

## Use of digital images in the undergraduate Community Medicine examination

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### Introduction

The use of digital resources (images and videos) is becoming a central component of the learning and teaching environment. (Candler *et al.*, 2003) An attempt to integrate digital technology in student assessment, through use of digital images for the spotting exercise, a part of the undergraduate Community Medicine (CM) practical examination, was made at a medical college in Delhi, India. We present the feedback received from the students and staff involved in the exercise.

### Methods

This cross-sectional study was conducted in October 2005 at Maulana Azad Medical College, Delhi, India during an internal examination. Study participants included all 178 students (age 20 to 25 years) appearing for the CM practical examination, and all 16 examiners (the department's faculty and residents; age: 24 to 55 years) conducting it. The examination involved statistical exercises, case presentations, viva-voice and spotting exercises. Spotting exercises involved identification of five spots related to varied topics (nutrition, vaccines, drugs, contraceptives etc.) and answering two related questions.

Students were divided into six batches of around 30 each, one batch examined on one day. The spots were projected as slides using MS PowerPoint to all examinees in a batch in a lecture theatre.

Each slide had a digital image (digital photographs of actual spots or scanned photographs) and two questions to be answered in one minute. The slide then changed automatically. Different sets of five slides/spots were projected for the six batches. The students and examiners rated the 'digital' method for conducting the exercise, its style of presentation and visual clarity of the slides (response options: poor/good/excellent), gave their preference for the digital method (versus the traditional method: actual spots that can be physically examined are displayed) and listed its advantages and disadvantages.

### Results

All examiners as well as 96.1% students rated the digital method as good or excellent. Ratings for style of presentation and visual clarity of the slides elicited a similar response. Four-fifths of the examiners (81.3%) and 73.6% of the examinees preferred the digital method over the traditional method. The most common advantages of the digital method, listed by both examinees and examiners, were that it was time saving and comfortable. Another advantage, mentioned by the examiners, was that it made cheating difficult. No disadvantage was listed by 41.6% examinees and 43.8% examiners. Among those listed by the examinees, the leading ones were non-use of actual spots, absence of 3-dimensional view of spots, strict time limits and difficulty in cheating. Half of the examiners also mentioned the non-use of actual spots as a disadvantage (Table 1).

In additional comments, students judged the effort as commendable (7.3%) and innovative (5.1%). They suggested an increase in time allotted per spot (5.6%), increase in number (1.1%) and magnification of spots (0.6%), and appreciated the use of technology (2.2%). The examiners suggested improving clarity of spots (7.3%), and comparing the results and methodology with similar pedagogical techniques in other medical colleges (6.3%).

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**Table 1: Advantages and disadvantages of conducting the digital spotting exercise**

| Response   | Examinees (N=178)<br>n (%) | Examiners (N=16)<br>n (%) |
|--|----------------------------|---------------------------|
| <b>Advantages *</b>                                  |                            |                           |
| Saves time   | 62 (34.8)                  | 11 (68.8)                 |
| Comfortable/ No need to run between workstations     | 53 (29.8)                  | 7 (43.8)                  |
| Spots are clear to see                               | 48 (27.0)                  | 4 (25.0)                  |
| Less confusion/ No need to form groups               | 38 (21.3)                  | -                         |
| Better understanding                                 | 29 (16.3)                  | -                         |
| Reduces anxiety in students                          | 9 (5.1)                    | 1 (6.3)                   |
| Looks good/ Good use of technology                   | 7 (3.9)                    | 1 (6.3)                   |
| No cheating possible                                 | 4 (2.2)                    | 5 (31.3)                  |
| More syllabus can be covered                         | 2 (1.1)                    | 2 (12.5)                  |
| Uniformity   | -                          | 2 (12.5)                  |
| No Response  | 23 (12.9)                  | -                         |
| <b>Disadvantages *</b>                               |                            |                           |
| Actual spot not tested                               | 34 (19.1)                  | 8 (50.0)                  |
| Three dimensional visualization of spot not possible | 29 (16.3)                  | -                         |
| Strict time limits                                   | 22 (12.4)                  | -                         |
| Technology dependent- Technical hitches possible     | 13 (7.3)                   | 1 (6.3)                   |
| No cheating possible                                 | 9 (5.1)                    | -                         |
| Cannot see a spot again                              | 4 (2.2)                    | -                         |
| Has increased the range of spots                     | 2 (1.1)                    | -                         |
| Needs a specialist person to conduct the exercise    | 1 (0.6)                    | -                         |
| No Response  | 74 (41.6)                  | 7 (43.8)                  |

\* Responses are not mutually exclusive

## Discussion

Our decision of using digital images for the spotting exercise, instead of actual spots was influenced by two factors. First, the students were familiar with the digital depiction of various spots as both the actual spots and their digital images were used during teaching sessions. Second, there were limitations of the traditional method used for conducting the exercise in which 30 students, examined on a single day, were divided into 3 batches of 10 each, and each batch was consecutively sent for the exercise, during which each student rotated among 5-6 stations, each station having an actual spot and related questions. This method had two limitations, the first being a delay in starting field-based case presentations, as it took 30-40 minutes to complete the exercise for the whole batch, only after which they would be sent to the field area for evaluating cases. The second limitation was that students in the first batch of the day messaged the answers (using cellular phones) to subsequent batches. As many medical colleges in India use a similar format for the spotting exercise, we suspect that they also face similar problems. Conducting the spotting exercise simultaneously for the whole batch using digital images helped us to reduce time for the entire exercise to 5-7 minutes, and negated the use of cellular phones for cheating.

Considering that majority of the respondents supported the digital method and nearly three-fourth students preferred it over the traditional method, in our opinion, use of digital images for the spotting exercise has the potential of replication in other medical colleges. In addition to the advantages listed by study participants, use of digital images can also overcome logistical and financial barriers faced in procurement of actual spots. We agree that the main disadvantage i.e. absence of actual spots that students can physically examine will remain a limitation of the digital conduct of the exercise. However, most spots used in the CM spotting exercises are amenable to identification through their images, unlike specimens used for similar exercises in subjects such as anatomy or pathology. Another concern was that the method was technology dependent, requiring availability of hardware (digital camera, computer, LCD projector) and familiarity with the software. While we agree that the duplication of our method is subject to hardware availability, once available we do not foresee major difficulties in software use. MS PowerPoint has been successfully used by medical practitioners, even those without significant computer expertise (Niamtu, 2001). Another limitation of the study is that it pertains to a single medical college and to a single admission cohort of the college.

There have been similar successful attempts in use of digital images for examining medical students in other countries, and in image intensive subjects such as pathology (Kumar *et al.*, 2004), histology (Heidger *et al.*, 2002) and radiology (Mullins *et al.*, 2001), however we were not able to find any related study from India, especially in CM. Although this limits comparability, it also calls for medical educators to come forward to explore the concept and feasibility of integration of digital technology in teaching and evaluation of medical students.

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