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**ORIGINAL ARTICLE****Perceptions of first professional year medical undergraduates and biochemistry faculty on one minute paper: A feedback tool to interactive lectures**

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**Abstract**

*Background:* The shift to Competency-Based Medical Education (CBME) requires student-centered teaching methods. The One-Minute Paper (OMP) is a quick feedback tool designed to assess and address students understanding of lecture content, promoting active learning and reflective thinking. *Aim and Objectives:* To evaluate the effectiveness and perceptions of the OMP as a feedback mechanism among first-year MBBS students and biochemistry faculty. *Material and Methods:* This cross-sectional study was conducted over two consecutive academic years (2021-2023) at KAHER's JNMC, Belagavi. The study included 400 MBBS students and 11 biochemistry faculty members. A Quick Response Code (QRC)-enabled OMP system was implemented after interactive lectures. Feedback was collected and analyzed using descriptive statistics. *Results:* The study covered 148 interactive lectures, with  $170 \pm 15$  OMP responses per lecture. Among students, 73% found the OMP helpful for voicing doubts, 86% noted that least-understood concepts were addressed, and 60% felt confident in applying learned concepts. Faculty reported the OMP as a valuable formative and self-assessment tool, with 100% acknowledging its role in improving lecture quality and curriculum refinement. *Conclusions:* OMP is a simple and efficient tool for fostering active learning, addressing knowledge gaps, and improving teaching quality. It aligns well with CBME principles and has the potential for wider adoption across medical education curricula.

**Keywords:** Competency-Based Medical Education, One-Minute Paper, Student Feedback, Interactive Lectures, Medical Education

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**Introduction**

The goal of medical education is to prepare “to be doctors” to care for the health requirements of society in an efficient and sufficient manner. However, the earlier medical curriculum was more teacher-centric with less opportunity for students to reflect, and interact, inability to diagnose learning needs and give feedback. This was the basis for the paradigm shift of medical education from contemporary to competency-based which is more holistic, in a sense it, in addition to emphasis on imparting knowledge, helps in the overall

development of “to be doctors”, making them competent enough to take care of the health needs of the society. To match this and help achieve the goals of Competency-Based Medical Education (CBME) a major change of teaching-learning methods was needed, and dedicated faculty who embraced CBME and converted weakness and challenges into opportunities and strengths [1-2]. Hence, facilitating methods are now student-centric. One such change was, shift from didactic lectures to interactive lectures. The main crux of

the interactive lecture is allowing students to question received knowledge during or after the class in the form of either a formal or informal feedback. Formal feedback (written format), may be lengthy, time-consuming, leading to neither being student nor teacher friendly. Hence, a need arose for an adaptable, heterodimensional, quick, easy, yet standard method of feedback. One-minute Paper (OMP) is a perfect tool, which best serves the purpose. Asking students one or two brief yet insightful questions about the material delivered is a flexible and simple assessment method [3]. Usually given at the conclusion of an interactive lecture, this activity takes one minute or less to finish and asks students to reflect on the material and determine which concepts they understood the best and least [4]. The one-minute paper was initially created by Weaver and Cottrell. Wilson changed it in 1983, but Cross and Angelo made it popular in the late 1980s [5]. Hence, keeping these points in view the following study was done to analyse the integrity of this OMP by analysing the perception of students and faculty. The goal of the study was to assess the perceptions of first professional-year medical undergraduates and biochemistry faculty on OMP.

### Material and Methods

This cross-sectional study was conducted over a period of two years at KAHER's JNMC, Belagavi, involving 400 students enrolled in the Phase I MBBS batches of 2021–22 and 2022–23, along with 11 faculty members from the Department of Biochemistry. Data collection commenced in March 2021 following Institutional Ethical Clearance (Ref: MDC/DOME/301). A universal sampling technique was employed, and participation was limited to students and faculty who

consented to be part of the study, while those unwilling or absent were excluded.

**Study protocol:** The following is the three-step protocol of our study.

1. Formulation and generation of Quick Response Code (QRC) for OMP and designing of feedback form, for students and teachers to find out the perception regarding OMP
2. Demonstration of the usage of OMP for both staff and students
3. Methodology for collection of OMP and perceptions.

#### 1. Formulation and generation of QRC of OMP and designing of feedback form for students and teacher to find out the perception regarding OMP

Firstly, OMP was tailor-made to as per our requirement (Table 1) and the same was validated by the biochemistry faculty members. Once approved, a Google form was created which included the components of consent and OMP. Later, the link was converted to QRC for feasibility and easy accessibility (Figure 1). Secondly, a feedback form was formulated to analyse the impact and perception of OMP by both students and faculty for which two separate Google forms were created, and face and content validation of feedback was done.

#### 2. Demonstration of the usage of OMP for both staff and students

A demonstration was scheduled to orient the students and biochemistry staff regarding the usage of OMP example. Suppose a class was to be conducted on cell membranes, the teaching faculty was requested to display the QRC after their interactive lecture and students were requested to

scan the QRC in their mobiles (with good internet connectivity) and were asked to fill the components and submit. The OMP was accessible on Google Drive to the concerned staff who engaged in the interactive lecture on cell membranes. Concerned staff was asked to sort through the responses on that very day for best-understood and least-understood concepts and take required steps accordingly.

### 3. Methodology for collection of OMP and perceptions.

The QRC pertaining to the OMP was mailed to all the biochemistry faculty who were involved in conducting interactive lectures for phase I MBBS 2021-22 batch and subsequently for the 2023-24 batch as per the timetable. After every interactive lecture, QRCs were displayed and the responses were analysed by the faculty on the very same day. The best and least understood concepts were detailed, and necessary steps taken.

At the end of the academic year for batch 2021-22 and subsequently for the 2022-23 batch a pre-designed and validated feedback form was given to the students and faculty to find out their perception of OMP.

### Statistical analysis

Microsoft Excel was used for statistical analysis. Responses from students and faculty were analyzed by descriptive statistics, including percentages and proportions.

### Results

Cumulatively 148 interactive lectures were conducted during the study period of academic years 2021-22 and 2022-23. For every interactive lecture,  $170 \pm 15$  OMP responses were received. Finally, at the end of both academic sessions (2021-22 and 2022-23), perceptions about the OMP were collected from students (Table 3, Figures 2 and 3) and faculty (Table 4, Figure 4).

**Table 1: Format for One Minute Paper**

<b>ONE MINUTE PAPER</b>	
<b>Topic:</b>	_____
<b>Sub Topic:</b>	_____
<b>Name of student: (Optional)</b>	_____
<b>Roll no:</b>	_____
<b>Best understood concept:</b>	_____
<b>Least understood concept:</b>	_____

**Table 2: Sample response of students**

Sample 1	Sample 2
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>One Minute Paper-Dr. [Redacted]</b></p> <p>Take a moment to think about the lecture you have just attended, and then answer the following questions. Feel free to pen your opinions.</p> <p><small>* indicates required question</small></p> <p>Email * [Redacted]      Roll number * [Redacted]</p> <p>Topic * [Redacted]      Subtopics * [Redacted]</p> <p>Molecular Biology      Transcription</p> <p>Which were the best understood concepts * <i>Steps of transcription</i></p> <p>Which were the least understood concepts * <i>Significance of post transcription modification</i></p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>One Minute Paper-Dr. [Redacted]</b></p> <p>Take a moment to think about the lecture you have just attended, and then answer the following questions. Feel free to pen your opinions.</p> <p><small>* indicates required question</small></p> <p>Email * [Redacted]      Roll number * [Redacted]</p> <p>Topic * [Redacted]      Subtopics * [Redacted]</p> <p>Acid base balance      Disorders of acid base</p> <p>Which were the best understood concepts * <i>Causes and biochemical defects in acidosis and alkalosis</i></p> <p>Which were the least understood concepts * <i>Anion Gap and its calculation</i></p> </div>

**Table 3: Students' feedback analysis on one minute paper (close-ended) n=346**

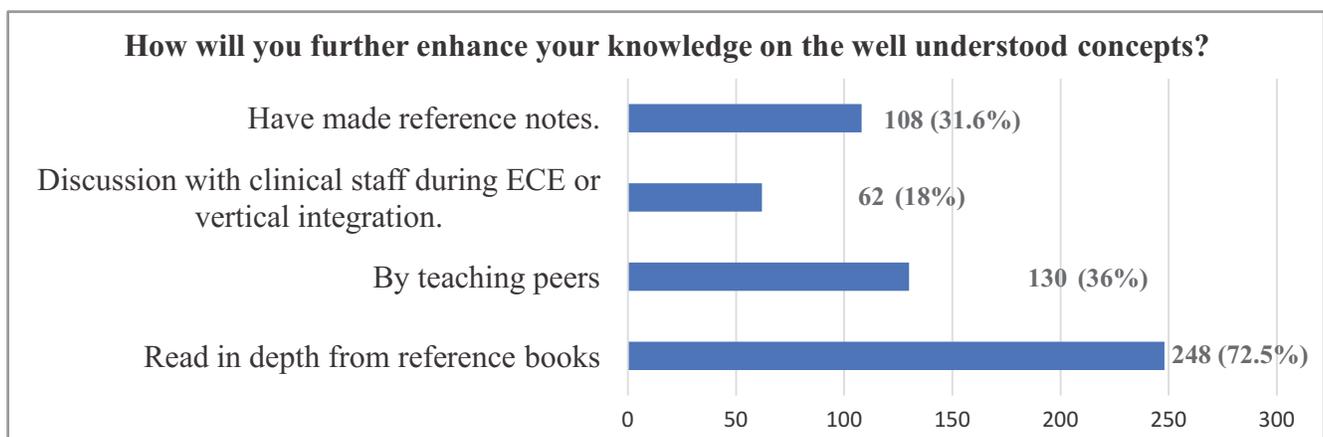
Item	Questions	Yes	No
1	Was one minute paper helpful as a tool to voice your doubts?	73%	27%
2	Was the least understood concept addressed in the next interactive lecture?	86%	14%
3	Are you confident in applying the well-understood concepts?	60%	40%
4	Did you feel the feedback just takes one minute	98%	2%
5	Was the one-minute paper monotonous to use after every interactive lecture?	8%	92%
6	Did you face any technical difficulties in submitting the feedback?	3%	97%
7	Do you feel, such feedback should be adopted by other departments too	91%	9%

**Table 4: Biochemistry faculty feedback analysis on a one-minute paper (Close-ended questions) n=11**

Item	Questions	Yes	No
1.	Was it a type of formative assessment tool to assess the class conducted?	100%	0%
2.	Was it a type of self-assessment tool?	75%	25%
3.	Was it helpful as immediate feedback for your lectures?	100%	0%
4.	Did the responses obtained from the one-minute paper help you reframe your objectives?	80%	20%
5.	Did you address the least understood concept from the previous class in your next lecture?	80%	20%
6.	Was it easy to analyse the feedback after every lecture?	80%	20%
7.	Did the feedback prompt you to improve your performance?	75%	25%
8.	Did the one-minute paper feedback identify your strengths and weaknesses?	75%	25%



**Figure 1: Sample Quick Response Code**



**Figure 2: Students' feedback analysis on one minute paper (open-ended) n=346**

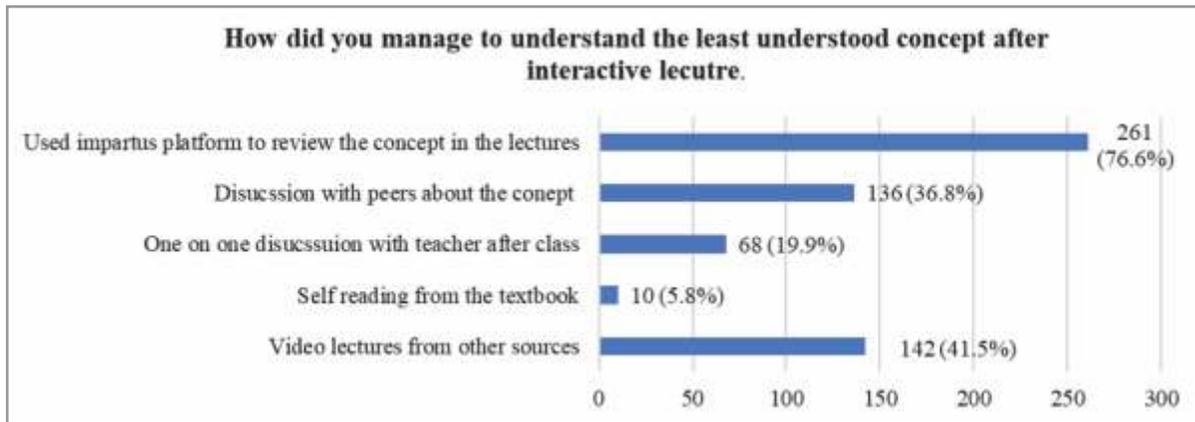


Figure 3: Students' feedback analysis of one minute paper (open-ended) n=346

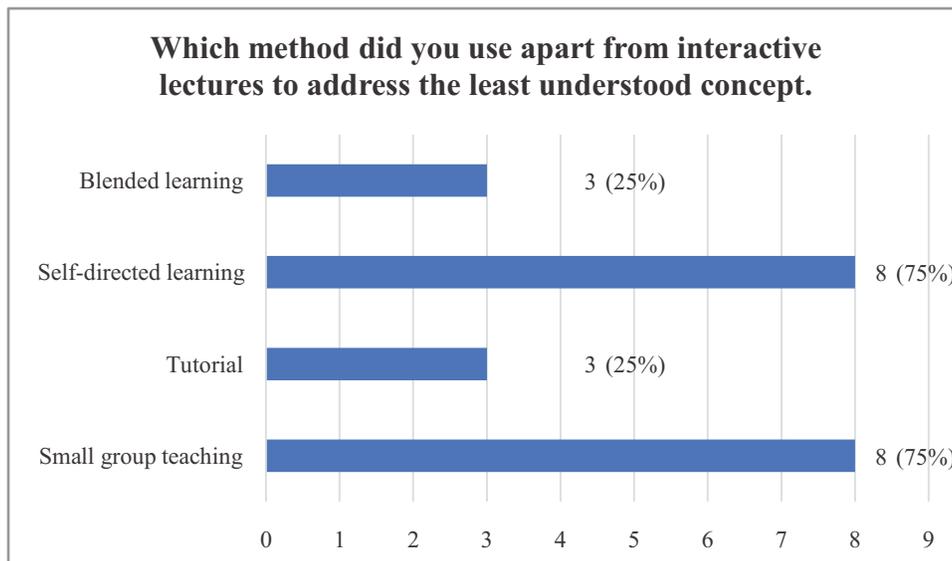


Figure 4: Teachers' feedback analysis of one minute paper (open-ended) n=11

**Discussion**

Self-reflection and feedback play a major role in CBME [6]. Taking extensive feedback after every one-hour lecture is not feasible. Hence, this tailor-made OMP for an hour-long lecture is a quick and simple feedback assessment tool. Most of the students perceived that the OMP was helpful in raising their doubts, and the doubts were addressed in the next interactive lecture, small group teaching, or self-directed learning sessions, thereby illustrating

the dedication of the faculty to undertake remedial measures to help students to decrease the knowledge gap (Item: 1, 2; Table 3). Students perceived that they were confident in the application of well-understood concepts, which means it took them to a higher level of Bloom's classification i.e. application of gained knowledge. There were no studies done to support or contradict these findings (Item: 3; Table 3). Students felt that it just took “one

minute” for them to fill in the feedback, thereby substantiating that it is the easiest, simplest, and student-friendly feedback [7]. These findings are in accordance with those of Ashakiran and Deepthi (2013) [3] but contradict those by David, [8] where the author emphasizes that it took more than a minute to reprocess the entire lecture (Item:4; Table 3). Students felt it was interesting, engaging, and fruitful to get to know their strengths and weaknesses about that particular lecture, (for almost 74 interactive lectures per academic year). However, David expressed that consecutively using the same format after every lecture turned to be monotonous [8] (Item 5; Table 3). Our institution has good internet connectivity and technical support. Hence, taking feedback after every lecture was an easy deal, and also students were happy to use mobile devices at the end of every lecture for productive work (Item:6; Table 3).

Students felt that other departments too should adopt such feedback (Item:7; Table 3). The same was discussed in our faculty development meeting, and later in the Board of Studies for preclinical subjects where one of the biochemistry faculty presented OMP, and the same was passed in the academic council to be adopted by other departments. Most of the students responded regarding how to enhance well-understood concepts by reading in depth from reference books (Figure 2) while the most interesting answer was, that 36% felt teaching peers helped them to attain more in-depth knowledge and helped the slow learners to learn in a non-hostile environment. A few students (18%) felt that discussion with clinical staff during early clinical exposure or vertical integration helped them to apply well-learned concepts. Many students feel inhibited talking to clinical staff and senior professors.

A substantial number of the students used the Impartus platform to review the lectures and understand the “least understood concept” (Figure 3). Impartus is “watch classroom” recording at any time anywhere at your own pace, an online platform that helps students revisit the lectures. The same has been subscribed by our institution, helping students to revisit and revise the interactive lectures at their own pace [9]. Around 40% of students felt that video lectures from other sources and discussions with peers helped them to understand the concepts that were not well understood during lecture classes. While 20% felt that discussing with teachers helped them clear their doubts, not all students felt comfortable to talk one-to-one with the professors. There are no studies done in relation to this.

With respect to the feedback taken from the biochemistry faculty (Table 4), almost all felt that it is a type of formative tool to assess undergraduate students as well as self-assessment tools for objectives (of every interactive lecture) and teaching skills. It gave immediate feedback to their interactive lecture as the responses were available in their Google Drive on the same day and the same could be sorted out by the faculty within fifteen minutes. This helped the faculty to design the next lecture class and decide the topics for self-directed learning and small group teaching. It was useful to find out the strengths and weaknesses of their interactive lectures, in terms of the quality of objectives, teaching pattern, and use of audio-visual aids, thereby letting them reframe the objectives for the next academic year. Our study is in accordance with a study done by Sahoo and Taywade (2021) [10].

Most of the faculty felt that self-directed learning and small group teaching could be appropriate

methods to address the least understood concept than lectures, not many were for tutorials and blended learning, as blended learning requires more resources and training. (Figure 4).

### Limitations

After collecting feedback about every lecture through OMP, the key concern was how sincerely the faculty addressed the least understood concept.

### Conclusion

We found OMP to be an excellent feedback tool for every interactive lecture, for both students as well as professors to weaken their weaknesses and strengthen their strengths.

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