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Mini review

Need of Small Group Teaching and Hybrid Models in Medical Colleges to Combine Problem Based Learning (PBL) and Traditional Methods in Curriculum

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During the last five decades, new understanding has emerged from cognitive science research about the nature of learning. There has been more emphasis on teaching in small groups instead of traditional large group lectures. The introduction of problem based learning (PBL) is a paradigm shift in pedagogy from teaching to active learning[7]. There are few medical institutions in Pakistan which have incorporated PBL in the curriculum. The traditional teaching is still the main teaching methodology in large majority of medical colleges in Pakistan. It may not be possible for all medical institutions to adopt PBL curriculum as it needs allocation of space, huge financial and human resources for its implementation. At the same time keeping the traditional methods as the main teaching strategy will not satisfy and meet the needs of medical students. It is only about 5% which can be retained from what is taught even in the most charismatic and inspirational lecture. In prevailing circumstances there is need of hybrid curricula to combine the PBL and traditional methods. It is especially useful for those colleges that want to benefit from the advantages of PBL methodology but do not want a complete reform to switch to an entirely PBL-based curriculum.

Formats of small group teaching

Small group teaching can be arranged in different formats to cover a wide spectrum of learning activities in medical education. This inherent diversity of small group formats provides greater flexibility to tailor the nature of the learning activities and to achieve maximum learning experiences[1]. Small group teaching may take in forms of Problem based learning (PBL), Workshops, Seminars, tutorials, Clinical teaching (Ward based or OPD based), Clinical skill laboratory sessions, Case based learning and Support groups (Students, Teachers) [2].

Underlying philosophy of small group discussions

The underlying philosophy of SGDs lies in the theory of constructivism. The core competencies in medical graduates are achieved over the years of training and teaching through use of several teaching strategies. The underlying philosophy of modern learning, gives small group teaching in its different forms, a pivotal place in these strategies[3].

The best learning takes place by active participation of students in the learning activity. SGDs in its all forms promote active participation of students which leads to deep processing of new information, better cognitive abilities and improved long term memory and recall. It provides opportunities for use of prior knowledge, assessment of what is known and what are lacunae, and building knowledge from known to unknown[4].

Small group learning is the most rewarding at all stages of medical education from undergraduate beginner to post graduate training and as continued medical education throughout career as a professional. It enhances collaborative learning and facilitates transfer of knowledge between group members. It also leads to better teamwork, improved communication skills, responsibility for independent learning, sharing information, and respect for colleagues and their views[5].

Adult learning Principles fostered by SGDs

Fostering several principles of adult learning is embedded in different forms of SGDs[6].

1- Adults are self-directed learners; with maturity they develop the capability to identify their learning needs and ways to meet them.
   SGD provides stimuli for self-directed learning in PBL, focussed group discussions and case study formats.
2- Adults have previous experience and knowledge. It enhances new learning and provides a solid foundation for learning new knowledge and skills. SGD in all formats effectively utilizes previous knowledge and paves the way for acquisition of new knowledge.
3- Adults are more inclined to learn which is related to their social responsibilities. They value learning which is helpful in daily life. SGD in formats of PBL, ward, OPD and case based learning helps to accomplish knowledge and skills useful in daily life.

4- Adults give more value to the application of knowledge. They are more interested in problem centred than subject centred learning. They value learning with practical applications to solve problems in daily life. SGD in the format of worked base learning helps to achieve these goals.
5- Adult learning is derived by internal factors. The motivation for leaning lies in personal ambitions and internal desire for excellence in profession. There is little influence of external factors like incentives and rewards. This motivation is kept alive while working and learning in small groups with self-satisfaction, a sense of achievement and desire for more knowledge.

Comparison of Problem Based Learning (PBL) with Guided learning (traditional teaching)

The introduction of PBL is a paradigm shift in pedagogy from teaching to active learning[7]. PLB was introduced due to dissatisfaction with the traditional teaching. Since its introduction an academic debate is going on which is more superior. Both supporter and critics have arguments in their favour, rightly so because both strategies have merits and demerits.

Current epistemology suggests that learning is an individual process and each learner organizes information differently. There is emphasis on construction of knowledge instead of passive recording of information conveyed by others. Self organised meaningful information in this manner is more likely to be retained, learned, and used. Problem-based learning facilitates all these aspects of learning process. In PBL, teacher acts only to facilitate and student takes responsibility of learning, creates meaning and constructs his own knowledge[8].

While in guided learning students are provided with full guidance and explanation of all the concepts and procedures which they are going to learn with the help of a suitable learning strategy. The underlying rationale of this theory is that instead of leaving novice learner to discover concepts and procedures by himself he should be provided with direct instructional guidance. There is solid academic research support to favour that novice learns better when provided with appropriate direct guidance[9]. It is also true for novel information; students should be fully explained *what to do* and *how to do* it. While engaged in learning complex tasks with minimum or no guidance students may become lost and feel frustration, with no instant remedy of confusion due to inadequate and immediate feedback, misconceptions are common. In these learning situation false starts are common, hence unguided instruction strategy is inefficient. There is strong evidence in support of improved and deep learning in the presence of guidance as compared with self-discovery.

On the other hand, self-creation of meaning, generating questions and finding answers to queries, student centered and self-directed learning are the hallmarks of PBL. The leading proponents of PBL justify their stance of this type of training and learning with understanding, while focusing on the meaning which student will carry to his future professional life.

In a recent review Henk G Schmidt and colleagues concluded "*there is considerable support for the idea that PBL works because it encourages the activation of prior knowledge in the small-group setting and provides opportunities for elaboration on that knowledge. These activities facilitate the comprehension of new information related to the problem and enhance its long-term memorability. In addition, there is evidence that problems arouse situational interest that drives learning*[10]".

The same argument was contested by opponents. In counter arguments Paul F. Shanley argued that medicine is not the subject left for self-teaching of novices especially at undergraduate level[11]. He further argued that prerequisite for self-directed learning is a certain level of maturity and knowledge of the subject. Useful learning is not possible if a student is unable to create a pertinent question. It is even more frustrating if there is no knowledge whether self-found answer is sufficient to a particular query. He further argued that we should now leave the "empty glass" of problem based learning behind.

Mark Albanese supported the same theoretical basis of PBL and its superiority in relation to other learning theories. He argued importance of contextual learning and its practical implication in professional life. In PBL problem is presented in real life scenarios and whatever students learn here has practical implications[12]. There were two classical reviews on effectiveness of PBLs after 15-20 year of experience in 1993 by Albanese and Mitchell[13], and Vernon and Blake[14]. Albanese and Mitchell concluded that PBL in comparison with conventional instruction is more nurturing and enjoyable, PBL students are better in clinical skills and faculty enjoys teaching PBLs. Vernon and Blake in their meta-analysis also found support for superiority of the PBL approach over more traditional methods.

The rapid globalization of PBL and student-centered teaching methods during the last three decades is a vivid and undeniable evidence of their efficacy and acceptance by new generation of educationist as well as students.

Jerry A. Colliver[15] (2000) and Paul A. Kirschner[16] (2006) again challenged the popularity and effectiveness of PBL. For the "over sold" concept of PBL, Colliver concluded that there was "*no convincing evidence that PBL improves knowledge base and clinical performance, at least not of the magnitude that would be expected given the extensive resources required for the operation of a PBL curriculum*[17]." While Paul A. Kirschner and colleagues gone even beyond, with the note that there was "*overwhelming and unambiguous evidence that minimal guidance during instruction is significantly less effective and efficient….*"

The cognitive load theory also favours direct instruction learning over self-discovery. When novice learners are left to explore tiny specific islands from the vast oceans of complex knowledge, frequently they are lost in it. A heavy working memory load, with little previous knowledge to make useful connections and no schema to activate impedes learning. In contrast guided learning has been found superior in fostering both short and long term memory and problems solving skills[18].

The counter argument from proponents of PBL again lies in its basic underlying philosophy of constructivism[19]. In constructivist tenet: Learner constructs his own knowledge and Learning is collaborative and there is important role of social interaction in process of learning, it is contextual and meaningful tasks are necessary for learning. In response to Colliver,s analysis Mark Albanese concluded his argument "*that PBL graduates are more likely to seek affiliation….. that students and faculty enjoy PBL more than traditional teaching methods. I conclude by arguing that even if knowledge acquisition and clinical skills are not improved by PBL, enhancing the work environment for students and faculty is a worthwhile goal in and of itself*[20]".

In every decade over the last 40 years there was a major review in support of PBL and guided learning. Here is brief summary and comparison of different argument:

Problem Based Learning	Guided learning(traditional teaching)
Introduced due to dissatisfaction with efficacy of traditional learning and Based on principles of constructivism	History and experience of centuries, proponents continue to resist change in the form of PBL Based on behaviourism
Self-directed learning is deep and life-long learning.	Learning in medicine cannot be left for self-teaching. Students need guidance.
Construction of knowledge on previous knowledge: creating meaning by asking questions and finding pertinent answers.	False starts are common and novices often lost in vast ocean of knowledge in the absence of guidance. Better performance with guided learning.
Problem solving skills and attitudes; students carry in professional life.	Manufactured artificial scenarios and problems by faculty. Questionable transition to real. Guided learning saves time, while large time consumed in problem solving activities without much learning.
Globalisation of PBL, worldwide acceptability by educationists and medical institutions is a self-speaking proof of its efficacy.	The idea of PBL was "over sold" by its proponents. Walk away from the "empty glass of PBL"
Advantages of learning in small groups.	No convincing improvement in knowledge base and clinical performance, given the extensive resources required for the operation of a PBL curriculum
Students and faculty enjoy PBL more than traditional teaching methods.	More useful for broad overviews, summaries and difficult topics.
Students are better at "diagnosis" as they are better equipped with clinical application skills.	Guided learning is better for teaching basic and non-clinical subjects.

Recommendations for Medical Colleges

The main teaching strategy in most medical colleges of Pakistan is traditional. There are large group lectures for 100 or more students in one lecture hall. It is easy to implement and minimum resources are required. What students are gaining from it especially when these sorts of lectures are now available on internet? There is need of time to move from teaching to learning of students. It will be difficult and resource demanding but there is need for teaching in small groups of 6-8 students. We recommend incorporations of small group teaching and PBL in all medical colleges of Pakistan. It has advantages of interaction in small groups with peers, listening and giving value

and consideration to their views, art of telling own point of view, arriving at consensus out of controversies, critical thinking, brain storming and ultimately becoming more confident, a habit of self-directed learning and knowledge construction with understanding of core ideas, improved diagnostic and clinical skills and gaining core competencies of a competent professional.

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