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Outcome Based Education Learning Assessment Perspective

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***Abstract*— Outcomes Based Education (OBE) is the current shift in education paradigm. With the advancement in science, it is found that setting outcomes at all levels in the learning process will lead to better insight. Advancement in assessment device rubric to play the key role in assessing programs' quality. However, rubric can be implemented at any stage in the learning process. This paper guides the development of a generic rubric, set the actions required in assessing learning at modules level. The rubric is designed, implemented, and assessment conducted based on the rubric implementation. The development process defines the three requirements for rubric development. The quality definition, the scoring strategy, and the evaluation criteria. Design templates, implement the designed templates in one of the modules. The use of rubric gives insight in identifying and highlighting areas of strengths, and weaknesses where more efforts are demanded for continuous improvement**

***Keywords*— Outcomes based education, Content based education, rubric, scoring strategy, quality definition, evaluation criteria, continuous improvement.**

I. Introduction

Paradigm shift in recent years advertise Outcomes Based Education (OBE) as an alternative to Content-Based Education (CBE). OBE focuses on developing curriculums based on the desired outcomes of the learning process. Uncertainty or failure to achieve the desired skills and competencies at the end of the curriculum will flag urgent improvement [3][4].

Theory and philosophy of OBE translate into practical actions in instructional planning, teaching, and assessment of student learning. Educational systems based on OBE can be identified based on performance indicators expressing what learners know, are able to do, or are like as a result of their education [4][7]. Assessing the quality of these systems usually carried on a designed rubric. Rubric is widely used in higher education in wide range of disciplines and for many purposes. Include but not limited to increasing learners' achievement, improving instructions, and evaluating programs [1][9][10]. Rubric are used as formative assessment beside evaluation. With carefully designed rubric, assessment process can give insight in identifying areas for improvement. Despite many recommendations on the use of rubric at all stages in the learning process, none gives a practical implementation at modules level. Grading schemes always become the popular option at the module level. This scheme referred to as direct assessment when applied to modules level.

This paper demonstrates rubric development. Practical actions are exemplified by developing the rubric and implement it on one of modules. In OBE learners are individuals, assessment should allow this individuality to be demonstrated. Assessment should tell educators and individual learners something that they do not already know. The rubric developed can be used in assessing learner's attainment at the module level. The aim is to demonstrate a generic rubric framework. The focus will be on the development process rather than on analysing the results obtained from applying the rubric in specific context.

This paper will guide the development and application of rubric to assess learners at the module level. Through the paper the terms module and course will appear interchangeably, both with the same meaning.

The paper is organized in five sections. The first section is an introductory section. Section two gives more highlights on OBE and rubric for assessment. Three gives the rubric development and the new Computing Accreditation Commission (CAC) procedures, since the rubric will utilize the Accreditation Board for Engineering and Technology (ABET) criteria and Outcomes. Beside detailed processes for the Rubric development. Four gives the implementation of the rubric and discussion. The last section gives conclusions and Recommendations.

II. Outcomes Based Education and Rubric for Assessment

The quality of a learning system can be judged from at least three perspectives. The input to the system, what happen within the system, and output which is product from an educational system.

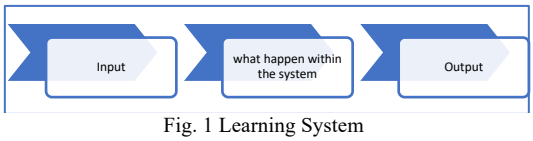


Fig. 1 Learning System

Figure 1 Shows these prospective. Quality of the Input to the educational system can be considered by looking to aspects of finances, resources, infrastructure, etc., and may use economic rationalism as the basis for their judgements about the quality or value of the system. What happen within the system can be judged based on processes used to organize, control and deliver education and training. The output can be judged from the products or results of education [7].

OBE rely on specify outcomes for certain criteria of interest. All activities within the learning system will serve to attain these outcomes. Whether at the institutional level, the program level, or the module level. The outcomes achievement at any stage of the learning process will feed in the upper level and back. Form a hierarchy of deriving wheels that will serve the community at the top level, Figure 2.

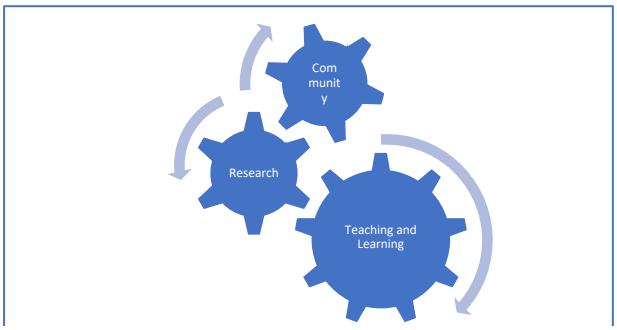


Fig. 2 OBE Driving Wheels in Higher Education Institutions

Figure 2 shows higher education three pillars. Teaching and Learning, Research, and community serve. The wheels that steer the institutional vision can be seen in different configuration. In figure 2, the teaching and learning assigned the biggest weight, that derive the research and the community need. Research derives the community needs. community needs reflected on demanding research. And research demands Teaching and learning.

OBE can be viewed as theory of education, or as a systemic structure for education, or as classroom practice. Taking this into account, assessment for the learning process at any stage can measure the attainment of learners in a specific context. In OBE, assessment contributes to improving the learning process (Figure 3). The figure shows the learning outcomes assessment process. The process is a continuous cycle for improvement. It starts by specify the learning outcomes. Then do some actions of teaching and learning, which we referred to as implementation. Then a review for the learner's work will contribute to refinement of the learning outcomes. In the revise and reinforce, an improvement plan will be implemented. At the module level, rubric can identify individual learner's experience and provide opportunities for improving the learner's attainment.

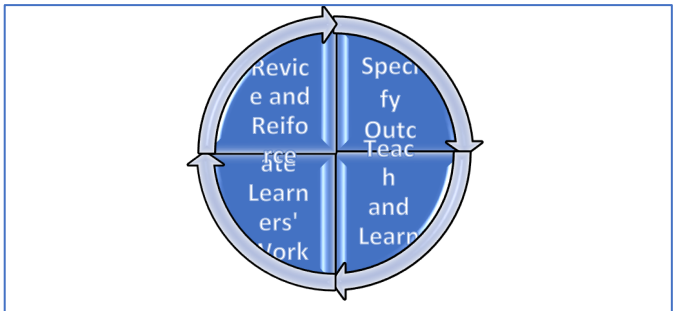


Fig. 3 Learning Outcomes Assessment Process

A rubric is defined as document that articulates the expectations for an assignment by listing the criteria or what counts, and describing levels of quality [1][2]. Rubric based on three metrics, evaluation criteria, quality definition and scoring strategy. Rubrics are criterion-referenced judgement rather than norm-referenced judgment. The use of rubric creates cooperative learning environment rather than competitive grading scheme, thus enhancing the learning process to ultimate levels. To ensure learner achievement, rubric can be used in all stages of the learning process including module level.

Two major types of rubrics are in practice:

- Holistic rubric where one global, holistic score for a product or behavior and
- Analytic rubric where separate, holistic scoring of specified characteristics of product or behavior [1].

Rubric is a way to measure cooperative learning. With this mind, the Evaluation criteria are the factors that an assessor considers when determining the quality of a learner's work. It is described as a set of indicators or a list of guidelines. Quality definitions provide a detailed explanation of what a learner must do to demonstrate a skill, proficiency or criterion in order to attain a particular level of achievement. Scoring strategies for rubrics involve the use of a scale for interpreting judgments of a product or process [9] [10].

The Accreditation Board for Engineering and Technology (ABET) is a popular agency that accredited Programs in the Engineering and Technology worldwide. ABET Computing Accreditation Commission (CAC) sets criteria that accepted globally. With referencing the Association of Computing Machinery (ACM) and the Institute for Electrical and Electronics Engineering (IEEE) Curriculum, computer science and computing programs in general can design curriculum effectively. For a criterion-based judgement, the rubric is crucial. Significant number of computing programs adopt ABET Student Learning Outcomes (SLO). In 2019 a new release of student learning outcomes come to light. The computer science program's new CAC defines six students learning outcomes given in the next section.

III. Rubric Development

Rubric is a power full tool for any assessment process. Continuous improvement can't fruitful unless perfect and accurate assessment take place in all the components participating in the learning process.

In this paper, rubric for the module level is developed. The approach integrates components present in the learning process to assess learner's attainment at the end of a semester. This rubric is based on OBE. Figure 4 illustrates these components.

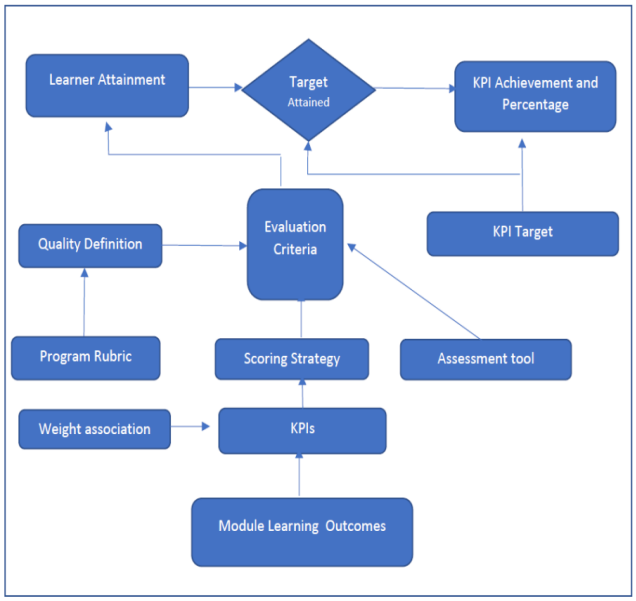


Fig. 4 Rubric Development Components

In Figure 4, a module uses the outcomes set to define the key performance indicators. These indicators are assigned weights according to their contribution to the outcome. The scoring strategy for each of these KPIs will depend on the weight assigned. Quality definition uses of program rubric (a rubric defined at the program level). Evaluation criteria make use of the scoring strategy and the quality definition to assign score to each learner for the assessment tool used.

Programs seek ABET accreditation should comply with the standard set by the ABET. The student learning outcomes and rubric for assessing these outcomes at the program level usually make use of the criteria set by ABET. Programs can implement the ABET CAC in the design of the students Learning Outcomes (SLOs). In practice this can be achieved through careful mapping of the curriculum to the SLOs. Taking into account the levels of learning. Table (1) gives the ABET new CAC, and Table (2) suggests template for such mapping.

TABLE 1
STUDENT OUTCOMES BASED ON ABET NEW CAC

No	SO	Description
1	Student Outcome 1 (SO1)	Analyze Complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2	Student Outcome 2 (SO2)	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3	Student Outcome 3 (SO3)	Communicate effectively in a variety of professional contexts.
4	Student Outcome 4 (SO4)	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5	Student Outcome 5 (SO5)	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
6	Student Outcome 6 (SO6)	Apply computer science theory and software development fundamentals to produce computing-based solutions.

Table (1) associates student's learning outcomes to the ABET new CAC. This association is then used to build rubrics at the program level. For each outcome, number of Key Performance Indicators (KPIs) are identified. The student attainment at the program level is then evaluated based on this rubric, which we will refer to as Program Rubric.

TABLE 2
USE OF ABET CAC IN SLOs

Module	CODE	Student Learning Outcomes					
		1	2	3	4	5	6

Table (2) consists of three columns, the first column from left lists all modules in the curriculum, column two will be used for the module code within the curriculum, and column three assign the students learning outcomes for each module with the specified level of learning. Levels of learning start with Introducing the learning outcome (I), this is usually occurring at the start of the curriculum, the learning outcomes then Re-enforced (R), and this takes place at the middle of the curriculum, then Emphasized (E) which is the highest level towards the end of the curriculum. The occurrence of the learning levels may vary according to where specific outcome is first introduced, and progress then after.

The Computer Science program within the Computer Science department identified a set of three performance indicators maximum as the basic level for each outcome to pilot the new criteria. The KPIs are adopted from the program assessment Tables. Tables three, four, and fives give the Performance indicators for the three Outcomes used in the module specified.

TABLE 3
OUTCOME 1: ANALYZE A COMPLEX COMPUTING PROBLEM AND TO APPLY PRINCIPLES OF COMPUTING AND OTHER RELEVENT DISCIPLINE TO IDENTIFY SOLUTIONS

PI level	PI	1: Do not meet expectation	2: Below Expectations	3: Meet Expectations	4: Exceed Expectations
1.1	Define the theory or principle of an event or phenomena.	Student has no idea about the theory.	Student knows a part of theory or principle.	Student is able to define the theory or principle but can't relate it to the phenomena.	Student is proficient in defining the theory or principle of an event or phenomena.
1.3	Apply basic mathematical knowledge to solve basic problems.	Student has no idea about mathematical knowledge.	Student knows the mathematical knowledge but cannot use it to solve basic problems.	Student is able to use mathematical knowledge to solve basic problem partially correct.	Student is proficient in using mathematical knowledge to solve basic problems for obtain solutions.
PI 1.6	Choose the best solution among options and analyse the solution.	Student has no idea where to start.	Student chooses the best solution but can't analyze the solution.	Student chooses the best solution among options and analyses it.	Student chooses the best solution among options and analyses it in proficient way.

TABLE 4
OUTCOME 5: FUNCTION EFFECTIVELY AS A MEMBER OR LEADER OF A TEAM ENGAGED IN ACTIVITIES APPROPRIATE TO THE PROGRAM'S DISCIPLINE

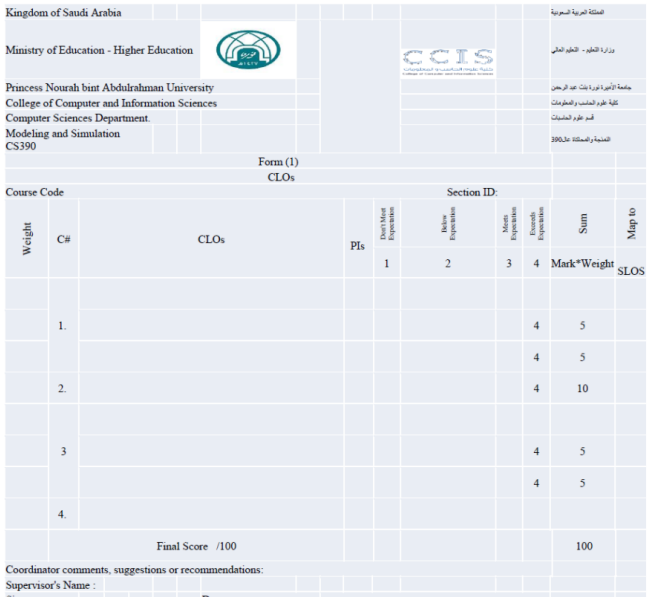
PI Level	PI	1: Do not meet expectation	2: Below Expectations	3: Meet Expectations	4: Exceed Expectations
5.1	Work cooperatively within a team.	Student cannot communicate with team members.	Student communicates with team members but does not participate in solving problems.	Student communicates perfectly with team members and participates in solving problem.	Student communicates, interacts perfectly with team members and suggests solutions.
5.2	Fulfil duties of team roles.	Student does not contribute in any team duty.	Student contributes in some team duties.	Student contributes in all team duties.	Student fulfils duties of team roles effectively.
5.3	Work cooperatively toward team decisions.	Student cannot fulfill assigned tasks to reach team decisions.	Student participates in taking some of the team decisions.	Student participates in all team decisions.	Student participates effectively in team decision and suggests some improvements.

TABLE 5
OUTCOME 6 APPLY COMPUTER SCIENCE THEORY AND SOFTWARE DEVELOPMENT FUNDAMENTALS TO PRODUCE COMPUTING BASED SOLUTIONS .

PI Level	PI	1: Do not meet expectation	2: Below Expectations	3: Meet Expectations	4: Exceed Expectations
6.1	Demonstrates an ability to identify trade-offs and the appropriate memory management and programming paradigms to solve a problem	Needs assistance identifying trade-offs and apply them to solve a problem	Demonstrates some ability to identify trade-offs but have difficulty in applying them to solve a problem	Demonstrates acceptable ability to identify trade-offs and apply them to solve a problem	Demonstrates an ability to identify trade-offs and to select optimal methods to solve a problem
6.2	Demonstrates ability to apply concepts and techniques, integrating hardware, software, and networking under different scenarios	Demonstrate poor or no understanding of the relationships between hardware, software, and networking or ability to integrate them	Demonstrate some understanding of the relationships between hardware, software, and networking but not able integrate them	Demonstrate acceptable understanding of the relationships between hardware, software, and networking. Basic ability to integrate them	Demonstrate strong understanding of the relationships between hardware, software, and networking and how to integrate them
6.3	Design computer-based solution applying the theory and implement the solution	No complete computer-based solution designed applying the theory with the solution	The design has minor short coming regarding the requirements	The design meets all requirements and is better than other possible solutions	The design meets or exceeds all requirements and an innovative approach was taken which yielded a superior solution

Based on the rubric designed at the program level, modules can implement this rubric and design the module rubric accordingly.

In order to use the rubric at the module level, each module will design its own rubric based on the module outcomes. The first step in the design of the rubric takes into account the criteria referenced to define the scoring strategy. For a certain module, the Learning outcomes will be identified and performance indicators for the achievement of each is set and weighted according to their contribution to the learning outcome. Figure 5 gives a generic template that implement the scoring strategy. For each module, the Course Learning Outcomes (CLOs) are break into Performance Indicators (PIs). Weights are assigned to each performance indicator. The last column refence the SLOs mapping to a particular performance indicator of outcome.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CS390
Form (1)
CLOs
Course Code
Section ID:

Weight	C#	CLOs	PIs	Don't Meet Expectation 1	Below Expectation 2	Meets Expectation 3	Exceeds Expectation 4	Sum Mark*Weight	Map to SLOs
	1.						4	5	
							4	5	
	2.						4	10	
	3						4	5	
							4	5	
	4.								
		Final Score /100						100	

Coordinator comments, suggestions or recommendations:
Supervisor's Name :

Fig. 5 Form 1 Scoring Strategy Template

Figure (5) gives Form 1 which can be used to define the scoring strategy for specific module.

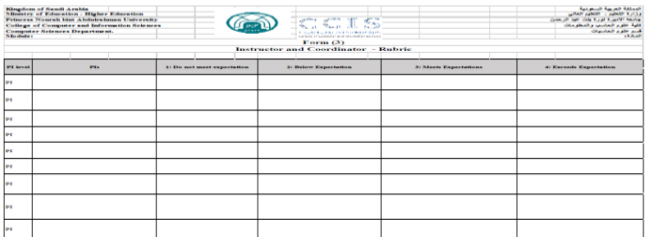
Form (3)
Instructor and Coordinator – Rubric

Fig. 6 Form 3 Quality Definition Form

Figure 6 gives generic template for defining quality. The form consists of specifying the Quality for the performance indicators for the module. Four level scoring is associated with each Performance Indicator. 1: don't meet expectation, 2: Below expectation, 3: meets expectation, and 4: exceeds expectation. With reference to this rubric, instructors can bench mark the learner's achievements. This process is implemented for each learner. Figure 7 gives Form 4, a generic template for the evaluation criteria.

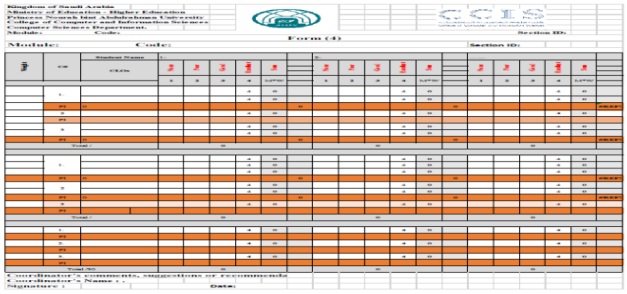

Fig. 7 Form 4 Evaluation Criteria Template

Figure 7 Implements the rubric designed for each learner. The form computes the performance indicators achievement based on the weights designed in scoring strategy.

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Computer Sciences Department.
Module :

Form (5)
……Assessment -Semester …..
Module : Section ID:

N	Learner ID	Learner Name	CLO1 /	CLO1%	CLO6 /	CLO6%	CLO5 /	CLO5%
1								
2								
3								
4								
5								
..								
		Total						
		Target						
		Achieve Target						
		% achieve target						

Course Instructor's Name
Signature
Date:

Fig. 8: Form 5 Learning Outcomes Achievements and Percentage of Attainments

Figure 8 shows an evaluation form for the learning outcome achievement, the form aid in computing the outcome achievement and the percentage of achievement for each outcome based on a pre-defined target.

IV Implementation and Discussion

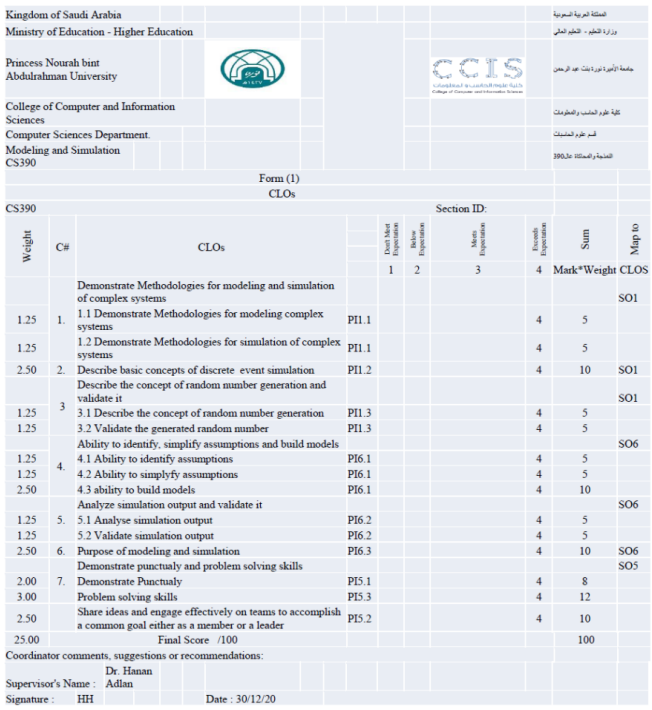
A pilot study is demonstrated on portion of the performance indicators for each outcome as outlined in the planning section. The CS program defines the learning outcomes for all the modules in the program. This activity takes place at the program level in coordination with the module's coordinators.

A rubric for one of the Computer Science (CS) modules is demonstrated for the CLOs rubric. The CLOs are identified and the performance indicators are weighted using the scoring strategy template.

Table 6 implements the template given in Table 2 and summarizes Computer Science program curriculum mapped to the ABET new CAC procedures, and the level of the learning outcome in each of the modules.

TABLE 6
LEARNING OUTCOMES LEARNING LEVEL PROGRESSION THROUGHOUT THE CS CURRICURULUM

COURSES	CODE	Student Outcome 1	2	3	4	5	6
Discrete Structures	CS 100	I	I	I			
Digital Logic Design	CS 105	I	I			I	
Programming language (1)	CS 110	I	I				I
Programming language (2)	CS 111	I	I			I	
Computer Organization	CS 206	R				R	I
Computer Architecture	CS 207	R	R	I			
Data Structures	CS 212	R	R		I		
Algorithms Design and Analysis	CS 220	R	R	R			
Advanced Programming language	CS 313				I	R	R
Operating Systems	CS 340	E			R		R
Human-Computer Interaction	CS 351	E	E			E	
Computer Graphics	CS 360	E		R			E
Artificial Intelligence	CS 370		E		R		E
Professional Ethics	CS 380				E		
Software Engineering	CS 385		E	E			E
Programming Languages Concepts	CS 430				E	E	E
Web Applications development	CS 486			E		E	E
Graduation Project (1)	CS 487	E		E	E	E	E
Graduation Project (2)	CS 488		E	E			E
Internship	CS 489			E	E	E	E
Advanced Algorithms	CS 321	E				E	E
Formal languages and Automata Theory	CS 322	E	E	E			
Multimedia Systems	CS 350	E				E	E
Computer Vision and Image Processing	CS 361	E				E	E
Selected Topics (1)	CS 372	E		E		E	-
Modeling and Simulation	CS 390	E				E	E
Parallel computers Architecture and Programming	CS 408		E		E		E
Distributed Systems	CS 409	E		E			E
Compilers Design	CS 431	E	E	E			
Robotics Fundamentals	CS 471			E		E	E
Software Design Methodology	CS 387		E	E			E
Software Testing	CS 386		E		E		E
Agile Software Development	CS 388		E			E	E
Mobile Application Programming	CS 410			E	E		E
Advanced Mobile Programming	CS 411	E	E	E			
System Interface Design	CS 412		E		E		E
Principles of Computer Animation	CS 460		E	E		E	
Computational Geometry	CS 461	E			E		E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Modeling and Simulation
CS390

Form (1)
CLOs

CS390 Section ID:

Weight	C#	CLOs		Don't Meet Expectation 1	Below Expectation 2	Meets Expectation 3	Exceeds Expectation 4	Sum Mark*Weight	Map to CLOS
		Demonstrate Methodologies for modeling and simulation of complex systems							SO1
1.25	1.	1.1 Demonstrate Methodologies for modeling complex systems	PI1.1				4	5	
1.25		1.2 Demonstrate Methodologies for simulation of complex systems	PI1.1				4	5	
2.50	2.	Describe basic concepts of discrete event simulation	PI1.2				4	10	SO1
	3	Describe the concept of random number generation and validate it							SO1
1.25		3.1 Describe the concept of random number generation	PI1.3				4	5	
1.25		3.2 Validate the generated random number	PI1.3				4	5	
	4.	Ability to identify, simplify assumptions and build models							SO6
1.25		4.1 Ability to identify assumptions	PI6.1				4	5	
1.25		4.2 Ability to simplyfy assumptions	PI6.1				4	5	
2.50		4.3 ability to build models	PI6.1				4	10	
		Analyze simulation output and validate it							SO6
1.25	5.	5.1 Analyse simulation output	PI6.2				4	5	
1.25		5.2 Validate simulation output	PI6.2				4	5	
2.50	6.	Purpose of modeling and simulation	PI6.3				4	10	SO6
		Demonstrate punctualy and problem solving skills							SO5
2.00	7.	Demonstrate Punctualy	PI5.1				4	8	
3.00		Problem solving skills	PI5.3				4	12	
2.50		Share ideas and engage effectively on teams to accomplish a common goal either as a member or a leader	PI5.2				4	10	
25.00		Final Score /100						100	

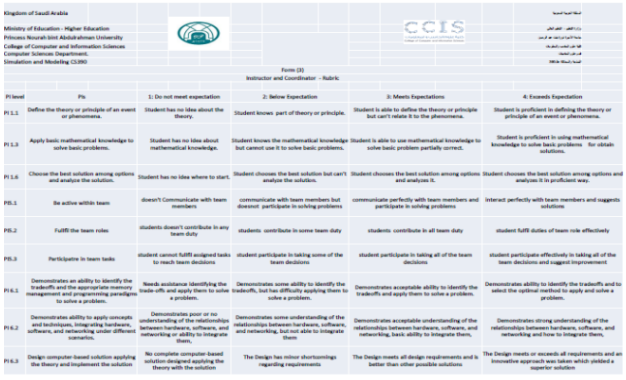
Coordinator comments, suggestions or recommendations:

Supervisor's Name : Dr. Hanan Adlan
Signature : HH Date : 30/12/20

Fig. 9 Scoring Strategy Implementation

Figure 9 details the scoring strategy Module implementation. Three learning outcomes, Student learning Outcome 1, 5, and 6 are mapped to CS module with Emphasis level of learning. The performance indicators for the module are identified and assigned the weights. Then mapped to the corresponding (CLO) learning outcome.

The rubric is designed based on the weights assigned to each Performance indicator, and accumulated accordingly. The rubric is implemented in one of the sections as sample for the CS390 module.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Form (3)
Instructor and Coordinator - Rubrik

PI level	PIs	1: Do not meet expectation	2: Below Expectation	3: Meets Expectations	4: Exceeds Expectation
PI 1.1	Define the theory or principle of an event or phenomena.	Student has no idea about the theory.	Student knows part of theory or principle.	Student is able to define the theory or principle but can't relate it to the phenomena.	Student is proficient in defining the theory or principle of an event or phenomena.
PI 1.3	Apply basic mathematical knowledge to solve basic problems.	Student has no idea about mathematical knowledge.	Student knows the mathematical knowledge but cannot use it to solve basic problems.	Student is able to use mathematical knowledge to solve basic problem partially correct.	Student is proficient in using mathematical knowledge to solve basic problems for obtain solutions.
PI 1.6	Choose the best solution among options and analyze the solution.	Student has no idea where to start.	Student chooses the best solution but can't analyze the solution.	Student chooses the best solution among options and analyzes it.	Student chooses the best solution among options and analyzes it in proficient way.
PI6.1	Be active within team	doesn't Communicate with team members	communicate with team members but doesnot participate in solving problems	communicate perfectly with team members and participate in solving problems	Interact perfectly with team members and suggests solutions
PI6.2	Fulfil the team roles	students doesn't contribute in any team duty	students contribute in some team duty	students contribute in all team duty	student fulfil duties of team role effectively
PI6.3	Participate in team tasks	student cannot fulfil assigned tasks to reach team decisions	student participate in taking some of the team decisions	student participate in taking all of the team decisions	student participate effectively in taking all of the team decisions and suggest improvement
PI 6.1	Demonstrates an ability to identify the tradeoffs and the appropriate memory management and programming paradigms to solve a problem.	Needs assistance identifying the trade-offs and apply them to solve a problem.	Demonstrates some ability to identify the tradeoffs, but has difficulty applying them to solve a problem.	Demonstrates acceptable ability to identify the tradeoffs and apply them to solve a problem.	Demonstrates ability to identify the tradeoffs and to select the optimal method to apply and solve a problem.
PI 6.2	Demonstrates ability to apply concepts and techniques, integrating hardware, software, and networking under different scenarios.	Demonstrates poor or no understanding of the relationships between hardware, software, and networking or ability to integrate them,	Demonstrates some understanding of the relationships between hardware, software, and networking, but not able to integrate them	Demonstrates acceptable understanding of the relationships between hardware, software, and networking, basic ability to integrate them,	Demonstrates strong understanding of the relationships between hardware, software, and networking and how to integrate them,
PI 6.3	Design computer-based solution applying the theory and implement the solution	No complete computer-based solution designed applying the theory with the solution	The Design has minor shortcomings regarding requirements	The Design meets all design requirements and is better than other possible solutions	The Design meets or exceeds all requirements and an innovative approach was taken which yielded a superior solution

Fig. 10 Quality Definition Implementation

Figure 10 gives implementation for specific module. Based on the performance indicators identified.
Figure 11 implemented the rubric on the learner's sample for the CS390 module.

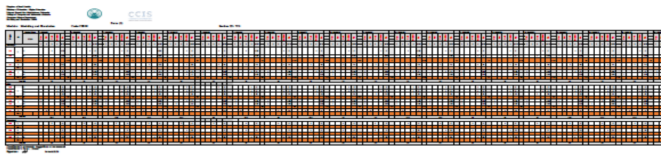


Fig. 11 Module Rubric Implementation

A magnified portion of figure 11, displays the rubric implementation.

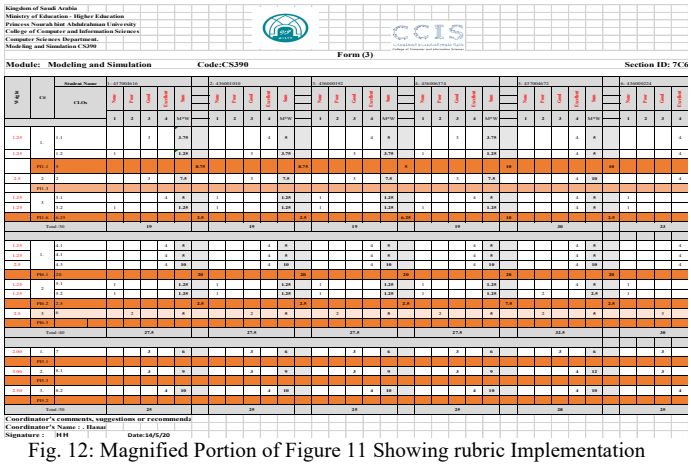
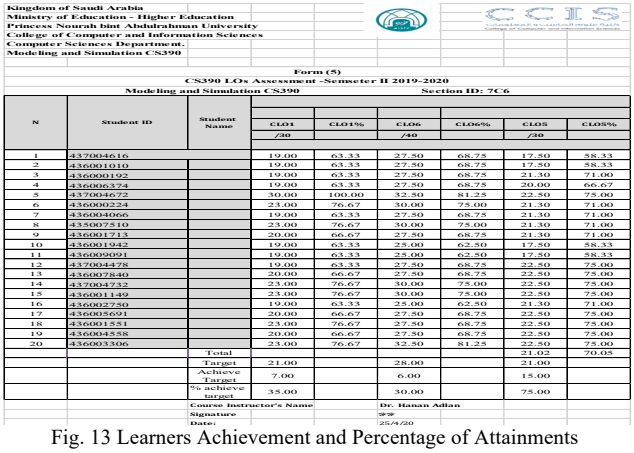


Fig. 12: Magnified Portion of Figure 11 Showing rubric Implementation

Learner's achievement in each of the performance indicators (Figure 13). The computation based on the weights assigned and the rubric. In this approach, instructors can identify the strengths, and weaknesses associated with each individual learner. As this gives insight in the performance of the learners.



Kingdom of Saudi Arabia
Ministry of Education - Higher Education
Princess Nourah bint Abdulrahman University
College of Computer and Information Sciences
Computer Sciences Department.
Modelling and Simulation CS390

Form (5)
CS390 LOs Assessment -Semester II 2019-2020
Modeling and Simulation CS390 Section ID: 7C6

N	Student ID	Student Name	CLO1 /30	CLO1%	CLO6 /40	CLO6%	CLO5 /30	CLO5%
1	437004616		19.00	63.33	27.50	68.75	17.50	58.33
2	436001010		19.00	63.33	27.50	68.75	17.50	58.33
3	436000192		19.00	63.33	27.50	68.75	21.30	71.00
4	436006374		19.00	63.33	27.50	68.75	20.00	66.67
5	437004672		30.00	100.00	32.50	81.25	22.50	75.00
6	436000224		23.00	76.67	30.00	75.00	21.30	71.00
7	436004066		19.00	63.33	27.50	68.75	21.30	71.00
8	435007510		23.00	76.67	30.00	75.00	21.30	71.00
9	436001713		20.00	66.67	27.50	68.75	21.30	71.00
10	436001942		19.00	63.33	25.00	62.50	17.50	58.33
11	436009091		19.00	63.33	25.00	62.50	17.50	58.33
12	437004478		19.00	63.33	27.50	68.75	22.50	75.00
13	436007840		20.00	66.67	27.50	68.75	22.50	75.00
14	437004732		23.00	76.67	30.00	75.00	22.50	75.00
15	436001149		23.00	76.67	30.00	75.00	22.50	75.00
16	436002750		19.00	63.33	25.00	62.50	21.30	71.00
17	436005691		20.00	66.67	27.50	68.75	22.50	75.00
18	436001551		23.00	76.67	27.50	68.75	22.50	75.00
19	436004558		20.00	66.67	27.50	68.75	22.50	75.00
20	436003306		23.00	76.67	32.50	81.25	22.50	75.00
		Total					21.02	70.05
		Target	21.00		28.00		21.00	
		Achieve Target	7.00		6.00		15.00	
		% achieve target	35.00		30.00		75.00	
		Course Instructor's Name			Dr. Hanan Adlan			
		Signature						
		Date:			25/4/20			

Fig. 13 Learners Achievement and Percentage of Attainments

Figure 13, the module learning outcomes achievements and attainments of learners. A target is set for each learning outcomes. Target for the three learning outcomes is set to 70% as the basic level. This target value can be updated in the assessment stages for continuous improvement. The theory and implementation of the target is beyond the scope of this paper.

IV. CONCLUSIONS AND RECOMMENDATIONS

This paper demonstrates rubric development for module level assessment. The rubric give insight identifying areas for improvement. Individual learners' strengths and weaknesses can be identified. The Rubric designed to measure predefined performance indicators in one of the computer science modules. In order to implement this approach, each module identifies the performance indicators. Four scale interpreting judgement bench learners' attainment. Based on the weights assigned to each performance indicator, the attainment can be measured using the tools designed. This paper demonstrates the design and implementation of rubric to assess learners' attainment in OBE approach. Some recommendations can be considered in highlighting approaches to set the target. Analysis on the outcome of the rubric implementation can also foster further research.

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