Adaptive strategies to conduct participant-centric structured virtual group discussions for postgraduate students in the wake of the COVID-19 pandemic

Simran Kaur, Megha Bir, Dinu S. Chandran, and Kishore Kumar Deepak
Department of Physiology, All India Institute of Medical Sciences, New Delhi, India

Abstract

In the wake of COVID-19, the postgraduate activities in physiology were shifted from live (face-to-face teaching) to virtual mode. This transition posed a challenge to postgraduate students and faculty moderators, especially for participant-centric group discussion, wherein face-to-face interaction contributes significantly to active learner engagement. To bridge the gap between live group discussion (GD) and virtual GD in the conventional format (VGD), we implemented an innovative yet feasible multistep approach of conducting structured virtual group discussion (sVGD). It involved priming of students during the preparatory phase and incorporation of the Tuckman model of group dynamics, which consists of sequential substages of forming, storming, norming, and performing into the virtual format. Unsupervised synchronous and asynchronous, as well as supervised synchronous interactions within and in between the minigroups in a structured way, led to active engagement of students with one another and the moderator, despite the constraints imposed by the virtual format. After establishing the feasibility of the approach during the first GD (sVGD-1), sVGD-2 was conducted, further refining the approach, and feedback was obtained from the postgraduate students. Pre-GD feedback revealed that the live session was preferred over virtual for the conduct of GD, whereas both live GD and sVGD were perceived to be more effective than VGD in the post-GD feedback. Such pedagogical innovations may also help to address the challenges posed in traditional teaching across the undergraduate and postgraduate courses in medical education and beyond during such unforeseeable circumstances.

active learning; COVID-19; participant centric; self-directed learning; small group teaching; synchronous learning; virtual group discussion

INTRODUCTION

Medical education has always evolved in response to scientific advances and societal needs (1). Recently, the COVID-19 pandemic posed as the greatest threat of unprecedented global health concern (2). In view of the health risks posed by COVID-19 and social distancing measures, conventional “face to face” methodology of academics, even in medical education, has been set aside. Given the current complex societal challenge to the medical fraternity, ensuring the continuation of medical education is what is needed now. An interruption in the academic activities could have a psychological impact on the mental well-being of the students, especially because of the uncertainty linked to this outbreak (3). Also, it can further lead to long-term effects on the learning curve of the students and can deter their academic performance (4). Thus, the “COVID-19 generation” of students should continue their education in a world transformed by social distancing (5).

In recent times, there has been a much-needed pedagogic shift from a teacher-centric to a student-centric approach. Understanding students’ perceptions about the education environment play a vital role in planning and implementing a teaching strategy (6). During these unforeseeable circumstances, there arose a need to employ alternatives, with an emphasis to target the factors that suit the students in the best possible way for effective academic learning. Thus, to cater to the needs of the students, it required the medical educators to focus on pedagogical innovations involving technology-based teaching (7). Keeping this in mind, innovative strategies were embraced for the smooth conduct of the postgraduate teaching in the Department of Physiology at the All India Institute of Medical Sciences, New Delhi.

The postgraduate teaching program caters to around 25 postgraduate students, pursuing degrees of Doctor of Medicine (MD) in physiology (3-yr postgraduate course after obtaining a basic medical degree) and Master of Sciences (M. Sc.) Physiology (2-yr postgraduate course after obtaining a bachelor’s degree in life sciences/medicine/paramedical courses/dentistry). At a given time, these students’ academic experience varies, depending on the date of joining the department. The teaching program is conventionally structured in a way that the students participate in both leader-centric (seminar and symposium) and participant-centric [group discussion (GD) and journal clubs] activities. Apart from the academic knowledge gained, this enables the
students to inculcate interpersonal and communication skills, self-directed learning, and adult learning strategies, and facilitates efficient networking and team building (8). Thus, in the wake of COVID-19, since face-to-face interaction and discussions were precluded, it was pertinent to innovate methodologies for the continuance of the academic activities.

Synchronous virtual techniques represent a convenient mode of online learning without sacrificing opportunities for real-time engagement with peers and faculty (9). Students’ positive feedback has also been reported in synchronous teaching with respect to student-student and student-faculty interactions (10). Thus, the postgraduate academic activities were shifted to a synchronous virtual format, so that real-time academic interactions could be facilitated.

This transition to online teaching was novel, as well as challenging to both postgraduate students and the faculty moderators especially for participant-centric group discussion, wherein face-to-face interaction contributes significantly to active learner engagement. The faculty moderators anticipated concerns related to the preparation of an effective online interaction catering to around 25 postgraduate students, whereas for students, this change was perceived as an unconventional, though inevitable, approach. Nevertheless, it was necessary to develop and evaluate the sustainability of the newer strategy (11). Thus, the present study aimed to innovate the mode of conduct of virtual group discussion (VGD) and assess the perception of postgraduate students on its effectiveness in comparison to conventional VGD and live GD.

### MATERIALS AND METHODS

In the department of physiology at the All India Institute of Medical Sciences, New Delhi, group discussion (GD) is scheduled once a week, for 1.5-2-h duration, attended by around 20–25 postgraduate students pursuing MD Physiology and M.Sc. Physiology at different levels of their academic experience. The topic is given at least a month in advance, and the academic activity is convened by a faculty (moderator) and a senior demonstrator. It has been documented that the physical environment also plays a pivotal role during the course of group discussion (12). Thus, conventionally, GD is conducted in a roundtable format, wherein the postgraduate students are uniformly spaced, and the moderator usually takes a central position. This ensures proper face-to-face interaction between the learners and the moderator, thereby facilitating effective communication even through nonverbal cues.

Small group teaching is based on achievable specific aims and objectives in a given time, with the key principles involving the introduction of the topic, ground rules, group maintenance, task/activity, briefing, and debriefing (13). Tuckman has put forth the following four stages in a conventional group activity: forming (the members know each other, exchange information), storming (address the problem and their role to solve it), norming (manage to have a specific aim and mutual plan), and performing (perform the task smoothly and effectively resolving conflicts, if any) (14). So, keeping in mind the fundamentals of group discussion and the resources available during these unforeseeable circumstances, an innovative approach named as structured virtual group discussion (sVGD) was sought to bridge the gap between conventional and virtual conduct of group discussion.

VGD is a replica of conventional live GD in a virtual mode, wherein the learning objectives are met through freewheeling discussions among students and the moderator, whereas, in sVGD, there is a shift from freewheeling to structured curation of the session to facilitate effective academic interactions among the students and also with the moderator. Additionally, an unsupervised priming session was scheduled before the main session in sVGD to compensate for the downplaying of freewheeling interactions during the actual session.

Because it was a novel and abrupt change, the approach was crystallized and followed initially for a single sVGD (sVGD-1). After establishing its feasibility, this approach was followed for another session (sVGD-2), wherein improvisations were made related to the priming, usage of breakout rooms, and collection of pre- and post-feedback of the GD session.

The schematic timeline for the conduct of sVGD is depicted in Fig. 1 and the characteristic features for both the sessions have been provided in Table 1.

### Preparation of the Session

Two weeks before the sVGD, the academic resources related to the topic were ascertained, and a plan was formulated by the moderator (faculty) and the senior demonstrator involved, over e-mail, video call, and telephone conversations. It was ensured that the postgraduate students had access to technology (internet access, as well as a laptop, tablet, or smartphone) during the course of the sessions.

### Division into Smaller Groups and Priming

The postgraduate students were divided into four or five minigroups, a week before the activity. These minigroups were heterogeneous and consisted of postgraduate students who varied regarding their academic experience and the academic paths (MD/M.Sc.). In each group, there was a senior MD (more than 2 yr of experience), a relatively junior MD (1–2 yr of experience), MD (<1 year of experience), and a senior (year 2) or junior (year 1) M.Sc. student. All the minigroups were comparably heterogeneous. The learning resources were shared online with each minigroup consisting of different subtopics, to ensure that the main topic is covered comprehensively (Table 1). The division into subtopics also ensured that the volume of the academic content allocated for discussion and preparation by the minigroups during the preparatory phase remained optimal, so that students had adequate time for self-paced learning and interactions with other members in the group. In sVGD-2, the postgraduate students were asked to prepare a summary based on the articles shared with them, which ensured objectivity, congruency of each student with the learning agenda of the group discussion, before the activity. Unsupervised group dynamics, based on asynchronous interactions, were present within the minigroups, using instant messaging and/or online meeting platforms to achieve their respective objectives. This outcome-based session primed the students for the upcoming activity.
Creating an Outline for the Discussion

A day before the scheduled activity, the moderator actively interacted with the senior demonstrator through video call, and trigger points were identified for the participants. An overall outline was created for the scheduled sVGD.

Group Interactions

The sVGD was held under the guidance of a moderator (supervised synchronous group dynamics) using a Web-based platform. The duration of the conduct was set to 1.5–2 h, similar to live (face to face) GD, as per the postgraduate teaching program of the department. This also ensured the optimal utilization of the time for the given topic in an efficient manner. All the postgraduate students were logged in at the same time, along with the faculty moderator and senior demonstrator and were instructed to switch on their respective audio and video during the activity. Additionally, in sVGD-2, a 20-min-breakout room session (unsupervised synchronous group dynamics) was given to the students to discuss and prepare a structured summary of the articles shared as learning resources before the main session (refer to Table 1 for details)

Stages of group interactions during structured virtual group discussion can be described as follows (Fig. 2).

**Forming: Tuckman stage 1.**

The topic was introduced by the moderator and an outline was shared on the platform to define the task-oriented objectives. Additionally, the moderator laid down the rules, roles, and expectations from the participants during VGD. Each minigroup presented their respective part sequentially according to the subtopic allotted to them for 10–15 min. The use of pointer and animations, along with adequate tempo facilitated a better understanding of the concepts by the participants.

**Storming: Tuckman stage 2.**

The students were encouraged to raise their queries using the chat box function during the presentations delivered by each group. The team tried to address the queries in the best possible way, though discussions and confrontations did occur during the process. Using the appropriate intervention, the moderator and the senior demonstrator resolved the conflicts, directing the group in a positive direction.

**Norming: Tuckman stage 3.**

Active and equal participation of all the participants was ensured by the moderator during the discussion. Participative decision making, consonance, and acceptance of one another’s perspective led to cohesiveness in the group.

**Performing: Tuckman stage 4.**

Goal-oriented objectives were met during the VGD through problem-solving, critical thinking, and collaborative efforts of the students in the group along with the facilitators (moderator and the senior demonstrator).

Concluding the Session

The group was debriefed regarding the topic, and the moderator summarized and concluded the session.

Pre-GD and Post-GD feedback were obtained from the postgraduate students through online surveys during the activity.
sVGD-2 after obtaining a due ethical clearance (IEC-487/05.06.2020, RP-30/2020). In the pre-GD survey, feedback regarding students’ perception of the preferred mode of conduct for group discussion was obtained on a bipolar scale. Feedback was obtained regarding the effectiveness of different formats of GD (live GD, VGD, and sVGD) and the importance of peer-to-peer interactions for the students to facilitate their motivation to learn on a five-point Likert scale in the post-GD survey. Likert scale scores for the effectiveness of different formats of conducting GD were analyzed using a nonparametric Kruskal-Wallis test. Statistical analysis was done using GraphPad Prism ver. 8.4.3 (GraphPad Software, San Diego, CA).

The feedback questionnaires used in this study can be accessed using the links to the supplementary files: Pre-GD feedback questionnaire (https://mfr.osf.io/render?url=https%3A%2F%2Fosf.io%2Fj72g8%2Fdownload) and Post-GD feedback questionnaire (https://mfr.osf.io/render?url=https%3A%2F%2Fosf.io%2Fbewhg%2Fdownload) uploaded to a generalist data repository hosted by Open Science Framework (https://osf.io/).

### RESULTS

During the conduct of sVGD-2, pre-GD and post-GD feedback were sought through email from the postgraduate students to which 14 (88% response rate) and 15 (94% response rate), respectively, responded out of 16 eligible participants (Table 1). It was found that the majority of the postgraduate students (10 out of 14) in the pre-GD survey preferred the live, face-to-face session over the virtual mode for the conduct of the group discussion (Fig. 3). Thereafter, analysis of the Likert scale scores obtained in the post-sVGD-2 feedback revealed that live GD was perceived to be more effective than VGD [median Likert scale score (25th percentile to 75th percentile) of 4 (4–5) for live versus 3 (2–3) for virtual; \( P < 0.0001 \)] and sVGD was perceived to be more effective than VGD in the conventional format \( [4 \ (4-4) \text{ for sVGD vs. } 3 \ (2-3) \text{ for VGD;} \ P = 0.0004] \). However, there was no statistically significant difference in Likert scale scores obtained for live GD versus sVGD. Similar trends were observed when the feedback responses for the effectiveness of the three different formats were expressed as categorical data (Fig. 4). Two-thirds of the respondents (10 out of 15) perceived that peer to peer interactions within the mini-groups before the scheduled GD were quite or extremely important to facilitate their motivation to learn in the wake of COVID-19 pandemic.

### DISCUSSION

During the conduct of sVGD-1, feasibility was established for the structured approach and subsequently, sVGD-2 was conducted further refining the approach,
wherein feedback was also obtained from the postgraduate students. The transition to virtual format was perceived to be more challenging for GDs by the students and the majority of the students considered live/face-to-face session as the preferred mode, as revealed by the pre-GD feedback. Previous literature also suggests that computer-mediated communication is less effective than face-to-face group interaction (15). However, if virtual teams are given sufficient time to adapt and develop strong intragroup relationships, they may perform as effectively as face-to-face group (16). Thus, we innovated by adopting a structured approach to conduct virtual group discussions (sVGD) using priming sessions, wherein relevant learning resources were shared with the students during the preparatory phase to set the stage for more efficient and focused interactions among the subgroups during the actual conduct of the session.

Congruent to the pre-GD feedback, post-GD feedback also revealed that the postgraduate students still preferred live GD over VGD in the conventional format. As anticipated, the students perceived sVGD to be more effective than VGD to improve their overall learning. Concurrent to our findings, Chidambaram et al (16) also reported that process structuring can help to effectively channel group interactions leading to improvement in the overall outcome of the group, especially for the factors like cohesiveness and satisfaction. A comparison of Likert scale scores did not reveal any statistically significant difference in the perceived effectiveness of sVGD versus live GD. This can probably be attributed to the limited sample size and needs to be explored further.

Further, in the post-GD feedback, the majority of the postgraduate students reported that peer-to-peer interactions were psychologically important and facilitated their motivation to learn (Fig. 5). This may be because the pre-GD sessions were carried out in an unsupervised manner, thereby giving them flexibility and comfort to interact informally.

Figure 2. Stages of group interactions during the synchronous session of structured virtual group discussion (sVGD). Boxes identified with circled numbers indicate the key activities involved in the conduct of sVGD. The approximate time allocation and pacing for various activities were as follows: ①, 10 to 15 min; ②, ③, ④, ⑤ and ⑥ (combined), ~1 h 30 min, with 30 min allocated for presentations and 1-h for discussions; and ⑦, 10 to 15 min.

Figure 3. Pregroup discussion feedback of the postgraduate students on the preferred mode of conduct for group discussions. GD, group discussion; VGD, virtual group discussion.
The inevitable shift to virtual conduct motivated the authors to explore alternative methods, keeping in mind the fundamentals of group dynamics. Investing additional time on small-group learning and a more structured curation of the actual session, including the use of chatbox functionality for timely documentation of queries and addressing them at appropriate intervals helped to circumvent the limitation on the level of interactivity. A distinct advantage appeared to be the creation of a conducive atmosphere, especially for the quieter students, who probably opened up during the preliminary subgroup interactions before the actual GD. In a larger context, it may have allayed anxiety in the students by staying connected with their peers and the faculty, especially in this difficult time. The subsequent GD session (sVGD-2), retaining the format but with further modifications, elucidated the effectiveness of the given structured approach.

The sVGD approach reported here incorporates Tuckman’s four-stage model at its core, giving a structural framework to the temporal sequence and nature of group interactions happening during a group discussion and, thereby, improves the perceived effectiveness of group discussions conducted in a virtual learning environment. Because this adaptive approach is more of a process innovation that is independent of the academic content delivered, it could easily be implemented with necessary modifications for the effective conduct of small-group teaching/learning activities in virtual learning environments for undergraduate students in health and life science disciplines. The modifications may include the liberal use of breakout room sessions for keeping it learner-centered when being implemented for larger groups while adhering to the four-stage model for better curation and synchrony of virtual group interactions for fulfilling the learning goals. Thus, the current study may act as a torchbearer to implement structured virtual small-group teaching with synchronous and asynchronous elements for the undergraduate students and the postgraduate students across specialty, especially during a pandemic or similar circumstance.

■ LIMITATIONS

The authors perceive that the division of the GD topic into subtopics may result in a loss of holistic understanding. However, it was done for coordinated and efficient handling of the content during the session. By taking up trigger points identified from all relevant aspects of the topic at specific time points during the actual session, we could ensure that students in each subgroup were made aware of a holistic understanding of the topic vis-a-vis attainment of specific learning objectives.

Since sVGD-1 was the first to be conducted using the given methodology, a formal feedback survey was not planned, as the feasibility of the new approach was yet to be tested. However, in the subsequent sVGD-2, pre-GD and post-GD feedback were obtained from 14 and 15 students, respectively. Since a specific proportion of MD students were posted for COVID-19 management on a monthly rotation, the attendance in sVGD-2 was relatively low compared with sVGD-1. However, the students who missed either of the sessions were provided learning resources and access to the video recording of the sessions. Thus, the findings of the feedback survey, owing to its limited sample size, can only be treated as preliminary evidence requiring further testing.
and confirmation in larger student groups across courses and disciplines.

## CONCLUSIONS

sVGD could be used as an innovative approach with more impetus on self-directed learning (during unsupervised group dynamics) and critical thinking, communication skills, team building (during supervised group dynamics) for active engagement of postgraduate students during virtual group discussions. The facilitators have a key role to adopt a structured approach during the preparation and execution of the activity at the cost of investing more time and effort.

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## DISCLOSURES

The authors declare no conflict of interest, financial or otherwise.

## AUTHORS CONTRIBUTIONS

S.K. conceived and designed research; S.K., M.B., and D.S.C. performed experiments; S.K. and D.S.C. analyzed and interpreted the data; D.S.C. prepared the figures; S.K. drafted the manuscript; S.K., M.B., D.S.C., and K.K.D. edited and approved the final version of the manuscript.

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