An Outcome-Based Assessment And Improvement System For Measuring Student Performance And Course Effectiveness

M. A. Anwar, Al Ghurair University, Dubai, UAE
Naseer Ahmed, Al Ghurair University, Dubai, UAE
Abdurahem Mohammed Al Ameen, Al Ghurair University, Dubai, UAE

ABSTRACT

The evaluation of students' expected performance and course effectiveness play a vital role in determining the course contribution toward meeting the program's learning objectives or outcomes. The success of any course not only requires a well-designed syllabus with clearly defined course learning outcomes and the use of appropriate outcome-based teaching and assessment methods, but also a systematic approach to document and analyze the entire assessment data and results. Such an approach will be helpful in providing a better insight and understanding of students' competency levels achieved in all course learning outcomes which ultimately would facilitate course instructors in their efforts to improve course curricula and to introduce reforms in teaching and assessment processes.

This paper presents a simple and easy-to-use system that aids course instructors in recording and analyzing the results of various assessment instruments administered in their courses. A detailed analysis provided by the system would also guide curriculum planners and assessors in suggesting reforms and improvements at the program level.

Keywords: Instructional Cycle; Assessment Plan; Evidence Collection; Evidence Analysis; Reporting Results; Outcome-based Assessment; Course Effectiveness

INTRODUCTION

The direct assessment measures, in conjunction with other indirect measures, provide a strong base for assessing various Course Learning Outcomes (CLOs) and overall objective of a particular course. Direct assessment method is, however, the most important and key element in demonstrating a satisfactory (or otherwise) performance level in meeting and achieving the requirements of each learning outcome of the course. Classically, the assessment is the collection and interpretation of information about what, how much, and how well students are learning (GWU, 2011). The assessment process is an essential part of a typical instructional cycle encompassing certain critical tasks; namely, planning, teaching, assessing, analyzing, and improving as depicted in Figure 1. This cycle enables various stakeholders to make informed decisions for making students' learning experiences more interesting and valuable.

The right information at the right time by the right people to the right people guarantees the success of any organization. The academic institutions are not the exception. Our experience shows that the required assessment data for various courses offered in a particular semester are incomplete, late, or not documented properly in accordance with the policies and procedures laid down by individual colleges or departments. The success of the instructional model depends on accurate and timely availability of the assessment data compiled by course instructors to the designated assessment committees of the colleges/departments who are entrusted with the

responsibility of suggesting various strategies and improvement actions in order to meet stated course and program outcomes, which ultimately help an academic institution in achieving its declared institutional mission and goals.

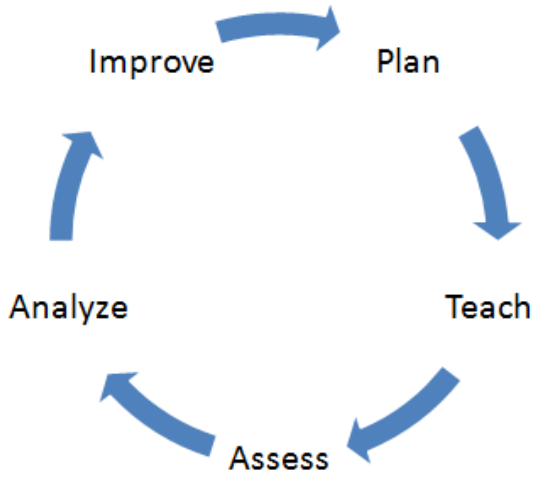

Figure 1: Instructional Cycle and Course Assessment

ABET EC2000 (ABET, 2005), states that the institution must have an efficient assessment process to insure that each program objective/outcome of an academic program is successfully met. There must be a proper system in place for documenting an ongoing evaluation and closing the loop by communicating a suitable feedback for implanting required improvement actions, where appropriate. A number of studies (Bloom, B.S., M. D. Englehart and M.D. Furst, E.J., 1984; Karimi, A., Clutter, K. and Arroyo, A., 2004; King, F.G. and Ilias, S. 2003) that put emphasis on course assessment and its impact on a program of study have been carried out. Being an integral part a program, the success or failure of each individual course eventually determines the overall success or failure of one or more program outcomes or objectives. This fact necessitates a well planned and systematic assessment and evaluation process at the course level. On the whole, the assessment of advanced courses (especially capstone, senior project, internship, etc.) has a significant impact on measuring the degree of achievement of various program outcomes in accordance with the pre-defined curriculum matrix and standards. The course assessment data/results guides all stakeholders (instructors, academic advisors, educational managers, and internal/external assessors) about how the course was taught and assessed, what kind of difficulties students and instructors face, and how this information might be utilized to improve the contents, as well as delivery method, of the course.

The quality of outcome-based course assessment results depends on the data collection process which is not an easy process, especially in the absence of an efficient tool. There are many student information systems that facilitate instructors to store examination data and grades but, to our knowledge, none provides a facility to record raw data in the format needed for analyzing individual students' performance as well as each CLOs of the course. To achieve this objective, the instructors must be able to collect, compile, and process the relevant data at all stages of instructional and course assessment cycle, as illustrated in Figure 1. This paper describes a model system to carry out the above-mentioned course assessment and effectiveness activities timely, efficiently, and effectively. The system also helps academic institutions in establishing a culture of assessment by providing an "easy to use" MS Excel tool for instructors responsible for teaching various courses of a program.

We are confident that the proper and timely implementations of this system will not only minimize the time and the efforts of course instructors for maintaining the assessment record of students, but will also provide an efficient method for keeping track of achievement of the individual students in a particular assessment instrument alone and in a course as whole. This system will also provide tangible quantitative evidence that would facilitate instructors and quality assurance bodies responsible for suggesting desired improvements and corrective actions for future offerings of the course.

The system architecture and details of each module are described, various aspects that are necessary for closing the loop are discussed, and a conclusion and future work is presented.

SYSTEM ARCHITECTURE

In this section, we provide the detailed system architecture shown in Figure 2 (see Appendix) of our approach. This system comprises of four major modules:

1. Assessment Plan Module
2. Instruction and Evidence Collection Module
3. Evidence Analysis Module
4. Reporting Results Module

In the following subsections, we discuss each module and its implementation on a three-credit hour course titled "Introduction to Programming (ENG 204)"that is taught as part of the Bachelor of Science in Computer Science and Engineering (BSCSE) program offered at the College of Engineering and Applied Sciences of Al Ghurair University (AGU) (AGU, 2011) in Dubai. AGU is a reputed university of United Arab Emirates (UAE) in the private sector and its programs are accredited by the Ministry of Higher Education and Scientific Research, UAE. The system has been implemented using a MS Excel-based prototype and will later be upgraded using appropriate web-based technologies. A number of templates have also been developed and used while implementing the proposed system, which are also discussed and presented in the following subsections. We assume that approved curriculum of a program and related institutional policies and standards are in place before implementing this system.

ASSESSMENT PLAN MODULE

To carry out a meaningful and effective assessment, planning is crucial. It is the first major step that helps in identifying and employing appropriate assessment methods to quantify the success of a particular outcome/objective. In the academic context, a course syllabus is the first document that provides a strong base for preparing a course assessment plan as it contains vital information about the course design, delivery, and assessment. This document also serves as an understanding or a contract between student, instructor, and academic institution. A model course syllabus typically presents a framework outlining the course goals/outcomes, along with the relevant information about various strategies for achieving these goals/outcomes (Felder, R.M. and R. Brent, 2003). At AGU, each syllabus is prepared using a standard template. The course instructors are required to provide all necessary details regarding course description, course learning outcomes, course content, assessment methods, and all related material that is necessary for the effective delivery of this course. The syllabus also contains an assessment matrix linking CLOs with various assessment methods. Education literature is full of material that focuses on the importance of incorporation of Bloom's Taxonomy cognitive domains and the use of action verbs in writing course and program learning outcomes. We assume that instructors are competent enough in writing appropriate CLOs covering the entire syllabus while considering the desired levels course and program goals using Bloom's Taxonomy. Once the course learning outcomes are specified, their assessment becomes straight forward (Karimi, A., Clutter, K., and Arroyo, A., 2004; King, F.G. and Ilias, S., 2003).

The assessment plan module consists of two standard templates that allow the instructors to develop the syllabus of a course along with a detailed course assessment plan. The main purpose of these templates is to standardize the documentation and data collection process in one format that would consequently make the whole exercise of data analysis and evaluation much easier and efficient. Few selected portions of the template indicating the course assessment plan for a programming (ENG 204) course are shown in Figures 3, 4 and 5 (see Appendix).

The assessment plan template is used to design and document a comprehensive course assessment plan using a variety of direct and indirect methods. The assessment plan template comprises of three sections. Section A (Figure 3) documents the basic information about the course and its CLOs, whereas Section B (Figure 4) presents a matrix linking CLOs with various direct and indirect assessment methods. Section C (Figure 5) consists of two parts. The first part that contains information about the assessment measures and success criteria is filled during the

planning stage of course assessment. The second part of Section C is filled after gathering and interpreting the evidence as it provides an opportunity for the course instructor to record the results of the assessment and how these results will be used for introducing changes to improve future course offerings. The success criteria or benchmark set at the planning stage of the course assessment is compared with the results obtained from the system and, accordingly, the appropriate improvement actions are suggested. This portion of Section C is completed after the teaching and assessment of a course is completed.

The template also allows the faculty to document their course assessment plan using both direct and indirect assessment methods. The direct assessment method is used to measure the degree of each student's achievement in a particular course learning outcomes/objective once the student has completed the course. These direct methods may include classical, as well as non-classical, methods (Felder, R.M. and R. Brent, 2003). In the planning stage of the course, the instructor is required to set the success criteria for every CLO that would serve as a benchmark for comparing the assessment results obtained at the completion of the course. Typically, the success criteria are set in terms of two numbers - 1) average class achievement level (e.g. 70% marks or grade C) and 2) a percentage of the students exceeding the pre-set achievement level (e.g., 60% of the students are expected to achieve 70% or higher, or 60% of the students are expected to achieve grade C or higher). Similar success criteria are set for each CLO of the course. The model system employs the standard assessment process that requires each instructor of the course to:

- Develop an assessment instrument (assignment, test, project, case study, etc.) consisting of certain questions/tasks that are designed to assess either one or a combination of CLOs of the course.
- Map assessment instrument questions/tasks to CLOs based on the assessment plan recorded in Section B of the template.
- Evaluate and mark the assessment instrument and enter each student's marks for every question/task into the designated worksheets of the model system.

Instruction and Evidence Collection Module

The second module of the model system is called "Instruction and Evidence Collection" which facilitates the course instructor to document the course assessment plan and to keep a track of marks obtained by each student in every assessment instrument. The back-end of the system provides a complete linkage of the course information with the course assessment plan and thus the instructor does not have to re-type the course information on every sheet of the MS Excel book time and again. This module uses a separate sheet for each CLO of the course to record/document the assessment data of each student for various assessment instruments used in the course.

AT AGU, the assessment instruments are generally divided into two categories - 1) continuous assessment (assignment, project, quiz, case study, essay, laboratory work, major tests, etc.) and 2) final examination. The first sheet in the MS Excel workbook facilitates the instructor to create an assessment plan which is linked to other worksheets. An image of the MS Excel sheet illustrating the "CLO Assessment Plan" for the course ENG 204 is shown in Figure 6 (see Appendix). This sheet shows various assessment instruments administered for this course, along with the marks and their appropriate linkage with each CLO. The method of entering the data for one assessment instrument, for example - "Final Examination (FE)" - is explained in the following paragraph.

The total marks for this instrument are 100 and are entered in Marks column. The allocated percentage weight for the final examination is set at 40%. This instrument had 10 questions and was designed to test all three CLOs of the course. The total marks of the questions that were meant to asses CLO-1, CLO-2, and CLO-3 were 35, 35, and 30, respectively. These values were entered under the columns CLO-1, CLO-2, and CLO3. The formulae are set to compute the percentage of each assessment instrument in different CLOs.

The instructor entered the marks obtained by each student in every assessment instrument administered in the course in the designated CLO assessment data recording sheet. The MS Excel book allows as many worksheets as number of CLOs entered for a course in the assessment plan. A portion of the image of the MS sheet illustrating "Course Assessment Data" recorded for the CLO-1 of the course ENG 204 is shown in Figure 7 (see Appendix). The method of entering the data for one assessment instrument - Final Examination (FE) - is explained below:

Total marks for this instrument were 100 and the corresponding allocated weight for the CLO-1 was 35. The instructor entered marks obtained by the first student in the questions relating to the CLO-1 that were 23.5 as shown under the "Final Exam" column; i.e., this student received 23.5 marks in questions that were designed to assess CLO-1 of the course. Similar data were entered for the marks obtained by this student in questions relating to other CLOs of the course in sheets designated for entering the data for CLO-2 and CLO-3. These sheets are not shown here due to the limitation of space. The formulae are set in the MS workbook to compute the percentage contributions of various assessment instruments in achieving each CLO of the course.

Evidence Analysis Module

Once the evidence is collected and recorded, the analysis of the course assessment becomes straight forward. The instructor is just required to enter the assessment data of the course into the evidence collector worksheet. The remaining part of the analysis is done automatically through linked worksheets with built-in formulae in accordance with the standard policies of the institution. Triangulation is an important feature of effective assessment. The more tools used to assess a specific course learning outcome, the greater the likelihood that assessment will be both valid and reliable. Therefore, both direct, as well as indirect, assessment tools are used.

The instructor designs an assessment item consisting of a certain number of questions to assess selected course topics and consequently, the course learning outcomes. The instructor uses the Bloom's Taxonomy guidelines (Bloom, B.S., M. D. Englehart, M.D. Furst, E.J., Hill, W.H. and Krathwohl, D.R., 1956 & 1984) while preparing such assessment items. An articulation matrix, or any other method, is used to map the assessment questions to the CLOs. There are three components in this module - 1) Result Analyzer, 2) CLO Assessment Analyzer, and 3) Chart Plotter.

Result Analyzer

The marks recorded in individual CLO worksheets are linked with the result analyzer worksheet. The result analyzer computes the overall result of each student based on his achievements in every assessment instruments (assignment, quiz, lab work, project, case study, final examination, etc.) administered in the class. Another worksheet is used to analyze and compute the achievement levels for each and every student in all CLOs of the course. The corresponding images of these worksheets are shown in Figures 8 and 9 (see Appendix), respectively.

The grade analyzer is an important part of this module. The grade analyzer worksheet provides the overall performance and analysis of the grades of all students in each class (or section if the course was taught in more than one section). The MS Workbook allows the instructor to view the entire analysis both in table and bar chart formats. This worksheet provides complete statistics for each section which consist of grade distribution, average marks, standard deviation, and the computed value of the course performance. Figure 10 (see Appendix) presents a view of the grade analyzer worksheet and the generated bar graph for the course.

CLO Assessment Analyzer

This component of the module is a central part of the system as it provides the vital statistics about the achievement levels of various CLOs of the course. The achievement levels are categorized as level F (below 50%), level D (50%-64%), level C (64%-78%), level B (68%-92%), and level A (92%-100%). The achievement levels of students in each CLO of a course are computed in counts and percentages.

Chart Plotter

Visual presentations, such as charts/graphs, are often much easier to comprehend than verbal descriptions and numerical numbers. The values obtained in the CLO assessment analyzer are used to generate charts. The success criterion set at the planning stage of the course assessment for each CLO is compared with these charts and appropriate decisions are suggested for course improvements. An image of the CLO assessment analyzer worksheet, along with the generated graph, is shown in Figure 11 (see Appendix).

CLOSING THE LOOP

Closing the Loop is the final step of the course assessment process. It allows course instructors to review and utilize the assessment results by suggesting changes that might be necessary to improve the quality and standard of future offerings the course with an aim of enhancing the overall effectiveness of the course. This is done by completing the designated part of the "Course Assessment and Improvement Template" (Figure 5). The instructors must address the following three important areas:

1. Assessment Findings - Instructors provide a summary of assessment results and discuss briefly what instructors have learned after gathering and interpreting the assessment data for each CLO.

2. Corrective Action for Improvement - Instructors provide information about:
   - How do they plan to use the assessment results to improve the course?
   - Who shall be responsible for implementing the plan?
   - What resources will be required to carry out the plan?

3. Completion Date - Instructors provide key target dates to carry out and complete the suggested improvement plan.

As mentioned earlier, Figure 11 (see Appendix) illustrates the success levels of each CLO in this course. The analysis provides an insight to the course instructor, curriculum planners, academic advisors and managers and facilitates them in deciding what course improvement strategies they must adapt to enhance the quality of student learning. Consider the analysis of CLO-3 shown in the graph of Figure 11. The percentage of students achieving level F (0–50%) is quite high (58%) which shows that the course learning outcome number 3 (Solve simple problems using C++) is not met when compared with the success criterion set for this particular learning outcome; i.e., 50% of the students will score more than 50 marks. This failure could be attributed to a variety of reasons, such as: 1) students' inability to use the programming control structures in the problem-solving situations and 2) students' analytical skills were not developed to a level so that they could understand the problem and write its solution in C++. Based on this analysis, many course improvement strategies were recommended. For future offerings of this course, the course instructor decided to provide more problem-solving opportunities to the students by giving them more problem-based assignments/activities in the course. A review of all courses designed to develop and enhance students' analytical skills in the academic program was also suggested to find out reasons for poor analytical skills of students and to take appropriate measures for improving the quality of these courses.

CONCLUSION

We presented a simple and efficient system to plan and implement the process of assessing various CLOs of a course taught in an academic program. We have demonstrated that it is user-friendly and an easy-to-use system. Various templates designed as a part of this system have been found to be very effective in documenting and recording the assessment data in a standardized format that makes the collection and interpretation of assessment evidence, as well as the process of closing the loop, much more effective and efficient. The system was designed and implemented using MS Excel Workbook as a prototype tool that will be further refined and upgraded to a web-based system using advanced tools and technologies available in the field.

ACKNOWLEDGMENT

The authors wish to acknowledge the support and financial assistance of Al Ghurair University to develop and implement the model system.

AUTHOR INFORMATION

M. A. Anwar is Assistant Professor at College of Engineering and Applied Sciences, Al Ghurair University, Dubai, 37374, UAE. Phone: +971-44200223 ext.345; Fax: +971-44200226; E-mail: anwar@agu.ac.ae (Corresponding author)

Naseer Ahmed is Director, Institutional Research and Effectiveness at Al Ghurair University, Dubai, 37374, UAE E-mail: naseer@agu.ac.ae

Abdurahem Mohammed Al Ameen is President, Al Ghurair University, Dubai, 37374, UAE E-mail: alameen@agu.ac.ae

REFERENCES

1. ABET, "Criteria for Accrediting Engineering Programs, Effective for Evaluations During the 2006-2007 Accreditation Cycle," Engineering Accreditation Commission, Accreditation Board for Engineering and Technology, Inc., Oct. 2005.
2. AGU, http://www.agu.ac.ae/ (Access date: 25 May 2011).
3. Bloom, B.S., M. D. Englehart, M.D. Furst, E.J., Hill, W.H. and Krathwohl, D.R., *Taxonomy of Educational Objectives: Handbook 1: Cognitive Domain*, Longman, New York, 1956 & 1984.
4. Felder, R.M., and R. Brent, "Designing and Teaching Courses to Satisfy the ABET Engineering Criteria," *Journal of Engineering Education*, 92 (1), 7-25, 2003.
5. GWU, http://www2.gwu.edu/~oapa/course_assessment/ (Access date: 25 May 2011).
6. Karimi, A., Clutter, K. and Arroyo, A., "An Example of Course and Program Outcome Assessment," Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition, 2004.
7. King, F.G. and Ilias, S. "Imbedding Assessment and Achievement of Course Learning Objectives with Periodic Reflection," Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition, 2003.

APPENDIX

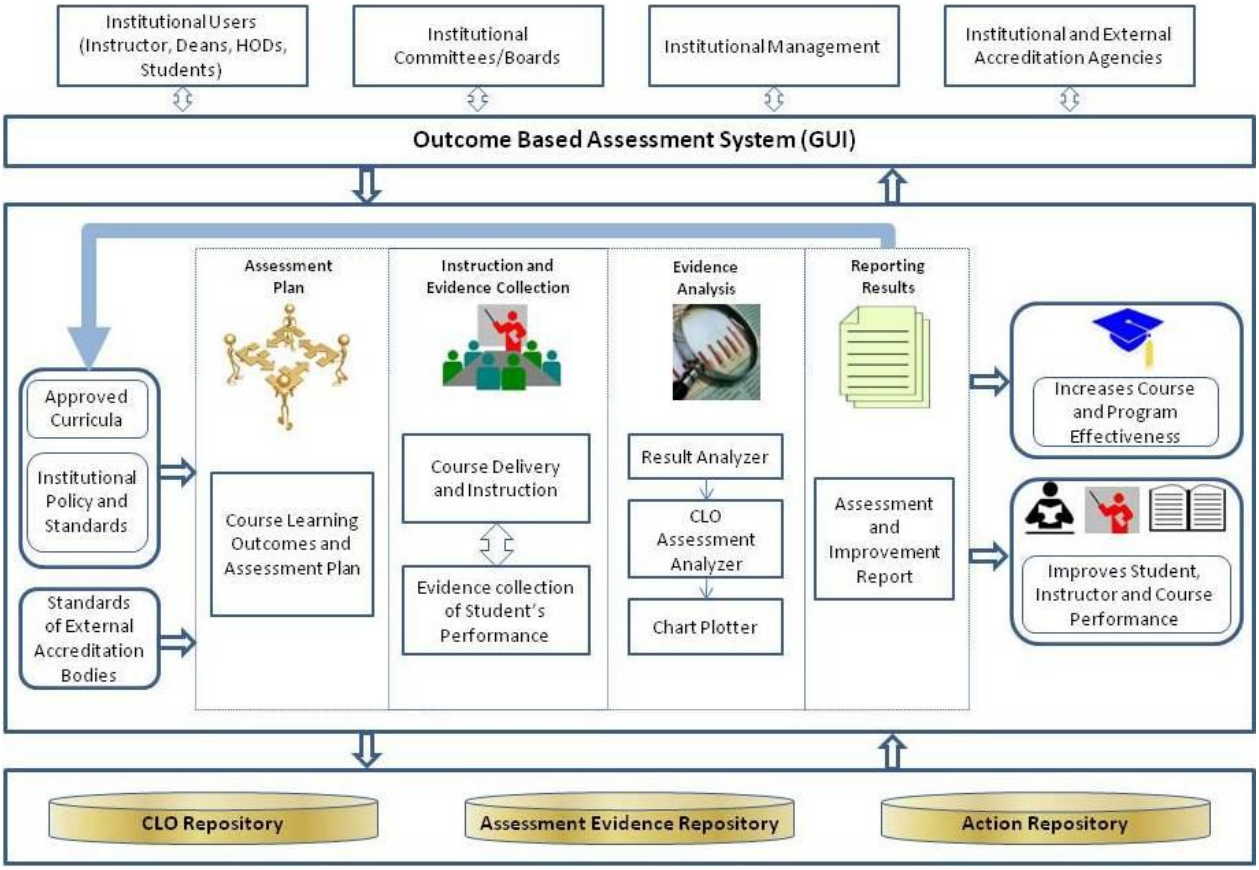

Figure 2: System Architecture

College of Engineering and Applied Sciences

ALGHURAIR UNIVERSITY

Section A
Course Assessment Plan And Improvement Report

Program Assessment Coordinator: Dr. Edriss Ahmed Ali
Course Instructor: Dr. Muhammad Abaidulah Anwar
Course Title: Introduction to Programming Through C++
Course Code: ENG 204
Assessment Start Date: 28 September 2009
Assessment End Date:14 January 2010
Program Title: BS in Electrical Engineering / BS in Computer Science Engineering
Course Learning Outcomes (CLOs):

1. Demonstrate the use of control structures, functions and arrays.
2. Design and write simple programs in C++.
3. Solve simple problems using C++

Figure 3: Course Assessment and Improvement Template (Section A)

Section B
Course Level Assessment - Matrix Linking Clos With Various Types Of Assessment Tools
List Course Learning Outcomes (CLOs) in the first column of the table given below. Place a cross [X] in the appropriate column in front of each outcome to indicate the assessment tool that shall be used to measure the achievement of that particular course learning outcome. You may add any additional assessment tool (direct or indirect) that you may want to use for assessing the CLOs of this course.

Course	Direct Measures																		Indirect Measures					
Learning Outcomes (CLOs)	Homework assignment	Individual project	In-class demonstration	Lab work	Oral presentation	Written test/quiz	Written paper/report	Skills tests	Group project	Classroom assessment	Peer evaluation	Course portfolio	Comprehensive exam	Other					Self-assessment of knowledge/ skill	Course participation	Classroom assessment techniques (CATS)	oral questions/quiz	Student feedback	
CLO 1	X			X		X			X				X						X				X	
CLO 2	X			X		X			X				X						X				X	
CLO 3	X			X		X			X				X						X				X	

Figure 4: Course Assessment and Improvement Template (Section B)

Complete This Part At The Planning Stage				Complete This Part After Gathering And Interpreting Data		
Course Learning Outcomes (CLOs)	**Assessment Measure**		**Criteria for success**	**Assessment findings**	**Corrective action for improvement**	**Completion Date**
	Provide information about the following: 1. What method you plan to use to collect the evidence or data of progress in meeting a particular CLO? 2. How the data will be collected? 3. Who will be responsible for collecting the data?		What target level you would like to achieve at the end of your efforts in meeting a particular CLO?	Provide a summary of assessment results and discuss briefly what you have learnt after analyzing the collected evidence.	Provide information about the following: 1. How do you plan to use your assessment results to improve this course? 2. Who shall be responsible for implementing this plan? 3. What resources you will require to carry out the plan?	Provide key target dates to carry out and complete the improvement plan.
1. Demonstrate the use of control structures, functions and arrays.	D	Assignment, Quiz, Test, and Lab work. The marks of each assessment item listed will be collected. The faculty member teaching the course will be responsible.	50% of students will score more than 50 marks.	The students who scored more than 50 marks in this CLO are 64% showing that the CLO is fully met.	The percentage of the students will be set 60% to get more than 50 marks in next offering of the course. The instructor will be responsible. The students will be given more practical assignments and home work.	Fall Semester 2010 - 2011
	I	Student feedback. Course instructor's overall report.				
2. Design and write simple programs in C++.	D	The practical assignment, quiz, test and lab work. The marks of each assessment item listed will be collected. The faculty member teaching the course will be responsible.	50% of students will score more than 50 marks.	The students who scored more than 50 marks in this CLO are 64% showing that the CLO is fully met.	The percentage of the students will be set 60% to get more than 50 marks in next offering of the course. The instructor will be responsible. The students will be given more practical assignments and home work.	Fall Semester 2010 - 2011
	I	Student feedback. Course instructor's overall report.				
3. Solve simple problems using C++	D	Assignment, Quiz, and Final Examination. The marks of each assessment item listed will be collected. The faculty member teaching the course will be responsible.	55% of students will score more than 50 marks.	The students who scored more than 50 marks in this CLO are 48% showing that the CLO is not met.	The students will be given more programming exercises and tutorials in class and as take home. The lab facility will be provided for maximum possible time for the students. The instructor and lab assistant will be responsible. The computers in the labs need to be increased.	Fall Semester 2010 - 2011
	I	Student feedback. Course instructor's overall report.				
4. Demonstrate and apply object-oriented programming concepts.	D	Assignment and Lab Work. The marks of each assessment item listed will be collected. The faculty member teaching the course will be responsible.	55% of students will score more than 50 marks.	This CLO was not assessed due to the lack of time and students' poor understanding in the prerequisite course CAS 105. The more emphasizes was given on basic programming structures.	The CAS 105 should concentrate only on computes introduction and part of programming included in this course should be part of ENG 204. The OO concepts in ENG 204 should be excluded and included in ENG 307 course. Three syllabi need to be modified. The instructors of the three courses are responsible.	Fall Semester 2010 - 2011
	I	Student feedback. Course instructor's overall report.				

Figure 5: Course Assessment and Improvement Template (Section C)

ALGHURAIR UNIVERSITY	COURSE LEARNING OUTCOME ASSESSMENT PLAN					Program Title	Bachelor of Science in Computer Science Engineering						
						College/Department	College of Engineering and Applied Sciences						
	Course Title	Introduction To Programming				Course Code	ENG 204		Credit Hours	3	2	2	
Instructor (Section 1)	Instructor (Section 2)		Instructor (Section 3)		Instructor (Section 4)		Course Coordinator		College Dean/HOD				
Dr. Mohamad Abdullah Anwar									Dr. Yousif Abdalla				
Assessment Measures		Type	Marks	CLO1	CLO2	CLO3							
CONTINUOUS ASSESMENT	Assignment, Project, Case Study, Quiz, Essay etc.	A-1	40	40									
		A-2	40	10	10	20							
		Q-1	10	7	3	0							
		Q-2	20	12	4	4							
		% Weight	20	12.55	3.09	4.36							
	Lab Work	Final Lab	15	6	4	5							
		% Weight	10	4.00	2.67	3.33							
	Test/Examination	Test-1	40	10	20	10							
		Test-2	40	10	10	20							
		% Weight	30	7.50	11.25	11.25							
Final Exam		FE	100	35	35	30							
		% Weight	40	14.00	14.00	12.00							
TOTAL			100	38.05	31.01	30.95							

Figure 6: Assessment Plan Worksheet

ASSESSMENT DATA (COURSE LEARNING OUTCOME 1)																									
Sr. No.	Section Number	Student ID	Assignment, Project, Case Study, Quiz, Essay etc.										Lab Work						Test/Examination					Final Exam		Total
			A-1	A-2	Q-1	Q-2						%	Final Lab					%	Test-1	Test-2		%			
			40	10	7	12						20	6					10	10	10		30	35	40	100
1	E	20080275	5.0	10.0	7.0	12.0						9.9	6.0					10.0	10.0	10.0		30.0	28.5	32.6	82.4
2	E	074192048	5.0	7.5	4.5	10.0						7.8	6.0					10.0	9.0	4.0		19.5	35.0	40.0	77.3
3	E	074192022	5.0	10.0	6.5	9.0						8.8	6.0					10.0	6.0	8.0		21.0	30.5	34.9	74.7

Figure 7: CLO Assessment Data Recording Worksheet

ALGHURAIR UNIVERSITY	OUTCOME ASSESSMENT ANALYSIS		Instructor (Section 1)	Instructor (Section 2)	Instructor (Section 3)	Instructor (Section 4)	Course Coordinator
			Dr. Mohamad Abaidullah Anwar				
	Program Title	Bachelor of Science in Computer Science Engineering	College/Department	College of Engineering and Applied Sciences		Dean/HOD	Dr. Yousif Abdalla
	Course Title	Introduction To Programming	Credit Hours	3	2	2	Course Code ENG 204

No	Section	Student ID	CONTINUOUS ASSESMENT																			Final Exam		Total	Adjusted Total	Letter Grade
			Assignment, Project, Case Study, Quiz, Essay etc.										Lab Work						Test/Examination							
			A-1	A-2	Q-1	Q-2						%	Final Lab					%	Test-1	Test-2		%	FE	%		
			40	40	10	20						20	15					10	40	40		30	100	40	100	0.00	
1	E	20080275	20	41	8.5	20						16.3	13					8.7	35	36		26.6	66	26.4	78.0	78.0	B
2	E	074192048	20	22.5	6	16						11.7	13					8.7	29	34		23.6	72	28.8	72.8	72.8	B
3	E	074192022	20	37	8	13						14.2	13					8.7	23	24		17.6	55	21.8	62.3	62.3	C
4	E	20080260	5	22	7.5	11						8.3	11					7.3	17	22		14.6	56	22.2	52.4	52.4	D+
5	E	074292010	20	35	6	13						13.5	11					7.3	30	27		21.4	66	26.2	68.4	68.4	C+

Figure 8: Result Analysis Worksheet

OUTCOME ASSESSMENT DATA AND ANALYSIS																													
CLO1	Adjusted	Success Level	CLO2	Adjusted	Success Level	CLO3	Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level		Adjusted	Success Level
100			100			100			100			100			100			100			100			100			100		
82.4	82.4	B	66.4	66.4	C	96.0	96.0	A	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F
77.3	77.3	C	62.9	62.9	D	88.5	88.5	B	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F
74.7	74.7	C	42.6	42.6	F	85.0	85.0	B	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F
79.8	79.8	B	4.6	4.6	F	76.5	76.5	C	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F
69.3	69.3	C	77.2	77.2	C	75.2	75.2	C	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F	0.0	0.0	F

Figure 9: CLO Assessment Analysis Worksheet

ALGHURAIR UNIVERSITY

FINAL GRADE ROSTER

		Program Title				Bachelor of Science in Computer Science Engineering					
		College/Department				College of Engineering and Applied Sciences					
		Course Title	Introduction To Programming			**Course Code**	ENG 204	**Credit Hours**	3	2	2
Section	**Instructor**	**A**	**B+**	**B**	**C+**	**C**	**D+**	**D**	**F**	**Performance**	
E	Dr. Mohamad Abaidullah Anwar	0	1	3	1	5	4	4	6	1.46	
OVER ALL		**0**	**1**	**3**	**1**	**5**	**4**	**4**	**6**	**24**	
PERCENTAGE		**0**	**4**	**13**	**4**	**21**	**17**	**17**	**25**	**100**	
				AVERAGE:	**51.8**	**STDEV:**	**16.3**	**Course Performance:**			**1.46**
				Adjusting Factor		**0.00**					

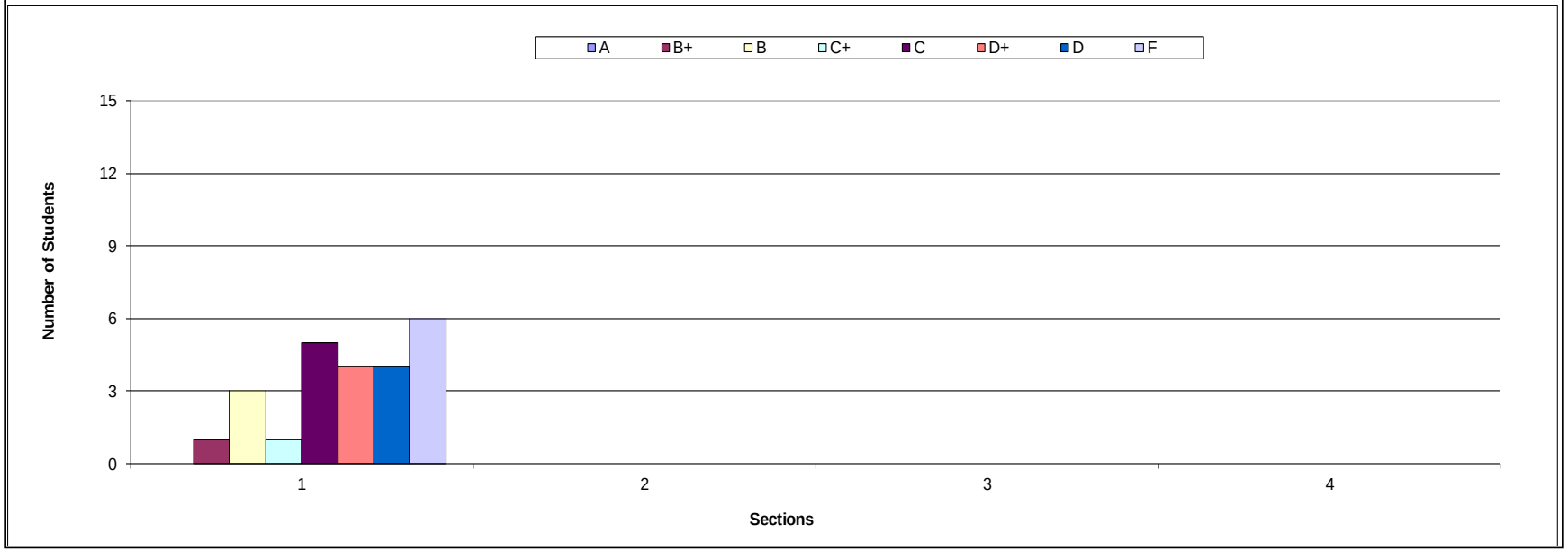

Figure 10: Grades Analyzer Worksheet and Graph

ALGHURAIR UNIVERSITY

CLO ACHIEVEMENT LEVELS

Program Title	Bachelor of Science in Computer Science Engineering							
College/Department	College of Engineering and Applied Sciences							
Course Title	Introduction To Programming	**Course Code**	ENG 204	**Credit Hours**	3	2	2	
Instructor (Section 1)	**Instructor (Section 2)**	**Instructor (Section 3)**	**Instructor (Section 4)**	**Course Coordinator**				
Dr. Mohamad Abaidullah Anwar								

CLOs	Level A (92-100%)		Level B (78-92%)		Level C (64-78%)		Level D (50-64%)		Level F (0-50%)	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
CLO1	0	0	2	8	7	29	7	29	8	33
CLO2	1	5	2	10	8	38	5	24	5	24
CLO3	1	4	2	8	3	13	4	17	14	58

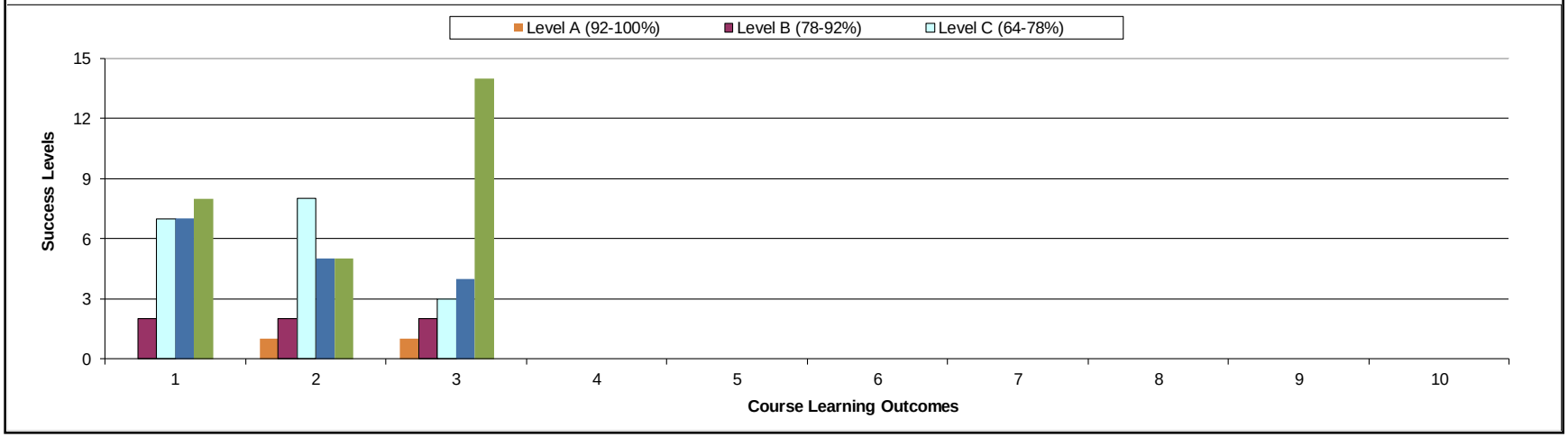

Figure 11: CLO Assessment Analyzer Worksheet and Graph

NOTES