

THE USE OF CONCEPT MAPS AND PROPOSITIONS TO PROMOTE DEEP LEARNING

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ABSTRACT

Studies have shown that the use of concept mapping and developing suitable schemata help in promoting deep learning. The schemata adopted in classrooms has helped in promoting students' approach towards deep learning to digest the knowledge, which has been transformed for better outcome. Relatively difficult and more complex topics can best be explained taking support of metaphors and suitable schemata. Experiential sharing is communicated here that the uses of suitable metaphorical references have helped students by making them strategic and deep learners taking verbal feedback from students.

KEY WORDS: Concept mapping, deep learning, better learning outcomes, calcium channel blockers, medical education.

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INTRODUCTION

The students are nowadays overburdened with exponential information mainly available through internet. It is difficult for them to decide what information is to be stored and retained in their long term memory. Hence the role of teachers is very dynamic in promoting deep learning as good teachers facilitate students' learning.¹ Nevertheless, it is not easy as setting of the classrooms does affect the learning process particularly if one keeps in mind the narrative that learning is either "student centered" or "teacher centered".² Similarly, the types of learners like aural learners or visual learners also determine the nature of selecting suitable instructional strategy.^{3,4} Thus in the given set of large classrooms (100 students) we usually adopt following strategies.

Often so many times, as head of the department, I have personally probed students for their less attentiveness and subsequent absenteeism from the class room, where the answer was very repulsive that most of the students merely used to come for formal attendance requirements. Their learning is self-directed where they used to take the support of either notes of other teachers' or merely read the previous exam papers and prepare themselves accordingly. Here, persuasions play a vital role in setting the learning trends for learners. Persuasions are mainly based on the nature of interaction between the teachers and students. Hence a teacher becomes problem solver for students rather than their learning facilitator. This can be achieved through promoting interaction even outside the class room. Thus to promote the culture of problem solving, teachers must

profile their students according to their strength, achievements and affiliation.⁵ This is more focused on personality of students (learners). This necessitates for precisely profiling of the target audience personality as well.

So far three basic approaches (surface, deep and strategic) have been proved to have different learning outcomes.^{1,6} The concept of active and reflective learning should also determine our strategies to promote deep learning. Deep learning can be promoted by using suitable concept as it helps in transforming knowledge, preferably in suitable language to digest, with simultaneous use of metaphors.^{7,2} Even conceptualized framework has helped in mapping for better learning outcomes.^{1,8} So is the quality of teaching and method of assessment that encourage students to look for deep levels of meaning.^{9,1} In a classroom of about 100 students, it would be better to provide them basic information/knowledge about calcium channel blockers. This shall be followed by classification of the calcium channel blockers either based on the chemical structures or on their site of actions. As per verbal feed-

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back, classification based on sites of action is more preferred by learners as it has helped the learners in application of knowledge in different clinical conditions. More, it has been difficult for the learners to remember classification based on chemical structures. To promote deep learning, therefore, the concept of schematic learning may be approached. In an attempt for learners' preferred schemata is adopted in Table 1, which shares the key information at a glance:

The students would be guided efficiently to transform the knowledge/information tabulated in Table 1, keeping in view different possible scenarios where they may come across while setting in OPDs / Clinical setup. Like the use of calcium channel blockers may be effective while referring to following schemata or elaboration as well:

B.P = Peripheral Resistance X Cardiac Output
 B.P = Peripheral Resistance X Heart Rate X Stroke Volume

In order to help the learners to remember and differentiate between the calcium channel blockers that act on the heart and blood vessels, the concept of propositions may be

used. Like uncommon between the common (that all calcium channel blockers act on the blood vessels to dilate) is:

1. Verapamil implies for "very much acts on the heart" or relate verapamil with "V" that refers to ventricle and more precisely saying "it's more effect on the heart".
2. Diltiazem is referred to "Dil (in Urdu language)" or "diastole" in (English) as it may be attributed to its predominant actions on the heart.

As active learners, contrary to reflective learners, tend to work in group, hence, task(s) at the end of lecture (based on the contents being taught) may be given to promote active learning. This can be achieved using the support of task based learning strategy too. Hence selection of suitable strategy is critical in information transfer.

Another important aspect which promotes learning is assessment. Likely the students may be asked at the end of presentation or class lecture to accomplish assignment(s)/ tasks at their homes or campus based on following schemata listed in table 2:

This will promote deep learning and make them conditionally active learners (high involvement conditional learning) rather than to be reflective learners who like to work alone.¹¹ In addition this directed self-learning has proved to improve the students' learning as well.

While at the end of lecturing at level of high cognitive domains, students tend to draw conclusions from the topic that been taught. Last 30 - 60 seconds outlines about assessment have worked tremendously to make them strategic and deep learners. For example, hints about assessment (more precisely programmatic assessment nowadays) may be shared keeping view the lecture delivered in the respective contact hour and the use of conceptualization framework; and schemata being adopted have proved to make them more enthusiastic and deep learners (Figure 1).

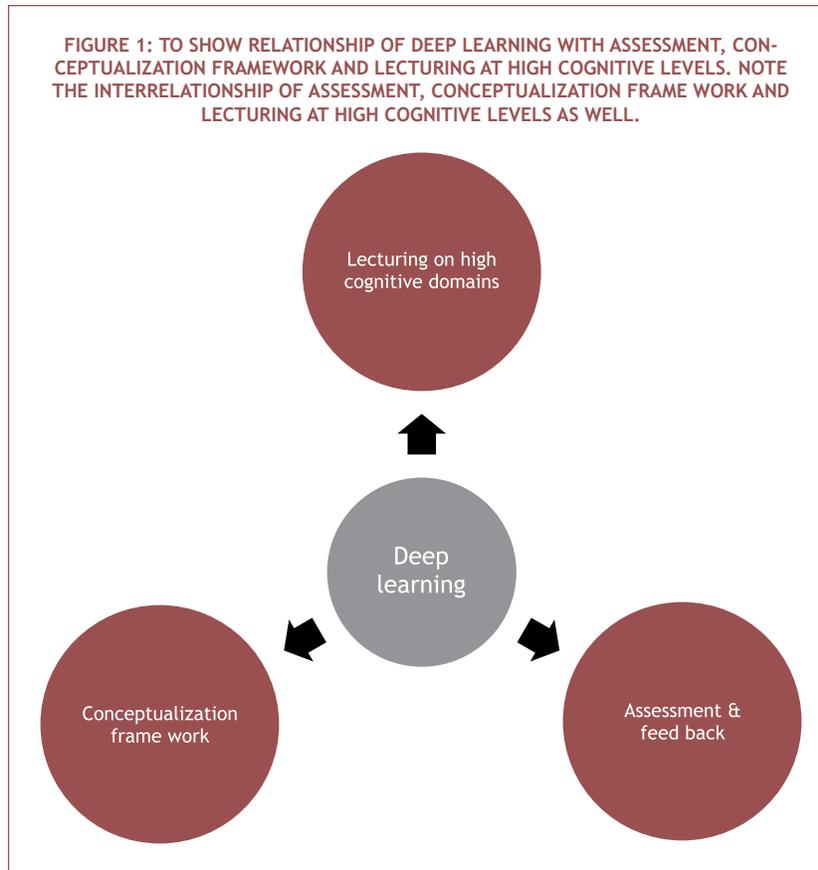
As tutors, we must know that the strength of learning is enhanced by six factors: importance, message involvement, mood, reinforcement, repetition and dual coding.¹² Hence, the concept of repetition, reinforcement and dual coding shall be ap-

TABLE 1: A SCHEMATIC ILLUSTRATION OF CALCIUM CHANNEL BLOCKERS TO SHOW ITS PHARMACOLOGICAL ACTIONS AND THEIR RELATIVE EFFECTS ON SITES OF ACTIONS¹⁰

Drugs	Dilation of blood vessels	Suppression of cardiac contractility	Suppression of SA nodal automaticity	Suppression of AV nodal conductivity
Diltiazem	3	2	5	4
Verapamil	4	4	5	5
Nicardipine	5	0	1	0
Nifedipine	5	1	1	0
Nimodipine	5	1	1	0

TABLE 2: TO REPRESENT PHARMACOLOGICAL PROFILE OF CALCIUM CHANNEL BLOCKERS

Drugs	indications	Recommended doses	Time required to get maximum concentration in blood (Tmax).	Plasma half life	Adverse drug reactions
Diltiazem					
Verapamil					
Nicardipine					
Nifedipine					
Nimodipine					



plied practically in the class room as well.

As stated earlier, students should be informed about assessment and ways of assessments to be adopted as well. Even during lecturing, they may be informed that questions (whether multiple choice questions, short answered questions or long answered questions) may be set likely in the manner as discussed during class no matter what suitable learning strategies have been adopted for mode of information transfer. This will direct their self-learning as well. This will help learners to read how much? And which information / knowledge are important for them or otherwise. Guide for further reading also determine their reading behaviors as reading is one of the components that promote deep learning as well. However, care shall be taken in mind that learners can assimilate the information being provided. The importance of prior knowledge and

recall will help in learning and building new concepts. This will keep the tutor to the topic and relevancy shall be maintained to avoid the unnecessary information overload.^{11,13,14}

Having said that, for difficult topic to remember, schemata, concept mapping and the use of propositions will work where retrieval of prior knowledge is easy that can help the learners to solve the scenarios or the task being assigned thereafter. This will promote constructivism of the topic contents in a meaningful manner for development of different clusters (data points) that may help in application of their knowledge, comprehension for synthesis and evaluation in different clinical scenarios in near future.

For example, knowledge imparted on schemata mentioned in Table 1 and subsequent task assigned in Table 2 can be applied in two different cases.

Case 1: A 50 years male, with

no other concomitant ailments except asthma, is reported in the OPD with isolated systolic hypertension BP=150 mm Hg. He is suffering from mild bilateral headache. Ruling out all other possible causes of headache, you are of the opinion that the patient is hypertensive and requires treatment. Assuming normal ECG reports, if you have been asked to select a suitable drug from Table 1, what shall be your choice? Justify your answer while referring to its pharmacological actions not more than in three sentences?

Case 2: if the same patient (mentioned in above in case 1) with similar isolated systolic hypertension BP=150 mmHg is reported for an ectopic beat, what drug will you advise from Table 1 assuming that the patient is not asthmatic? No signs and symptoms of congestive heart failure are there. Your logical statements should not be more than three lines?

NOTES ON CONTRIBUTORS

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CONFLICT OF INTEREST

None.

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