significant emphasis on

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schools and colleges of pharmacy assessing tangible student learning advancements, evaluating the teaching and learning environment, and actively fostering continuous quality improvement efforts [9].

The bulk of academic research related to cultures of assessment has focused on theoretical models for creating such a culture, rather than empirical studies that identify or confirm factors that constitute cultures of assessment in a particular institution [8,10]. In the realm of pharmacy education, research has indicated that robust institutional support for assessment and the active involvement of faculty members in assessment processes are positively associated with favorable outcomes [11]. Assessment plans in US colleges and schools of pharmacy typically incorporate several components, such as formal assessment plans, committees for assessment and curriculum, leadership roles for assessment, and involvement of non-faculty professional staff members [12]. However, there is a dearth of literature that describes a case study featuring the implementation of a comprehensive assessment plan for a particular pharmacy program [13].

The School of Pharmacy (SOP) at the American University of Health Sciences (AUHS) rolled out a three-year accelerated curriculum for its PharmD program in the summer of 2019, culminating in the graduation of inaugural class in May 2022. The SOP is committed to adhering to the ACPE 2016 accreditation standards. This commitment entails identifying areas that require improvement in terms of quality, planning the necessary resources and processes, implementing changes, and assessing the effectiveness of the program using data metrics. This article examines how the SOP has established an assessment culture, while also addressing the challenges that can arise during the implementation of such a culture. This study presents strategies that can be utilized to maintain an assessment culture.

2. Methods

The SOP developed and fostered an assessment culture through administrative support and organizational commitment, participation of all stakeholders, and faculty buy-in. The SOP Dean and University Administration ensured that infrastructure and fundamental support systems included funds, technological support, physical facilities, and support for faculty professional development on assessment.

2.1. Ensuring administrative support

The University Office of Institutional Research and Assessment provides support to the SOP through assessment data analysis including internal surveys and programmatic data. The University Director of Institutional Research and Assessment serves as a resource and an advisor to the faculty and Assessment Committee. The Dean and Executive Committee have promoted collaboration between all functional areas of the program, encouraging shared accountability. All administrative units are assessed annually for achieving and maintaining the mission, vision, and goals of the program.

2.2. Development of the organizational structure toward assessment

The SOP has devised approaches to cultivate a culture of assessment by promoting shared responsibilities and commitments toward continuous quality improvement. The assessment process was made inclusive and engaging for all stakeholders, leading to a more comprehensive and effective assessment of SOP. Assessment responsibilities were integrated into each functional unit and committee of the program to promote teamwork, accountability, and shared ownership across the program. The SOP administration, faculty, staff, standing committees, preceptors, students, and alumni have designated roles in the assessment process (Table 1).

The faculty-driven Assessment Committee is comprised of faculty and student members. One faculty member serves as the 'Assessment Champion,' who is a primary liaison between the Assessment Committee and the faculty. The Assessment Champion actively delivers messages regarding assessment such as processes or results and promotes assessment development opportunities for faculty. The Curriculum Committee regularly reviews individual course offerings to ensure that they meet their intended goals and objectives. The committee is responsible for managing, monitoring, assessing, and revising the curriculum to ensure that it complies with accreditation standards and professional practice requirements. The Co-Curricular Committee is responsible for planning and implementing co-curricular activities. The committee collects, analyzes, and maintains assessment data relevant to co-curricular experiences. The Faculty Development Committee is responsible for developing and implementing all faculty development activities. The Assessment Coordinator is responsible for coordinating assessment activities, maintaining assessment data, and communicating assessment findings and action plans to stakeholders.

Students were engaged in the assessment process through assessment committee membership. They

Table 1. Roles and responsibilities of stakeholders in the assessment process.

Stakeholders	Roles and responsibilities
Dean	• Provides administrative support and resources for assessments
Assessment Coordinator	• Collects, analyzes, disseminates, and manages assessment data.
Assessment Champion	• Serves as liaison between faculty and Assessment Committee • Serves as the primary resource for faculty assessment needs
Assessment Committee	• Promotes a culture of assessment within the SOP • Evaluates assessment data • Prepares reports with recommendations for relevant stakeholders • Reviews and recommends modifications to the assessment plan • Guides faculty in the development and implementation of assessment tools
Curriculum Committee	• Designs, develops, evaluates, and maintains curriculum • Monitors suggested curriculum-related action plans proposed from the assessment report
Office of Experiential Education	• Collects and analyzes student learning outcomes data of IPPE and APPE • Monitors and assesses sites and preceptors for quality improvement
Office of Academic Affairs	• Oversees the assessment efforts of the program. • Collects and analyzes students' faculty and course evaluation data, focus group data • Conducts curriculum mapping and review involving all faculty
Assistant Dean of Student Affairs and Admission	• Oversees the assessment efforts related to admissions and student progression. • Monitors changes in the areas related to student affairs and admission.
Admission Committee	• Collects and evaluates data related to admissions and student progression. • Assesses the admission process and recruitment of students.
Faculty	• Design and implement course-level formative and summative assessments. • Ensure that assessments are mapped to CLOs and PLOs. • Review, provide suggestions, and ultimately approve the assessment plan.
Preceptors	• Provide feedback through surveys and advisory meetings. • Assess students' performance and attitude throughout their experiential rotation.
Students	• Participate in course assessments. • Complete course-related assignments and reflections and maintain a portfolio • Provide feedback on curriculum, learning, and program through surveys and focus groups.
University Office of Institutional Research and Assessment	• Analyzes SOP curriculum and program-level assessment data • Provides faculty development opportunities on assessments • Administers surveys to stakeholders

participate in assessment activities through faculty and course evaluation surveys, focus groups, portfolios, self-assessments, and exams, providing valuable data on their learning and progress.

2.3. Integrating faculty into assessment through faculty development

Over the past four years of the development phase of the SOP, faculty were integral to the development of the curriculum, ensuring its alignment with desired outcomes and goals. Faculty designed and executed various formative and summative assessments to gauge student learning and program effectiveness. They collected course-level assessment data and used the assessment result to improve their courses and to make necessary changes. In addition, the faculty participates in quality improvement of SOP assessment by developing standardized rubrics and providing feedback on assessment-related activities or processes.

The SOP supports and encourages faculty to actively participate in and support assessment practices through ongoing faculty development activities that focus on the culture of assessment and how it can enhance program quality. The SOP provides workshops, seminars, and expert presentations on assessment (Table 2).

2.4. Development of comprehensive assessment plan

The SOP assessment strategy is guided by the Comprehensive Assessment Plan (CAP), which is developed, revised, and implemented by the Curriculum Committee and Assessment Committee with input from the Executive Committee and faculty. The plan outlines a systematic approach to assess student learning, program structure, and processes (Fig. 1). It evaluates educational outcomes and quality improvement efforts based on the school's vision, mission, and core values. The CAP evaluates student learning outcomes throughout the didactic curriculum, co-curriculum, and experiential education, and includes a review of core curricular areas and quality improvement processes (Table 3). Assessments of student educational outcomes and professional

Table 2. Representative examples of faculty development activities on assessment.

Representative Faculty Development Seminars/Workshops on Assessment (2020–2022)
• Current expectations for assessment in pharmacy
• Assessment terminology used in the pharmacy education
• Role of faculty in a quality assessment program
• Mapping questions/assignments to CLOs and PLOs
• Identifying curriculum gaps and redundancies through curriculum mapping
• Integration of basic and clinical sciences in PharmD curriculum: Are we assessing it right?
• Establishing clear, measurable outcomes of expected student learning
• Gathering, analyzing, and interpreting evidence to determine how well student learning matches our expectations
• Methods of Evaluation of Program Leadership.
• How to use AACP Surveys to support assessment of program effectiveness
• What do we mean by *sustainable* assessment? Learner-Centeredness
• How to evaluate learning using simulation
• What is Assessment? - Fundamentals of learning outcomes assessment
• ILO, PLO, CLO- Definitions of the learning outcomes used for assessment
• Rubrics- Introduction to rubrics and rubric design and use
• Active learning workshop
• Teaching, Learning, and Assessment: Evidence to Action with Equity in Next-Generation Assessment Practice
• The Art and Science of Writing Multiple-Choice Questions: Yes, We Learn Together!
• Assessment of Strategic Planning

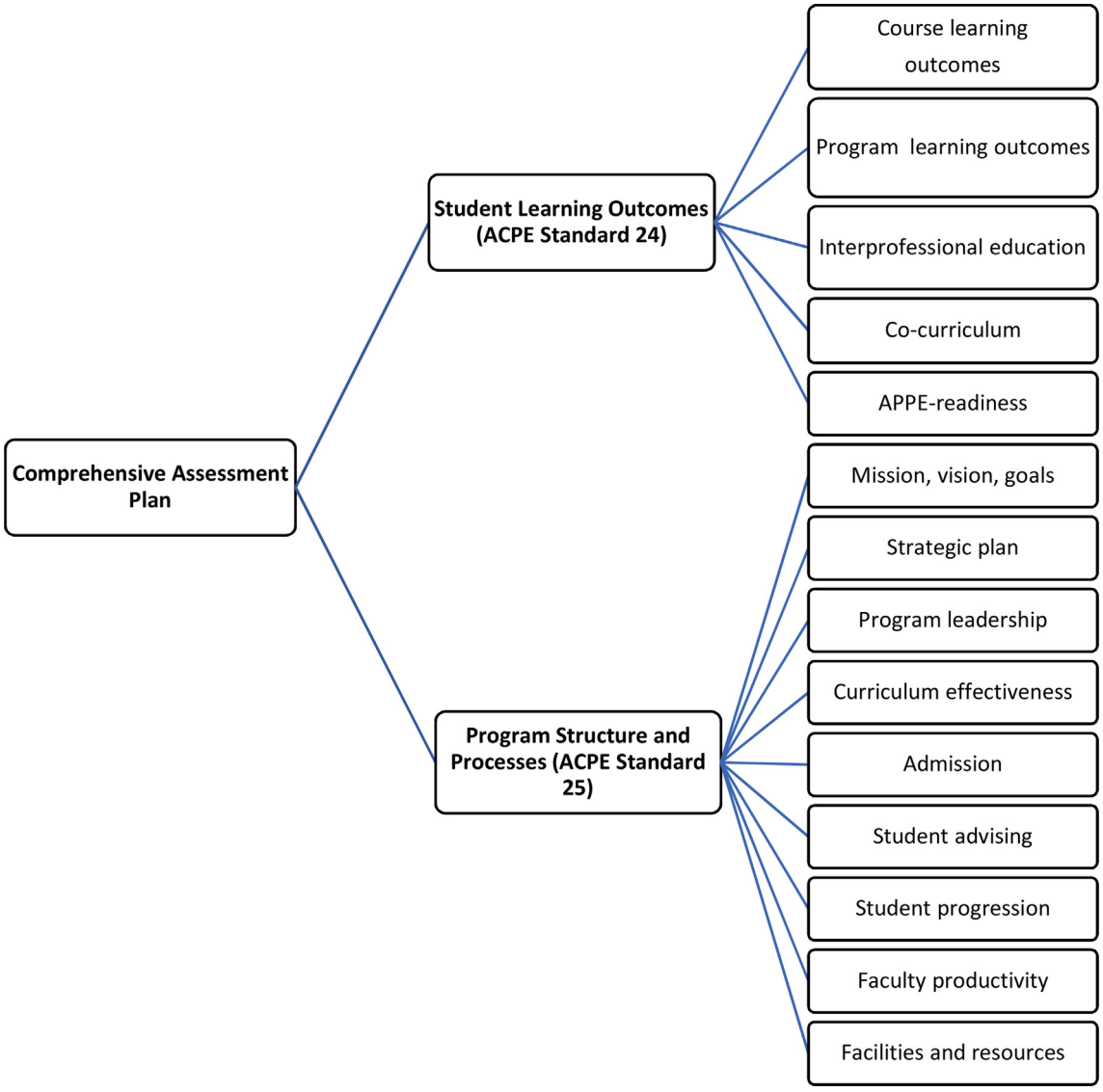

Fig. 1. Components of the school of pharmacy comprehensive assessment plan (CAP). In alignment with the ACPE 2016 Standards, the CAP includes two major domains: 1) assessment of student learning outcomes and 2) assessment of program structures and processes. Each domain has respective constituents for continuous quality improvement.

Table 3. Comprehensive Assessment Plan- Assessment of student learning outcomes.

Areas of Assessment	Assessment Tool	Benchmark	Data Collection	Data Analysis and Management	Timeline
Foundational Knowledge	CLOs mapped to PLO	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator Office of Institutional Research and Assessment	Annually
	NAPLEX, CPJE, MPJE	At or above the national average	Assessment Coordinator	Assessment Coordinator	Annually
	AACP survey of Graduating Students	% Agree/Strongly agree (at or above peer/national average)	Assessment Coordinator	Assessment Coordinator	Annually
Essentials for Practice and Care • Patient-centered care • Health and wellness • Medication use systems management • Population-based care	CLOs mapped to PLO	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator Office of Institutional Research and Assessment	Annually
	IPPEs and APPEs activities	Aggregate mean (≥70%)	Experiential Office	Assessment Coordinator	Annually
	AACP Surveys (Graduating Students, Preceptors, and Alumni)	% Agree/Strongly agree (at or above peer/national average)	Assessment Coordinator	Assessment Coordinator	
	IPPE/APPE student evaluations by preceptors	Average score of ≥3 out of 4	Experiential Office	Experiential Education	
Approach to Practice and Care • Problem-solving • Educator • Patient advocacy • Interprofessional collaboration • Cultural sensitivity • Communication	CLOs mapped to PLO	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator	Annually
	Assessments/Grades for the IPE activities that are mapped to PLO 3.4	Aggregate mean (≥70%)	Faculty/IPE Committee Chair	Assessment Coordinator	
	AACP Standardized Survey: (Students, preceptors, alumni)	% Agree/Strongly agree (at or above peer/national average)	Faculty/IPE Committee Chair	Assessment Coordinator	
	IPPE/APPE student evaluations by preceptors	Average score of ≥3 out of 4	Experiential Office	Experiential Education	

Personal and Professional Development • Self-awareness • Leadership	CLOs mapped to PLO	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator Office of Institutional Research and Assessment	Annually
• Innovation	IPPE self-reflections	Aggregate mean (≥70%)	Faculty/Canvas	Experiential education	
• Entrepreneurship • Professionalism	Reflections on personal/professional growth and development: Co-curricular activity reflections	Aggregate mean (≥70%) (Graded based on rubric)	Faculty/Canvas	Faculty advisors, Assessment Coordinator	
	AACP Graduating Student, Preceptor, and Alumni Surveys	% Agree/Strongly agree (at or above peer/national average)	Assessment Coordinator	Assessment Coordinator	
	IPPE/APPE student evaluations by preceptors	Average score of ≥3 out of 4	Experiential Office	Experiential Education	
Interprofessional Education	Assessments mapped to PLO 3.4. (Collaborator)	Aggregate mean (≥70%)	Faculty/IPE Committee Chair	Assessment Coordinator	Quarterly
	IPEC Competency Rubric	At or above satisfactory level	Faculty/IPE Committee Chair	Assessment Coordinator	Quarterly
	Clinical Performance rubric	At or above satisfactory level	Faculty/IPE Committee Chair	Assessment Coordinator	Quarterly
	Students' attitude: RIPLS/ SPICE-R	At or above satisfactory level	Faculty/IPE Committee Chair	Assessment Coordinator	Quarterly
	AACP Graduating Students, Questions 11, 46	% Agree/Strongly agree (at or above peer/national average)	Assessment Coordinator	Assessment Coordinator	Annually
	Students' engagement in IPE activities	100% students' participation	Faculty/IPE Committee Chair	Assessment Coordinator	Annually
Student Progression to APPE	Practice Readiness Course assessments	Aggregate mean (≥70%) 100% of student progress	Faculty/Canvas	Experiential Education	Quarterly
	Embedded assessments in didactic courses (Knowledge and skill-based)	Aggregate mean (≥70%) 100% of students progress	Faculty/Canvas	Assessment Coordinator	Quarterly
	Course assessments mapped to Standard 1−4	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator	Annually
	PPCP mapped assessments	Aggregate mean (≥70%)	Faculty/Canvas	Assessment Coordinator	Quarterly

Table 4. Comprehensive assessment plan- assessment of program structure and processes.

Areas of Assessment	Data	Benchmarks	Data Source/Data Collection	Data Analysis and Management	Timeline
Mission, Vision, and Goals	Strategic Plan	Achievement in each objective	Assessment Coordinator	Assessment Coordinator	Annually
	AACP Faculty Survey	% Agree or Strongly Agree at or above peer/national average		Annually	
	PLOs assessment	Aggregate mean (≥70%)		Assessment Coordinator	Annually
Curriculum Effectiveness	PLOs assessment	Aggregate mean (≥70%)	Assessment Coordinator	Assessment Coordinator	Annually
	Students' Course and faculty Evaluation	Overall Score ≥3 out of 4 on the Evaluation	Institutional Research and Assessment	Institutional Research and Assessment	
	IPPE/APPE site and preceptor evaluations by students	Each site/preceptor scores an average of ≥3.5 out of 5	Experiential Education	Assessment Coordinator	Quarterly
	AACP Graduating Student Survey	% Agree/Strongly agree (at or above peer/national average)	Assessment Coordinator	Assessment Coordinator	Annually
Student Progression	Progression Data	100% student progress	Academic Affairs	Assessment Coordinator	Quarterly
Faculty − Teaching Effectiveness	Students' Faculty Evaluation	Overall Score ≥3 out of 4 on the Evaluation	Institutional Research and Assessment	Assessment Coordinator Department Chair	Quarterly
	Chair Evaluations	100% of faculty are evaluated		Department Chair	Quarterly
Faculty Scholarship/ Research	Number of peer reviewed publication/presentations	One publication/presentation per year	Department Chair	Department Chair	Annually
Program Leadership • Leadership Effectiveness	AACP Surveys (Graduating Student, Preceptors, and Faculty)	% Agree or Strongly Agree at or above peer/national average	Assessment Coordinator	Assessment Coordinator	Annually
	An internal survey of faculty	80% Agree or Strongly Agree	Institutional Research and Assessment	Assessment Coordinator	Annually
School Committees	AACP Faculty Survey	% Agree or Strongly Agree at or above peer/national average		Assessment Coordinator	Annually
Admissions Criteria	Correlation of admission variables	Monitor at least 3 variables	Office of Student Affairs	Assessment Coordinator	Annually
Admission Process	Survey of students interviewed	80% Agree or Strongly Agree		Student Affairs and Admission	Annually
Facilities and Resources	AACP Graduating Student Survey	% Agree or Strongly Agree at or above peer/national average	Assessment Coordinator	Assessment Coordinator	Annually
	AACP Faculty Survey	% Agree or Strongly Agree at or above peer/national average		Assessment Coordinator	Annually

competencies include course-level individual and aggregate learning outcomes assessment, embedded practice readiness assessments, experiential education, interprofessional education, and co-curriculum. The programmatic assessment plan continuously and comprehensively evaluates all areas of the SOP's mission and goals (Table 4). The plan includes the assessment items, assessment tools, benchmarks, responsible parties, and timelines for pertinent data collection, analysis, and reporting.

2.5. Implementation of CAP

At AUHS SOP, the assessment process was made inclusive and engaging for all stakeholders to ensure efficient management, teamwork, accountability, and shared ownership. The Assessment Committee developed an Assessment Calendar with timelines for all assessment activities to facilitate timely data collection and analysis. The assessment plan has been implemented for the last three assessment cycles beginning from the 2019–2020 academic year. The SOP has collected assessment data on the achievement of 1) student learning outcomes and 2) program structure and processes.

Course faculty developed reliable and valid assessments that align with program goals and deliberately assess student learning outcomes. Faculty mapped assessments (e.g., exams, OSCEs, comprehensive cases, and preceptor assessments) to course learning outcomes (CLOs), program-learning outcomes (PLOs), disease states, and ACPE standards during the course implementation. Faculty utilized a broad mix of formative and summative assessment activities to measure student learning and professional development throughout the curriculum and co-curriculum. The Co-Curriculum Committee implements a comprehensive co-curricular plan to help students develop self-awareness, leadership, innovation, entrepreneurship, and professionalism. The co-curricular activities were focused on community health education, health screening, immunization, and medication therapy management. Their co-curricular experiences are assessed through guided self-reflections, rubrics, and feedback from faculty advisors. Similarly, the SOP has implemented the IPE plan that outlined specific activities, timelines, outcomes, and assessment tools. A variety of assessment tools were used to measure knowledge, knowledge application, and performance on IPE including validated rubrics and standardized instruments. Students also maintained electronic portfolios to document their achievements and reflections.

The SOP has implemented a comprehensive programmatic assessment plan that supports continuous quality improvement. Program assessment data includes mission, vision and goals, strategic plan objectives, leadership effectiveness, curriculum effectiveness admission variables, student survey on the admission process, student advising by their faculty advisors, faculty quality indicators, and facilities and resources. The AACP graduating student surveys were used to assess the quality of academic advising, in comparison with both national and peer data. Besides, the Admissions Committee developed and deployed a survey to students seeking their feedback on the SOP admission process.

2.6. Assessment data collection and analysis

At the end of each quarter, the Assessment Coordinator collects students' performance data from the faculty, Office of Experiential Education, and Office of Academic Affairs and Co-Curricular Committee.

For program-level assessment, the Assessment Committee tracks and assesses the outcomes outlined in the Strategic Plan. At the end of each quarter, the Office of Academic Affairs collects and analyzes data from students' course evaluations, faculty self-evaluations of courses, and student focus group comments. Additionally, data from the systematic curriculum review and mapping are collected and analyzed by the Office of Academic Affairs. The internal survey data of admitted students, their admission variables, academic performance, attrition rates, and progression rates are provided by the Office of Student Affairs and Admission to the Assessment Coordinator. Similarly, department chairs provide faculty productivity in scholarship, teaching effectiveness, and professional and community service data to the Assessment Coordinator. The assessment data is accessible from a shared drive maintained by the Assessment Coordinator. Thus, the Assessment Coordinator collects, analyzes, and manages student learning outcomes and program assessment data.

2.7. Interpretation and dissemination of data

The Assessment Committee reviews data and provides recommendations to relevant stakeholders. The assessment data collected is shared with respective functional units, leadership, and faculty to ensure the continuous development of the program. Assessment results are disseminated to stakeholders through various channels, including

Dean's Town Hall meetings, University Academic Council meetings, and Preceptor Advisory Council meetings. The assessment report is also included in the University's Annual Assessment Report. The findings of the assessment are also disseminated through conference presentations and peer-reviewed journal publications.

2.8. Data-driven action and decision making

The SOP is committed to monitoring assessment data that forms the basis for evaluation and continuous improvement of the curriculum. Curriculum effectiveness is systematically assessed by triangulation of multiple data sets, including course level formative and summative assessments data, aggregate students' achievements of CLOs and PLOs in the courses, preceptors' evaluation of students' performance in IPPEs and APPEs, students' performance in knowledge- and skills-based embedded assessments related to practice-readiness, students' faculty and course evaluations, and focus group feedback on curriculum.

2.9. Feedback loops: documenting the use of assessment data and monitoring for improvement

Based on the evaluations and recommendations for course-level improvement provided by the AC, action plans for improvement are created by the course coordinators in collaboration with the respective Department Chair. The action plans are reviewed and approved by the AC. The CC also ensures the proper implementation of these changes either to the specific courses or the overall curriculum. Similarly, if any area is identified in the program structure and processes where goals are not met, the respective functional unit enact action plans to address the issues identified. The circle is completed when the outcomes of the changes are monitored and evaluated.

3. Results

3.1. Student learning outcomes and curricular effectiveness

Student learning outcomes are assessed through students' performance on CLOs and PLOs from each course. Every year, PLO aggregate data and individual student achievement on PLOs are assessed to monitor student progress on PLOs and identify gaps in the curriculum. In addition, an individual student's progress in all areas including didactic courses, experiential education, and co-curricular activities, is monitored, and compared with the aggregate data. This comprehensive assessment approach helps identify students at risk promptly and give clear ideas of where to improve.

The gaps identified from the assessment data most commonly are 1) inadequate test questions mapped to CLOs to achieve adequate assessment of specific content areas, 2) mapping of one CLO to multiple PLOs contributing to a gap in PLO assessment, and 3) too many CLOs in some courses. The course coordinators developed action plans in concert with their Department Chair based on course-level assessment data. The action plans for several course-level improvements were approved for their implementation by the faculty. The changes include streamlining the mapping of CLOs with PLOs, adjusting course materials based on credit and contact hour allocation, and aligning content coverage with the student learning outcomes. The impact of these changes is monitored and evaluated, closing the loop with its evaluation. Table 5 shows some examples of curriculum changes based on assessment results. The assessment results led to improvements in instructional design, delivery, and assessments in 11 courses.

3.2. Program structures and processes

The program level assessment includes strategic plan, leadership, curriculum effectiveness, student admission, faculty qualitative and quantitative factors, and resources and facilities. The strategic initiatives were re-evaluated and re-prioritized to ensure that the SOP is responsive to changes in higher education, pharmacy practice, and healthcare. Implementation of the newly developed strategic initiatives and how they are guiding the development of the program are in place with a special focus on student personal and professional development in the curriculum, shared governance in the fostering culture of assessment, empowering students and faculty serving the underprivileged and underserved population, recruit and retain diverse faculty, staff, and students, and advance research and scholarship.

The 2020–2022 AACP Faculty Surveys and the internal faculty survey of SOP leadership, administered by the Office of Institutional Research and Assessment, revealed that the faculty ratings of the SOP administrators were satisfactory. Based on the surveys, suggested action plans were developed for each administrator which focused on how the administrator could build on their strengths and

Table 5. Examples of Curriculum improvements based on assessment data.

Assessment Data	Courses	Changes/Modifications	Timeline
Student course evaluation Focus group	PS 714: Biochemistry:	• The wet lab component was removed.	Summer 2020
Faculty course feedback	AS 723: Pharmacy and US Healthcare Systems:	• The global health content was shortened.	Summer 2020
Student course evaluation Focus group	PS 731: Immunology & Medical Microbiology:	• Course materials were adjusted based on credit and contact hour allocation	Fall 2020 and Winter 2021
Student course evaluation Focus group	PS 741: Pathophysiology	• Course materials were adjusted based on credit and contact hour allocation	
Student course evaluation Curriculum review	PS 744: Medical Illustration I and AS 854: Medical Illustration II:	• The IPE projects are streamlined towards the theme of "patient care".	Fall 2020 and Winter 2021
Student course evaluation	PS 722: Pharmaceutics and Biopharmaceutics with Lab	• Reinforcement of pharmaceutical calculations on acids and bases • Addition of videos as an instructional strategy	Fall 2021
Student course evaluation CLO/PLO assessment Faculty feedback	CS 881: Integrated Pharmacotherapy VII - Oncology and Nutrition with Lab:	• Several topics such as skin, ovarian/cervical, prostate, GI/bladder cancers were covered in other courses and omitted to avoid redundancies. • Pharmacoeconomic consideration in drug therapy was added	Spring 2022
Student course evaluation CLO/PLO assessment Faculty feedback	CS 862: Integrated Pharmacotherapy IV - GI/Endocrinology	• Course content and delivery are adjusted based on updated American Diabetic Association (ADA) guidelines.	Fall 2021
Student course evaluation CLO/PLO assessment Faculty feedback	CS 861: Integrated Pharmacotherapy III - Nephrology and Pulmonology Pharmacotherapy with Lab,	• Incorporated in-class case discussions and polls everywhere • Course learning outcomes were rephrased for clarity	Fall 2021
Student course evaluation CLO/PLO assessment Faculty feedback	CS 872: Integrated Pharmacotherapy VI -Infectious Disease with Lab	• Special focus on vancomycin and aminoglycoside • Increased focus on in-class activities such as the jeopardy game, and video • Pharmacoeconomic consideration in drug therapy to be added	Winter 2022
Student course evaluation CLO/PLO assessment	CS 882: Integrated Pharmacotherapy VIII - Urology & Reproductive System with Lab	• Incorporated patient counseling sessions on contraception	Spring 2022

address any suggestions or areas of improvement reported in the survey results.

The SOP has developed and implemented a well-structured student advising program that provides students a means for enriched, targeted discussion, self-assessment, career planning, and purposeful reflection on the personal and professional developments of students. Students highly rated the

existing SOP student advising program in a survey on various aspects of the advisee–advisor relationship. The results of this survey indicate that the student advising program is meeting students' needs.

The SOP Admissions Committee continually assesses the admission process after each recruitment period. Correlation analyses were conducted among the prepharmacy cumulative GPA and math/science GPA and students' performance in the program. The Admissions Committee developed and revised a post-interview survey for soliciting candidates' feedback. The survey data are used to identify the strengths and weaknesses in the SOP admission process.

Course evaluations and Chair evaluations of teaching provided evidence of quality improvement and effectiveness of faculty teaching. Overall, the faculty teaching evaluations were satisfactory and the ratings were over 4.0 on a 5-point Likert scale. The frequent positive comments about faculty teaching effectiveness included knowledge, passion for teaching, empathy, hardworking, caring, flexibility, well-organized, and excellent teaching style, etc. Students also provided constructive feedback on how faculty, specifically those who are new to academia, can improve their teaching effectiveness. The common areas needing improvement for faculty include content overload, poor time management, and fast-paced delivery. After completion of each experiential rotation, students evaluated the quality of preceptors and identified areas needing improvement.

The AACP Faculty survey provided some assessments of the faculty mentoring program. For example, faculty agreed that they receive formal feedback regularly, constructive performance feedback, and guidance on career development. Faculty workloads on teaching, research, and service were evaluated annually by the Department Chair.

3.3. Evaluation of the assessment plan

The evaluation of assessment processes was conducted using multiple approaches including the Assessment Committee's annual review of the CAP, AACP Standardized Surveys, and feedback from faculty, preceptors, students, or other stakeholders during the faculty retreat. After the implementation of the CAP, two iterations of revisions were conducted by the Assessment Committee in 2021 and 2022 for quality assurance of the assessment process. The major updates in the CAP included revisiting the timelines, benchmarks, and responsible parties in several elements of CAP. In experiential education and IPE, a new assessment tool, Field Encounter, was included to improve the assessment of IPE learning outcomes. In addition, several assessment tools including preceptor and site evaluation by students, preceptor screening, and new site screening are included in the assessment of facilities and resources.

During the AACP faculty survey (2020–2022), over 90% of faculty felt that the assessment processes and curriculum oversight processes are effective and the program uses assessment data to improve the curriculum. Similarly, faculty agreed/strongly agreed that the SOP has sufficient resources, faculty, and staff, programs to improve teaching and learning, and physical facilities to effectively address programmatic needs.

Program-level improvements were done in strategic planning, admission, and faculty development areas.

4. Discussion

It is a daunting task in higher education to maintain a culture of assessment that involves several obstacles [14]. After four years of assessment efforts, we have identified key factors essential for developing and sustaining a culture of assessment. Effective leadership, participation of all stakeholders, collaboration, shared accountability, and adequate resources are necessary. We have learned that faculty buy-in and understanding of the assessment process and its needs were the most critical factors for a culture of assessment to thrive (Fig. 2).

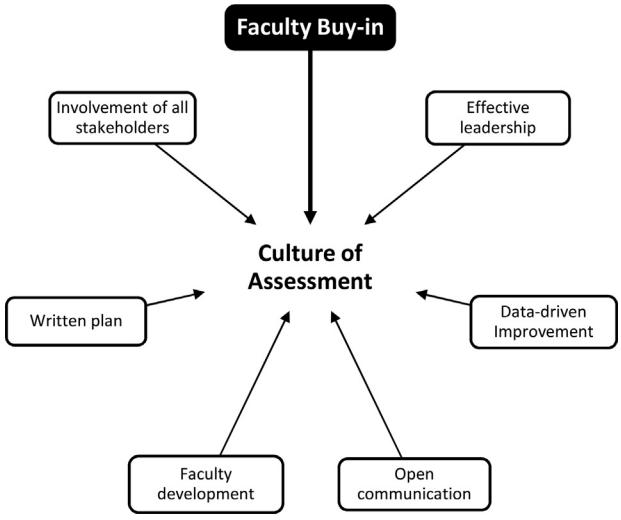

Fig. 2. The elements of assessment culture established at AUHS SOP. Faculty buy-in appeared as the most critical element for sustenance of a culture of assessment.

The SOP leadership played a critical role in careful planning, examination of successful practices, providing faculty training, and ensuring widespread faculty participation. Leadership is critical in fostering an assessment culture within higher education settings [15,16]. To promote effective assessment practices, effective leaders incorporate assessment into the strategic planning process, establish goals, and prepare policies and procedures [1]. Recent studies suggest that leaders who provide clear expectations, mentoring, and recognition for assessment efforts are more likely to create a culture of assessment and enable faculty and staff to engage in assessment effectively [16]. In addition, leaders ensure the resources needed for assessment. Insufficient resources, both in terms of time and finances, can impede the effectiveness of assessment practices [17]. By having specific responsibilities for each unit, all aspects of the assessment process are covered and no one unit is overburdened. This allows for specialized skills and knowledge to be utilized, leading to more precise and efficient assessments. A culture of assessment is more likely to emerge and be sustained when it is grounded in shared responsibility [18]. By distributing the responsibility for assessment across multiple units, it becomes clear that assessment is not the sole responsibility of a single person or department, but a shared responsibility. This encourages a collective sense of ownership and accountability, which is best cultivated through ongoing collaboration and communication among faculty, administrators, and students [18].

Engaging faculty is crucial for sustaining a culture of assessment [1,19,20]. Faculty are responsible for developing and implementing assessment strategies to assess student learning outcomes. However, it can be challenging if faculty lack familiarity with assessment practices or view them as a burden and unnecessary. One of the main difficulties is resistance to change, as faculty may not see the value in making changes [20,21]. Another challenge is a lack of faculty time due to competing obligations such as research, teaching, and service [19]. In our experience, this created multiple challenges in assessment, including inappropriate mapping of assessments to CLOs and PLOs, or inadequate mapping due to lack of assessments, which ultimately lead to delayed data collection and analysis. Often, time constraints and resource limitations can also make it difficult for faculty members to prioritize assessment and implement new practices. We have mitigated some of these challenges by providing training on assessment literacy, integrating assessment into the workload, involving faculty in decision-making, and providing feedback. Providing ongoing professional development opportunities can help develop assessment literacy among faculty and staff, which is essential to design and implementing effective assessment systems [18,22,23]. The training should be tailored to the needs of the faculty and should be provided in a timely and convenient manner. We believe that clear communication and collaboration between the Assessment Committee and faculty are essential for addressing these challenges. Feedback on the effectiveness of assessment strategies and activities should also be collected and analyzed to identify areas for improvement. Reflecting on our experience, we can see how effective faculty engagement can improve teaching practices, student outcomes, and institutional effectiveness.

Student involvement in assessment is crucial for promoting student-centered learning and developing a culture of continuous improvement [10]. Involving students in self-assessment and peer assessment can enhance their learning experience and cognitive abilities [24–26]. Students can provide feedback on their learning experiences through surveys, focus groups, and faculty and course evaluations (FCEs) [27]. However, like other schools, we have experienced challenges concerning students' response rates and quality of feedback in FCEs and AACP graduating student surveys. In consistent with published literature, our experience also suggests that students' feedback focuses on mostly teacher behaviors rather than course characteristics or overall course quality.

It is difficult to keep all functional units on track when implementing and assessing strategic initiatives in program assessment. To address this challenge, the school Executive Committee meets regularly to review the strategic plan. The Assessment Committee keeps track of deadlines and responsible parties.

It is imperative to view assessment as a continuous improvement process that involves sharing results with stakeholders and the use of data [7,28]. The sharing of results is essential to promote transparency and accountability, in addition to providing stakeholders with the opportunity to provide feedback and suggestions for improvement [6,7,19]. Additionally, to ensure that the comprehensive assessment plan is relevant to the changing needs of the program, it should be regularly updated and reviewed [19,29].

5. Conclusion

Sustaining an assessment culture requires a comprehensive plan, faculty engagement, student involvement, sharing results with stakeholders, using

results for program improvement, and ensuring compliance with accreditation requirements. Constant monitoring is needed to mitigate the inexorable challenges associated with the implementation and sustenance of an assessment culture. The study guides other schools seeking to develop and implement their assessment plans aligned with their specific student learning objectives, curriculum, programmatic, and accreditation requirements.

Ethics approval

The proposal has been verified and determined to be exempt from review by the American University of Health Sciences Foundation Institutional Review Board (IRB).

Conflict of interest

None.

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