Strategic Method to Identify Students Needing Additional Curricular Support: Empirical Evidence across Courses in Health Professions Education in a Private Health Sciences University

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ABSTRACT

Background and objectives: To validate the generalization of the first periodic assessment as a tool for identification of the students needing additional curricular support (SNACS) across the health sciences courses.

Materials and methods: The performance of the students in the first periodic assessment and summative assessment were compared retrospectively for two batches in medical college and nursing college of a private health sciences university. The students were divided into three groups based on their ranks in the first periodic assessment as high, middle and lower third rank. The odds of failure of the students in the lower third formative ranking was compared to that of the students in the middle and top-third ranking.

Results: Analysis of the retrospective data of the medical and nursing college revealed that majority of the students failed in the summative assessment belonged to the lower third formative ranking. The odds of failure of the students in lower-third ranking was consistently more than that of the students in the middle and top third ranking.

Conclusion: Based on the results of the study across the courses in health profession, the performance of the students in the first periodic assessment is a valid method to identify the SNACS at the earliest.

Keywords: Formative assessment, Low achievers, Poor performers, Prediction of academic failure, Slow learners.

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INTRODUCTION

Every class has got a spectrum of learners varying widely in their academic achievement. The issue of concern at the class level or the institute level is always at the two extremes—the high scorers and the low scorers who influence the results. The result of the low scorers has multiple effects at the individual level and the institution level.[1] The individual student once lost the examination will lose motivation and gets depressed. Studies prove that the academic factors are causing more stress to the students than the other factors like personal life issues, faculty relationships, clinical work and professional identity.[2,3] The student might turn irregular for further classes, the academic performance might further deteriorate or can even lead to attrition of the student from the course. The remedial classes are more challenging due to the attitudinal change in the students. Hence identifying the high-risk students early in the academic year and supporting them before the summative assessment that determine their course progression is always beneficial.[4,5]

This paper is in continuation of the research conducted and published earlier.[6,7] In the earlier research, a trend of the first year students getting low-pass percentage than the other students was observed in the dental college of a private university. A basic retrospective research was then done to identify a strategic method to identify the SNACS. The relationship of the academic performance of the students in the first formative assessment and summative assessment was analyzed. The first formative assessment was similar to summative assessment in the duration, question paper format, invigilation and evaluation. The study found a positive association between both the assessments. The failures in the summative assessment were predominantly from the lower third rank of the first formative assessment. The results of the earlier study led to exploring of the association between first formative assessment and the summative assessment in the other constituent colleges of the private health sciences university. Several researchers have suggested that the spectrum of formative assessment utility needs to be studied further in educational research.[8,9]

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MATERIALS AND METHODS

Retrospective secondary data of two consequent batches of first year students, first formative assessment and the summative assessment was obtained from the constituent medical college and nursing college of the private health sciences university. The first formative assessment theory marks were analyzed. The details of the students who were absent for one or more first formative assessment were excluded from the analysis. The students were ranked based on the total marks in the first formative assessment. The result of the summative assessment (university examination) was compared with the students were ranked based on their percentile ranking in first formative assessment. First formative assessment ranking. The students were divided into top third, middle third and lower third ranking by percentile of the total theory marks in first formative assessment. Summative assessment odds of failure of the students in the lower third rank in first formative assessment was determined.

RESULTS

The students were ranked based on the theory marks of the first formative assessment. 33.3% cutoff, norm referenced based on the group performance. The total number of students in batch 1 of medical college was 252 of which 84 students were in upper, middle and lower third, respectively. In batch 2 of medical college the total number of students was 255 of which 85 students were in upper, middle and lower third, respectively. The total number of students in batch 1 of nursing college was 99 of which 33 students were in upper, middle and lower third, respectively. In batch 2 of nursing college the total number of students was 96 of which 32 students were in upper, middle and lower third, respectively.

The failures in the summative assessment were analyzed for their performance in the formative assessment ranking. Analysis of the medical college data of the batch 1 revealed that out of 56 failures in the summative assessment, 50 of them were in the lower-third formative ranking, 5 in the middle-third formative ranking and only 1 in the top-third formative ranking. In batch 2, out of 88 failures, 60 of them were in the lower-third formative ranking, 21 in the middle-third formative ranking and 7 in the top-third formative ranking (Table 1).

In the nursing college data, in batch 1, out of 13 failures 12 were in the lower one-third formative ranking and 1 was in the middle-third formative ranking. In batch 2, out of 24 failures included for the analysis, 21 of them were in the lower-third formative ranking and 3 in the middle-third ranking. In this batch, 5 failures were omitted from the analysis, since they were absent for more than one subject in the first formative assessment. In both the batches, none of the failures were from the top third of the formative ranking (Table 1).

Table 1: Distribution of failures (medical college and nursing college)

Batch	First formative assessment ranking			Total failures (university)
	Top third	Middle third	Lower third	
Batch 1 (medical)	1 (2%)	5 (9%)	50 (89%)	56
Batch 2 (medical)	7 (8%)	21 (23.8%)	60 (68.2%)	88
Batch 1 (nursing)	0	1 (7.6%)	12 (92.4%)	13
Batch 2 (nursing)	0	3 (12.5%)	21 (87.5%)	24

Odds of failure of students in the lower third ranking in first formative assessment to that of the students in middle third and top third ranks were assessed from the medical college results. In batch 1, (Table 2) the odds of failure of students in summative assessment for lower third ranking of first formative assessment were 23.24 times more when compared with the students in the middle third ranking and 122.05 times more when compared with the students in the top third ranking. In batch 2, (Table 2) the odds of failure of students in summative assessment for lower third ranking of first formative assessment were 7.31 times more when compared with the students in the middle third ranking and 26.74 times more when compared with the students in the top third ranking.

Odds of failure of students in the lower third ranking in first formative assessment to that of the students in middle third and top third ranks were assessed (Table 3) from the nursing college results. In batch 1, the odds of failure of students in summative assessment for lower third ranking of first formative assessment were 18.28 times more when compared with the students in the middle third ranking. In batch 2, the odds of failure of students in summative assessment for lower third ranking of first formative assessment were 18.45 times more when compared with the students in the middle third ranking.

DISCUSSION

Following the results of the study conducted at dental college,[6,7] wherein statistical association was proved between the first formative assessment and summative assessment, retrospective data of two consecutive batches in the medical college and the nursing college were analyzed. The results of both the constituent colleges (medical and nursing) were matching with that of the previous study conducted at dental college. In both the groups, most of the failures in the summative assessment belonged to the lower-third ranking of the first formative assessment.

The study done with first year medical students on the correlation of formative and summative assessments was reported to be statistically significant that supports the results of the present study.[10] The result of the current study is in alignment with a similar study where the role of formative quiz in identifying the students at higher risk of failing in anatomy was explored.[11] In addition to the overall correlation between formative and summative assessment they also found that the correlation was much stronger in the case of poor performers. The present study also proves greater risk of failure of the students in the lower third formative ranking consistently in all the batches.

A positive association between the academic achievement of the students of pregraduate health sciences and their formative assessment also supports the findings of the present study.[12,13]

However, one study failed to find any positive association between the undergraduate students formative and summative assessment in oral surgery. The author have attributed that to the comparison of clinical work rather than theoretical performance of the students.[14]

The relationship between the final examination in second year MBBS students and their periodic assessment was investigated and found to be related directly.[15] Investigation of academic performance in professional examination using the class tests was found to be related with each other.[16]

There exists a general belief among the educators that the students will not give the same attention to the preparation for formative assessment as they do for the summative assessment and

Table 2: Risk of failure based on formative assessment in medical college

	Summative failures	Summative pass	Total students in formative ranking group	Odds ratio
Batch 1				
Failures from lower third rank	50	34	84	23.24
Failures from middle third rank	5	79	84	
Failures from top third rank	1	83	84	122.05
Batch 2				
Failures from lower third rank	60	25	85	7.31
Failures from middle third rank	21	64	85	
Failures from top third rank	7	78	85	26.74

Table 3: Risk of failure based on formative assessment performance (nursing college)

	Summative failures	Summative pass	Total students in formative ranking group	Odds ratio
Batch 1				
Failures from lower third rank	12	21	33	18.28
Failures from middle third rank	1	32	33	
Total	13	53	66	
Batch 2				
Failures from lower third rank	21	11	32	18.45
Failures from middle third rank	3	29	32	
Total	24	40	64	

hence their performance may not match in both the assessments. However, the results of the current study supported by earlier references have clearly shown that the performance of the students in a properly conducted formative assessment can be used as a strategic method for identifying the SNACS. Assessment drives learning irrespective of whether it is of high stakes or low stakes by nature. If the predictive potential of the formative assessment is considered by faculty members the value of formative assessment will be raised by several times.[17–19] The research has resulted in an institutional best practice of "Zero Failure initiative" for the undergraduate students.

The limitation of the study includes lack of elaborate statistical analysis. However, generalizations from a research can be of statistical generalization, analytical generalization or can be mere transferability. The results of the current study provides analytic generalization of the results of the previous study done by the author. The results of the current study suited the cohort of all three constituent colleges where a mixed cohort of students prevailed. If the cohort is completely low or high profile, the educational support strategies may be required for students in all three ranks or *vice versa*. Future research can include further exploration with qualitative research methods to identify the reason behind failure in the students from the top third formative ranking. The effectiveness of support strategies can be studied in all the constituent colleges to cater to the needs of SNACS.

CONCLUSION

Within the limitations of the study, it was found that, the majority of the students failed in the summative assessment belonged to the lower third formative assessment ranking. The risk of failure of the students in lower-third ranking was consistently more than that of the students in the middle and top third ranking. Same results were obtained across the health profession courses suggesting that the performance of the students in the first formative assessment can be used as a strategic pathway to identify the SNACS at the earliest.

AUTHORS CONTRIBUTION

All four authors contributed equally for the conduct of the study and the manuscript preparation.

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