



360 degree approach of lecture hall for teaching

Ashfaq Akram¹, Farzana Rizwan², Nurul Azimah Ahmad Arzaai³,
Robina Shaheen⁴ Nabishah Mohamad⁵

ABSTRACT

Summary Delivering a lecture is a traditional teaching method in medical schools and it is a dilemma to make it effective for many lecturers especially when the class size is large. Much has been explored on teaching methodology but less has been focused on design of lecture halls and laboratories used as venue for large sized classes. A 360 degree is the new architectural design of lecture hall meant for large size class having teacher's site called source of information (SOI) in the middle. Around the SOI, the seating arrangement of students is in a complete circle rather than ordinary rectangle or D shaped lecture halls. This design as hypothesis shrinks half of the seating area and would transform the large size class into a small size class. This would enhance to monitor the students and more likely be easy to interact with students who use to sit on backbenches and keep their distance quite far from teachers in traditional teaching method. This is also applied to laboratory designs reserved for large size classes. 360 degree lecture hall may likely to be effective. But a pilot study is suggested to assess the reliability of this architectural design.

¹International Medical School,
Management & Science University,
Malaysia

²Faculty of Medicine, Taylor
University, Malaysia

³Electrical Department, Polytechnic
Sultan Azlan Shah, Malaysia

⁴Foundation of Medical Science,
Allianze University College of Medical
Sciences, Malaysia

⁵Faculty of Medicine, Universiti
Kebangsaan Malaysia, Malaysia

Address for correspondence:

Ashfaq Akram, International Medical
School, Management & Science
University, Malaysia
ashfaqakram@hotmail.com

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INTRODUCTION

Managing a large sized classroom is a popular debate in medical education. Traditional lectures in many parts of the world are the primary methods of instructions in medical programme particularly for large class sizes [1-3]. Lecture base teaching provides opportunity students to learn conceptual information from spoken communication better than from reading. It provides real time human presence which makes it easier for most students to focus attention [4].

A lecture hall (class room) is a physically comfortable place that allows the students to learn through seeing and hearing the teaching material presented to them. Lecture halls of varying layouts such as the Rectangle, the semi-D, the Square and U shape are in practice to cater such needs [5, 6]. The rectangle shaped lecture hall is a traditional design which is built to accommodate large and small audience. The main advantage of this design is to produce attention towards one direction. On the other hand, the persons (students) sitting on the back, may not give attention to the instructor or vice versa. This is directly proportional to the area of the hall, the bigger the area the farther the distance of backbencher to the instructor (Fig.1A).

The term 'class size' is the number of students participating

in learning process. A student / teacher ratio is a relationship between the number of enrolled students and the number of full time employed teachers by the school. In many medical schools (for example in Malaysia) the ratio is 5:1 which means for five students, there is one full time teacher. But this does not mean the class size is 5 students. The debate on class size and students-teacher ratio is beyond this paper. We will focus on large size class which means 75 or more than this number of students per cohort [7]. However, figure does not restrict the exact number of students because in many South East Asian medical schools, number of medical students vary from 200- 250 per cohort.

Much has been written on medical curriculum and teaching methodologies to reduce the class size. But there is fewer data on improving the design of venues such as lecture halls and laboratories which are used for medical teaching. This paper aims to illustrate a new design of lecture hall to maintain the integrity & effectiveness of traditional teaching alive. To improve the quality and maintain the adequate control over the large size class, we will focus on the design of lecture halls which should meet the true needs of both the faculty and students. We describe a hypothetical architectural design of lecture hall to illustrate another way to produce small size class rather than decreasing the number of students.

METHODS

Description of new architectural design of lecture hall

The architectural design of 360 degree lecture hall is a flipped traditional lecture hall with a circular shape. Students seating stations are in a perfect circle regardless of which type of furniture is used in new hall. The teacher's place is in the middle rather than at front. We would call teacher's place as 'Source of Information' (SOI). The students' seats are stationed around the SOI where the first row of seats is about 2 meter from the SOI. Having a complete circle of seats shrinks almost half of the distance if compared to a rectangular shaped lecture hall (Figs.3A). It means in a traditional lecture hall, farthest student (backbencher) is usually 25-30 meter away from teacher because of lecture hall design where seats are located in front of teacher centre and it is itself situated on one corner of the hall (Fig. 2A). In addition, the new lecture hall would contain a minimum of ten percent seats for left handed students. In normal cases, left handed seats are installed on the left side of the aisle when viewed from the instructor area [8]. The stations for handicapped students using wheel chairs are provided at approximately four percent of the capacity of the lecture hall. Furthermore, at least one seat of all fixed seats would be an aisle seats without an armrest on the aisle side. Such stations are available in a variety of locations within the seating area. The SOI should accommodate teachers using wheelchairs in a similar manner [8].

The ceiling may vary depending upon the number of students stations within the 360° lecture hall. According to guideline, the ceiling height at rear should be 10 feet for a distance of 50-75 feet from the centre [8]. The lecture hall would have four to six concaved screens with the distance from screen to farthest viewers being no more than 4 times the screen width and the distance from screen to first row of seats being no less than 1.5 –2 times the screen width [8]. At the middle of the lecture hall is the SOI - equipped with a round desk, microphone and other required electronic devices, to make it teacher centre for large cohort. It is moveable, a key feature of SOI, at a speed of ≥ 1 km/hr. With slow motion movement of SOI, the teacher moves in such a way that s/he can see all the students steadily.

In terms of electronic devices, four to six concaved projectors would be displayed at an angle of 30 – 45 at the outermost row of students' stations. We also suggest equipping student stations with mini screens (1 mini screen for three students) in new lecture hall would facilitate the students' attention on learning process. These mini screens would be connected in serial and controlled by the respective teacher. These guidelines are not absolute and may vary from each school's individual needs. A diagrammatic sketch is shown in Fig. 3B.

We also suggest the design of traditional laboratories from rectangle to circle (360 degree) shaped having semi circle shaped table around the SOI.

RESULT

The design of 360 degree would shrink the distance between students and teachers by providing the space for seating at teachers' end which is commonly not utilized. Thus backbencher would be at half of the distance of the traditional lecture hall because seats are situated all around the teacher centre and it is itself located in the middle of the hall (Fig 3A). This arrangement minimizes the distance and transforms the venue into a small class room.

DISCUSSION

The quality of medical education is a matter of concern to all academicians' especially medical educationists. Medical schools traditionally focus mainly on three key educational ingredients: curriculum, instructional methods and assessment techniques. Though space or venue is a key element in the accreditation process but showing some numbers of lecture halls and laboratories with reasonable space area measured in square feet gives a positive fact for accreditation. We do not deepen the process of accreditation because this is not our topic. The fact is to improve the learning process even if the cohort is large. U shape lecture hall is a minor variation of the rectangle lecture hall. It provides the opportunity to majority of the students to face towards the instructor. In addition, it gives some space to the students in the middle of the hall to walk and come closer to the instructor for discussion with instructor after the lecture if needed.

Semi D shaped is another modified lecture hall and has been introduced currently in some medical schools. This design is an effort to bring or provide opportunity maximum students to be closer to the instructor. It broadens the view of teachers but there is still a considerable distance between teachers and students. The semi- D shaped is good for medium sized class. But what would happen if cohort is 250-300 students – a common practice in many Asian medical schools. Many studies have proven that small size classes produce better results in terms of achievements by students [9-11]. None or little data is available on efficacy of Semi D or U shaped designs of lecture halls in terms of students' achievements by using them. We do suggest 360 architectural designs to be focused by researchers in future.

Prober and Heath [12] proposed flipping the medical school classroom by having students review didactic material (videos) before class and using face to face time to discuss case based problems. This principle has long been recognized as effective practices that shift the emphasis from teaching to learning and incorporated in approaches such as Problem based learning and Team based learning [13]. The method proposed by Prober & Heath [12] would be more effective if architectural design of traditional lecture halls is transformed from rectangle or D-shaped to 360 degree shape. This issue may be taken as new focus point for future research.

Figs. 1A to 2B - Traditional Lecture Halls.



Fig 1A. Traditional Rectangle shape lecture Hall



Fig 1B. Ordinary lecture with one projector screen

Students sitting on backbencher are 20-25 meters away from the teacher. Teachers cannot focus especially on back benches.

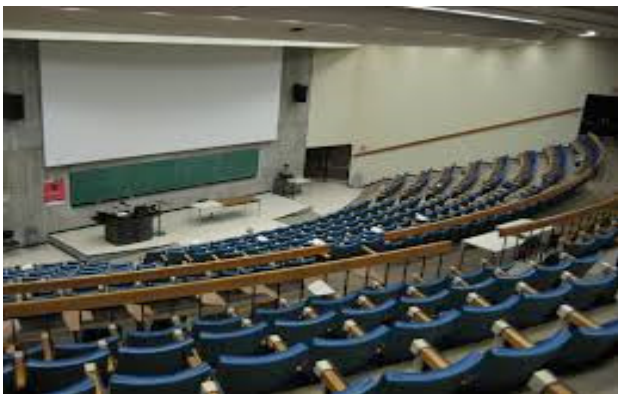


Fig. 2A. D shape lecture hall. Teacher's site is at front left hand side. From the backbencher, most of teachers are unable to observe the academic interest of students sitting at backbenches. (Picture ref: www.luminouseviews.com)

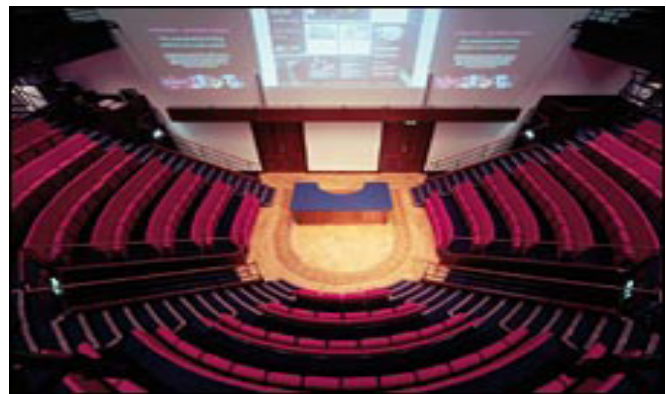


Fig 2B. U shape lecture hall. Almost same situation do exist. The distance between backbencher and teacher is noticeable. (Stanford University School of Medicine) www.med.stanford.edu

The relationship between class size and learning outcomes is also in debate. Why 'large' classes do make classroom teaching more difficult and less effective? Teachers in large classrooms have difficulty in getting to know their students as individuals. They are unable to understand the learning needs of their individuals. The teachers' fundamental task is to get students engaged in learning activities to get the desired outcomes from the learning process which is difficult to achieve in large sized class. This is because teachers are seated quite away from the backbenches. They have negligible eye contact with their students and in most cases; students engage themselves in other activities by using modern tools of communication and it affects adversely their performance [14]. The 360° lecture hall would incorporate the teaching of large size class in a manner of small sized group. Teachers would have a closer distance with students making it effective as small group teaching. However, its construction may require special attentions

from architecturers and civil engineers which may hinder its implementation.

CONCLUSION

The 360° lecture hall provides a possible solution to teach large size cohort in a small size class manner by moving the teacher's place from one corner to middle of the hall. Backbenchers are brought close to the teacher' site by utilizing the space at teacher' end. However, architectural measurements, concave projection screens may need special attention of IT technicians, architecturers and building planners. Future research by designing and constructing such design of lecture halls and laboratories may likely to be encouraged to get the efficacy of teacher centre - a primary and fading traditional but effective way of teaching around the globe.

Fig 3A & 3B: 360 degree Lecture Hall for Large Size Cohort

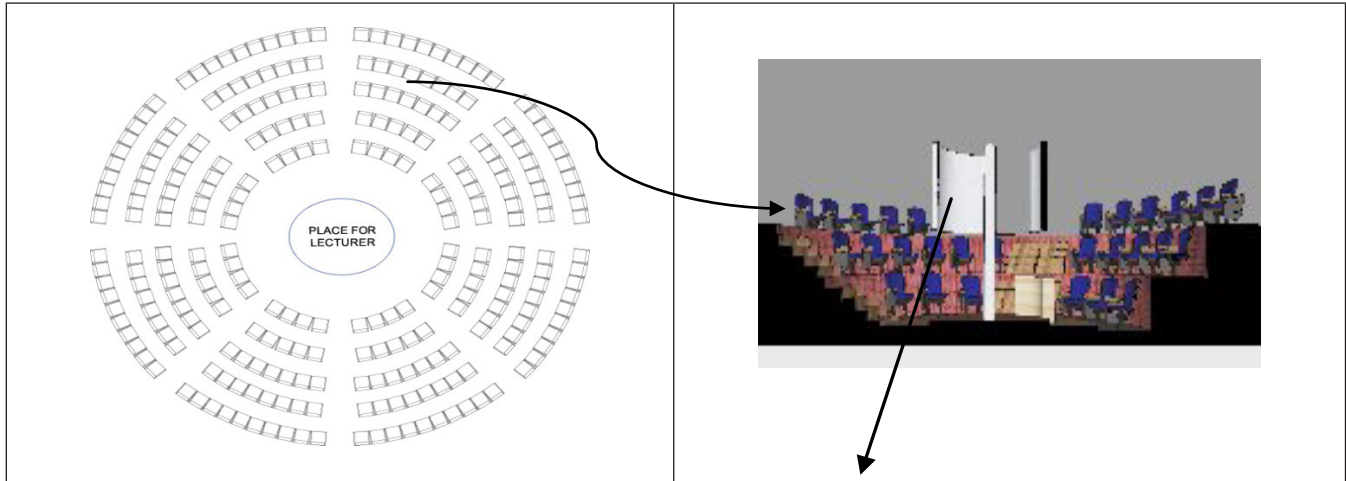


Fig 3A. 360 degree seating arrangement and teacher's place is in middle (SOI). It minimizes the distance at large size class between teacher and students especially the backbenches.

Fig 3B. Concave shaped projectors 4-6 are recommended. Each of them will enhance the view for students sitting in arch form. Only one section is taken from a 360 hall.



Fig 3C. An architectural design of 360 degree Lecture Hall shrinks the distance between teacher & students especially backbenches. The number of seats and rows may vary requirements of each school. This would help to improve the teacher centre activity.

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