



Examining the Relationship Between Monitoring Learner Progress and Course Learning Outcomes Achievement

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Abstract

Students of the first-year nursing program were recently experienced continuous and formative assessment through their training program. This is to improve the achievement of the students and the Course Learning Outcomes (CLOs). Therefore, the aim of the current study was to investigate the relationship between monitoring students' performance through continuous and formative assessments, student, and CLOs achievements. The study revealed a significant increase in the students' marks in all assessment methods after the mid-semester exams. In addition, the CLOs achievement is increased when the students got feedback.

Keywords: Feedback, Formative Assessment, Learning Outcomes, Student Assessment; Student Progress

1. Background

Assessment of health professionals must have a rigorous system which assessment results can rely on. This is due to the decisions about the performance of the students having a direct impact on the patients and health care¹. Such decisions are collected from several points and are made based on a variety of sources of information. Policies and procedures should be developed to direct the panel and panelists to help them reach decisions².

Thus, it is essential to maintain the progress of students in the higher education institutions at a good pace³. These can be attained via monitoring achieving learning outcomes which are the expected performance of the graduates. These relate to the five learning domains which are: knowledge, cognitive, interpersonal, and communication and psychomotor domains⁴. Different types of assessment are used to measure the achievement of students in these domains. All the assessment methods must be valid, reliable and fair to be suitable to measure the learning outcomes⁵. These types are direct and indirect assessment methods. CLOs are assessed directly by collecting data from students' performance in quizzes, Student Prepared Presentations (SPP), assignments, Team Based Learning (TBL), portfolios and written exams.

Indirect assessment of learning outcomes is of vital importance in measuring the student achievement⁶.

At the program level, the school can prove the attainment of program learning outcomes by a constructive approach calculating the CLOs achievements. Then CLOs achievement is calculated by the average approach. In the average approach, the average of the scores of the students in all assessment methods is calculated and should exceed the target (80%) for example⁷. In addition, Outcome-based Education is the current model applied in health professions education. Therefore, assessment of CLOs and students' progress is a contemporary topic of international interest⁸. Due to the impact of student achievement on assessing Course Learning Outcomes (CLOs), the irregularly monitoring student performance will decrease CLOs achievement.

Although in most of the programs the achievement of CLOs is measured, this was not done till the end of the course. In the current study, we analyzed the results and took the necessary action before the end of the course through measuring students' progress to continuously improve the course before the final exams. We also investigated the relationship between monitoring students' performance, feedback, and reflection on the CLOs achievements in a course of health profession schools.

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2. Methodology

2.1 Study Context

The study was conducted in Fakeeh College for Medical Sciences. The target population was the first-year students in a nursing program. The number of students was 56 students. Assessment methods included continuous assessment such as: quiz, TBL, cases, PBL, reflection, SPP, in addition to written exams (midterm and final exams) in both semesters in 2019-2020. The indirect assessment method is measuring the students' perception of CLOs survey. The assessment plan in the nursing program level is based on PDCA cycle. The used program plan is based on the alignment between learning outcomes at the course level and the learning outcomes at the program level. The main purpose of this program plan is to improve the program based on the results of the assessment methods⁹. The planning phase begins with ensuring the alignment between PLOs, CLOs, and the teaching and assessment methods while in doing phase the exam schedules and submitting the exam papers are done. In the check phase, the Quality and Accreditation Unit reviews the assessment reports. In the fourth phase, the course instructor writes the course report, and the Head of the Department writes the annual report to discuss the recommendation and action plans for revisiting the planning phase and acting on the next exams¹⁰.

2.2 Study Instruments

The data was conducted through the calculations of students' scores in quizzes, TBL cases, PBL, reflection, and SPP, in addition to written exams (midterm and final exams). The data was anonymous. Moreover, we compared the CLOs achievements in two different courses taught in the same year with the same instructor.

2.3 Statistical Analysis

Data analysis was done with use of the Statistical Package for the Social Sciences (SPSS, version 20. IBM). Descriptive statistics was used for analyzing the study findings. T-test was used for estimating differences between means.

2.4 Study Type

A quantitative comparative study, where the effect of monitoring the achievements of CLOs early in the course was explored.

2.5 Study population and sample type

It was a nonprobability purposeful sample; respondents were a group of students (56), from the first year, one course (2 theory+ 1 CH practical) with on-campus program, in the first semester as shown in Figure 1. The same students have been taught in the second semester, course with the same CH and the same instructor with frequent feedback. They experienced continuous assessment by a variety of assessment methods. Sample Size: The whole batch was investigated in this study. Data collection tools:

- Document reviews.
- MCQs, essays, assignments, SPP.
- Feedback sessions were given orally to the students.

3. Results

3.1 Courses' details

The details of the two compared courses, title, code, credit, hours, level, semester, and number of students are shown in tables 1 and 2.

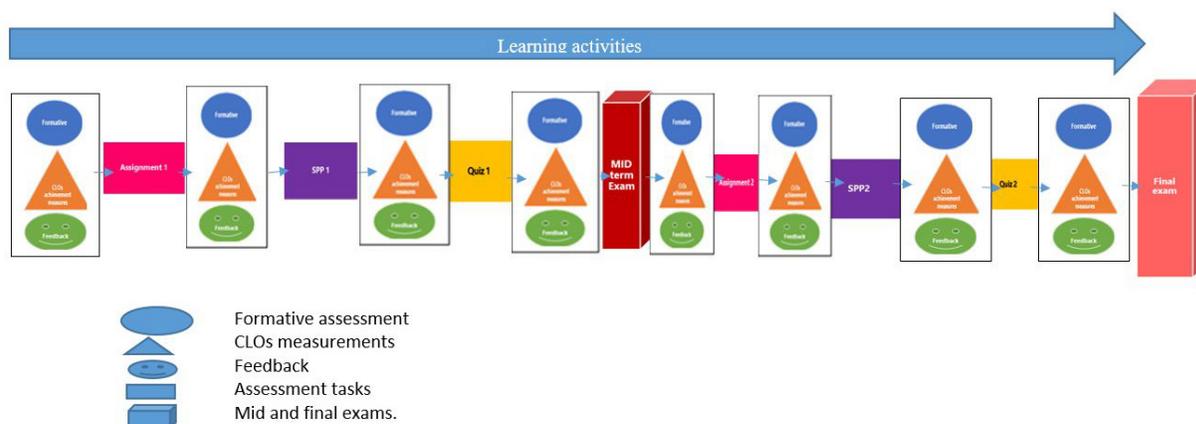


Figure 1. The flowchart of the investigated course

Table 1. The Courses' Details

Course title	Credit hours	Year	Semester	Number of students
Course 1	3	First	First	56
Course 2	3	First	Second	56

Table 2. The Assessment Plan in the Two Courses

	Assessment task	Week Due	Proportion of Total Assessment
1	Oral presentation (SPP)	During the semester	10 %
2	Poster presentation (group)	During the semester	10%
3	Midterm examination	8	20%
4	Assignments (single/group)	During the semester	10%
5	Quizzes	During the semester	10%
6	Final examination (Theoretical)	14-15	40%
Total		100%	

Differences between mean scores in the assessment methods:

The study revealed a significant difference in mean scores in quizzes, assignments and SPPs in the second semester course as shown in Table 3, 4 and 5.

Table 3. Student scores (N=56) in Quiz 1 and 2 in Course 2

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Quiz 1	40.216	55	.000	3.964	3.77	4.16
Quiz 2	72.338	55	.000	4.3464	4.226	4.467

Results are expressed as raw scores of students in Quizzes in the second semester course (which feedback and measuring CLOs achievements are measured), data were analyzed using t-test.

Table 4. Student Scores (N=56) in Assignment 1 and 2 in Course 2

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ass. 1	41.626	55	.000	3.268	3.11	3.43
Ass. 2	32.345	55	.000	2.5625	2.404	2.721

Results are expressed as raw scores of students in assignments in the second semester course (which feedback and measuring CLOs achievements are measured), data were analyzed using t-test.

Table 5. Course 2: Students' Scores (N=56) in SPP1 and 2

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
SPP 1	18.664	55	.000	4.875	4.35	5.40
SPP 2	21.409	55	.000	3.750	3.40	4.10

Results are expressed as raw scores of students in SPPs in the second semester course (which feedback and measuring CLOs achievements are measured), data were analyzed using t-test.

Difference between CLOs achievements in courses 1 and 2

The following tables (table 6 and 7) show a significant deference in the CLO achievement (knowledge and cognitive) between the first and the second course.

Table 6. CLOs Achievement in Knowledge Domain in The Two Courses

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Course 2	44.710	57	.000	42.644	40.73	44.55
Course 1	26.597	57	.000	32.010	29.60	34.42

Results are expressed as percentage of CLOs achievements in knowledge domain in the first and second semester courses (course 1, the feedback was not implemented and Course 2 feedback and measuring CLOs achievements were measured), data were analyzed using t-test.

Table 7. CLOs Achievement in Cognitive Domain in The Two Courses

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Course 2	38.843	57	.000	48.621	46.11	51.13
Course 1	26.588	57	.000	32.001	29.59	34.41

Results are expressed as percentage of CLOs achievements in cognitive domain in the first and second semester courses (course 1, the feedback was not implemented and Course 2 feedback and measuring CLOs achievements were measured), data were analyzed using t-test.

4. Discussion and Conclusion

4.1 Discussion

In this study, we investigated the effects of monitoring course progress and performance on the achievement of CLOs.

In our program assessment, information from multiple resources to improve the learning outcomes achievements, is collected. It has four main purposes: improving the learning, informing the decision-makers about the effectiveness of the educational process in the program, proving that the assessment process is effective in showing the achievements of the students. Finally, the program assessment supports the strategic planning and accreditation process¹¹.

Van der Vleuten *et al.* argued that there should be one master plan for the program to follow-up the students' acquirement of competencies. The assessment should be forming multiple points and the assessment methods are in a continuum of stakes. Putting in the consideration bias reduction strategies to reduce the subjectivity of scoring¹². This is consistent with our study, where the assessment committees ensure the alignment between PLOs and CLOs, then the course coordinators follow the assessment plan to monitor the CLOs achievement. In another study by Tweed & Wilkinson who mentioned that the intuitions should follow a process based on the several pieces of information to make the pass/fail decision of students to decrease the subjectivity of the scoring in the current study we collected scores from a variety of assessment methods throughout the course contributes².

In the present study, it was noticed that the means of marks of all assessment methods has been improved with the feedback. Feedback is proved to improve learning, performance, behaviors and consequently achievements. The feedback conversation enhances the awareness of the students about their roles if a good facilitator is involved in the conversation¹³. The results of this study are in compatible with the results of a study that investigated the effects of using learning analytics and giving feedbacks on the at-risk students¹⁴. The results of this study revealed that the performance of at-risk students improved after knowing their grades weekly.

Farooq stated that weighted average method is a simple way assess CLOs. It is conducted through calculating the proportions of all assessment tools. In the current study, we used this method to follow-up the students' progress in achieving the CLOs⁸.

Van Der Vleuten divided the purposes of intermediate assessments into three categories. First, as a diagnostic purpose to know how the learning is going, second as a therapeutic to remedy any defect in student learning, third as a prognostic to prevent the deficit in the final assessments¹⁵.

The assessment committee is responsible for putting remediation action with the collaboration with the mentors. The feedback is personalized, and the student is engaged in the action plan. This is compatible with our study which we provide feedback after each assessment point with the action plan and remediation.

For Continuous Quality Improvement, useful and relevant feedback should be related to the assessment and learning. By doing this, the feedback guarantees the students levels on the development continuum¹⁶.

In this study, we focused on the importance of monitoring student progress in health profession education. Moreover, this helps in improving the students' performance and will affect program evaluation through early discourse of the achievement of learning outcomes. The data collected from the students' performance were used to measure the CLOs achievement. Therefore, students' progress should be monitored early to increase CLOs achievement. This could be through variety of assessment methods such as quizzes, assignment, midterm exam. However, immediate feedback is required to enhance the student scores.

This study has some limitations; the study investigated only two courses in monitoring the progress of the students' performance. More studies are required to involve more courses for showing the effect of feedback on different learning contexts.

4.2 Conclusion

There is a substantial rising need to provide student feedback. Hence, establishing a system to document, monitor, evaluate, and report feedback is mandatory to monitor the student progress. Moreover, measuring CLOs achievement is an important part of closing the loop of student assessment. Taken together, instructors should collaborate with the students to improve their performance and achievements.

5. Authors' Contribution

SE constructed the design of this research, collected, analyzed data, and wrote the first draft of the manuscript. MH collected, analyzed data, and reviewed the manuscript. The final manuscript was read and approved by the authors.

6. Ethical Considerations

The study was approved by the Institutional Research Board at FCMS. The data collection tools were anonymous. Personal data will not be published under any circumstances. The extracted data from the records will be used for scientific

publishing and educational reform. No harmful consequences are expected from this work.

7. Funding

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8. Conflict of interest

No conflict of interest.

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