EAI Endorsed Transactions
on Scalable Information Systems

Research Article EAI.EU

Students' feedback- An effective tool towards enhancing the Teaching Learning Process

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Abstract

INTRODUCTION: Evaluation is a key activity to improve the quality of service in every domain. However, it becomes quite challenging to measure the performance in some areas. Teaching is one such domain where it is bit intricating to evaluate the performance of teaching community. Here, in this work, authors have proposed effective usage of students' feedback to enhance the quality of teaching learning process.
OBJECTIVES: The objective of this paper is to scientific and well-defined approach for teacher's performance evaluation. This can help the faculty to identify the strengths and weaknesses of their teaching and evaluation methods.
METHODS: Data analysis and data visualization techniques have been used gain useful insights of the stduents' feedback on various parameters. In order to carry out the simulation, authors have considered the teaching learning process in an engineering college.
RESULTS: It is evident from the results obtained 12 that more than 50% agree that the feedback system is fare and beneficial for the quality improvement in teachers.
CONCLUSION: Such analysis not only provides the useful insights regarding avenue for improvement, but also helps the management for appraisals to outperforming teachers.

Keywords: students feedback, teachers' evaluation, teaching learning process, quality

Received on 17 May 2023, accepted on 25 May 2023, published on 03 July 2023

doi: 10.4108/eetsis.3347

1. Introduction

It is well-known that quality is an important aspect for any business or organization to grow and excel. The requirement for quality remains true for production sectors as well as service industries. In the current scenario of this cut-throat competitive world, each organization works stringently to provide the best quality of service. This requirement to provide utmost quality has open avenues for quality check and quality assurance sections in the business. Now, quality check for a production industry does not pose much challenges as it has numerous well-defined but measurable parameters. However, it becomes bit challenging for service industry as parameters of quality are loosely defined and are generally difficult to measure. Among various service industries, teaching industry also observes that teacher has sufficient number of parameters.

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Among these parameters, although some can be measured easily but others are difficult to measure. The aim of this study is to provide an effective approach that uses students' feedback to evaluate the teachers' performance. The same can also be used in a constructive manner to enhance the quality of teaching. The terms teacher and trainer have been used interchangeably throughout the paper.

In order to evaluate the performance of teacher, several performance metrics are available but students' feedback can be considered as a vital tool which can be used to gain useful insights as students are the genuine source to determine teaching effectiveness. As mentioned earlier, authors have used the data pertaining to an engineering college to carry out experiment. The motive to undertake this project is a zeal to improve the teaching learning process by figuring out where the teachers are lacking. Thus, the findings will also contribute towards holistic development of teacher.

Additionally, the finding will help the trainers to gain active engagement of learners in the class by unveiling the less discussed portion in the teaching. Further, the necessity for establishing an effective teaching learning practice has been experienced by various researchers and resultantly several researchers have undertaken this challenge of devising an efficient method for quality in teaching.

Considering the tremendous impact of teaching on the future of nation, it has observed a huge growth from diverse range of perspectives viz. internally and externally. Here internal bodies refer to the quality assurance check performed by internal personals however external check involves personals from external bodies.

Further, the teaching learning process has gained attention of the entire world post China's university education reform announced in 2014. Also, a drive to cultivate talent has been initiated on the similar lines by several nations further raising the concern for quality in teaching learning process. Now, considering the requirement of effective teaching learning process, it is evident that a reasonable, scientific, and feasible performance evaluation system is necessitated. Hence, authors aim to present a system that can be widely employed to evaluate the performance of trainer in teaching learning system.

The work has been organized in various sections. Here, section I briefly discusses the need of a scientific and well-defined approach for performance evaluation. The similar research by various authors has been presented in section II. Methodology for the same is presented in section II. Detailed discussion regarding the same is given section III. Results are discussed in section IV and finally conclusion and future work is mentioned in section V.

2. Related Work

As discussed earlier, several researchers have undertaken this challenge of devising a scientific approach to evaluate students' feedback to gain constructive insights. Among these researchers, the author in [3] have discussed the usage of data mining technique referred as Educational Data Mining (EDM). In their work, authors in [3] have explored the data mining techniques which can be used to improve the students; performance by enhancing the quality of teaching learning process.

Following the same line of research, authors in [2] also propose usage of big data and mobile computing driven model. The paper also discusses the process that is used by teachers to acquire and assimilate the feedback data to enhance the teaching performance. The reason behind usage of these two methods is their organic integration which can be employed to evaluate the performance of teaching.

Further, authors in [12] has suggested Peer assessment as a process to grade each other. Further, authors propose usage of peer assessment as a tool to gain insight into the feedback system. Here, PA an under researched topic, has been presented as an effective exploratory tool that performs backward evaluation of feedback so as to help students to improve themselves.

Further, authors in [13] has presented a performance evaluation system that to evaluate performance of teaching in a university. For the same, authors used type-II fuzzy sets to address the challenge of fuzziness, uncertainty, complexity involved in the teaching process. It consisted of construction of an evaluation indicator system comprising of teaching content, teaching attitude, and teaching methods etc. Further, type-II fuzzy sets theories are used to address the challenges posed by subjectivity and uncertainty, thus achieving effective evaluation process. The proposed model is validated by simulating the experiment.

Further, the experiment is also performed by authors in [14,15] to analyse the feedback through data science approach. Here, authors propose a data science approach that delivers solution to explore the role of teaching. The experiment ensures that privacy of the subjects is maintained. The approach implements a model in Splunk, a big data platform to collect and analyse the abundance of data.

Now considering the various authors who have undertaken this experiment, it is evident that the field has lured several researchers to this field of study. Hence, authors also make an attempt to propose a model as elaborated in succeeding section.

3. Proposed Methodology

The proposed methodology collects the data and then proceeds with data preparation. For data collection a survey was done of the students' feedback of an educational institute. Once the data has been pre-processed, it is used for statistical and visual analysis in order to gain useful insights. The stepwise methodology has been illustrated in Fig. 1.

Figure 1. Flowchart Representation of the methodology used for the data-analysis

In order to simulate the proposed methodology, feedback of the teachers of Computer Science and Engineering branch is collected from students of all years in the programme. A duly verified feedback collection format is designed for the purpose as shown in Fig. 2. The institute may put some eligibility criterion (e.g attendance and marks) for the students in order to be eligible to give feedback. The feedback form comprises of various parameters used for evaluation as shown in Fig. 3. The obtained feedback is further analysed using through various data analysis tools. The analysis is thereafter used to generate a confidential report for individual.

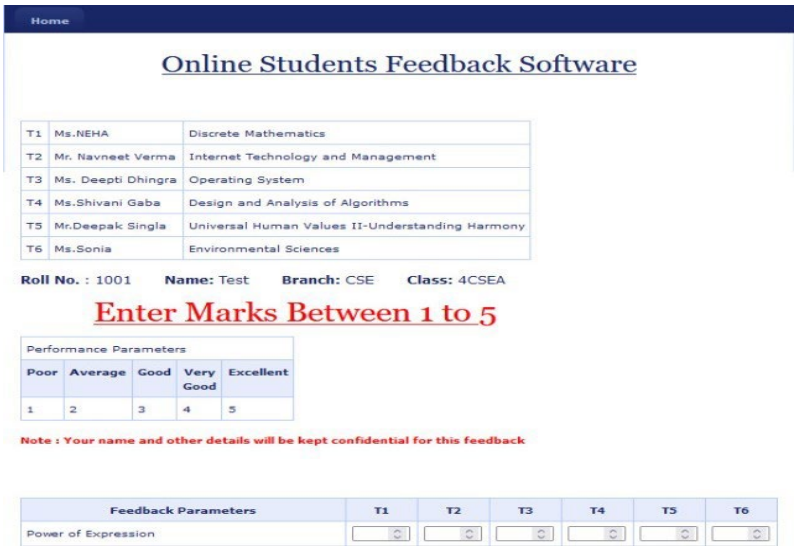

Figure 2. Designed Feedback Form

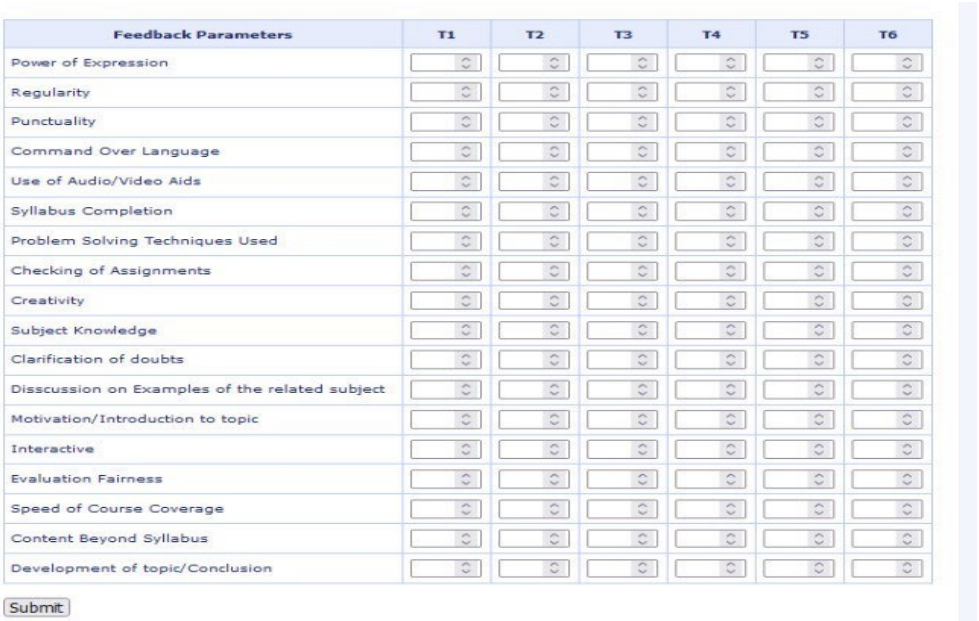

Figure 3. Various feedback parameters

Once the reports are generated, it is shared with the concerned faculty members so that they could work towards teaching enhancement. The feedback process is repeat-ed after a stipulated period to check for the improvement if any. In addition to the repeated feedback, a questionnaire is also given to both students and teachers to evaluate effectiveness of analysis system. The actions performed in different steps as shown in Fig. 1 can be summarized as follows:

3.1 Data Collection

For data collection, online web-based system is designed where individual student has to fill the format as shown in Fig. 2. Here, each student fills the format anonymously. The system then maintains the database in a CSV format which is further analysed using R language, a powerful tool for data analysis.

3.2 Data Pre-processing

The data obtained through online portal in maintained in CSV format where columns are teacher name and feedback attributes. This format is useful for class -wise analysis that evaluates performance of all teachers teaching in same class.

3.3 Data Analysis and Visualization

The feedback is analysed by a 2-member committee while maintaining the identity of students. Post analysis, the strengths and weaknesses of each teacher are summarized which is forwarded to the Dean of Academics. During the process, it is ensured that confidentiality and privacy of the data is maintained.

As discussed earlier, feedback is taken on 18 different parameters such as power of expression, regularity, punctuality etc. shown in Fig. 3. The data has been collected from 320 students while putting an eligibility criterion that attendance must be more than 75% in order to be eligible to fill feedback form. Most of the teachers involved in the feedback system are quite approachable and have also encouraged students to participate in various academic and extracurricular competitive activities.

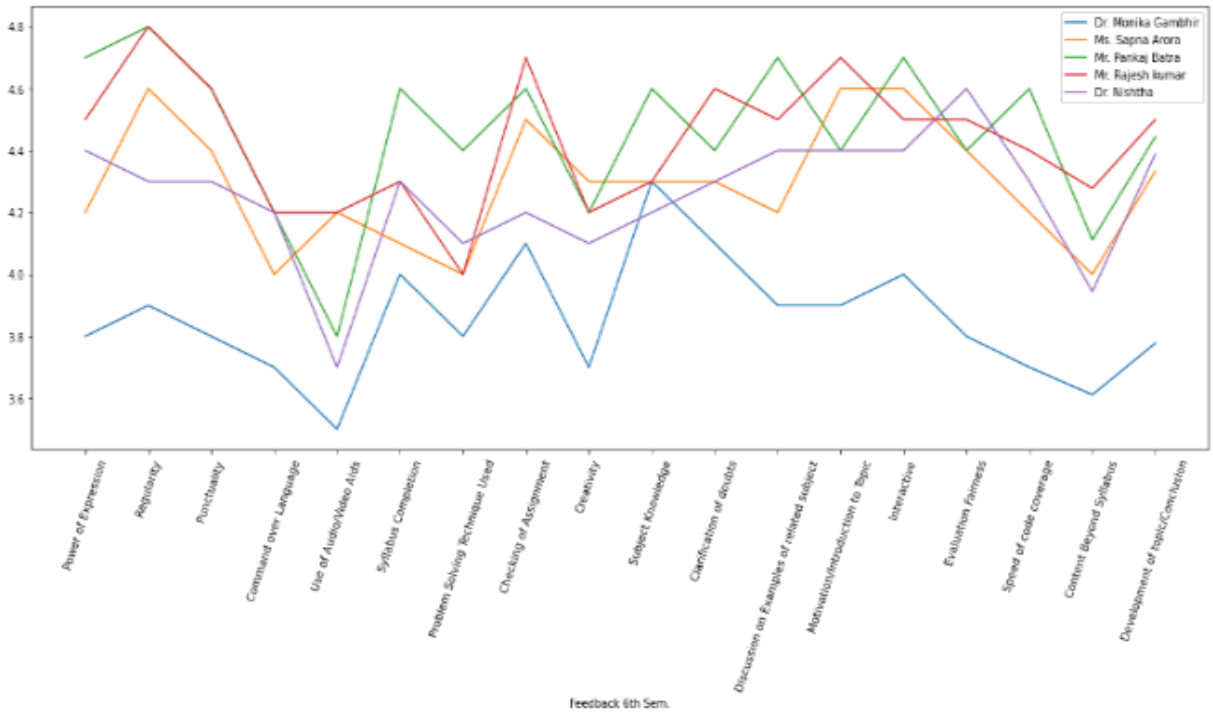

Figure 4. Class-wise- Feedback for Second year of Engineering students

After the data has been collected and pre-processed, it is analysed through visual tools in order to have enhanced understanding. The class-wise and teacher-wise analysis of feedback is shown in Figure 4 to 6 and Figure 7 to 9 respectively. From the graphical representations, it is evident to evaluate which teacher is performing best.

Further, it can be also used an as effective way to identify which teacher needs improvement in his/her teaching style.

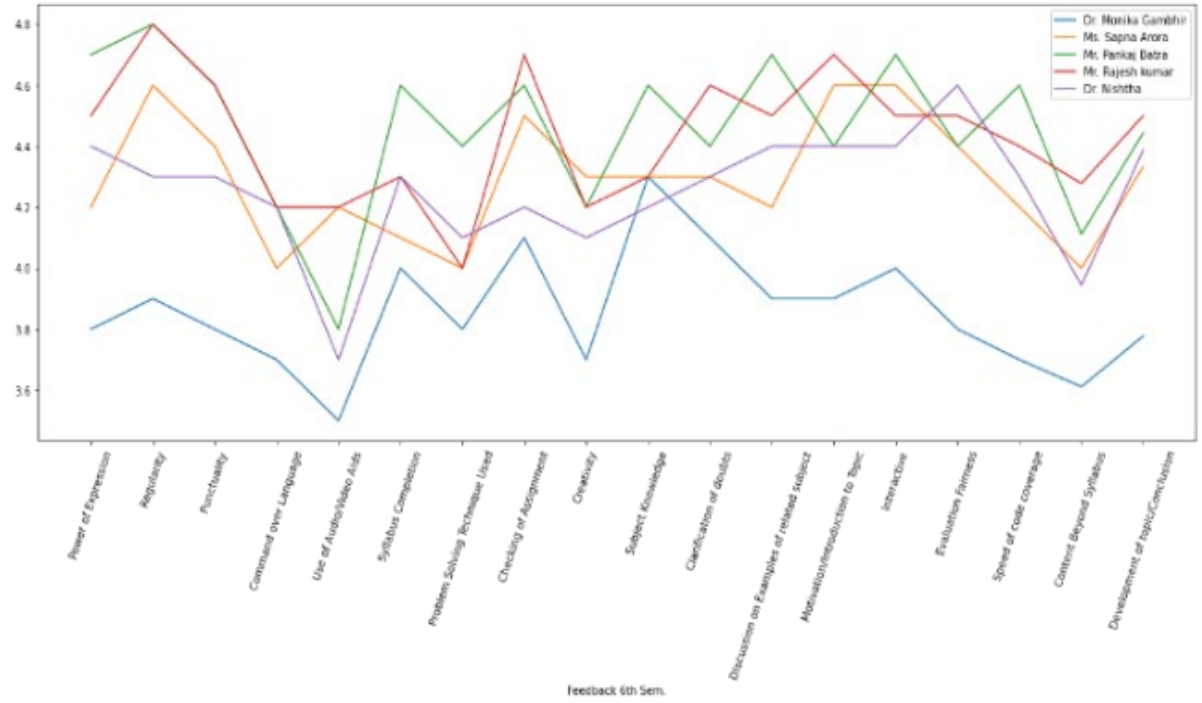

Figure 5. Class-wise- Feedback for third year of Engineering students

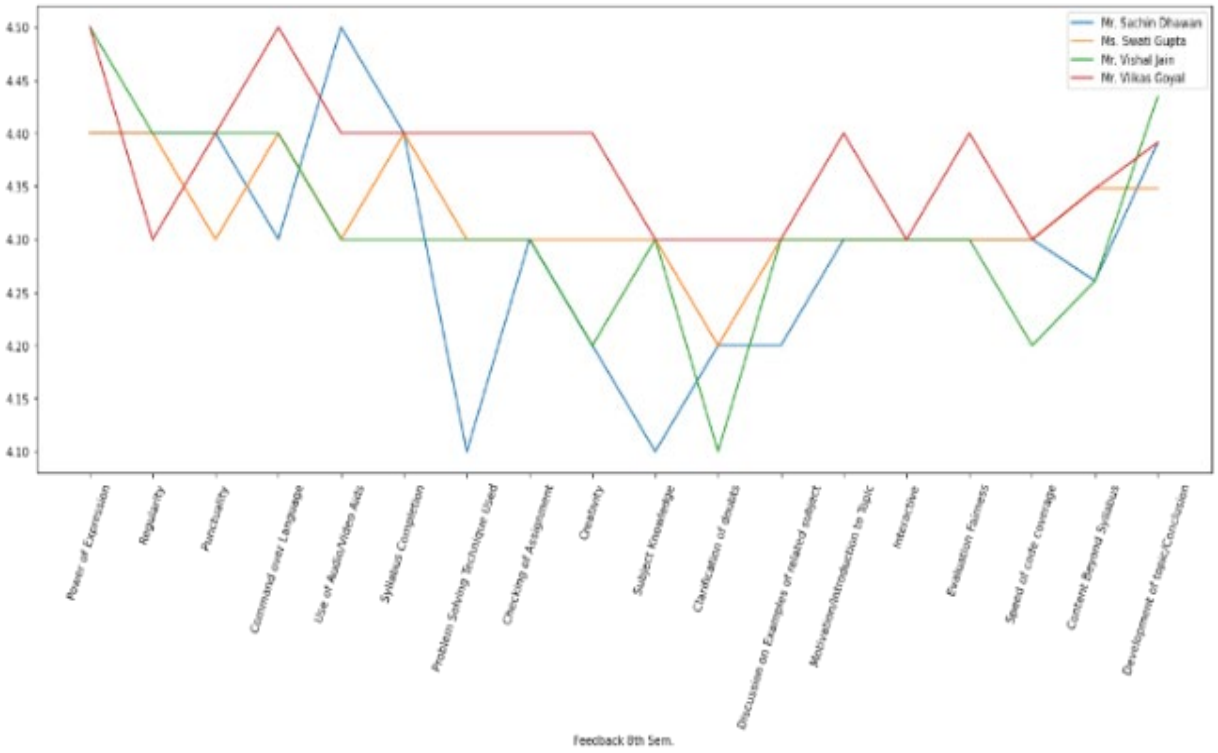

Figure 6. Class-wise- Feedback for Final year of Engineering students

In addition to class-wise analysis, another analysis is also performed for individual teacher to evaluate all 18 parameters, shown in Fig. 7 and Fig. 8. Further Fig. 9 illustrates the feedback of faculty z in two different classes. The name of the teacher is kept private in order to maintain privacy. This teacher-wise analysis helps to deter-mine weakness of individual teacher that helps the teacher to improve in that direction. Now, as evident from Figure 7, the teacher x needs to improve "use of audio-visual aids" and "problem solving technique". Similarly, in Figure 8, the teacher y needs to work on 3 parameters viz. "use of audio-visual", "clarification of doubts" and "content beyond syllabus".

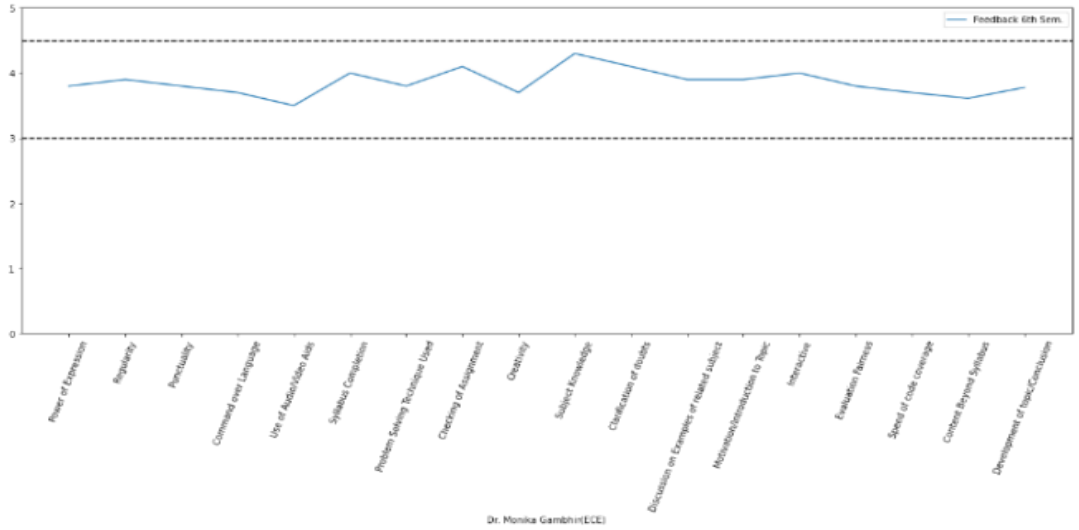

Figure 7. Teacher-wise Feedback for Faculty X

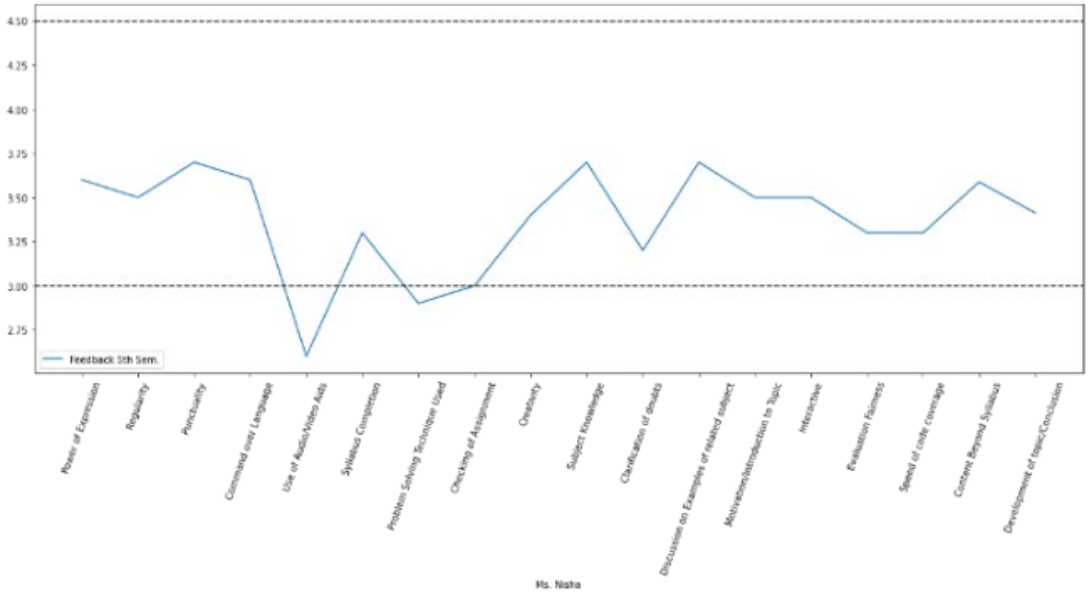

Figure 8. Teacher-wise Feedback for Faculty Y

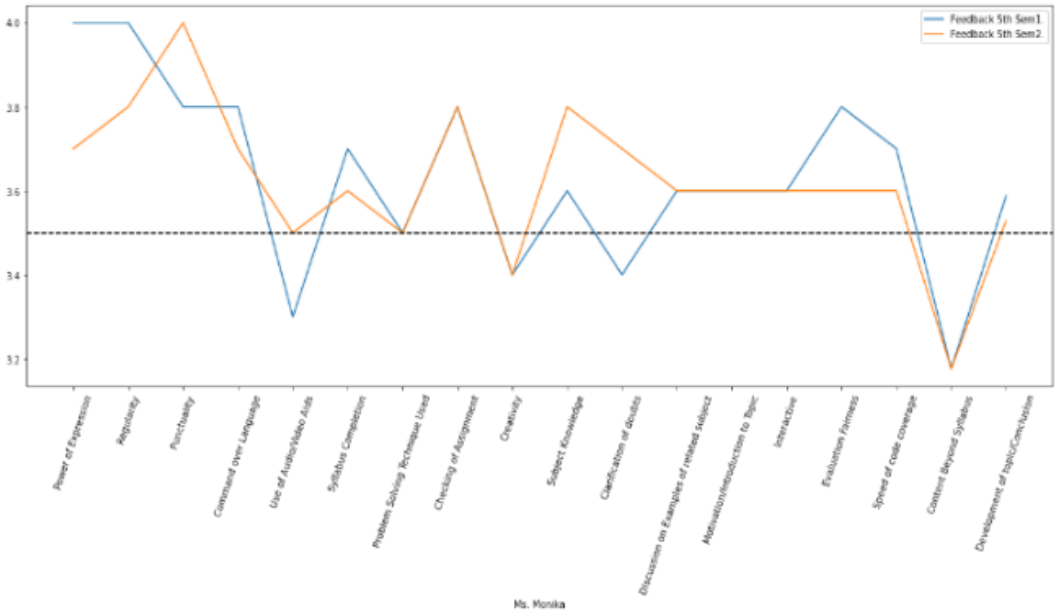

Figure 9. Teacher-wise Feedback for Faculty Z in two different classes

Such analysis not only provides the useful insights regarding avenue for improvement, but also helps the management for appraisals to outperforming teachers.

In order to determine the significance of feedback system amongst teachers and students, a rational questionnaire is designed. This questionnaire is filled by 12 teachers and 64 students. As per the response received through questionnaire, it is evident that teachers admit that students' feedback is an effective tool for performance enhancement. Majority of the teachers also believed that students' feedback sensitizes them towards students' needs. This questionnaire is using a 5-point Likert scale. Fig. 10 and 11 depicts the proforma for the questionnaire and corresponding database generated.

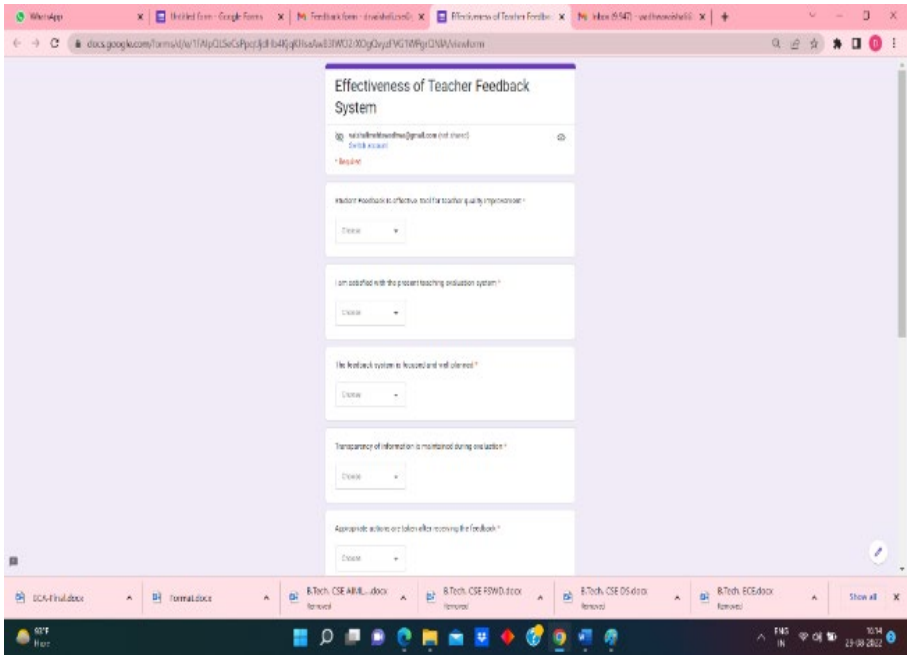

Figure 10. Effectiveness of Teachers' Feedback System

	B	C	D	E	F	G	H	I	J	K
1	Student Feedback is effective tool for teacher quality improvement	I am satisfied with the present teaching evaluation system	The feedback system is focused and well planned	Transparency of information is maintained during evaluation	Appropriate actions are taken after receiving the feedback	Feedback system is user friendly and easy to understand (not over technical or vague)	Teachers gender or designation influences your answer	Feedback should be taken	Any suggestions	
2	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Disagree	Twice in a semester		
3	Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Disagree	Once in each Semester		
4	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Disagree	Twice in a semester		
5	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Disagree	Twice in a semester		
6	Strongly Agree	Agree	Agree	Strongly Agree	Disagree	Agree	Disagree	Not Sure		
7	Agree	Agree	Agree	Agree	Neutral	Agree	Disagree	Once in each Semester		
8	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Disagree	Twice in a semester		
9	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Disagree	Not Sure		

Figure 11. Students' responses to questionnaire

A similar questionnaire was filled by teachers in order to check the effectiveness of teachers' feedback system from the point of view of a teacher. An analysis was then performed to assess the effectiveness of present feedback system as shown in figures 12 and 13. It is evident from the results obtained in Fig. 12 that more than 50% agree that the feedback system is fare and beneficial for the quality improvement in teachers. However, around 40% students also admitted that teacher designation or gender influences the feedback to some extent. This has helped us to understand the psychology of the students while filling the proforma and mentoring them accordingly.

In the questionnaire filled by the teachers, around 40% teachers were of the view that teacher designation and gender affect the feedback of a teacher. Around 60% teachers also pointed out that feedback should not be taken from students as it leads to sort of complex among teachers. Around 40% teachers also agreed that a strict teacher will get poor feedback as compared to friendly one. This has helped them to under-stand that a friendly atmosphere in the classroom makes the lectures more interesting and interactive.

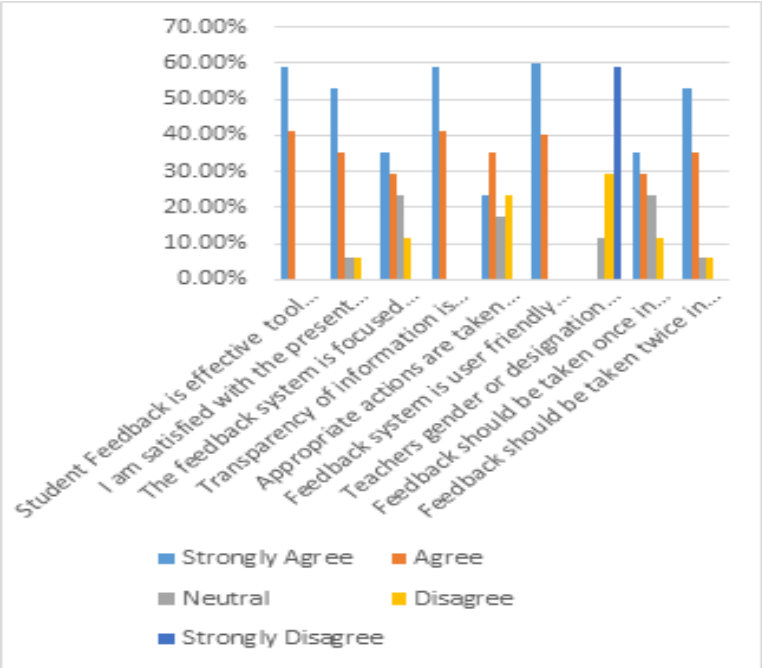

Figure 12. Analysis of Students' responses to questionnaire

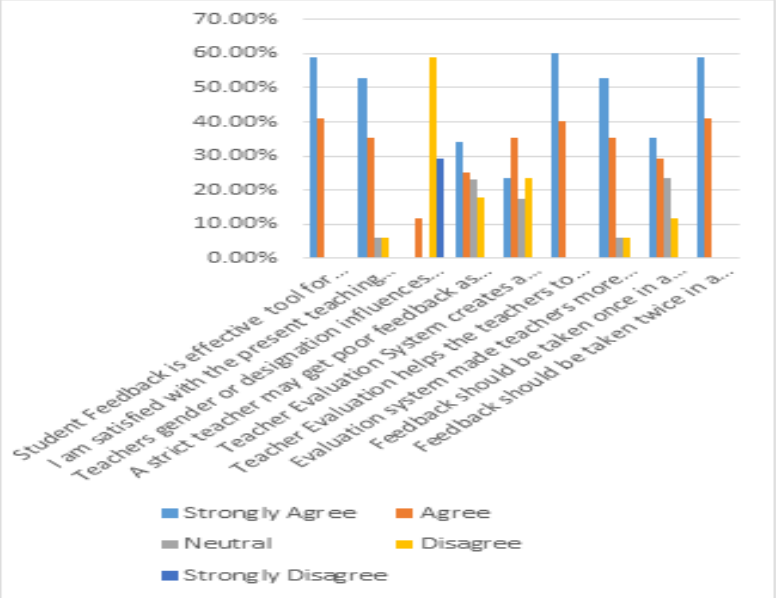

Figure 13. Analysis of Teachers' responses to questionnaire

4. Discussion

This process of teacher feedback system solely relies on the teaching process. Teach-er evaluation processes concentrate on the core activity of teaching covering areas such as planning and preparation, the classroom environment and instruction of teaching. The primary purpose of such feedback is to help the faculty to identify the strengths and weaknesses of their teaching and evaluation methods [1,2,3].

Different ways of assessing teachers' effectiveness include student achievement measures, on-the-job evaluation, performance measures, and use of portfolios.[4] The method of students' feedback as an evaluation tool for teachers can be considered as one method of the on-the-job evaluation. Other common sources of information may be peers, administrators, and teachers' self-evaluation. [5] Here, effort has been made to know the effectiveness of students' feedback as an evaluation tool.

Peer evaluation, self-evaluation, and administrator observation have questionable reliability due to small number of raters. This is probably one of the important rea-sons which has led to the institutions using student evaluation of teaching [6,10].

In general, students' evaluations of teaching have been found to be reliable. Re-search has shown that certain teacher variables (such as gender, age, teaching experience, personality, and research productivity), student variables (including gender, age, level, grade average, personality), course variables (class size, time of day of class), and administrative variables (time of module during the term) generally do not impact upon the evaluations given by students on teaching quality.[7] In our study, most of the teachers mentioned designation as an important variable affecting the students response. They have also mentioned that the allotment of number of lectures, topic, and the timing of lectures plays an important role in students' response. Literature exploring the validity of student evaluations found that this tends to correlate highly with lecturers' self-ratings, with the ratings of lecturers' colleagues and with students' actual grades [7,9].

One of the key issues in the student evaluation of teacher is the question of how competent students are to make judgments on teaching and course quality. It should be remembered that students are not competent enough to evaluate teaching roles such as those involving course design (objectives, content, methods, and assessment), or grading practice in assessment. However, in terms of "the quality of the delivery of lecture or instruction," it is generally agreed that only students are in a position to provide good feedback [8,11,16]. Although all the teachers agreed that students feedback made them more aware of the students, need and helped them to improve their skills but still feedback make them uncomfortable.

The limitation of this study is that it was done only on a single batch to know the effectiveness and acceptability of students' feedback as a teacher evaluation system in a new medical college. This now can be implemented to all the incoming batches as it will help the faculty to further improve their skills and academic performance ultimately leading to overall faculty development.

Acknowledgements.

Firstly, I would like to thank professor Shakti Kumar for his motivation and inspiration towards carrying research in the field of data science and data analysis. It was really a great experience working with people who have great knowledge and dedication towards research. I would specially extend my thanks to Dr. Sachi Nandan Mohanty for his constant support and guidance. His dedication and commitment towards research were my inspiration to complete this research. Finally, I would like to thank all my friends, family and supporters who have supported me directly or indirectly for finishing the research.

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