

Leveraging Technology for Enhanced Pharmacy Education Assessment

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Background

According to the American Council for Pharmacy Education (ACPE) accreditation standards, specifically Standard No. 24 - **Assessment Elements for Section I: Educational outcomes**: A detailed description of the plan to assess student achievement of the educational outcomes at the individual level is required.

Objective

This work aims to enhance assessment processes through the implementation of an individual assessment plan focused on monitoring students' attainment of CAPE educational outcomes (EO) using technology.

Methods

A comprehensive assessment dashboard was developed to integrate diverse performance indicators spanning from P1 to P4.

A total of 61 students were tracked from their first professional year in P1 to P4.

Mapping

This dashboard encompasses performance indicators extracted from experiential courses, co-curricular activities (CCA), interprofessional educational program (IPE), Objective Structured Clinical Examination (OSCE) and select didactic courses.

Faculty aligned each indicator with specific EO, creating a longitudinal assessment framework across professional years.

Analysis:

Data from multiple sources were combined to generate a score per EO, per professional year for each student.

An individual student assessment report was generated to highlight individual student's strengths (EO score > 70%) and monitor areas for improvement (EO score < 70%).

Mapping

For each student, individual EO was assessed across diverse courses using multiple rubrics (range: from 1 to 10), competencies (range: from 1 to 40) and data points (range: from 1 to 200).

	Rbrcs	1.1 Foundational knowledge		2.1 Patient-centered care		2.2 Medication use systems management		2.3 Health and wellness; 2.4 Population-based care		3.1 Problem solving; 4.3 Innovation and Entrepreneurship		3.2 Education		3.3 Patient advocacy		3.4 Interprofessional collaboration		3.5 Cultural sensitivity		3.6 Communication		4.1 Self-awareness		4.2 Leadership		4.3 Professionalism																																																																																									
		1	2	1	1	4	2	1	3	1	4	3	2	3	1	4	3	2	3	1	4	3	2	3	1	4	3	2	3																																																																																						
P1	Cmp	1	29	1	2	4	2	1	3	1	15	6	2	9	P2	Cmp	7	34	2	2	10	3	2	3	1	9	10	5	18	P3	Cmp	13	14	17	5	12	9	6	8	2	19	14	5	24	P4	Cmp	10	40	30	10	21	20	10	10	0	20	40	10	9	Pts	1	60	10	20	17	13	3	24	3	35	35	13	65	Pts	32	208	11	5	46	16	103	123	3	24	9	5	18	Pts	95	115	120	25	84	39	24	44	3	65	66	21	56	Pts	50	200	150	50	103	100	50	50	0	100	200	50	45
	Pts	1	60	10	20	17	13	3	24	3	35	35	13	65		Pts	32	208	11	5	46	16	103	123	3	24	9	5	18		Pts	95	115	120	25	84	39	24	44	3	65	66	21	56		Pts	50	200	150	50	103	100	50	50	0	100	200	50	45																																																								

Challenges

- Collecting and entering data / missing data points.
- Standardizing weight of each competency.
- Educational outcome mapped to few competency.
- Threshold variation.
- Delayed students.

Aggregate results

1) Results related to each EO are generated and student achievements below performance criteria (set at 70%) are highlighted. The table below shows EO 3.4 Interprofessional collaboration as an example.

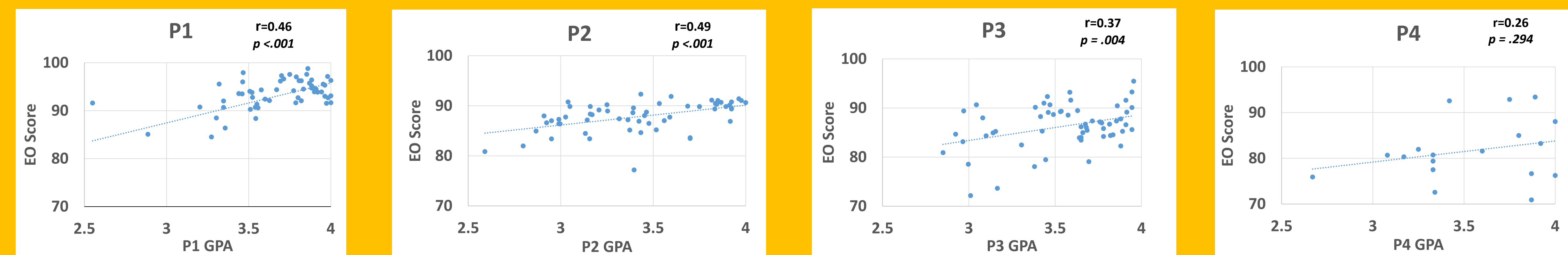
	3.4 Interprofessional collaboration				P4
	P1	P2	P3	P4	
Student 1	70.5	93.6	89.2	89.2	Graduated at P3 with a BS
Student 2	76.2	91.1	93.1	93.1	Graduated at P3 with a BS
Student 3	67.7	72.1	79.0	79.0	Graduated at P3 with a BS
Student 4	84.7	88.8	84.2	84.2	60.0
Student 5	87.3	80.1	84.0	84.0	Graduated at P3 with a BS
Student 6	82.3	79.4	85.2	85.2	100.0
Student 7	84.3	85.4	83.6	86.7	73.3
Student 8	88.0	69.4	90.3	90.3	81.4
Student 9	89.2	94.9	81.4	81.4	Graduated at P3 with a BS
Student 10	76.6	90.1	77.8	77.8	Graduated at P3 with a BS
Student 11	81.0	87.9	89.7	89.7	Graduated at P3 with a BS
Student 12	81.1	87.1	86.2	86.2	Graduated at P3 with a BS
Student 13	77.8	72.4	82.7	80.0	80.0
Student 14	84.0	88.8	72.3	80.0	80.0
Student 15	85.0	84.9	97.6	73.0	73.0
Student 16	80.8	72.6	80.7	80.7	Graduated at P3 with a BS
Student 18	53.9	70.4	89.4	89.4	Graduated at P3 with a BS
Student 19	77.2	77.9	83.7	83.7	Graduated at P3 with a BS
Student 20	80.0	76.1	93.2	93.2	Graduated at P3 with a BS
Student 21	88.3	86.6	81.8	81.8	Graduated at P3 with a BS
Student 22	81.0	76.9	86.2	86.2	Graduated at P3 with a BS
Student 23	89.5	93.9	80.2	80.2	Graduated at P3 with a BS
Student 24	78.8	86.4	89.5	89.5	80.0
Student 25	87.4	87.9	89.0	89.0	Graduated at P3 with a BS
Student 26	88.0	85.6	96.0	96.0	Graduated at P3 with a BS
Student 27	86.2	89.1	81.0	81.0	Graduated at P3 with a BS
Student 28	87.8	93.4	83.9	80.0	80.0
Student 29	78.3	79.9	77.8	77.8	Graduated at P3 with a BS
Student 30	77.2	81.9	84.2	86.7	86.7
Student 31	85.5	79.9	80.4	86.7	86.7
Student 32	76.8	78.1	89.6	85.0	85.0
Student 33	83.2	79.6	85.9	73.3	73.3
Student 34	87.1	78.1	85.6	85.6	Graduated at P3 with a BS
Student 35	72.2	88.4	91.8	91.8	Graduated at P3 with a BS
Student 36	87.3	83.1	83.8	83.8	Graduated at P3 with a BS
Student 37	66.2	67.4	84.2	84.2	Graduated at P3 with a BS
Student 38	87.8	77.9	96.6	96.6	Graduated at P3 with a BS
Student 39	87.7	66.1	88.8	80.0	80.0
Student 40	78.0	84.6	92.5	80.0	80.0
Student 41	87.3	76.9	82.1	82.1	Graduated at P3 with a BS
Student 42	80.2	88.1	85.3	80.0	80.0
Student 43	92.2	91.9	84.1	80.0	80.0

2) All EO average scores are above 70%.

	P1	P2	P3	P4
1.1 Foundational knowledge	87	89	87	81
2.1 Patient-centered care	96	82	88	79
2.2 Medication use systems management	95	79	91	83
2.3 Health and wellness; 2.4 Population-based care	96	93	92	81
3.1 Problem solving; 4.3 Innovation	96	90	78	82
3.2 Education	94	91	82	78
3.3 Patient advocacy	90	72	88	88
3.4 Interprofessional collaboration	81	82	86	81
3.5 Cultural sensitivity	93	71	67	N/A
3.6 Communication	91	92	85	78
4.1 Self-awareness	95	98	87	84
4.2 Leadership	96	99	91	85
4.3 Professionalism	96	87	86	88
Average of the cohort by Professional year	93	87	85	82

Validation


4) Results show a moderate to weak correlation between EO scores and GPA in P1, P2 and P3.



Results

Individual results

3) The individual report serves as a comprehensive assessment tool to track each student's achievements of the CAPE educational outcomes throughout their professional years.

Individual Student Assessment Report 

This report serves as a comprehensive assessment tool to track each student's achievements of the CAPE educational outcomes throughout their academic journey from P1 to P4. This report aims to guide continuous improvement with the ultimate goal of ensuring that each student meet or exceed all educational outcomes.

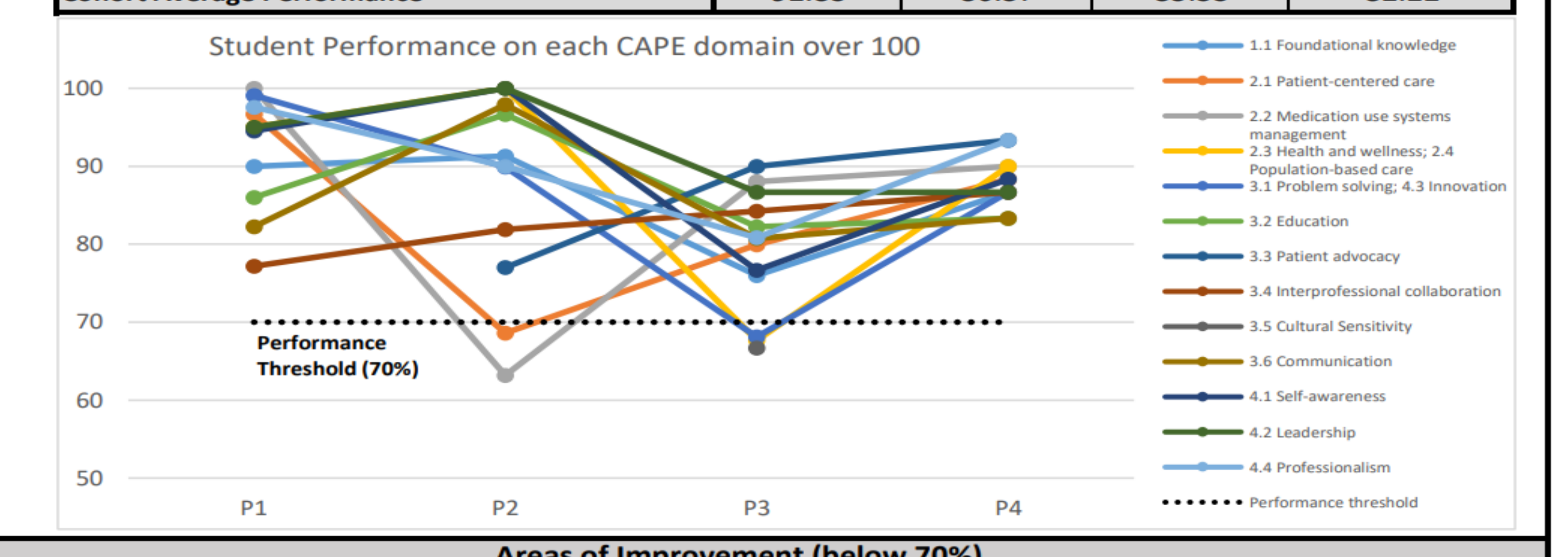
Name: _____ ID#: _____ Date: Fall 2023

Achievements of the Educational Outcomes

Each educational outcome is assessed by triangulating multiple assessment sources from different course evaluations. The performance criteria is set at 70%. Area (s) of improvement (s) is (are) highlighted and indicated below. This report is updated on annual basis.

	AY20-21	AY20-22	AY20-23	AY20-24
	P1	P2	P3	P4
1.1 Foundational knowledge	90.00	91.30	76.00	86.67
2.1 Patient-centered care	96.67	68.60	79.92	88.33
2.2 Medication use systems management	100.00	63.18	88.02	90.00
2.3 Health and wellness; 2.4 Population-based care	95.00	100.00	67.67	90.00
3.1 Problem solving; 4.3 Innovation	99.09	89.90	68.12	86.67
3.2 Education	86.00	96.65	82.24	83.33
3.3 Patient advocacy	NA	77.00	90.00	93.33
3.4 Interprofessional collaboration	77.18	81.88	84.24	86.67
3.5 Cultural Sensitivity	NA	NA	66.67	NA
3.6 Communication	82.24	97.92	80.73	83.33
4.1 Self-awareness	94.53	100.00	76.67	88.33
4.2 Leadership	95.00	100.00	86.67	86.67
4.3 Professionalism	97.58	90.00	80.83	93.33
Student Overall Average Performance	92.12	88.04	79.06	88.06
Cohort Average Performance	92.83	86.57	85.33	82.22

Student Performance on each CAPE domain over 100



Areas of Improvement (below 70%)

P1	None
P2	2.1 Patient-centered care/ 2.2 Medication use systems management
P3	2.3 Health and wellness/ 3.1 Problem solving / 3.5 Cultural awareness
P4	None

Development plan (if needed)

During P2	None
During P3	To reinforce skills related to patient care and medication use systems
During P4	To participate in health and wellness activities, reinforce cultural awareness and problem solving skills

Implications

The integration of technology facilitates tracking of individual student achievement of the EO, providing actionable insights for faculty to tailor interventions and support students' development.

References:
ACPE accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree (www.acpe-accredit.org/pdf/Standards2016FINAL.pdf)
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