

Teaching - Learning Methods in Medical Education Merits and Demerits

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ABSTRACT

Medical education is facing various challenges in teaching tomorrow's physicians. In such a challenging situation medical schools should adopt new teaching methods to maintain excellence in medical education. These methods shift teaching from a teacher-centred and product-based activity to a more student-centred & process-based activity. This strategy encourages students to be active in the experience of learning rather than being passive learners. Integrating teaching, learning and technology is a mandate, not an option, and doing anything less would burden on professional irresponsibility. The new adaptations include electronic (e-learning), on-line or web-based learning and problem-solving-based learning. The transformation is from subject-centred to centralized integrated curriculum. Skill labs and simulation techniques are new methodologies. In this are an attempt was made to discuss merits and demerits of few teaching-learning methods.

Key words: Medical education, Teaching - Learning methods, Traditional, New adaptations

INTRODUCTION

Wide spread adoption of Curriculum Based Medical Education (CBME) would mean a paradigm shift in current approach to medical education. Components of CBME are - competency, entrustable professional activity, tailored learning experiences, sequenced progression and programmatic assessment. The aim of training in the medical colleges is to produce a medical graduate who is capable of taking care of health needs of the society. Previously the teaching learning methods and assessment methods would focus on knowledge rather than on skill and attitude. The traditional curriculum is subject centred and time based. CBME is aimed at taking care of communication skills, ethics, professionalism and know-how of doctor-patient relationship. CBME promises greater accountability, responsibility, flexibility and learner-centred. This means that Teaching-Learning Methods (TLM)

should be designed such a way that the competencies would continue till the desired result is obtained. Teaching modalities are focussed on real-life practice. In this article different TLMs are discussed to suite CBME.

The TLMs discussed in this article are

- I Lecture cum Demonstration
- II Laboratory experiments
- III Roleplay
- IV Case study
- V Mastery Learning
- VI Creative Project
- VII Small group discussions
- VIII Tutorials
- IX Simulation
- X Self directed Learning

I Lecture cum Demonstration:-

Symbiotically stand together. If information is verbally delivered it is "Lecture" and if the same is visually provided it is called "Demonstration". In

didactic lecture the learners listen for extended periods. This is purely instructor centred TLM. The learner is inactive & hence less attentive leading to reduced perception, especially in crowded classroom setting. The method of pedagogy adapted does not involve thought and reflection practices. Learner centred classroom promotes analysis, synthesis and evaluation

of Bloom's taxonomy of cognitive educational outcome. Purpose is to develop skills, gain knowledge, verify facts and problem solving skill. Study by Maloney et al., observed significant difference between perceived educational value, with teaching approaches of pre-recorded video tutorial and student self-video being rated higher than traditional live tutoring [1]

Steps in L & D

Table-1

1.Planning	Lesson planning; Reharssal of experiment; Collection & arrangement of apparatus
2.Introduction of lesson	Introduced as personal experience / Student environment/ Telling story
3.Presentation of subject	In a simple & clear manner in a language which the learner understands
4.Demonstration	Simple & speedy ; Economical

Table -2

Advantages	Disadvantages
Economical	Maxim of education is ignored(Learning by doing)
More reliable	
Demonstration is useful when the learner lacks expertise to perform himself	Visibility compromised if viewers are more in number
Useful for all types of learners -	Hinders the development of skills in learners
Easy to remember & recollect	



Figure 1 (Lecture cum demonstration method of teaching power point presentation- slideshare.net ; By Roma Smart Joseph, Teacher Educator, Lucknow UP,India) [2]

affect of independent variable on dependent variable.



Figure 2 (stem education. chemistry lesson in laboratory: dreamstime.com) [3]

II Laboratory experiments as TLM

It is structured environment. Learner explores a set of materials representing a given problem or situation. Learner experiments, observes & evaluates . Makes an attempt to apply theories in the real world situations. This is traditional method of teaching. LE establishes cause & effect relationship. In turn enables learner to make predictions about how dependent variable will act in future. Measures precisely the

Suggestions for designing lab

1. conceptual understanding
2. retention of content knowledge
3. scientific reasoning skills
4. laboratory manipulative skills
5. better attitude towards science
6. better understanding of the nature of science.

Table-3

Advantages	Disadvantages
Accuracy & precision	Lacks external validity
Isolation of variables	Learner is aware of both cause & effect – may change his behaviour
Controlled /Structured environment	May mislead the teacher
Allows elimination of effects of extraneous variables	Learner proves certain inferences
Extremely reliable & scientific	Difficult to generalize
	Ethical problem of harm to respondents
	Lack of informed consent



Figure 3 Milgram (1963) was interested in researching how far people would go in obeying an instruction if it involved harming another person. (Utahpeoplespost.com) Why People Are Easily Coerced When It Comes To Obeying Orders ^[4]

III TLM by Roleplay

Role-play is widely used as an educational method for learning about communication in medical education. It is very important that health professionals should have the ability to apply effective communication skills during their interaction with their patients. ^[5] Features of a role-play are 1. Understanding 2. Self-disclosure and trust 3. Respect 4. Truth telling and honesty 5. Empowerment and support 6. Reflective thoughts (2 .) Use the appropriate listening skills in order to understand patients' problems. Understanding is of vast importance in the context of therapeutic communication.



Figure 4(Giving effective feedback roleplay.: youtube.com) ^[5]

Role-play is used as a training method to acquire knowledge, attitudes and skills in a range of disciplines and with learners of

different ages (e.g. acquisition of language skills, ^[6,9] cross-cultural training. Van Ments (1989) defines role-play as: "... one particular type of simulation that focuses attention on the interaction of people with one another. The idea of role-play, in its simplest form, is that of asking someone to imagine that they are either themselves or another person in a particular situation. They are then asked to behave exactly as they feel that person would. As a result of doing this they, or the rest of the class, or both, will learn something about the person and/or situation." ^[8]

When interacting with patients, positive role models demonstrate respect for patients and intentionally use various behaviors, such as listening to patients, using eye contact, using touch, adjusting voice tone and altering the speed of speech (Molinuevo et al. 2011) ^[7] They provide time for patients to express their emotions and respond to them empathically (Weissmann et al. 2006). ^[6,11]

Table -4

Advantages	Disadvantages
It is social & communal	Sometimes uncomfortable
Prepares for real life situation	Sometimes not considered seriously
Indicates current skill level	

IV CASE STUDY AS TLM:

Case study is detailed analysis of a single person or group and it's relationship to a phenomenon. Case studies portray real life situations. Facilitate learning by participants with the help of trainer in the session and have open ended discussion. Merriam states that "...a case study is an examination of a specific phenomenon such as a program, an event, a person, a process, an institution or a social group" ^[9,18]

Table -5

Advantages	Disadvantages
Allows intensive study	Inability to replicate
Helps to develop new research	Researcher biased
Contradicts established theories	No clarity, No classification
Gives new insight : Case studies have the ability to give insight into phenomena that cannot be learned in any other way	Chance for errors is more regarding memory and judgement
Simplifies complex situations	Time consuming
Improves analytical thinking and communication	Difficult to find appropriate case to meet the situation; Insufficient information can lead to inappropriate results
Develops analytical and problem solving skills	May not be relevant to the situation and unethical

V Mastery learning(ML)

Proposed by Benjamin Bloom [12] in 1968. Learner must achieve a level (90% on knowledge test) of mastery in prerequisite knowledge before moving forward to learn subsequent information. If the learner does not acquire the knowledge he/she is given additional support in learning and tested again. In this method the focus is not on time required to achieve certain level of knowledge but on ability of learner to acquire the same. There is a shift in responsibilities from learner to instructor. ML group based / individualized promises to achieve a high level of understanding in a given domain if the learners are given enough time. The outcomes of ML could be 1. Cognitive outcome 2. Affective outcomes. In cognitive outcomes the learner increases excellence in a subject. Affective

outcomes in ML are related to the sense of self-efficacy & confidence in learners.

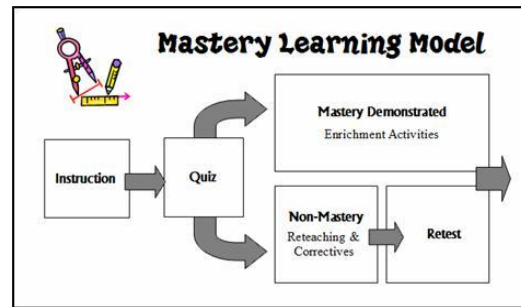


Figure 5(Mastery learning resources -lauracandler.com) [13] google mages

The phases of ML are :1.Planning for Mastery 2.Teaching for Mastery 3. Formative evaluation for diagnosing mastery 4.Mastery providing for differential teaching 5.Reevaluation & remedial work for mastery 6.Summative assessment & mastery for other learning units.

Table -6

Advantages	Disadvantages
Differentiates what is known & what to be learned	Long process
Prevents minor learning disabilities from accumulating	Single method of instruction can not be chosen
Learner has 2 nd chance to success	Time consuming
Breaks cycle of failure	

V Creative project Project based learning is a pedagogical strategy in which students produce a product related to a topic. The teacher sets goals for the learner & then allows the learner to explore & create their project. This is modern method of teaching. This method is based on philosophy of pragmatism and the principle is “Learning by Doing”. [14] The instructor acts as a “Facilitator”. The research project at undergraduate level should be viewed as a learning experience which will aid you in future projects allows learning in a supported environment. [17]

Blumenfeld & krajcki(2006) cite studies by Marx et al .,2004, Rivet & Krajcki, 2004 and William & Linn, 2003 state that “ research has demonstrated that students in project – based learning get higher scores than students in traditional classroom.”



Figure 6 (creativeandinnovativestuffs.blogspot.com) [15]

Table -7

Advantages	Disadvantages
Encourages investigative learning	Time consuming to plan & execute
Learner is actively involved	Financial constraints
Spirit of scientific enquiry	Systematic learning is not provided
Promotes practical aspects	Keeping track of cognitive skills is difficult
Enhances social skills	
Provides degree of freedom & psychological boost	
Encourages research	

VII Small group discussion Problem based learning (Walton & Matthews 1989) depends on small group teaching. Group leader is identified as tutor, moderator, instructor or facilitator is crucial agent. Here the participants interact in face to face situation. It differs from seminar which is teacher-centred & aims at specific topic.

Research has demonstrated that group discussion promotes greater synthesis and retention of materials. [15]



FLIPPED CLASSROOM –

Figure 7 (Behavior workshop old.ddp-cambodia.org) [16]

The concepts of small group are – Forming – formation of group by selecting members, Norming – Goals of discussion are listed, Storming - Individual opinions are expressed, Reforming - The sequence of decisions are aligned and Disbanding - Termination phase

Table - 8

Advantages	Disadvantages
Members acquire knowledge on subject	Domination by fellow participants /leader
Opportunity to express personalized ideas	Group work may be irrelevant
Receive instant feedback	May prove expensive
	Time consuming

VIII Tutorials

Small group learning is gaining attention as it has positive effect on motivation to learn, elaboration of knowledge and productivity. Tutorials is one such method. Allows students to develop interpersonal, presentation and communication skills which are useful lifelong skills. These generic skills are difficult to develop in isolation without multisource feedback from teachers, peers and self-assessment (Crosby & Hesketh, 2004). [19,20] More attention needs to be paid to individual students’ behaviour, personalities and difficulties (Edmunds & Brown, 2010). [21] In teaching students to interact professionally as part of a diverse and dynamic group, the group becomes effective when the participants adopt the various roles and responsibilities. [22]

IX Simulation

This has all characteristics like behavior, functions and abstract or physical properties. [10] Simulation can be used when the real system can not be engaged because it may not be accessible or may be dangerous or unacceptable. (Ex:Simulation of a case of Hysteria)



Figure 8 (ahn.mnsu.edu) [29] google images Types of simulation are – 1. Physical 2. Interactive 3. Continuous 4. Discrete event 5. Stochastic- Based on Monto carlo technique. 6. Deterministic 7. Hybrid 8. Stands-alone – Runs on a single work station 9. Parallel 10. Inter-operable

Clinical Healthcare simulators are being developed to teach therapeutic & diagnostic procedures. [23] Best method of simulation in medical field is developing & construction of skill-lab, where the learner can acquire knowledge and skill of life saving measures like cardio-pulmonary resuscitation, endotracheal intubation & so on. The need for a "uniform mechanism to educate, evaluate, and certify simulation instructors for the health care profession" was recognized by McGaghie et al. in their critical review of simulation-based medical education research. [24] In 2002, the Society for Simulation in Healthcare (SSH) was formed to become a leader in international interprofessional advances in the application of medical simulation in healthcare. [25]

X Self-directed learning (SDL)

Medical curriculum is expanding at such a rate that it is difficult to be covered in the 5^{1/2} yrs fixed time period. Heutagogy or SDL is the process in which the learners take the initiative with or without the help of others in determining their needs; formulating learning goals; and choosing and determining learning strategies. [26] SDL is the need of hour. “Learning to learn” is just not a phrase but it is an art.

Achievement goal (AG) motivates learners towards learning. AG is 2 types – Performance goals and Mastery goals. Performance goal is extrinsic motivation, helps competing with peers to get rewards and avoids punishment & embarrassment. Mastery goal is intrinsic motivation of learner.

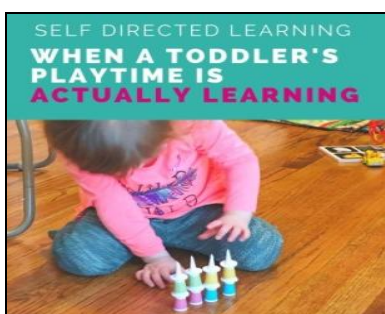


Figure 8(pinterest.com^[30] / Google images)

Self- Directed Learning Readiness Scale (SDLRS) was developed by Guglielmino, L.M.(1978) & improvised by Fischer in 2011.^[27] This is also known as Learning Preference Assessment (LPA) to avoid bias. It has 3 sections of questionnaire 1.Self management 2. Desire for learning 3.Self control.

Advantages are – teaches learner how to learn & what to learn, rooted in application of skills, broadens learners' ability to communicate and promotes creative problem-solving.

One of the sources of SDL is E-Learning. Content is delivered electronically & the learner uses virtual learning environment. It is also called web-base learning, computer based instruction or internet based learning.^[28] E-learning can be synchronous or asynchronous. In the synchronous type teacher & learner are physically separated. In asynchronous type the teacher prepares the courseware before start of curriculum. The advantage of e-learning is the learning modules allow learners to work at their own pace. E-learner is self-directed, self-motivated, self-regulating & life-long learner. Training of teachers under MCI national faculty development programme, conducted

through regional & nodal centres is making use of E-learning.^[22]



Figure 9(google images)

Disadvantage of SDL is it promotes trial & error and leads to failure & frustration

CONCLUSION

Different TMLs have application in educating medical students. But each individual TLM has advantages & disadvantages as described above. Hence, hybrid techniques may be designed to teach different topics in either basic sciences or clinical skills.

Conflict of interest: None

REFERENCES

1. Maloney S, Storr M, Paynter S, Morgan P, Ilic D. Investigating the efficacy of practical skill teaching: a pilot-study comparing three educational methods. *Adv Health Science Education Theory Practical*. 2012 Feb22
2. Lecture cum demonstration method of teaching power point presentation-slideshare.net ; By Roma Smart Joseph, Teacher Educator, Lucknow UP,India
3. Stem education. chemistry lesson in laboratory: dreamstime.com
4. Utahpeoplespost.com; Why People Are Easily Coerced When It Comes to Obeying Orders; Milgram experiment 1963.
5. Giving effective feedback roleplay.: youtube.com
6. Weissmann P, Branch W, Gracey C, Haidet P, Frankel R. 2006. Role modeling humanistic behavior: Learning bedside manner from the experts. *Acad Med* 81:661–667.
7. Molinuevo B, Escorihuela R, Fernandez-Teruel A, Tobena A, Torrubia R. 2011. How we train undergraduate medical

- students in decoding patients' nonverbal clues. *Med Teach* 33:804–807
8. Van Ments M: The Effective Use of Role Play: A Handbook for Teachers and Trainers. 1989, New York: Nichols Publishing, Steinert Y: Twelve tips for using role-plays in clinical teaching. *Medical Teacher*. 1993, 15 (4): 283-291.
 9. Merriam, S. B. (1988). Case study research in education. San Francisco: Jossey-Bass.
 10. Jones K: Simulations in Language Teaching. 1982, Cambridge University Press: Cambridge(Google Scholar)
 11. Steinert Y. Twelve tips for using role-plays in clinical teaching. *Medical Teacher*. 1993;15:283–291.
 12. Bloom BS. Time and learning. *Am Psychol*. 1974;29:682–688
 13. Mastery learning resources - lauracandler.com
 14. Mangal, SK (2012) Essentials of educational Technology. New Delhi: PHI Learning Private Limited
 15. creativeandinnovativestuffs.blogspot.com
 16. Behavior workshop old.ddp-cambodia.org
 17. James Barnard, Alison Ledger . Practical tips for undertaking a medical education research project at undergraduate level. Recommendations for both students and supervisors.(2016) www.mededpublish.org/manuscripts
DOI: <https://doi.org/10.15694/mep.2016.000027>
 18. Davis B. San Francisco, CA: Jossey-Bass Publishers; 1993. Tools for Teaching.
 19. Gade S, Chari S. Case-based learning in endocrine physiology: An approach toward self-directed learning and the development of soft skills in medical students. *Adv Physiol Educ*. 2013;37:356–60.
 20. Crosby JR & Hesketh EA. (2004). Developing teaching instinct: small group teaching. *Medical Teacher* 26:1: 2004, pp 16-19.
 21. Edmunds S & Brown G. (2010). Effective small group learning: AMEE guide No. 48. *Medical Teacher* 2010; 32: 715 – 726. <http://dx.doi.org/10.3109/0142159X.2010.505454>
 22. Medical Council of India. Vision. 2015. [Last accessed on 2012 Jan 07]. Available from:<http://www.mciindia.org/tools/announcement/MCI-booklet.pdf>
 23. Meller, G. (1997). "A Typology of Simulators for Medical Education". *Journal of Digital Imaging*. 10 (Suppl 1): 194–196
 24. McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ (2010). "A critical review of simulation-based medical education research: 2003–2009". *Medical Education*. 44 (1): 50–63
 25. Struijk, Jennie (2013-04-11). "Certified Healthcare Simulation Educator (CHSE) – an update for ASPE
 26. Knowles, M. (1975) Self-directed learning: A guide for learners and teachers, New York: Cambridge Books.
 27. Guglielmino, L. M. (1978). Development of the Self-Directed Learning Readiness Scale. (Doctoral dissertation, University of Georgia, 1977). *Dissertation Abstracts International*, 38, 6467A.
 28. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. *Acad Med*. 2006;81:207-12.
 29. ahn.mnsu.edu –Minnesota society of education
 30. pinterest.com

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