



## FLIPPED CLASSROOM TECHNOLOGY: CHANGING TRENDS AND FUTURE OF MEDICAL EDUCATION IN DEVELOPING COUNTRIES

SUMATHILATHA SAKTHI VELAVAN <sup>1</sup>

<sup>1</sup> AFFILIATION: DEPARTMENT OF ANATOMY, TOURO COLLEGE OF OSTEOPATHIC MEDICINE, 125TH STREET, NEW YORK – 10027, USA.

### ABSTRACT

*A series of changes are being implemented in the medical curriculum all over the world. The modification aims towards early clinical exposure with incorporation of problem based and team based learning. The ultimate goal is to produce a self-learning oriented and a competent physician. With the advent of technology and flipthis modification is eased out by various newer computer and audio-visual based approaches. They help to reduce the burden of students and faculty who are overwhelmed by time constraints and introduction of newer style of curriculum. This article aims at discussing about the various newer modalities of teaching in the field of Anatomical and other basic science. These techniques are already being practiced and found to be advantageous in many universities in developed countries.*

**Keywords:** Medical education, Anatomy, Histology, flipped class room, Virtual microscopy.

### Introduction

Medical education is constantly changing. Medical school faculty cannot teach everything that a future physician is expected to know. The medical student has to evolve into a self-learner who builds up his knowledge on a regular basis. There are multiple tools available to enrich his knowledge that range from continued medical education to work shops. The present generation of physicians turns their heads to online resources to upgrade their knowledge, exemplified by webinars, online courses, online videos etc.

Recently, an extension of such a trend into medical education is well appreciated. The cost and efficiency technology allows represent a paradigm shift in how we teach and utilize faculty, space, finances, and other resources [Williams DE, 2016]. Studies have shown such a modification of learning to be successful in multiple fields namely competitive exam preparation, school education etc. a couple of studies have also demonstrated varying although significantly positive outcome in medical education.

### Discussion

A first year medical student who is glued to the chair in a lecture hall among hundreds of his batch mates tries hard to focus on the voluminous material taught in a limited time frame. Attention span is very hard to be sustained through series of lectures based on loads of new terminology, facts and mechanisms. Flipped classroom technique is currently being practiced in a number of institutions all over the world. It is shown to facilitate the learning by medical students and also made the delivery of teaching material very efficient [Moraros J et al., 2015, Prober CG et al., 2013]. What is flipped classroom? In traditional teaching, lecture delivery happens in the

classroom and the student processes the information and reinforces the concepts after the lecture. In flipped classroom, the lecture delivery and learning happens outside the classroom and lecture hours are converted to interactive discussion and assessment based sessions.

The flipped classroom sessions are designed with assessments before, during and also after the lectures. Pre-class online quizzes can allow the instructor to practice 'Just-in-Time Teaching', which means that the instructor tailors class activities to focus on the elements with which students are struggling [Novak G, 1999]. The students receive productive feedback through the processing activities that occur during class, reducing the need for the instructor to provide extensive written feedback on the students' work. The key is that students are using class time to deepen their understanding and increase their skills at using their new knowledge [Brame C, 2013]. Post lecture assessments are based on student discussion of conceptual "clicker" questions and quantitative problems focused on physical principles [Mazur E, 2009]. This model represents a potential future as a means for improved instructional efficiency. The flipped classroom can enable students to be better prepared for the clinical experience so they can go further in their training, rather than catching up to where they're supposed to be [Williams DE, 2016].

In the first year of medical school, Anatomy is a major component and dissection is an essential part of Anatomy education. Pre-recorded videos of dissection and demonstration enhance the effectiveness of dissection hours. Many companies have come up with software that are easily installed and aid in three dimensional understanding of the complex anatomical structures. Studies have shown that gross anatomy videos were a well-received form of Computer aided instruction that may

be useful in bridging the gap created by a reduction in gross anatomy course contact hours [Topping DB, 2017].

Histology used to be learnt in the past over extensive hours in lab that included slide preparation apart from identification and learning the micro anatomical details. Once again, with the limitations imposed by curricular alteration, many components have been removed from the Histology syllabus. Introduction of virtual microscopy allows learning histology at ease and at one's own convenience and avoids the hassles of maintaining cluster of microscopes in the medical school. A study shows that the switch from light microscopy to virtual microscopy was very favourably received by both students and faculty [Krippendorf BB et al., 2005]. In addition to the virtual microscopy, short demonstration videos of histology slides not only help the students to understand but also provide the option of reviewing the material prior to exams.

### Conclusion:

In present era, when everyone is tech savvy, the gadgets play a major share of one's day to day activities. Teaching and learning should merge with the daily routine rather than being isolated to classroom, lab, textbooks and notes. Instead of reducing the essential content, simplifying the teaching methods is ideal way of preserving the quality of medical education. Learning based on technology cannot definitely replace live classroom teaching or cadaveric dissection for sure. However all the technology based teaching modes described supplement the traditional methods while considerably improving the positive outcome.

### REFERENCES

1. Brame, C., (2013): *Flipping the classroom*. Vanderbilt University Center for Teaching. Retrieved from <http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/>, accessed [Oct 6, 2017].
2. Krippendorf, BB. and Lough, J. (2005). *Complete and rapid switch from light microscopy to virtual microscopy for teaching medical histology* *Anat Rec B New Anat* 285(1), p. 19-25.
3. Mazur, E. *Farewell, Lecture*. (2009). *Science* 323, p. 50-51.
4. Moraros, J., Islam, A., Yu, S., Banow R. and Scindelka B. (2015). *Flipping for success: evaluating the effectiveness of a novel teaching approach in a graduate level setting*. *BMC Med Educ*, 15(1), p. 317.
5. Novak, G., Patterson, ET., Gavrin, AD. and Christian, W. (1999). *Just-in-Time Teaching: Blending Active Learning with Web Technology* Upper Saddle River NJ: Prentice Hall.
6. Prober, CG. and Khan, S. (2013). *Medical education*

*reimagined: a call to action*. *Acad Med*, 88(10), p. 1407-10.

7. Topping, DB. (2014). *Gross anatomy videos: student satisfaction, usage, and effect on student performance in a condensed curriculum*. *AnatSci Educ*, 7(4), p. 273-9.

8. Williams, DE. (2016). *The Future of Medical Education: Flipping the Classroom and Education Technology*. *The Ochsner Journal*, 16(1), p.14-15.