Role of framing departmental policies to achieve improvement in academic performance-Observational study in a new medical college

M. Ramadevi[1,*], N. V. Lakshmi[2], R. D. Malathi[3], Sateesh[4]

[1]Professor, [2]Associate Professor, [3]Assistant Professor, [4]Tutor, Dept. of Biochemistry, Government Medical College, Nizamabad, Telangana, India

***Corresponding Author:**
Email: ramadevi.mopuri@gmail.com

Abstract

Objectives: Establishing teaching policies which improve the quality of student learning experience and thereby, enhance the overall learning outcome. Teaching and learning are inherently intertwined, and this necessitates a holistic approach towards the development of novel teaching methodologies.Sustainable quality teaching policies require long-term, non-linear efforts and thus call for a permanent commitment from the teaching faculty. In general, certain quantitative standards/measures can be employed to gauge the efficacy of teaching. In this article, we present an observational study conducted at a recently established Govt. Medical College at Nizamabad in the State of Telangana. A novel teaching-learning framework was formulated and implemented. The efficacy of the framework was measured by gauging various parameters post-implementation of the policy.The proposed framework included policies related to the following aspects:

1. Attendance
2. Specific teaching-learning programme for
   a. Practical procedures
   b. Formative assessments followed by feedback sessions reflecting on their performance
   c. Conducting periodical tests
   d. Formulation of questions by Students for Mock Orals
   e. Conducting Quiz Programmes

As shown by certain quantitative metrics, the implementation of the proposed framework has resulted in the improvement of academic performance of the students.

Material and Methods: The study was based on data analysis of summative marks records, after each year. The data was collected for about 400 students over a period of 4 years.

Results: The efficacy of the proposed teaching method was analysed by the gauging the academic performance of students prior to and post implementation of the policy framework. The results indicate significant improvement of student academic performance after the implementation of the proposed policy framework.

Conclusion: Evolving departmental policies with specific teaching learning programmes will help to improve the academic performance through motivation and better understanding of subject. Administering specific teaching learning programmes with strict attendance policy plays a role in improving the academic performance of the students.

Keywords: Attendance policy, Specific teaching learning programmes.

Introduction

Early identification of failure and understanding the underlying reasons for it, would help certain students to perform better with adequate guidance. Students in their experiential years may have better study, analytical and critical thinking skills than students in their successive years. The specific teaching and learning frameworks at department, programme level play significant role in better academic achievement of the students.[1] The teaching and learning frameworks in use define the objectives of teaching and the expected learning outcomes for students. The present study has been conducted at the Government Medical College Nizamabad, which was setup in the year of 2013. In the early days we have noticed the problem of absenteeism and tried to tackle situation by insisting students to attend the classes. Performance of about 20 students in the formative examinations was below 50%. At the time of start of the study, the hostel infrastructure was still under development, which resulted in majority of the hostel students travelling to home-towns during the weekend.

However, even after complete development and with availability of full-fledged infrastructure, students continued to travel on weekends, out of habit. Due to the travel on weekends, majority of students tended to be absent for the Monday classes.

For the first batch of students, theory and practical classes were conducted, along with the required number (three) of formative assessments, which are mandatory as per the Medical council of India (MCI). Amongst the students of this batch, 43 received first class marks (more than 65% of marks) and 4 received distinctions. From preliminary data analysis, it was observed that students with low attendance tend score less on their tests and have a higher propensity for failure, which correlated with other studies in literature.[2-4] Regular attendance plays an important role in enhancing student Performance as it helps the student to increase their understanding of basic concepts, easily understand

every point, students achieve greater understanding and improve coordination with teachers and peers. These problems can be overcome by improving the attendance and reducing the absenteeism. To mitigate the issue, new attendance rules were formulated and implemented at the end of the academic year. To alert students about low attendance, the attendance was calculated on a quarterly basis and communicated to them. Further, interactions/meetings were held with chronic absentees, together with their parents. These measures lead to some improvement in few cases and recorded a higher percentage of 62% of students (as compared to 43% of previous batch), receiving a first class in the 2014-2015 batch. It is in fact ironic that students in government medical colleges fail. As these are the very students, who secure about 90-95 % in intermediate/12th classes. Through our studies, we intended to answer the question of why such meritorious students under-perform/fail in their professional courses. From our observations, we understood that at the education of 12th class (intermediate board), students are monitored closely and tutored continuously. To improve the academic performance of students, close monitoring and continuous tutoring was envisaged as an optimal strategy.[4] Typical lecture-style teaching may not suffice as most of the students are from diverse backgrounds and in some cases may have problem understanding the language. The language barrier leads to difficulty in coping up with the demanding and vast syllabus of the professional courses.

It was also noticed that around 50% of the students' performance in viva was average. When enquired the students told that they have not come across this sort of examination in their years of school education. Alternate methods were formulated to support students with very little exposure to viva-voce examinations.

Together with policy for attendance, specific teaching-learning programme was designed and implemented.[5] The aspect of practical learning was emphasized upon significantly in this programme. Typically, during the practical classes, the students are given detailed instructions about the experimental tests/procedures. After taking notes, students proceed to perform the experiments. However, while performing the experiments students closely refer to the observation/procedure notes. This process of performing the experiment while continuously referring to the notes is ineffective, as most students do not revise/study the process after the class. Typically, students revise/re-learn the test procedures, only at the time of final internal practical assessment. This process of rote learning leads to incomplete understanding of the underlying concepts and thereby leading to nervousness of the student prior to the examination.

The first measure taken in reference to teaching-learning framework was the assignment of mentor/tutor to each of the student. The students were taught the experimental procedures/tests. After which, they learn and understand the procedures in a critical manner.[13,14] Following which, they were asked to write-up/summarize the procedure. The student's write-up/summary of the procedure was then evaluated by their respective mentor. Only after this preliminary evaluation, students were allowed to perform the procedures/tests in the laboratory.

After this policy was followed, a significant change was observed in the amount of information retained by the student. Further, a lot of behavioural changes were observed in the way in which students performed their experiments. For example, prior to this policy change, students would discuss amongst themselves a lot. Whereas, after the write-up evaluation procedure was implemented, it was noticed that students discussed a lot-less and were fully engrossed in the procedural aspects of the experiment. Due to the implementation this active learning scheme, it was found that most of the students secured more than 60% of marks in their practical examinations. It was noticed that some of the students were unable to understand the reason for their low performance in the formative examinations, as compared to their peers. For such students to gain a critical capacity for evaluating their own answers and understanding their pitfalls, reflective feedback sessions, were formulated and introduced. In a similar manner, active learning schemes were implemented in all the aspects of the overall teaching framework.

The following were the changes made to typical lecture-style teaching process:

1. Half-hour written examination after each completion of each chapter, prior to the mandatory internal assessments.
2. Mock viva was conducted, wherein the students themselves were asked to formulate/frame questions in topics of viva syllabus.[8] We have adapted this method to relieve students of their pre-examination stress which affected the creativity of students. The motivating element of competition between students was introduced.[8]
3. Reflective Feedback sessions were conducted after the prefinal examinations.[15]

Viva Voce has been an old traditional method of examining student's knowledge, basic concepts, comprehension level and communication power in 'question and answer' format.[12] The mock viva process has helped relieve the anxiety of most of the students. Further, it was noted that students were enthusiastic and participated actively in the mock oral examinations. The feedback sessions played a key role in helping the students understand where they were going wrong while answering questions.[6-8] During the reflective feedback sessions, students were explained in a detailed manner- (1) the process of evaluation, (2) the requirements, evaluator looks for in an answer, (3)

Assessment of Learning Outcome**.** After which, the students were handed a format to review and self-assess their own answers against the characteristics of an ideal answer as expected by the evaluator. The students were then handed the corrected answer-scripts of the internal assessments and were asked to compare and identify their own mistakes, by referring to a textbook. For the process of self-assessment, a tabular format has been framed.

Table 1: Format for Student Self-Assessment

Question	Answer written	Expected answer as per textbook	Self-assessment/analysis
			If more marks are expected, please explain the basis of your expectation.
3HMP shunt	6 Phosphatase Synthetase	--	--

The reflective feedback sessions lasted for about four and half hours over a period of 3-4 days. Each session was attended by 25 students and overseen by 4 faculty members. Most of the students actively participated in the feedback sessions and were glad to have understood the faults/inadequacy in their answers. The reflective feedback sessions lead to the increase in number of first class grades received from 63% to 71%, among which 20 students received distinction grade. Amongst the next batch of students, about 73% have received first class and 16 received distinction grade.

Material and Methods

In this observational study, the data collected from 4 batches of 100 students from the academic years of 2013-2014 (Batch-I), 2014-2015 (Batch-II), 2015-2016 (Batch-III), 2016-2017 (Batch-IV) was used. The attendance details of students, belonging to these batches were collected from the registers of the Bio-chemistry Department. Performance of these students was assessed by academic achievement as represented by the results in university examinations. The proposed framework and attendance rules were implemented from Batch-II onwards. Hence, Batch-I can be considered as control group for which no corrective measures/policy changes were implemented. As per their class attendance, the students were divided into three categories. Group-I (LOW), students with 75% Attendance, Group-II(MEDIUM) students with attendance in the range of 76-85%, Group-III(HIGH) students with attendance in the range of 86-100%. The frequency of failure and percentage of marks in the 3 groups were analysed by using chi-square test. The scores/marks for practical examinations were separately analysed to assess the efficacy of the implemented learning programme. Herein, the students were categorised into five groups – Group-I students with 50-60 percentage of marks, group-II students with 61-70 percentage of marks, group-III students with 71-80%, group-IV (81-90%) and Group-V (91-95%)

Table 2: Distribution of Marks achieved by Students in Practical Summative Examinations

	Group-I	Group-II	Group-III	Group-IV	Group-V
Year	50-60%	61-70%	71-80%	81-90%	>91%
2013	12	20	34	32	2
2014	nil	1	27	59	13
2015	1	5	43	44	6
2016	NIL	5	42	40	8

Table 3: Total number of Class hours conducted during each academic year

	Theory classes (in hours)	Tutorials,feedback sessions, quizzes (in hours)	Practical classes (in hours)	Total
2013	115	10	43	168
2014	120	22	53	193
2015	126	35	50	211
2016	130	45	52	227

Results

The batch-wise academic performance of students has been shown in the following tables. The number of students distributed across different attendance and %Marks groups has been shown.

Table 4: Year Wise academic performance of students

Academic Performance (2013 - 2014 Batch)					
% Marks % Attendance	40 - 49%	50 - 64%	64.5 -74%	above 74.5%	
Group -I 75%	5	35	12	NIL	52
Group - II 76% to 85%	3	11	18	3	35
Group - III 86% to 100	NIL	3	9	1	13
Total	88	49	39	4	100
Academic Performance (2014 - 2015 Batch)					
% Marks % Attendance	40 - 49%	50 - 64%	64.5 -74%	above 74.5%	
Group -I 75%	1	17	16	NIL	34
Group - II 76% to 85%	NIL	17	24	11	52
Group - III 86% TO 100	NIL	3	9	2	14
Total	1	37	49	13	100
Academic Performance (2015 - 2016 Batch)					
% Marks % Attendance	40 - 49%	50 - 64%	64.5 -74%	above 74.5%	
Group -I 75%	1	8	6	NIL	15
Group - II 76% to 85%	NIL	13	21	7	41
Group - III 86% to 100	NIL	7	24	13	44
Total	1	28	51	20	100
Academic Performance (2016 - 2017 Batch)					
% Marks % Attendance	40 - 49%	50 - 64%	64.5 -74%	above 74.5%	
Group -I 75%	NIL	9	NIL	NIL	9
Group - II 76% to 85%	NIL	9	20	1	30
Group - III 86% to 100	NIL	8	38	15	61
Total	NIL	26	58	16	100

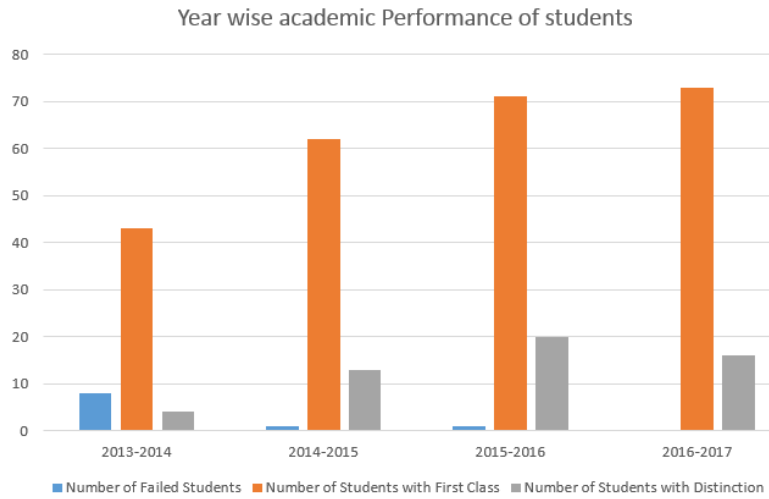

Fig. 1: Year wise academic performance of students

The performance details of the students have been summarized in Table 4 and Fig. 1. As evident from the results, in the 2013 batch, there were 52 students with attendance of 75 %. Among these, 35 students achieved up to 64%, 12 students achieved 74%. None of the students in this low attendance group achieved distinction. Further, the highest number of failed students (5) fall under this low attendance category.

In the 2013 batch, about 35 students fell into the Medium attendance (76-85%) category. Among these 35 students, 3 students failed, 11 students passed (above 50% marks), 18 students secured first class marks (above 64.5%) and 3 students secured distinction (above 75% marks). Among the students in the High attendance category (above 86%), 3 students passed (above 50% marks), 9 students got first class (above 64.5%) and one student secure distinction (above 75% marks). As none of learning frameworks were implemented, this batch served as the control group for this study. Further, as observed there is strong correlation between attendance and academic performance of the students. This result agrees with various studies available in literature.[2,3]

The proposed teaching learning frameworks were first introduced for students in the batch of 2014. In this batch, 34 students were found to be in the Low attendance category. Among them, 17 students passed (50-64% marks), 16 students secured first class, none of them secured distinction and one student had failed. 52 students were found to be in the Medium attendance category. Among these 52 students, 17 students secured pass marks, 24 students secured first class and 11 students secured distinctions. In the High attendance category, 3 students secured pass marks, 9 students secured first class and 2 students secured distinction.

In 2015 batch among 15 students who fell in the Low attendance category, 1 student failed, and 8 students secured pass marks and 6 students secured first class. Among 41 students, who fell in the Medium attendance category, 13 students secured pass marks and 21 students secured first class and 7 students secured Distinction marks. Among 44 students who have put in above 86% attendance 7 students got up to 64%, 24 students got above 65%, 13 students got above 75%.

In the year of 2016, all the nine students, who fell in the Low attendance category secured pass marks. Among 30 students who fell in the Medium attendance category, 9 students secured pass marks, 20 students secured first class and one student secured distinction. Among 51 students who fell in the High attendance category, 8 students secured pass marks, 38 students secured First class and 15 students secured Distinction marks. It is interesting to note that, there were no students, who failed in this batch.

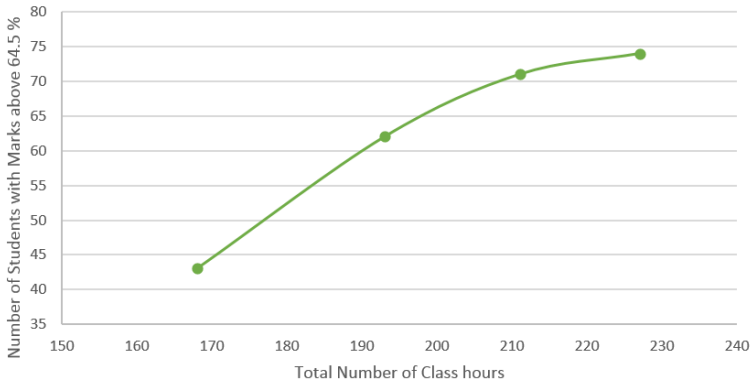

Fig. 2: Academic Performance v/s number of class hours

Discussion

As it can be seen from the above the results, the number of students, who fail has steadily reduced over the years. The highest failure rate was for the 2013 first batch (control group), for which no attendance policy and special teaching framework was implemented. Among the 8 students who failed 5 students were in 75% attendance group and 3 students has above 76% attendance.We have adopted strict rules that no student will be allowed to appear for internal assessment examinations unless they have more than 75% attendance and if any student was absent because of sickness they will be allowed to write the summative examination only after producing medical certificate. We started informing their parents after 1st internal assessment itself. It can be observed that, after implementation of the framework, there has been a significant reduction in number of failures. Further, the number of students achieving first class and distinction marks has steadily risen from only 4 for Batch-I (2013-14) to a highest of 51 first classes and 20 distinctions for Batch –III(2015) and 58 first classes and 16 distinctions for batch IV 2016. Also note that with the implementation of the framework, the number of students with Low attendance has steadily decreased. The steady improvement of academic performance with the rise in the attendance is a result of implementation of the proposed framework. The demonstrated correlative increase in academic performance with the rise in attendance agrees well with other studies in literature about attendance and academic performance of students.[2,3]

Over the years, Medical education has become very challenging, with a large percentage of students struggling cope up with the syllabus. The country's brightest students work extremely hard to secure

admission into medical colleges. It is ironic that these highly meritorious students fail to cope up with the syllabus, after their admission into the medical degree programme. Most of these students have secured 90-95% in their intermediate board examinations. In contrast, majority of them secure 50-60%in the summative assessments, with a portion of them failing as well. From a preliminary survey, it was understood that these students go through intense pressure during their medical admission tests and tend to relax, after securing an admission. An initial plan was drafted to segregate the students into low achievers and given them special attention. Such system was resisted by the students, as they were treated in a similar manner by the coaching centres in 11th and 12th classes. The scenario presented us with an opportunity for implementation of alternate teaching learning activities, which would motivate students to gain interest in the subject. After the first batch, we developed the proposed specific teaching-learning programmes, like practical procedure learning before conducting the tests. This has shown significant improvement in securing more marks in practicals compared to the first batch that is 2013 batch in which 68 students secured more than 70%, later in 2014 batch 99 students got above 70%. In 2015 batch 93 students and 2016 batch 90 students got 70%. Overall practical performance of the students increased above 90% after 2013 batch.

As part of active learning programme, we have gradually increased the number of tutorials, feedback sessions, quizzes from 10 hours in 2013 batch to 45 hours for 2016 batch. Conducting quizzes, mock viva questionnaire preparation by students and feedback sessions with self-assessment forms made many students to involve themselves in to active learning. Majority of the students found this style of teaching learning programme to be very different from their coaching centres. Further, the implemented framework has also lead to the many of them developing a new-found interest in the subject of biochemistry. The results of the proposed methods agree well with the other studies in literature, which propose such active learning methods like conducting quizzes[10,11], mock viva questionnaire[12] etc.

Conclusions

As evident from the above results, there is a direct correlation between attendance of students and their academic performance. Further, from the overall improvement of students over the course of implementing the framework, the number of students who fail has decreased, whereas the percentage of students who achieved first class and distinction marks has steadily increased. This study investigated the efficacy of employing a specific teaching-learning framework, tailored for the needs of first year medical students, who tend to lose interest due to the immense pressure of coaching centres prior to admission. Guided assignments and student specific structured feedback, together with formative assessment were found to be successful in helping students acquire additional reading skills. The questionnaire preparation for mock viva session helped them to gain confidence and were free from anxiety when they were facing the external examiners. Further, these methods have been found to induce curiosity in the students and helped them gain self-learning and self-assessment skills.

Overall, the current study demonstrates the efficacy of active teaching-learning methods in improving the academic performance of students. For the case of Indian scenario, students at the 11th and 12th class level are simply trained to answer objective type questions, without actively engaging them in the learning process. Thereby, mounting of immense pressure and losing interest in the process of learning post the medical degree entrance examinations. Such active teaching-learning methods would help students to not only understand the subject matter well, but also help them gain a deep appreciation for the nuances of the subject. Thereby, help create individuals who are not just learning for the sake of passing the examinations but learning for the simple beauty of it. The implemented policy framework is one of the first steps towards moulding individuals, who have deep passion for the subject of Medical science. As potential further improvement, the students with a higher level of passion for the subject can be motivated to form self-study groups, which research advanced topics, under the mentorship of a faculty. Such systems would potentially lead to students actively participating in medical research and increasing the overall research output of Indian medical community.

References

1. Bikas. C. Sanyal, Institutional management in higher education, Train Course Manual. International Institute for Educational Planning.
2. Naila Khalid, Effects of Absenteeism on Students Performance, International Journal of Scientific and Research Publications, 2017;7(9):151 ISSN 2250-3153.
3. Rudina Guleker, Julinda Keci, The Effect of Attendance on Academic Performance, Mediterranean Journal of Social Sciences; MCSER Publishing, Rome-Italy 2014;5(23).
4. Luke Moloko Mphale, Mavis B. Mhlauli, An Investigation on Students Academic Performance for Junior Secondary Schools in Botswana, *Eur J Ed Res* 3(3):111-127, ISSN 2165-8714
5. Nahid Shirani Bidabadi, Ahmmadreza NasrIsfahani, Amir Rouhollahi, Roya Khalili, Effective teaching methods in higher education: requirements and barriers, Journal of Advances in Medical Education & Professionalism 2016;4(4).
6. David. J. Nicol, Debra Macfarlane-dick, Formative assessment and self-regulated learning: a model and seven principles of good feedback practice, *J Studies Higher Ed* 2007;31(2).
7. Susan M. Brookhart, How to give to your students Effective Feedback, 2nd Edition, ASCD Publications, 10-Mar, 2017.

8. Andrzej filip, Piotr drag, The creation of "questions bank"and introduction of 2.0. Examination session, *Information Systems in Management* 2015;4(4):241-50.
9. Christene Chin, Jonathan Osborne, Students' questions: a potential resource for teaching and learning science. *Studies in Science Education* 2008;44(1):1–39.
10. Niu Zhang and Charles N.R. Henderson, Can formative quizzes predict or improve summative exam performance? *J Chiropractic Education* 2015;29(1):16–21 DOI 10.7899/JCE-14-12
11. Henry L. Roediger III, Pooja K. Agarwal, Mark A. McDaniel, and Kathleen B. McDermott: Test-Enhanced Learning in the Classroom: Long-Term Improvements From Quizzing. *J Experimental Psychol: Applied* 2011;17(4): 382–95.
12. Rehana Rehman, Sadiqa Syed, Azhar Iqbal, Rabiya Rehan, Perception and performance of medical students in objective structured practical examination and viva voce, *Pak J Physiol* 2013;8(2).
13. Peter Armbruster,Maya Patel,Erika Johnsonand Martha Weiss, Active Learning and Student-centred Pedagogy Improve Student Attitudes and Performance in Introductory Biology, CBE—Life Sciences Education 2009;8:203–213.
14. Deborah Allen and Kimberly TannerInfusing Active Learning into the Large-enrolment BiologyClass: Seven Strategies, from the Simple to Complex Cell Biology Education 2005;4:262–68.
15. Mieke p. c. Embo1, Erik w. Driessen, Martin valcke & Cees p. m. Van der Vleuten, Assessment and feedback to facilitate self-directed learning in clinical practice of Midwifery students, Medical teacher; 2010;32:e263–e269.