Questioning: A tool in the nurse educator's kit

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Summary Effective questioning is one of the most important teaching techniques and plays a crucial role in creating an effective learning environment. Yet, in nurse education little has been written about this technique or its importance. Most literature refers to the need for lecturers to be skilled in questioning, but less is written about how to develop this essential technique.

   Being skilled in questioning is an important fundamental step towards becoming an effective lecturer. Developing the skills necessary to help students draw on and apply acquired knowledge in new, unique situations requires the skilled use of questioning. Most experienced lecturers use both written and verbal questioning, but evidence suggests that the majority of their questioning is posed at lower cognitive levels of description.

   Quality teaching requires students to be engaged with the content of learning tasks designed to reach understanding. Using questioning appropriately facilitates the learning process by requiring the student to participate in the process and to achieve higher comprehension skills by acquiring deep, elaborate understanding of the subject. To acquire and develop this skill, the lecturer is required to understand questioning, to select the tool appropriately and to use questions that are varied, planned, appropriate and humanely posed. The functions of questioning, types of questions and the key skills required for the effective use of this teaching strategy are outlined in this article.

Aim

The aim of this article is outline the key skills required for the effective use of questioning in nurse education in order to assist lecturers involved in all aspects of education to use this important teaching technique effectively.

   The importance of questioning and the skills required to effectively use questioning in teaching situations are also described.

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Functions of questioning

It is widely accepted that questioning is integral to the skills required in effective nurse education and it is considered to be one of the strategies thought to facilitate the development of critical thinking (Phillips and Duke, 2001).

Questioning has many functions that range from requiring the student to use simple recall of information to complex critical thinking. Effective questioning prompts thinking, enhances cognitive ability and helps students develop reasoning ability (Sachdeva, 1996). Questioning keeps the students involved in the learning activity (Cashin, 1995) and can challenge students assumptions and prior knowledge (Petty, 1998). Keeping the student involved in the learning process gives the student an opportunity to openly express ideas and thoughts and enables other students to hear different explanations of the material by their peers (Morgan and Saxton, 1991) and can improve student motivation (Petty, 1998). Questioning also stimulates creative thinking (Roth, 1989; Johns, 1992) and can provide interactions that involve tasks that elicit, engage and challenge students thinking and can help in the development of critical thinking skills and enquiring attitudes (Dantonio and Beisenherz, 2002). The use of questioning is also critical to the implementation of problem based and enquiry based learning (Price, 2003) and allows students to discuss concepts from their own experiences (Billings and Halstead, 2005). Given the changing multicultural nature of nursing education and practice and the cultural diversity amongst student groups using questioning can encourage the sharing of cultural experiences and the exploration of diversity amongst student cohorts.

Questioning, which is ''an expression of enquiry that invites or calls for a reply'' (Billings and Halstead, 2005, p. 304) has many specific educational functions. These include social purposes, motivational purposes, cognitive purposes and assessment purposes (Quinn, 2000). As a teaching tool questioning can be used in providing instruction, structure and direction, to remind students about expected behaviours, assess understanding, evaluate student progress and diagnose problem areas. By using skilled questioning, the lecturer can provide an opportunity to facilitate discussion, to challenge, to promote learning from each other and to explore global views in a learning situation.

Effective questioning techniques

Effective questioning techniques enhance not only the students learning, but can be used to gain insights to the level of student's knowledge, develop student's communication skills and confidence, raise issues and complexities to extend and refine student's analysis, and challenge students to defend their positions and strengthen their arguments (James and Baldwin, 1997). Skilled questioning and planning the use of questions types enables the lecturer to ask questions that expand student's knowledge and encourage the development of creative thinking.

The process of effective questioning includes using well constructed questions, an appropriate mix of questions, phrasing questions accurately, interposing sufficient wait time and using probing questions. It also involves the process of creating an appropriate physical and psychological environment and a climate conducive to learning.

Types of questions

There are also many types of questions ranging from low level closed questions to challenging questions. Low level closed questions require the student to do no more that recite facts and figures or to recall information, while challenging higher order questions require the student go beyond simple recall and to engage in more sophisticated thinking so that deep learning will occur (Ramsden, 2003). High order questions require students to use their knowledge to problem solve, reason, to think deeply and critically, analyse, evaluate and develop creative new insights (Brualdi, 1998) and to engage in higher order cognitive processes.

Phillips and Duke (2001) suggest that in the literature, there is evidence that many teachers use mainly factual and lower level questioning, which does not promote critical thinking, as they rely on simple recall that results in a narrow range of responses. These questions do not promote critical thinking as they usually result in a yes or no answer. They create no opportunity for further discussion and assess only lower order thinking. Salpellah et al. (1998) in a study of questioning by clinical teachers found that they predominately asked questions from the lower order cognitive levels. Additionally the overuse of closed questions also involves the recall of simple facts, rote type responses and demonstration of a superficial understanding of the topic. Students may view a continual overuse of closed questions as rhetorical or patronising (James and Baldwin, 1997), while other may find it intimidating, resulting in a poor learning environment.

Skilled questioning development

The practice of skilled and effective questioning can be assisted in its development by addressing the following six issues:

1. Phrasing questions

In order to ensure clarity questions must be clearly phrased. This ensures that the goal or purpose of the question is evident. Failure to ask a question correctly and to take these factors into account may lead to the student's responses being inhibited. The cognitive level of the content and the level of abstraction or complexity must be appropriate to the student's level of experience.

Lorsch and Ronkowski (1982) identified four inappropriate ways of phrasing questions. These are closed, ambiguous, spoon feeding and compound questions. Closed or ambiguous questions, for example ''you understand that, don't you?'' or ''what is the most important activity of living?'' are both unclear and unfair to the student.

The type of question, for example ''you all look like you understand that, don't you?'' can be a rhetorical quip, which can be either humorous or sarcastic, but results in non-functional responses and do not assess learning at any level. Incorrectly phrased questions can lead the student to think —''guess, what the teacher is thinking?'', for example ''you all know what that means, don't you?''

Spoon feeding questions do not require the student to use higher order thinking skills, give too much guidance to the student and are also ineffective. Compound or multiple focused questions, for example ''what are the signs of hypoglycaemia and how do they affect the patient?'' result in student confusion as the question includes too many factors, or poses too many questions, to facilitate in depth answering of any part of the question to be considered by the student at one time.

2. Questioning and cognitive development

Effective questioning involves cognitive reasoning and critical thinking at an appropriate level for the student. In doing this, the teacher plans to draw on and develop the student's lower to higher thinking skills. It can be useful to use an educational hierarchy to ask questions, which move from simple recall of information to the more difficult skills of cognitive reasoning and critical thinking. These levels of thinking have been developed into a hierarchy, such that each successive level

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Knowledge
This lowest level entails recalling facts or observations in the exact form that has been presented, or supplying specific factual information. It includes memorization of definitions, formulae or procedures.

Comprehension
This level of ability involves understanding the previously learned material, being able to restate material in the student's own words and comparing and contrasting information. They should also be able to recognise previously unseen examples of a concept.

Application
This level involves the student in applying known rules and techniques to problem solve without being given the rule or formula to solve the problem.

Analysis
This level entails the skills of making inferences, finding evidence to support generalization, skills required to break complex concepts or situations into their component parts, and analyse how these parts are related to one another.

Synthesis
This level involves developing solutions to problems, making predictions or rearranging component parts to form a new whole.

Evaluation
This level is the highest cognitive level and entails the student making value judgements about a controversial issue, judging the validity of an argument or the worth of a concept and arriving at a reasoned judgement.

Figure 1 Bloom's taxonomy.

Levels	Question stems and examples
Knowledge	Who, where, when, what, define, list, tell, list, name, identify, describe, recall, remember *What is meant by NIDDM? Tell me about Mr X?* *Define what is meant by the term NIDDM?*
Comprehension	Describe, categorise, summarise, estimate, distinguish, compare, contrast, explain, interpret, give examples, predict *Why is Mr X taking oral hypoglycaemic drugs?* *What are the symptoms of NIDDM in Mr X?*
Application	Apply, calculate, modify, solve, show, change, discover, illustrate, what, how, construct , classify, choose, relate *How often would you check Mr X's glucose level before he goes to theatre? What symptoms would make you would check his blood glucose level?* *Why are we concerned about this patient's fasting times?*
Analysis	Analyse, separate, order, explain, connect, compare, what ,would, why, how does, identify causes, infer, draw conclusions, determine evidence for *Explain what factors may cause Mr X to have a low blood glucose level in the morning?* *Based on what we have done earlier what would you do if the Mr X's blood glucose was low?*
Synthesis	Explain, modify, design, invent, plan, create, prepare, compose, formulate, modify, rearrange, how does, predict, produce, design, develop, generalise, rewrite *What would happen if Mr X's surgery was delayed until late this evening?* *What would you do about food intake for the patient?*
Evaluation	Assess, decide, rank, grade, measure, commend, select, judge, explain, discriminate, support, summarise, compare, conclude, does, how, discuss, what predictions, contrast *What would you do about his evening medication prescription (hypoglycaemics) if the patient was not going to theatre until very late this evening?* *What would you do about giving Mr X food when surgery is delayed for more than six hours?*

Figure 2 *Question design*: In this example, the questions relate to teaching the topic of diabetes management in a patient undergoing surgery using a case study example.

requires the student to use more complex cognitive processes to arrive at an answer.

There are a number of taxonomy classifications developed including Bloom's (1956) taxonomy, which can be useful in question design. (see Figure 1). This widely acknowledged taxonomy has six major components as listed and developed in Figure 1. In addition, to assist in the design of questions appropriate to this level examples have been provided.

Figure 2 has been developed to provide example question stems appropriate to each level of Bloom's (1956) taxonomy.

In preparing the questions, the teacher should select questions at an appropriate level in this taxonomy for the learning outcomes and phrase questions that promote the development of higher order thinking. It is suggested that teachers should

ask a combination of lower order and higher order questions and develop a balance between questions in learning activities (Brualdi, 1998).

3. Response/wait time

As well as using an educational taxonomy to frame questions at the correct cognitive level there are other issues, which need to be considered in the skilled use of questioning. Research on questioning stresses the use of wait time in developing skilled techniques (Swift and Gooding, 1996). Two types are identified — wait time 1 refers to the amount of time the teacher allows to elapse after a question has been posed and before the student begins to speak (Swift and Gooding, 1996). Wait time 2 refers to the amount of time a teacher waits after a

student has stopped speaking in response before saying anything.

Referring to wait time 1 Wilen (1991) suggests the teacher should allow three to 5 seconds to elapse from asking the question before expecting the student response, particularly when asking high cognitive level questions as students need at least 3 seconds to comprehend what has been asked, to consider the available information, to formulate an answer and to begin to respond. In using this wait time the lecturer allows for an increased length of student response and in turn facilitates an increase in the number of questions by students. This wait time is also associated with improvements in student achievement, retention of information and decreases in a failure to respond. It is also linked with an increase in the contributions by students (who generally do not participate significantly in learning activities, when wait time is under 3 seconds) and by those, who are considered by the teacher to be ''less well able'' (Slack, undated; Dantonio, 1990).

Using a wait time 2 of over 3 seconds is positively related to many *lecturer* outcomes including an increase in the number of higher order cognitive questions asked and in an expansion of the variety of questions asked (Slack, undated; Dantonio, 1990). Using this wait time also results in the lecturer making fewer teaching errors characterised by responding illogically or inappriately to a student comments (Swift and Gooding, 1996). It is also indicated that increasing thinking time to at least 3 seconds following a high cognitive level question *and* a quality reply is critical and facilitates more effective follow up questions by the teacher and other students. It also gives the lecturer and importantly other students in the class, time to comprehend the answer before moving on.

It is suggested that lower level questions need a 'wait time' of *3* seconds and higher level ones *5* seconds or more. Where the question is extremely complex it may be useful for the teacher to give all students 1—2 min to think about the question before asking for an answer.

It is also noted that by enabling too much 'wait time' can be detrimental to student interactions. A wait time of 20—30 seconds may be perceived by students as threatening and may result in poorer responses from the individual and group of students. Lorsch and Ronkowski (1982) suggest that, when students are not used to having a teacher ask them specific questions or use wait time, they might not immediately respond. It is important therefore to ensure that the use

of questioning as a teaching strategy is explained to students in the early phases of the teaching activity.

4. Student participation

Student contribution and total participation is related to the learning climate in the classroom (Sachdeva, 1996). The creation of a positive learning environment requires that the lecturer pays attention to the development of a learning relationship. In developing this relationship, the lecturer needs to develop a climate, where students feel free to ask questions both from the lecturer and their peers and also one in which students do not feel threatened if they give the wrong answer. Some students may find the use of questioning in a teaching situation, particularly problematic if they are either unused to the use of the strategy, for example if they have come through a traditional educational system that is teacher focused, or if they have experienced a learning situation, where they have been embarrassed for wrongly answering questions.

In order to develop a trusting accepting learning atmosphere and environment the lecturer should pay attention the skills of attending including active listening, reinforcement, use of appropriate eye contact, appropriate facial gestures and physical stance and proximity. In addition, the lecturer in order to promote maximum student participation and contributions should encourage everyone to respond and answers should be sought from volunteering and non-volunteering students. In some learning situations, one or more students may tend to monopolize the situation and other quieter students may feel exclude. Full participation can be achieved by using student's names, when asking a question and directing questions to named students or giving preference to those students, who have not yet contributed. This avoids the difficulty for the lecturer of handling multiple responses, helps create an environment in which the students feel that the lecturer knows them as individuals and active participation by all students. When the lecturer is faced with large groups of students in a formal lecture situation using student photographs and classroom-seating plans can help identify particular students by name.

Student participation can also be maximised by using occasional overhead questions, which are directed to the whole class for a response or by directing a question to the class, giving the class time to consider the question and then asking a specifically named student to respond. This can

help achieve total participation by all students, but should be done in a non-threatening manner. Using this very focused approach on a specific student has both benefits and disadvantages as the student may feel intimidated or view the act of questioning as an extremely threatening one. In order to avoid these situations positive non-verbal cues, a friendly tone of voice and a non-threatening posture can be adopted to reduce student anxiety. A 'pause-pose and pounce' approach is sometimes advocated, but 'pounce' may infer a more intimidating approach than is needed.

5. Encourage student response

In order to encourage a student response to each question asked requires skilled management by the lecturer. Where the student appears unable to answer a question asked, the lecturer can use a number of strategies, such as giving enough time to reply and using wait time. The aim is to allow the student time for thought and at the same time without turning the pause to embarrassment and a tension build up (James and Baldwin, 1997).

This is a delicate area in which the lecturer needs to use verbal and non-verbal skills. The lecturer can signal that a short silence is acceptable by using a statement such as ''This is a complex question, so I will give you some time to think about it ...'' It can also be helpful to rephrase the question, or to use a lower order question to help the student respond (Quinn, 2000). The teacher can also use the rephrase − redirect strategy to reduce the discomfort of the student, who has difficulty answering the original question. It is appropriate in this situation also to invite another student to reply, or suggest that students are given an opportunity to discuss the question in pairs before an answer is given. The aim of whatever strategy is used is not to expose the student to embarrassment or punishment for failing to give the correct answer or to undermine his/her confidence (Wolf, 1987).

Management of the situation, when a student gives an incorrect answer requires skill. However, it is important to remember that the student is probably there to learn and is not knowingly trying to avoid answering. The student also is not knowingly making a mistake and is probably doing their best to 'find' the correct answer. It should also be recognised that other students in the situation may also mistakenly be thinking the incorrect answer as well. Moreover, in this situation, if handled well other students can learn as much from an incorrect response as a correct one. There is also

times, when the student will recognize the mistake in their response if a follow up probe question such as ''now let's rethink what you have said... or why do you think that?'' is used.

Another strategy that can also be used, when an incorrect answer is given is to refocus the question. This can be achieved by rewording the question in order to make it clearer or to break the question into smaller and more manageable parts, using a lower level question if required. If using a lower order question or probing to help the student respond is unsuccessful, the question can be redirected to another student − the rephrase-redirect approach or 'shifting interaction' (Camp, undated; Wolf, 1987). Positive reinforcement skills should be used with the first student. It is important to avoid feelings of humiliation or embarrassment as Chuska (1995) suggest that failure to manage this situation sensitively can evoke negative attitudes towards learning and hinder the creation of a supportive classroom environment.

A continued inability by a student to answer any questions set in a class will involve the lecturer in a more detailed assessment as to why the student is not responding as they might and to attempt to resolve their difficulty (Quinn, 2000) and in a review of the teaching skills used.

6. Probing

The use of follow up prompts questions is necessary to probe students understanding and to enable students clarify or elaborate their comments. These will also help the student demonstrate higher order thinking skills. Carin (1987) provides some helpful examples of follow up probing questions such as ''what happens if?'', ''how would you?'', ''why do you think that?'', or explain why you?''

However, overuse of probing and follow up questions needs to be used judiciously and randomly as there is a possibility that students will not answer the original question for fear of knowing that a follow up probing question will be asked next. It is more helpful for the lecturer to refer back to the student's response later in the session and either asks the same student or another to explain the answer given originally (Wolf, 1987). For example ''Paul said earlier that ... John, what would happen now if...? The use of probing questions also requires skill and sensitivity on the part of the teacher as they ''may provoke anger or distress on the part of some students'' (Quinn, 2000, 450).

By preparing these questions in advance the lecturer can ensure that the cognitive level of the question is correct, they are correctly structured

and follow up prompts can be planned. By their very nature higher order questions and follow up probes require preparation, they take time to ask and to answer and can be time consuming. This time needs to be factored into the planning of the lesson and account taken of it, when structuring the class.

Management of the learning environment

Other issues in the management of the learning environment that is supportive to the use of questioning as a teaching strategy include the planning of physical and psychological environment. The teacher needs to create the right physical environment for the session. If students, for example, are unable to hear a question it is difficult to answer it, and if the teacher cannot hear the answer it is difficult to respond.

The psychological learning environment where questioning is recognised by the students as normal also requires thought and needs to be considered, when selecting to use questioning as a teaching tool. The teacher should ensure that students are aware that questioning will be used as a teaching strategy so that they are prepared to answer questions and accept that questioning and answering will form part of learning activities. It needs to be recognised that questioning can embarrass, humiliate, undermine, expose or conversely to empower, provoke discussion and create a climate of enquiry (Wolf, 1987). The teacher also needs to be seen as one, who is interested in student responses by ''…not asking questions that can undermine rather than build a shared spirit of investigation'' (1987:1). Psychological safety can also be assisted by ensuring that the lecturer listens to the student's answer without an interruption, uses eye contact appropriately, uses head nods and gestures to encourage and help the student to understand that the teacher is interested in the student, and the answer to the question.

Teacher's difficult moments

The final issue addressed in this paper relates to an issue that commonly emerges as a concern in discussions on the topic of questioning — What happens if the student asks a question and the teacher does not know the answer?

It is important that you recognise that no matter how familiar the teacher is with the topic, and no matter how well prepared the topic, the possibility of a student asking a question that the teacher cannot answer can and always should remain. Cashin (1995) is very clear that the initial step is to admit to not knowing the answer and to say so as this will not damage the students confidence in you. Conversely, if you 'fake it', there is a good chance that the students will find out and your credibility may be seriously damaged. Secondly, you might ask another student for the answer and or suggest that the student look at possible sources for information and or ask the student to find the answer and follow this up in a later class (Cashin, 1995). It is however the teacher's responsibility to find and bring the answer back to the class.

Conclusion

Within the literature there are many reasons, why teachers do not use this teaching strategy. Minton (1998, for example suggests that ''questioning does not come naturally to most people because novice teachers are used to thinking in terms of answers not questions'' (p. 163)). The literature continues to suggest that many teachers use low level questioning, which requires simple recall of information at the lowest level of Bloom's taxonomy (Phillips and Duke, 2001).

At the same time, it is widely accepted that questioning is an effective teaching strategy, when used appropriately that can assist in the development of critical thinking and is integral to the teaching role that can assist students apply their knowledge and critical thinking skills (Phillips and Duke, 2001). Questioning is also required in the application of innovative learning approaches including problem based learning that are student focussed and needs to be used as good teaching involves a dialogue between the teacher and the student.

A timely well phrased question can arouse the student's curiosity, capture their attention, focus on important points, assess the level of understanding and encourage problem solving and critical thinking. It can also promote exploration of experiences, application of knowledge and active learning. Poorly used the effects can be to increase student anxiety and confusion, encourage guesswork and vagueness and embarrass or alienate the students in the learning situation.

By learning and practising, how to ask questions skillfully, a number of interrelated goals of education can be accomplished. Leaning becomes an interactive process, the student becomes a participant in the learning process and the cognitive

abilities of higher order thinking can be developed. Effective, purposeful questioning also involves knowing, how to ask the right question at the right time, using a logical and sequential progression and using ''wait time'' appropriately. As with any teaching strategy the lecturer must also consider the individual students in the situation, for example their learning style or cultural background as well as creating a safe comfortable learning environment, where skilled questioning is one tool that can effectively promote student learning.

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