



Questioning Technique in Medical Education: A Review Study

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Abstract

Asking good questions and using questioning techniques in medical education can have a great impact on students' learning and academic progress. The importance and purpose of questioning in medical education are manifold, considering the nature of medical sciences. This review study was conducted to examine the evidence, experiences, recommendations, and challenges in the field of questioning and questioning techniques in medical education. By reviewing the available texts and articles in line with the purpose of the research, the findings in the field of questioning and questioning techniques in medical education were presented in the three main sections of question types, how to deal with students' wrong answers and the use of silence strategy. The effectiveness of the question is determined both through the content of the question and through the type of questioning. Therefore, questions that are appropriate to the student's level of understanding and have full clarity, if accompanied by a silencing strategy, are likely to be very effective in the learning process and create an active learning environment in which higher-order cognitive thinking takes place. Therefore, it is suggested that medical educators and lecturers have sufficient knowledge about questioning techniques because the more targeted and effective medical educators and lecturers can use questioning techniques, the more thoughtful and capable graduates are in the field of high-level thinking for there will be solutions to society's problems and future career challenges.

Keywords: Questioning technique, Medical education, Questioning, Academic progress.

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Introduction

Good questioning and ability in questioning is one of the most widely used and powerful educational strategies at different levels of medical education, which can have many effects in the field of teaching and learning, and Available online at: <https://jazindia.com>

is also considered one of the important techniques of lectures (1-4). There is less awareness of the value of these strategies as an important teaching and learning tool, but they are generally used more in the context of evaluating students' knowledge and skills (1, 4-7). For a long time, questioning techniques have been used as the most common and effective method of teaching and learning, and studies have shown that questioning plays an important role in students' academic progress (1, 3, 4, 8-12). A question, regardless of the grammatical form, is said to be any sentence that is proposed to elicit and arrive at an answer (13). Consider these two examples: "What is the most common chromosomal abnormality in Down syndrome?" and "mention the common causes of respiratory distress in Down syndrome infants." Regardless of the difference in grammatical structure, both questions seek a common answer from students, and one answer can satisfy the expectation of the question (5, 14-18). Closed-ended questions require a limited range of options to be selected, while open-ended questions allow students to choose a wider range of answers (19). Today, the importance and purpose of questioning and questioning in medical education are manifold due to the nature of medical sciences (1, 2, 20, 21) and most lecturers and faculty members consider the technique of questioning and posing questions as important during teaching (1, 22, 23). Good questions during instruction help students actively participate in learning, provide an opportunity for students to express their ideas and thoughts, and allow students to get to know the different opinions of other students (1, 4, 5, 24). By posing questions, important points in teaching are noticed and highlighted and can promote learning, develop logical thinking, defend decisions, remember quickly, communicate well with peers, and increase self-confidence and sense of success in students (25). Good questions also help teachers evaluate the process and learning rate of their students and revise their teaching method and strategy if necessary (5, 26). Even though good questioning effectively improves learning, studies show that correct questioning techniques are rarely used in education (3, 5). There are false presuppositions in this field, such as that asking questions causes students to deviate from the path of education or causes anxiety in students and teachers (27). Even though according to existing studies, using questions and appropriate questioning techniques helps teachers to maintain their focus on teaching and create a suitable learning environment (28). On the other hand, physicians and care providers in general are skilled in questioning techniques, as they use questioning, which often begins with several open-ended questions, every day when dealing with patients in the context of history and clinical reasoning (29). Questions like "What can I do for you?" To start the conversation, use and gradually, questions are raised to further explain or justify the previous issues (30). This pattern of selective progress of different types of questions is similar to many questioning techniques in education (5). The purpose of this article is to review the existing studies in the field of questions and questioning techniques in medical education.

Materials and Methods

The current study is a type of review study that was conducted without considering the time limit in public and academic databases and banks such as PubMed, Scopus, and Science Direct in English and the field of related materials with the keywords "Questioning", "Questioning Technique" and "Medical Education". First, the summaries of the studied articles and the articles that met the inclusion criteria were included in the study, and unrelated studies that were not in the mentioned field were excluded from the study. The inclusion criteria included books and articles that focused on questioning and questioning techniques in medical education. The value of the articles included in the study was also determined based on the prominence of the scientific method and the relevance of the findings to the topic and novelty. Finally, the related findings were reported in the form of a review article.

Results and Discussion

The present study was conducted to examine the evidence, experiences, recommendations, and challenges in the field of questioning and questioning techniques in medical education. With a review of the reviewed texts and articles in line with the purpose of the research, the results of the related findings in the field of questioning and questioning technique in medical education in three main parts of question types, dealing with students' wrong answers and using the strategy of silence have been presented.

Types of Questions

From an educational point of view, different types of questions are considered based on the objectives of the questions and the nature of the anticipated answers.

Factual Questions

It is being used to get information from students and often to control and strengthen memory. Example: "What is the most common chromosomal abnormality in Down syndrome?"

Clarification Questions

The purpose of asking such questions is to help clarify students and teachers. Such questions have important implications and help students review their previous statements and views with the views of others. We might use any of these as clarifying questions: "What do you mean by ...?", "Can you give an example?", "Can you rephrase what you just said?", "You mentioned a possible thyroid problem in causing the symptoms of a child with Down syndrome. What do you mean by a possible thyroid problem? Can you be more specific or Give an example?"

Broadening or Extension Question

They expand the existing topic and generate more discussion in that field, explore the implications of the answer, and can be useful in the search for further studies. Such questions can be used to check and evaluate additional knowledge of students. Example: "Do you know any other chromosomal abnormalities in Down syndrome?"

Justifying Questions

It seeks to uncover presuppositions and search for reasons for the answers provided. These questions require comprehensive and significant understanding and reasoning skills from students. Example: "You identified a respiratory tract infection as the most likely cause of the difficulty breathing in a child with Down syndrome. What are your reasons for this diagnosis?"

Hypothetical Question

To explore students' understanding of complex situations beyond the scope of a specific case by creating hypotheses about it. Hypothetical questions are often useful late in the instructor-student interaction when basic facts and concepts have been established. Example: "Suppose a child with Down's syndrome has a septal defect of the ventricular wall and uses drugs to control his symptoms, what differential diagnoses can you suggest in terms of his respiratory distress?"

Questions about Question

It looks for reasons for asking questions that are asked by students from patients or lecturers. Asking these kinds of questions makes students express their reasoning and understanding of the reasons leading to asking their questions. Example: "You asked the mother of a child with Down syndrome if she was taking thyroid medication. Why did you ask that particular question? What were you thinking?"

Redirected Question

In this questioning technique, similar questions are asked to several students and actually, the responsibility of answering the question is distributed. One of the advantages of such questions is to create answers that are more diverse and create participation among students. This technique shifts the focus from teacher-student interactions to student-student interactions (5).

It is helpful to note that several types of these questions, especially justification questions, hypothetical questions, and question-related questions, encourage students to use critical thinking skills and achieve valuable learning objectives and higher cognitive levels. There is unfortunately too much emphasis on information rather than critical thinking. Questions that pay attention to low cognitive levels do not help students gain a deep understanding of the subject and limit students' learning to parrot-like and superficial knowledge. Questions that often begin with "who," "where," "who," and similar words are known as list questions that produce closed answers (5). In contrast, questions that target higher cognitive levels require the integration of information, force students to think critically about the subject, develop reasoning skills, and thereby create a much deeper understanding of the subject than most questions in the field of medical sciences are of this category (3, 5, 31, 32). A simple way to avoid questions that lead to mere repetition of facts is careful choice of words and verbs, including some verbs selected from Bloom's taxonomy Cognitive Domain. Examples of such words are: why, how, justify (as in "justify your statement"), describe, defend, elaborate, etc. "What is the most common heart abnormality in Down syndrome?", "Supposing a child with Down syndrome had the heart abnormality you mentioned, could you discuss the advice you would give the mother?" Both questions are important, but the second question requires students to think deeply beyond simply recalling facts and is cognitively higher level (5).

According to the research, the questions may be placed in one of the classified levels based on the learning taxonomies. These levels are hierarchical in such a way that each successive level requires the student to use more complex cognitive processes to reach the answer. To classify the level of questions, the classification of questions of Bloom's educational objectives is mostly used.

According to Lewis, in general, good questions are those that have the following characteristics: purposeful (asked to achieve a specific goal), clear and concise (students fully understand the meaning of the question), concise (expressed in the fewest words possible), be expressed naturally and away from complex terms (in simple and colloquial language), be thought-provoking (stimulate thought in the context of finding answers), cover a limited range of topics take and not be extensive (only one or two points in the chain of reasoning should be called), appropriate to the level of the class and students of the target group (appropriate to the different characteristics of the students of the class) (33).

How to Deal with Students' Wrong Answers?

Based on existing experiences, it is expected that in question and answer sessions, students will give incorrect answers to questions or make wrong assumptions and may not be able to answer the question at all. One of the reasons why students often do not know the answers to questions can be that the wording of the question is unclear to them. In such cases, restating and simplifying the question is what is needed to reach the correct answer (5).

Since the type of interaction between students and teachers is important and should be done carefully, the task of correcting mistakes and guiding students in the right direction is the responsibility of teachers. The reaction of professors and lecturers in this situation should be away from bias and adopt a method based on respect, or by maintaining silence or responding more neutrally. With careful questioning and guidance, it is possible to get the correct answer, but there is also the possibility of causing embarrassment to the students and harming the relationship between the teacher and the student (5).

Ende *et al.* investigated teachers' strategies for correcting wrong answers during meetings and stated four possible strategies to deal with incorrect answers: providing enough space and opportunity to reconsider in order not to provide an immediate answer and as a result. Allowing the student to find another answer, and asking follow-up questions in a way that contains clues from the initial question leads the student to the correct answer, to rephrase the questions in such a way that the wrong answers are corrected, correcting the wrong answer to the extent of small guidance to the extent that it needs more explanation and investigation. These are useful approaches for instructors to deal with situations where students give wrong answers. Careful use of these approaches increases the chances of getting correct answers from students without jeopardizing valuable teacher-student interactions (5).

Using the Strategy of Silence

Good questioning skills should also include other aspects such as the proper use of silence. Due to their busy schedules, professors tend to interrupt students immediately after asking a question, which may be in various forms such as providing an answer to the question, asking another question, presenting their opinion, or even worse, openly criticizing the students (34). According to one report, when instructors and faculty members ask questions, approximately 30% of students do not get answers, and instead of waiting for students to answer, instructors answer them themselves (1, 5). It is important to know that instructors after asking the question, have very little time to answer. By promoting and asking higher-level cognitive questions, the importance of using the strategy of silence becomes much more obvious (35). Unlike memorization-based questions, higher-level cognitive questions require significant mental processing by students before providing a meaningful answer, which itself requires sufficient time and opportunity (5). Therefore, waiting time is very necessary, because when a question is asked, students analyze, combine, or evaluate a lot of information to find the correct answer (1, 32, 36). Studies have stated that if the waiting time for students increases significantly, the length and accuracy of their answers to questions will improve (2, 37, 38) they will show more willingness to provide answers, the number of non-answers is reduced, and the students provide higher quality answers corresponding to higher cognitive abilities (39). The waiting time will also be useful for the instructors, because the strategies of the questions will be more diverse and flexible, and the number of questions will decrease in terms of quantity and its quality will increase. While the benefits of waiting time after asking questions were discussed, a period of silence after students have answered questions is also valuable (40). A short period of silence at this stage allows students to reflect on their statements and responses and allows instructors to fully consider the points they have made. It also conveys this important message to students that we care about their participation (5). A conscious effort to use silence as part of routine questioning strategies is necessary (41). Although there is no specific duration for the waiting time, depending on the complexity of the question and the level of

expectation of the students, 10 to 15 seconds of silence seems to be enough. This time is approximately three full breaths or you can count slowly from one to ten or fifteen (5).

Conclusion

Questioning has always been and will be an educational strategy in medical education. However, it is also noteworthy that if correct questioning techniques are not used, it can disrupt the learning process and even cause isolation of the learner. The effectiveness of the question is determined both through the content of the question and through the type of questioning. Therefore, questions that are appropriate to the student's level of understanding and have full clarity, if accompanied by a silencing strategy, are likely to be very effective in the learning process and create an active learning environment in which higher-order cognitive thinking takes place. Therefore, it is suggested that medical educators and lecturers have sufficient knowledge about questioning techniques because the more targeted and effective medical educators and lecturers can use questioning techniques, the more thoughtful and capable graduates are in the field of high-level thinking for there will be solutions to society's problems and future career challenges.

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