Questioning Techniques in Class Room Ambience

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Introduction

Questioning, thinking and understanding – these three dynamic activities in a class room facilitate student learning and performance in his / her career. Learning takes place when the students are engaged in doing an activity or thinking about a specific aspect of the subject matter. Quality questioning by a teacher in the class stimulates and supports student thinking process which encourages them to actively participate in the class and develop a deep understanding of concepts. Questions form a part of an on – going dialogue between a teacher and student that promotes his / her learning; learning is also termed as a process of opening the mind of a student to new concepts, ideas and knowledge. Socrates points out that "teaching is the art of asking questions – questions are the vehicles of thoughts" Through effective questioning skills, a teacher can kindle the curiosity to know in the minds of students, which is the need of the hour in the teaching – learning process. Research has acknowledged "questioning" as an important, core function of both learning and teaching with less emphasis on mere memorization of facts and details (Perkins, 1992; Hankins, 1995; and Wells, 2001). This article presents same salient aspects of effective questioning skills that each teacher is expected to understand and apply in a class room environment; it will transform the class room into a student – centered one with avenues for active, shared learning and understanding by the student.

What are the Purposes of Teacher's Classroom Questions?

A variety of benefits emerge from analysis of literature, including the following:

- Facilitates students to think and learn
- Increases students class room participation
- Makes them infer and draw conclusions
- Challenge their beliefs and learn new ideas
- Increase the effectiveness of class room instructions
- Stimulate students to become independent life – long learners
- Facilitates the learning of the art of professional behavior; it becomes a blue - print for their career

Definition of question

A question is an expression of inquiry that invites or calls for a reply. The questions under discussion in this article are instructional clues or stimuli that provide directions to the students in a class room ambience, in order to facilitate the understanding of concepts and apply them in practical situations.

Closed – ended and open ended questions

A closed – ended question (sometimes referred to as a lower order questions) aims at finding out a particular answer to a situation. They facilitate 'student recalling from memory' the learnt facts. For example, "What is the capital of India?" is a typical closed – ended question with a single specific answer. Such questions do not encourage reflective dialogue or creative thinking by students and hence they do not permit students to express their ideas and thought processes, freely to the teacher. Therefore, they are termed as lower order questions. Generally, closed – ended questions start with What / Where / When / Who is, which deal with factual information.

Majority of questions (nearly 90%) by teachers in the class room fall into this category. They test the knowledge and comprehension of the subject matter by students i.e. the lower levels of Blooms taxonomy. On the other hand, open – ended questions (higher – order questions) test the analysis, evaluation and synthesis skill – set of students. For example, "Describe how one experiences hurt and who is the main charter behind the hurt?"

These are thought provoking questions, generally starting with why / how / what do?

Such open – ended questions elicit brainstorm solutions, critical thinking by students; they involve authentic reflection by students based on their previous experiences, followed by a discussion. Open – ended question is considered as a powerful tool to maximize students engagement in a class and it facilitates innovative thinking. In view of the above, open – ended questions are perceived as higher – order questions. It is observed that teachers generally use marginal number of open – ended questions (~10%); however, effective teachers use both closed – ended and open – ended questions in a balanced manner, depending on the nature of the subject

Learning outcomes pertaining to a particular lesson plan are to be kept in mind by the teachers while formulating different types of questions. Encouraging students to formulate their own questions is another technique, followed by experienced teachers for effective student engagement.

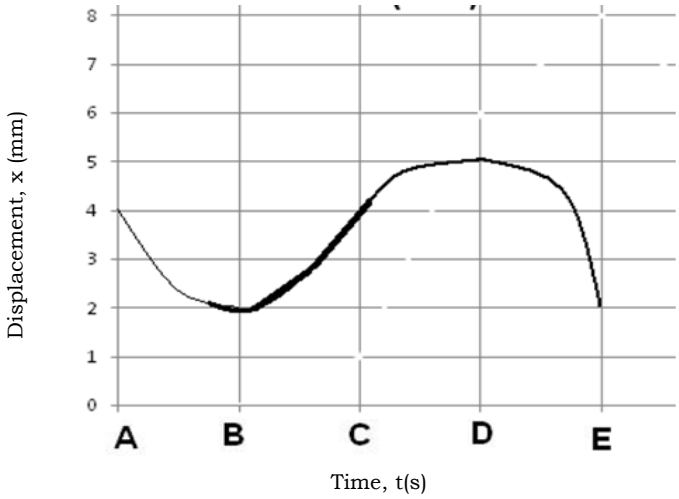
Metacognition

Metacognition i.e. an individual's ability to stand back and be aware of one's own patterns of thought process it is a powerful practice for adolescent students to gain emotional maturity. Open – ended questioning technique can be expected to promote metacognition, in due course of time.

Why teachers ask questions?

It is reported in literature, that posing oral questions during classroom lectures are highly effective in fostering learning by students; written questions in examinations may favor short term memory and at times, they are not from a deeper understanding of fundamentals. Students attention can be made to focus on typical important elements in a lesson by the questioning process; hence, it ensures better comprehension by the student

A typical mathematics question given below will illustrate the above aspect.



The above graph shows the variation of displacement (x) of an object with respect to time (t). The object will experience maximum velocity at the point

I. A
II. B
III. C
IV. D
V. E

The answer for the above question is the alternative 'C' as its location corresponds to maximum slope of the displacement curve with respect to time, the slope being the velocity

Another typical question that will promote critical thinking by students is provided below:

The solid mass of the log of wood is primarily contributed from

I. Sunlight
II. Water
III. Minerals
IV. Air

In this case, the alternative 'Air' provides the correct answer as the solid matter comes from 'C' – carbon whose source is CO_2 – carbon dioxide of air.

Photosynthesis can be represented using a chemical equation
The overall balanced equation is…

$$6CO_2 + 6H_2O \xrightarrow{\text{Sunlight}} C_6H_{12}O_6 + 6O_2$$

Where:

CO_2 = carbon dioxide; H_2O = water; $C_6H_{12}O_6$ = glucose; O_2 = oxygen

Besides an important reason ask teachers ask questions during why classroom sessions, is that, it provides immediate feedback to him / her about the topic of discussion. In addition, questioning can also be employed by the teacher to reinforce the concepts already covered.

Wait – time

Studies in questioning strategies reveal, that a teacher who poses a question to the student in the class room ambience must pause for a while, so that the students can organize his thoughts in his / her mind, from previous experience / study and get ready to communicate the same. Such a pause is important and it is termed as wait – time. The guidelines for pause / delay time that the teachers are expected to provide to the students in class room ambience are listed below

- For closed – ended questions, a wait – time of three seconds is recommended
- For open – ended questions, a generous wait – time beyond three seconds is desirable; it depends on the nature of question and the maturity level of the audience.

Redirecting/Probing Questions

When the answers given by the students, in response to a question are incomplete, the teacher is expected to provide typical clues, direction to the students that would encourage them to come up with the complete / correct response. A sample of probing questions is provided below:

- Can you be more specific?
- Does it always apply?
- What makes you think that?
- Can you comment on his/her idea?
- Tell me more?

Guidelines for Effective Questioning

Based on the studies reported in literature, the following guidelines are offered for effective questioning:

- Create an inviting ambience for answering questions (details presented in the next section)
- Talk to students about the value of questioning
- Rearrange classes to suit questioning and learning ambience
- Make time for questions (faculty to plan the same)
- Carefully prepared higher – order questions are desirable
- Analysis and practical application questions are the need of the hour
- Give an example and explain the rationale
- Use visual and auditory perceptions to reinforce
- Experiential learning is another powerful tool that can be explored in laboratories
- Hands – on – learning in laboratories with appropriate questions to be answered at the end
- Cooperative learning with the help of students
- Give timely feedback
- Ensure that the questions and correct answers are heard by all
- Help the students to make inferences and draw conclusions
- Ask for a set of questions to be answered in the next class

Questioning Ambience

Studies also suggest typical nature of the class room set up which will improve the effectiveness of questioning by faculty and some of them are provided below:

- Presence of a question board in the class where the students will pose their questions
- Effective handling of incorrect answers by the student is the key to the success of the questioning techniques
- Redirecting, providing clues, probing & reinforcing techniques will sustain the enthusiasm of the students during questioning
- Genuine appreciation for the students will also be a motivating factor in this approach
- Efforts are to be made by the teacher to increase the number of open – ended questions

Challenges in the Questioning Strategy

While implementing the questioning approach, there could be a few practical difficulties; some of them are highlighted below:

Student's perspective

Challenges -

The following ideas in the minds of the students can serve as a road–block towards the implementation of the questioning approach in classes

- Those who do not know the answers, they tend to perceive themselves as failures
- There is fear of being seen as silly before their peers (- use of clickers can overcome the above difficulty)
- Securing marks in written examinations is the primary goal of students – viva voce examinations in laboratories theory classes can be employed to test the understanding of students
- Overwhelming expectations from students

Above issues are to be handled through proper counseling of students

Teacher's perspective

Challenges -

The undermetioned perceptions/notions in the minds of teachers can also affect the successful implementation of the above approach in classes – these need to be overcome by proper counseling of faculty

- Mind set of faculty
- Pressure to cover the syllabus
- Time to explore questions (lack of proper time – management technique)
- Not wanting to embarrass students

Other common traps in the implementation of questioning strategies are:

- Asking questions to those 6 – 8 dominating students who connect well with the teacher – high achievers/volunteers
- Statements that make the students feel inferior
- Pretending to be curious (students)
- Risk of unexpected answers (for faculty)
- Imagination by teachers that they will lose control of class

Periodic faculty training and frequent monitoring of faculty by seniors will certainly help in overcoming most of the above issues

Conclusions

This article outlined the importance of questioning in teaching – learning ambience in class room, in order to promote critical thinking skill among students. Various types of questions and the relative importance of each one of them in promoting understanding of concepts were also discussed; typical class room ambience well set, for the questioning approach and the challenges that the teachers are likely to face in implementing the above were enumerated and possible solutions were also indicated. A glossary of questions prepared in accordance with the six levels of Bloom's Taxonomy pertaining to the topic of questioning presented in this article listed in Appendix I is expected to facilitate teachers in formulating their questions in related subject areas.

Major references

1. Perkins, D.(1992). "Smart Schools: from Training Memories to Educating Minds". Free Press: New York
2. Hunkins, F.P.(1995). "Teaching, Questioning, and Learning". Rutledge: London
3. Wells, G. (2001). "The Case for Dialogic Inquiry - Learning and Teaching Through Inquiry" (pp. 171-194). Teachers College Press: New York
4. Bloom,B.S (ed.), (1956.) "Taxonomy of Educational Objectives: the Classification of Educational Goals, Handbook I: Cognitive Domain." New York: David McKay Company, Inc. New York
5. Jackie Acree Walsh and Beth Dankert Sattes (2004) "Quality Questioning" Corwin Publishers: London

Appendix I – Typical questions based on Bloom's Taxonomy in the area of "Questioning strategies"

Remember – a fact

- How many seconds of wait – time is recommended for lower – order questions in class?
- Specify a teaching – learning technology tool that facilitates anonymous answering of questions?
- State the definition of "teaching" as given by Socrates
- What are the causes for diabeties?

Understanding – or describe something

- Distinguish between open – ended and close – ended questions
- Write in your own words about any one of the difficulties that you foresee in implementing effective questioning system.
- Can you provide an example of higher – order question?
- Differentiate between the symptoms of appendicitis and kidney stone?
- Why is regular exercise prescribed for people above a particular age?

Apply – Knowledge to solve a problem

- What would be the benefit of your encouraging "the hands–on–training", to students in specialized labs?
- What application question will you ask the teacher, while he/she is teaching 2nd order Linear Differential Equation?
- How to apply effective questioning methodology in lab classes/industry visits/clinical situations?

Analyze – information to solve a problem

- What was the underlying theme of traditional model of class room teaching? Compare with that of the thoughtful class room.
- Why students trained through effective questioning methods will become lifelong learners?
- How is the topic presented in this session, similar to that prevailed in the teaching-learning ambience of Upanishads?
- Why a patient generally hesitates to take a decision in favour of surgery?
- How does the student feedback about faculty, relate to the performance of students in a course?

Evaluate – an idea or opinion

- Which of the two techniques that your were exposed to in this article, would you like to practice and why?
- What changes do you propose in the existing evaluation system to derive full benefit of "quality questioning class" - approach and why?
- What do you think about the way a particular patient was handled in the hospital?
- How do you justify the planned expenditure to your boss?

Create – a plan or solution

- Develop a mind map of quality questioning class room.
- Design a questionaire to categorize the questions into six categories of Bloom's taxonomy, for a particular topic of your lecture class.
- If you were consulted on a particular case, (in the hospital) what would be your recommendations?