



A Digital Integrated Quality Management System for Automated Assessment of Qiyas Standardized Learning Outcomes

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Main points

- Accreditation primary driver for outcomes assessment?
- Review of published research referenced in this paper
- Specific PIs for outcomes assessment (Qiyas PIs)
- Shall we measure outcomes at all course levels for program assessment?
- Popular assessment methodologies
- Options for automation of outcomes assessment
- Outcomes Data/reports/modules implemented by Faculty of Engineering Islamic University

Video attachment

Appendix

1. Choose a Term:

2. Choose a Department Code:

3. SO Weighted Averaging Mode: Default (No Classification) | PI-level Classification: Regular Comprehensive

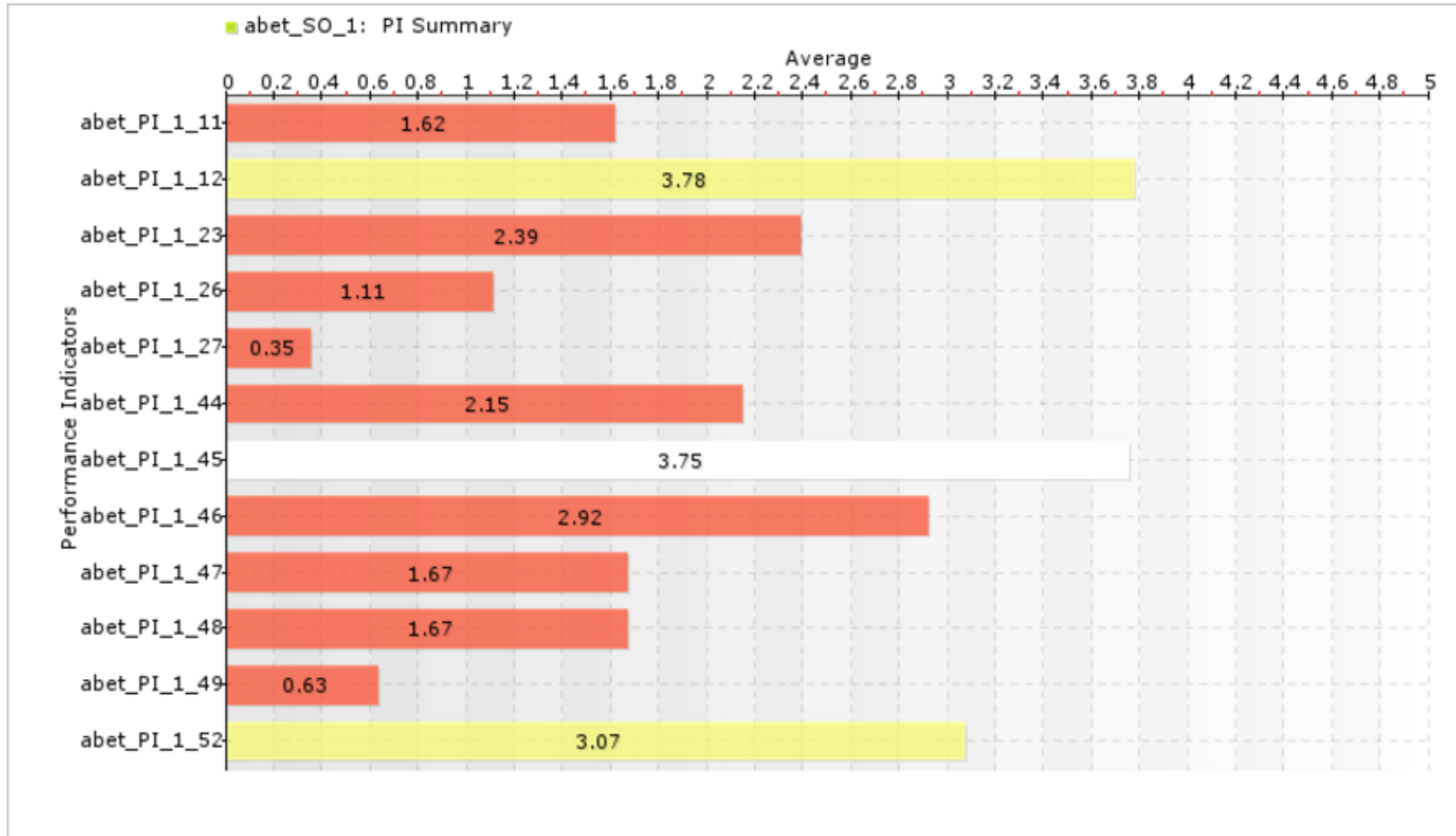
EE department's student outcomes:

Select	Outcomes	Average	%U	N	EAMU	Reviewed
<input checked="" type="radio"/>	abet_SO_1: an ability to apply knowledge of mathematics, science, and engineering	1.83			(0,1,2,9)	2015-08-25
<input checked="" type="radio"/>	abet_PI_1_11: Cognitive: Remembering Recognize various characteristics of various electronic semiconductor devices, such as diodes, BJT, JFET, MOSFET transistors and their simple applications like inverting and non-inverting amplifiers, metal oxide semiconductor inverters and logic gates, transistor logic circuits, and phase-locked loops	1.62	12.50	32	(0,0,1,2)	2015-08-25
<input type="radio"/>	abet_PI_1_12: Psychomotor: Mechanism Employ basic electrical power formulations and quantities, such as complex vectors, delta/star transformation, network flow matrices (network topology and incidence matrices) and symmetrical components	3.78	13.33	15	(0,0,1,0)	
<input type="radio"/>	abet_PI_1_23: Cognitive: Understanding Explain and apply the concepts of DC and AC (synchronous and induction) machine dynamics and transients as well as the principles of steady state and transient stability of electrical machines	2.39	35.00	20	(0,0,0,2)	2015-08-25
<input type="radio"/>	abet_PI_1_26: Cognitive: Applying Demonstrate knowledge of the operating principles of key electronic components and devices, such as PN junctions, diodes and BJT/field-effect transistors (FETs)	1.11	58.33	12	(0,0,0,1)	2015-08-25
<input type="radio"/>	abet_PI_1_27: Cognitive: Analyzing Apply basic laws and formulas of circuit theory, such as Ohm's and Kirchoff's laws as well as circuit theorems to simplify/analyze circuits (Thevenin and Norton theorems, superposition principle, max power transfer theorem, transformation etc.)	0.35	85.71	35	(0,0,0,3)	2015-08-25
<input type="radio"/>	abet_PI_1_44: Cognitive: Remembering Explain basics of electrical engineering parameters such as charge, voltage, current, energy, power, work done, resistance, capacitance, inductance etc.	2.15	30.00	20	(0,0,0,2)	2015-08-25
<input type="radio"/>	abet_PI_1_45: Cognitive: Remembering Explain basic semiconductors theory concepts such as applied electric field, junction capacitance, drift/diffusion currents, semiconductor conductivity, doping, electron, hole concentrations, N-type, P-type semiconductors.	3.75	0.00	12	(0,1,0,0)	
<input type="radio"/>	abet_PI_1_46: Cognitive: Applying Apply Coulombs law to calculate electric field intensity and electric flux density	2.92	37.50	8	(0,0,0,1)	2015-08-25
<input type="radio"/>	abet_PI_1_47: Cognitive: Remembering Define Gauss law and Evaluate electric flux and electric flux density in static electric field problems	1.67	50.00	8	(0,0,0,1)	2015-08-25
<input type="radio"/>	abet_PI_1_48: Cognitive: Understanding Elaborate the four Maxwells equations	1.67	50.00	8	(0,0,0,1)	2015-08-25
<input type="radio"/>	abet_PI_1_49: Cognitive: Understanding Elaborate time-varying electric and magnetic fields and Explain Faradays law	0.63	87.50	8	(0,0,0,1)	2015-08-25
<input type="radio"/>	abet_PI_1_52: Cognitive: Analyzing Study and analysis of the characteristics of the operational amplifier its applications in negative, positive feedback loops, integration, differentiation, multiplication, addition , instrumentation amplifiers and active filters	3.07	5.00	20	(0,1,1,0)	

Sample Program evaluation using specific PIs based on Bloom's 3 domains of learning and their levels



Appendix



Program term sample PIs plot

Appendix

Choose a different term:

Current Term: 361 2015

Department: CE

Student: ████████████████████

Student Outcome: _SO_1: an ability to apply knowledge of mathematics, science, and engineering

PI List:

- abet_PI_1_1: Describe the fundamentals of engineering drawing, surveying and spatial measurements
- abet_PI_1_14: Apply numerical methods for analysis of displacements and slopes for beams frames and trusses
- abet_PI_1_15: Describe stress and strain, deformation, uniaxial/multiaxial stresses and buckling concepts
- abet_PI_1_18: Identify a variety of basic materials used in construction Industry
- abet_PI_1_21: Calculate the resultant force, equivalent couple and moment on rigid bodies and its stability analysis.
- abet_PI_1_23: Calculate the shear force and bending moment at various sections of the beam and draw the bending moment (BMD) and shear force (SFD) diagrams.

Performance Indicator	PI Average	Term	Course	EAMU	Average (%)	
abet_PI_1_1	89.27	352 2015	CE 262 673 SURVEYING	(3,1,1,1)	89.27	
			Assignment	EAMU	WF	Score
			Lab Experiment 1	A	0.71	85/100
			Lab Experiment-6	E	0.7	95/100
			Lab Experiment-7	E	0.71	90/100
			Lab quiz 1	M	2.5	70/100
			Midterm Exam-1 Q3	E	11.25	5/5
		QZ-1	U	1.25	3/10	
abet_PI_1_14	38	352 2015	CE 224 674 STRENGTH OF MATERIALS	(0,1,0,1)	38	
abet_PI_1_15	73.06	352 2015	CE 224 674 STRENGTH OF MATERIALS	(0,1,1,3)	48.7	
		351 2014	CE 201 1587 STATICS	(0,1,0,0)	80	
			CE 211 1589 CIVIL ENGINEERING MATERIALS	(1,1,0,0)	90.49	
abet_PI_1_18	81.51	351 2014	CE 211 1589 CIVIL ENGINEERING MATERIALS	(1,2,1,0)	81.51	
abet_PI_1_21	82	351 2014	CE 201 1587 STATICS	(3,0,2,0)	82	
abet_PI_1_23	85	352 2015	CE 224 674 STRENGTH OF MATERIALS	(0,1,0,0)	85	

Overall SO Average: 74.81%



Sample student evaluation based on ABET SOs & PIs

Appendix

abet_SO_2	<p>abet_SO_2 : Overall Summary Discussion: Suggestion were documented in the PI evaluations. Panel has agreed that this SO has met its requirements but need further analysis for future terms</p> <p>Reviewers: Dr. Saleh Al Ahmadi, Dr. Kemal Fidanboyly, Dr. Imdad Khan, Dr. Laiq Khan, DR. Mazhar, Dr. H Abdul Wajid, Mr. Nathirullah Shareef, Mr. Mohiuddin, Mr. Arshad K V, Mr. Shujaur Rahman, Mr. Wajid Hussain</p>	3.67	Meeting Expectations 2015-08-25
	<p>abet_PI_2_18: Discussion: General observation is that students lack interest in spending more time practicing their lab experiments for increased proficiency of lab related skills.</p> <p>Action: AIs for hiring Lab Engineer, Technician and encouragement for students to attend labs were elevated to the EE committee for review and action. Review Date: 2015-08-25</p>	2.17	Below Expectations
abet_SO_3	<p>abet_SO_3 : Overall Summary Discussion: Panel has decided that this SO has met the expectation despite slightly lower results with a note on advanced analysis of future results</p> <p>Reviewers: Dr. Saleh Al Ahmadi, Dr. Kemal Fidanboyly, Dr. Imdad Khan, Dr. Laiq Khan, DR. Mazhar, Dr. H Abdul Wajid, Mr. Nathirullah Shareef, Mr. Mohiuddin, Mr. Arshad K V, Mr. Shujaur Rahman, Mr. Wajid Hussain</p>	2.96	Meeting Expectations 2015-08-25
	<p>abet_PI_3_30: Discussion: Suggestions for faculty to offer tutorials to cover course topics which require additional teaching to improve student comprehension</p> <p>Action: AIs was elevated to the EE committee to advise the faculty to organize tutorials besides the lecture hours to improve student comprehension for certain topics like filter theory. Review Date: 2015-08-25</p>	1.23	Below Expectations
abet_SO_5	<p>abet_SO_5 : Overall Summary Discussion: This SO is below expectations and necessary actions were considered for assignment to different committees for review and implementation</p> <p>Reviewers: Dr. Saleh Al Ahmadi, Dr. Kemal Fidanboyly, Dr. Imdad Khan, Dr. Laiq Khan, DR. Mazhar, Dr. H Abdul Wajid, Mr. Nathirullah Shareef, Mr. Mohiuddin, Mr. Arshad K V, Mr. Shujaur Rahman, Mr. Wajid Hussain</p>	2.61	Below Expectations 2015-08-25
	<p>abet_PI_5_22: Discussion: Students' basic math skills in basic differentiation and integration are very weak</p> <p>Action: AIs were elevated to the Math committee for reinforcement of fundamentals Review Date: 2015-08-25</p>	1.97	Below Expectations



Sample EE 352 term review report based upon failing SOs, PIs

Appendix

2. Choose a Department Code: EE

Term: 352 2015

All Domain Learning Analytic

Course Level	PI Grade	SO_1		SO_2		SO_3		SO_4		SO_5		SO_6		SO_7		SO_8		SO_9		SO_10		SO_11		Total Avg	Total N	% Learning	
		Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N				
Mastery	Advanced																							0	0	0	
	Intermediate	2.92	3							1.93	8													2.43	11	10	
	Elementary	1.32	4																					1.32	4	3.6	
Reinforced	Advanced			3.06	4	3.06	6																2.92	5	3.01	15	13.6
	Intermediate	1.11	4	3.89	5																			2.5	9	8.2	
	Elementary	2.64	12	5	1																			3.82	13	11.8	
Introductory	Advanced			4.56	1	3.65	3			4.35	6												2.04	8	3.65	18	16.4
	Intermediate	0.35	9	1.44	1					3.25	6												1.57	7	1.65	23	20.9
	Elementary	2.67	15	3.44	2																			3.06	17	15.5	
Aggregate:		1.84	47	3.57	14	3.36	9	0	0	3.18	20	0	0	0	0	0	0	0	0	0	0	2.18	20	2.48	110	100	

Cognitive Domain Learning Analytic

Course Level	PI Grade	SO_1		SO_2		SO_3		SO_4		SO_5		SO_6		SO_7		SO_8		SO_9		SO_10		SO_11		Total Avg	Total N	% Learning	
		Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N				
Mastery	Advanced																							0	0	0	
	Intermediate	2.92	3							1.93	8													2.43	11	12.6	
	Elementary	1.32	4																					1.32	4	4.6	
Reinforced	Advanced																						2.92	5	5.7		
	Intermediate	1.11	4																				1.11	4	4.6		
	Elementary	2.64	12																				2.64	12	13.8		
Introductory	Advanced					1.22	1			4.35	6												2.34	7	2.64	14	16.1
	Intermediate	0.35	9							3.25	6												1.57	7	1.72	22	25.3
	Elementary	2.67	15																					2.67	15	17.2	
Aggregate:		1.84	47	0	0	1.22	1	0	0	3.18	20	0	0	0	0	0	0	0	0	0	0	2.28	19	3.18	87	99.0	

Affective Domain Learning Analytic

Course Level	PI Grade	SO_1		SO_2		SO_3		SO_4		SO_5		SO_6		SO_7		SO_8		SO_9		SO_10		SO_11		Total Avg	Total N	% Learning	
		Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N				
Mastery	Advanced																							0	0	0	
	Intermediate																							0	0	0	
	Elementary																							0	0	0	
Reinforced	Advanced																							0	0	0	
	Intermediate																							0	0	0	
	Elementary																							0	0	0	
Introductory	Advanced																						1.44	1	1.44	1	100
	Intermediate																							0	0	0	
	Elementary																							0	0	0	
Aggregate:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.44	1	1.44	1	100

Psychomotor Domain Learning Analytic

Course Level	PI Grade	SO_1		SO_2		SO_3		SO_4		SO_5		SO_6		SO_7		SO_8		SO_9		SO_10		SO_11		Total Avg	Total N	% Learning
		Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N	Avg	N			
Mastery	Advanced																							0	0	0
	Intermediate																							0	0	0
	Elementary																							0	0	0
Reinforced	Advanced			3.06	4	3.06	6																	3.06	10	45.5
	Intermediate			3.89	5																			3.89	5	22.7
	Elementary			5	1																			5	1	4.5
Introductory	Advanced			4.56	1	4.87	2																	4.72	3	13.6
	Intermediate			1.44	1																			1.44	1	4.5
	Elementary			3.44	2																			3.44	2	9.1
Aggregate:		0	0	3.57	14	3.97	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.50	22	99.0	



Sample test data Bloom's 3 Learning Domains evaluation term 352 EE

Summary

- Accreditation primary driver for outcomes assessment
- Review of some current outcomes assessment models
- Automation of outcomes assessment a necessity
- Faculty of Engineering Islamic University outcomes assessment examples

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