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Effective questioning strategy: mandates of research for teachers and teacher educators

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Right from the days when our Rishis discussed the difficult and abstruse questions of metaphysical &ontological nature and the period when Socrates the inimitable and uncompromising philosopher-cum-pedagogue developed his questioning model, the pedagogy has benefitted immensely by utilization of questioning technique as a promoter of reflective thinking. As the progressive education movement in the 19th century brought the mandate of natural inquiry to be the watch word of educators this technique has been further sophisticated. Over about hundred years during the regime of behaviourists an intense concern got accentuated for sharpening the techniques of questioning as an important tool in structuring and designing a stimulus-response pattern of behaviour. Recently, the constructivist paradigm in learning has asserted the supremacy of inquiry based investigative and discovery learning by placing emphasis on construction rather than instruction through a dynamic process of Simultaneous Mutual Interchange (SMI).

The present article is set forth in the above frame of reference in order to highlight the need for emphasizing questioning technique drawing support from the research evidences. Questioning is a heavily used and a widely researched teaching strategy. Research indicates that asking questions is second only to lecturing. Teachers typically spend anywhere from 35 to 50 percent of their instructional time asking questions. But are these questions effective in raising students' achievement? How can current educational research inform practice? There is ample research evidence to reinforce the contention that effective teaching presupposes the use of effective questioning techniques. Researches have proved that instruction involving question is more effective than instruction without questions. Very recently questioning has been identified as one of the nine research based effective strategies employed in classroom Instruction that works (Marzano Pickering &Pollich, 2001).

CYCLE OF QUESTIONS

In a bid to focus on the viable and dynamic character of instruction Esther Frosco & Lawrence F. Lowey (2012) have laid bare a step by step approach to engage thinking and they have dwelt upon effective questioning techniques in the classroom as evident from the researches undertaken in this domain. They have

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indicated a circular pattern perceived at the operational level of this strategy by deciphering a questioning cycle which consists of eight components as follows:

- Establishing lesson goals & guiding questions.
- Planning the questions.
- Asking the questions.
- Allowing wait time.
- Listening to the students' response.
- Assessing the students' response.
- Following up the students' response with another question.
- Re-planning based on students' responses.

Subsequent to this enunciation they have also illustrated the steps involved in questioning cycle which has been depicted through a diagram as follows:

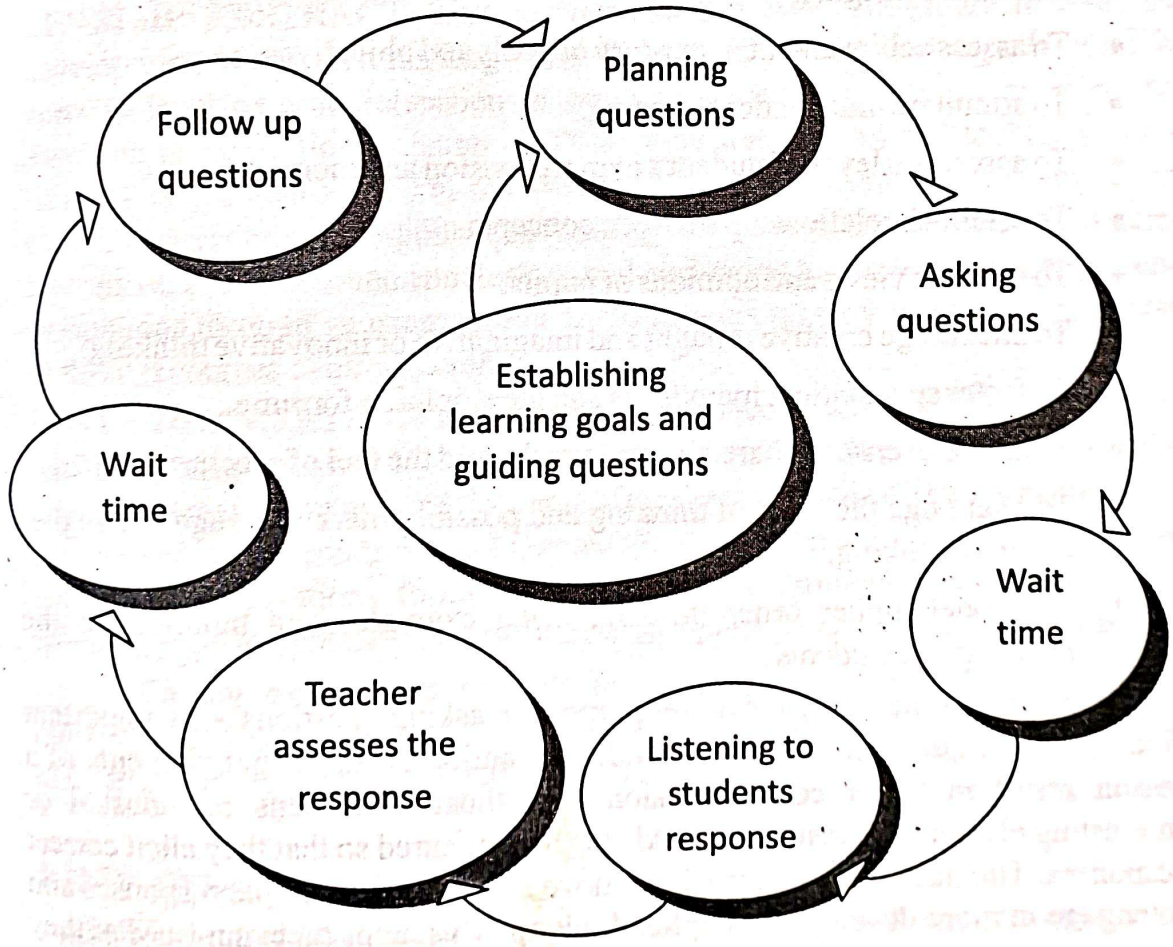

DIAGRAM: QUESTIONING CYCLE

From the diagram it is apparent that for effective questioning planning is very important. This is followed by asking questions to the participants (students) with wait time which implies the brief interval of two-three seconds allowed to students for giving answers. This further leads to listening to students' response and assessment of the correctness or otherwise of the response with a wait time and follow up questions. In using this cycle various purposes and intents may be manifest. The most obvious ones are listed as follows:

- To actively involve students in the lesson.
- To increase motivation or interest.
- To evaluate students preparation.
- To check on completion of work.
- To develop critical thinking skills.
- To review previous lessons.
- To nurture insights.
- To assess achievement or mastery of goals and objectives.
- To stimulate independent learning.
- To assess the level of student's comprehension and memory.
- To establish relationship between concepts.
- To seek the views and opinions of pupils.
- To encourage creative thought and imaginative or innovative thinking.
- To foster speculation, hypothesis and idea/ opinion forming.
- To create a sense of shared learning and avoid the feel of a lecture.
- To challenge the level of thinking and possibly mark a change to a higher order of thinking.
- To model higher order thinking using examples and building on the responses of students.

A teacher may vary his or her purpose in asking questions. One important finding is that questions that focus student attention on important elements of a lesson result in better comprehension than those that focus on unusual or interesting elements. Questions should also be structured so that they elicit correct responses. The question helps teachers move students from simple responses and to engage in more developed complex thinking. This helps them apply what they

understand to bridge learning from other times and different situations, to think more actively in lessons and learn from each other's answers.

LEVELS OF QUESTIONS

In the light of various purposes pointed out in the previous section it will be in fitness of things to understand that questioning and questions may be structured at various levels of cognitive thinking. Richard L. Carner (2011) has proposed three levels of questioning such as level I- Concrete, Level-II Abstract and level-III Creative.

LEVEL-I: CONCRETE- At this level the questions usually elicit responses which are characteristic of concrete thinking. In such questions the primary concern is for observable, tangible and obtainable details. In this level of questioning one is dealing with relatively simple ideas, objects, processes or concepts which most often do not require evaluation, judgement or drawing conclusions. Carner suggests that such questions should not be misunderstood as ineffective means to assess understanding. According to him there are many occasions when specific, concrete answers are desirable and necessary.

LEVEL-II: ABSTRACT- The questions at this level contribute towards the development of abstract thinking skills. The pupils are required to go beyond the specific level of comprehension in order to generalize, classify or relate the specifics into meaningful patterns. These questions are related to 'HOWS' and 'WHYS' of problem as well as the 'WHATS'. Level II questions according to him also aid perceiving relationships, sensing continuity and sequence, making inferences, drawing sound conclusions and evaluating the facts, events, arguments or opinions through an examination of his reasoning or by making comparisons with other sources of information.

LEVEL III: CREATIVE- The questions presented at this level require answers which are most creative by nature and may demand both concrete and abstract thinking. It may be mentioned that most of the researches have delineated the major characteristics of creative thinking as reorganization of concepts into novel patterns. The questions formulated at this level stimulate divergent thinking enabling pupil to hypothesize new or different applications or principles learned.

Carner asserts that creative thought processes triggered up through questions at this level characterize the heart of scientific inquiry and must be encouraged from the beginning of formal education.

KINDS OF QUESTIONS

In the educational literature derived from researches on teaching, questioning has

been invariably classified into divergent ways. One very popular classification (Bentley and Miller, 1971) puts them under four heads viz., memory questions, convergent questions, divergent questions and evaluative questions. This scheme of classification assumes cognitive functioning of the lowest level exemplified through memory to the highest level involving critical thinking (evaluation). Questions may be analyzed also in terms of how they function in a discussion. Having formulated in advance the concepts and principles which students should master as a result of participating in the instructional discussion, the instructor can sequence questions to reach the desired outcomes. Depending upon the goals of the instructional discussion, an effective strategy generally follows a pattern as follows:

- Asking an introductory sequence of informational questions, the instructor focuses students attention on the identification and description of relevant units of information. Students responses serve as a foundation for later generation of concepts and principles.
- Testing for understanding in which the instructor asks questions requiring students to apply the concepts and principles they have generated to new data and different situations. The questions at this stage require the students to demonstrate and justify their new understandings.
- Moving to a higher level of questions where the instructor encourages the students to explore relationships between and among the units of information and to generate concepts.(Adapted from Sondra Napell's Technique of Teaching)

Besides, questions can also be identified as Open and Closed questions, Funnel questions, Probing questions, Leading questions, Rhetorical questions, Reflective questions, Clarifying questions, Informational questions, Analytical questions, etc.

OPEN AND CLOSED QUESTIONS

Open questions elicit longer responses. They usually begin with what, why, how. An open question asks the respondent for his or her knowledge, opinion, or feelings. Describe, Explain can also be used in the same way as open question. For example, What happened at the meeting?, Why did he react that way?, How was the party?, Describe the circumstances in more detail? Open questions are good for developing an open conversation, Finding out more detail, Finding out the other person's opinion or issues.

Closed questions usually receive a single word or very short factual answer. For example, Are you ready for learning? The answer is Yes or No, Where do you

live? The answer is generally the name of town or address. Closed questions are good for testing understanding or the other person's, concluding a discussion or making a decision, frame setting, etc. A misplaced closed question can kill the conversation and lead to awkward silences, so are best avoided when a conversation is in full flow.

FUNNEL QUESTIONS

This technique starts with the general questions and then homing in on a point in each answer, and asking more and more detail at each level. In classroom situations these questions are useful in investigating and diagnosing the problems of students. So in using Funnel questions one must start with closed questions and as one progresses through the process open ended questions can be used. Funnel questions are good for finding out more details about specific point, gaining the interest or increasing the confidence of a person speaking to.

PROBING QUESTIONS

Asking probing questions is another strategy for finding out more detail. Sometimes it is as simple as asking student for an example to help understand the statement they have made. At other times one needs additional information for clarification or to investigate whether there is proof for what has been said. An effective way of probing is to use the 5 Whys method which can help quickly to get to the root of a problem. Probing questions are good for gaining clarification to ensure one's understanding and drawing information out of students who are trying to avoid telling something.

LEADING QUESTIONS

Leading questions try to lead the students to the way of thinking of teacher. This can be done in several ways as with an assumption- 'How late do you think that the project will deliver'? This assumes that the project will certainly not be completed on time. Another way of using leading questions is by adding a personal appeal to agree at the end: 'Anita is very efficient, don't you think?' or Option two is better than option one, isn't it?' Phrasing the question so that the easiest response is yes- 'Shall we all approve option two?' another way of leading questions. Giving students a choice between two options, both of which would be happy with rather than the choice of one option or not doing anything at all is also the way of leading questions. Leading questions tend to be closed and they are good for getting the answer one wants but leaving the other person feeling that they have had the choice.

RHETORICAL QUESTIONS

These are just statements phrased in question form. For example isn't Anita's design work so creative? These questions are those which actually require no

response from students. They may be used effectively to gain or focus attention, provide new information and suggest strategies for analysis. However, Rhetorical questions if used frequently may inhibit the thinking processes of the students. These questions are good for engaging the listener in the teaching- learning process.

INFORMATIONAL QUESTIONS

These questions are mostly memory questions as they can be answered from memory or by description. They are factual in nature but are vital to most discussions. They help students to establish a foundation of factual material from which they can later generate concepts, rules or principles. It will be, howeve,r worthwhile to remember that too many informational questions may be eventually detrimental to thinking.

ANALYTICAL QUESTIONS

Such questions may be answered from memory or perception. They are intended to help thinking beyond the facts, encouraging the students to establish relationships, compare and contrast concepts and principles, making inferences seeing causes and effects, finding rules and principles and using ideas critically. It may be observed that analytical questions are characteristic of inquiry oriented teaching and through their frequent use students are encouraged to develop and validate insights through their own research and thinking.

SOME GUIDELINES FOR CLASSROOM QUESTIONING

The use of effective questioning entails employment of specific techniques. Most of these techniques are corroborated through research and empirical evidences gleaned from classroom interactions. A guideline in this regard is being offered here for the benefit of practising teachers and designers of teaching-learning systems at various levels of schooling.

- **Preparing students for extensive questioning:** Teachers who use lot of questions in a classroom might have to justify their use of questioning to students. Some students conclude that questions imply evaluation, monitoring and efforts to control students. Students need to know that questions seek clarification and elaboration of students' ideas in order to make their thinking visible and to help the teacher address misconceptions.
- **Using both pre-planned and emerging questions:** Teachers should prepare discussion by identifying the goal and pre-plan a number of questions that will help achieve the goal. There are a number of discussion types designed to introduce new concepts, so it is advisable to focus the discussion on certain topics, steer the direction in specific direction or

identify student knowledge level on the topic. Questions derived from the discussion itself can help guide the discussion.

- **Using a wide variety of questions:** It is best to begin a discussion by asking divergent questions and moving to convergent questions as the goal is approached. Questions should be asked that require a broad range of intellectual (higher and lower order) thinking skills. Bloom's Taxonomy or Rhodes Typology can be used as a guide to the type of questions one wants to ask. Simple YES or NO type questions should be avoided as they encourage students to respond without fully thinking through an idea.
- **Avoiding the use of Rhetorical questions:** Rhetorical questions as discussed earlier are those to which answers are already known or merely seek affirmation of something stated previously such as RIGHT?, DON'T YOU?, CORRECT?, OKAY? And YES? More often than not rhetorical questions are unintentional and are suggestive of habit or nervousness.
- **Questions should be stated with precision:** Poor wording and the use of rapid-fire, multiple questions related to the same topic can result in confusion. Instead of repeating the question it is more appropriate to restructure it and explain it in other words if students don't seem to understand. One question at a time should be asked else students won't know how to respond.
- **Before seeking clarification question should be posed to the whole group:** Questions should be directed to the entire class. The questioner should handle incomplete or unclear responses by reinforcing what is correct and then asking follow up questions. Asking for additional details, seeking clarification of the answer or asking the student to justify a response are other effective devices. Redirecting the question to the whole group till the desired response is not obtained is another possibility.
- **Using appropriate wait time:** Wait time encourages all students to think about the response as they do not know who is going to be called upon to answer the question. The teacher can significantly enhance the analytic and problem-solving skills of students by allowing sufficient wait times before responding, both after posing a question and after the answer is given. This allows everyone to think about not only the question but also the response provided by the student. Three to five seconds in most cases, longer in some may be up to 10 seconds for higher order questions.
- **Selecting both Volunteers and non- volunteers to answer questions:** Introvert students frequently take longer to respond so the teacher should

give them adequate time to do so. Picking on the student who is first to raise his or her hand will often leave many students uninvolved in the discussion. Therefore, teachers should use a randomized approach to make the students answer and this will ensure equitable participation and keep students intellectually engaged.

- **Responding to answers provided by students:** Teachers should listen carefully to students as they respond to them, and let them finish their responses unless they are completely missing the point. The advice is to 'ECHO' their responses in your own words and acknowledge correct answers by providing them positive reinforcement. Teachers should also identify incorrect responses and ask for alternative explanations from other students. The students answers should be repeated when the other students have not heard the answers.
- **Positive class atmosphere should be maintained:** If the students are not clear in their thinking or enunciation or not paying attention then teacher should not use sarcasm, unreasonable reprimands, accusations and personal attacks.
- **Throwing back students questions:** Sometimes the student will restate the teachers questions in their own words and ask the teacher for a response or get the teacher to do the intellectual work. When such an event occurs, then the question should be restated and posed it to the class.
- **Interrelating previous comments:** As the discussion moves along, the teachers should be certain to interrelate previous student comments in an effort to draw conclusion and he/she should avoid doing the work of arriving at a conclusion for the students.
- **Restating discussion goal periodically:** The teacher should periodically restate the goal of the discussion so that it is clearly received by the students. It is particularly important to ask question near the end of the discussion that help make it clear whether or not the goal has been achieved. Areas in need of clarification should be identified.
- **Taking one's time:** Hard intellectual work takes considerable effort and students might not be terribly familiar with the thought processes required to draw conclusions. Much of their education might have required them merely to parrot back things previously told to them. Teachers should not give up on students. If a discussion is worth doing at all it is worth doing it correctly.

IN SUM

To conclude this presentation it may be observed that the current scenario in respect of new pedagogy mandated by the constructivist has to focus on evolving a spectrum of questing techniques intimately rooted in cognitive processes of higher levels. This will certainly imply and hopefully so, a continuous updating of the designs and formats of questions for the various contexts of education in general and that of teacher education in particular. The research findings in this domain which are readily available now have to be carefully sifted, utilized, augmented and assimilated in the instructional plans and programmes.

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