

WHY ARE QUESTIONS IMPORTANT?

Opening questions for the reader before reading:

- What do you think happens in your brain when you ask a question?
- What do you think happens in your brain when you hear an answer?
- What do you think happens in your brain when you hear an answer that you didn't ask for?
- How do you know when the solution/statement/opinion you are giving is wanted/needed?
- How often do you ask questions in your teaching sessions? What kind of questions do you ask?
- Why do you think we have created a chapter about questions?

Historically teachers have often been viewed as the people who provided correct answers and trained students to know those right answers. The contemporary view of education has (hopefully) evolved from this idea and we now know that in most things in the world, there is no one simple fixed answer. Much depends on the context and our scientific understanding of the world changes over time.

Of course in a given specific situation there can be distinctions between right and wrong solutions, but even these cannot be taught in a top-down approach to masses of students, because we cannot prepare people for all the specific situations they might face in life. So **the essence of education becomes the ability to find the right answers yourself and adapt those answers when changing situations call for it.** This means that the skill that people need to learn is **how to look for answers – that means knowing what questions to ask.** And this in turn means that we should also teach through questions.

What happens when we ask questions

When asking questions, our thinking is more active than simply listening to someone talk. We have realised there is something we don't know and we want this missing information. It could also be that we want the person from whom we are asking a question to start thinking about a certain topic. So questions also help to activate the thinking of those around us.

But not all questions are created equal. How many times have we heard at the end of a lecture:

“Does anyone have any questions?”

- How often is it followed by a lively debate between the lecturer and listeners?
- How eager are people usually to ask questions at that point?
- How long is usually the time when the questions can be asked and how quickly does the lecturer move on and/or close the lecture?

There are of course exceptions, but quite often in these cases this question almost feels like a compulsory element that has to be said and after a very short moment of silence everybody moves on. Why is that so?

It could be that from the lecturer's side there is no skill of discussing the questions of learners, there is even a fear of it or there is no understanding of the importance of questions. Also the lecture might have been set up in a way that the learners were passive during the whole lecture and therefore were not able or wanting to ask good questions in the end. For the latter there could be many reasons which can be found in other chapters of this handbook, but it also may mean that the question itself was wrong, asked at a wrong time and probably in a wrong way.

Thus, when designing training courses, the crucial part is not only asking questions but also what kind of questions are being asked, how they are presented and when they are being asked.

When should the questions be asked?

The answer could be found in another question: when do you want your learners to start thinking about your topic?

Probably you want them to be focused on your topic from the beginning. So this is also the moment when to start with the questions. Questions could be asked throughout the learning activity, almost every topic could be formed into a question and discussion instead of a statement made by the educator. Of course there is information that we want to pass on to our learners, they are just more likely to grasp it if they discover it themselves through the questions. When we are engaged in a discussion, our thinking is much more active than when simply listening.

Who should be asking the questions?

Is it important that the educator asks questions from learners or that learners ask questions from the educator? Why one or the other?

Although there can be very active learners who already have many questions in the beginning of the session, questions are a tool for the educator to direct the flow of the session and learners' thinking. So while learners can have their questions "all over the place", the educator could give them a direction with his/her own questions in the beginning of the session.

The trick of teaching is to **get the learners themselves to say out the things you would want them to know**. So while it is much faster to just say it to them ourselves, in terms of learning, it is more effective if they get there themselves. In the end it's important to ask, who do we want to be answering the questions? For effective learning we want the learners to come up with the answers first and the educator is there to add on, correct and help to analyse the answers. Educators can guide the process with their questions, and direct the learners' questions back to them. If someone has a question, we can ask the whole group how they would answer that and then the educator's answer would be the last one.

What kind of questions should the educator ask?

The art of teaching is in fact the skill of coming up with such questions that would lead the learners to want our answers. A good question to your learners is the one whose answer is the main topic of your session. And it's not easy to create questions like this. One indicator for the educator here can even be: how much time from your preparation did you spend on developing good and deep questions?

Questions in their structure can be very different in terms of what kind of thinking processes they evoke. They can be divided into types based on the complexity of thinking that is involved in answering them. Not all questions in a learning session have to be around conceptual change, actually it can be good to have a mix of different types of questions. Just to keep in mind that at least a few of them should be more complex. Here are few examples of the types:¹

Question type	Example
Lower order: Explanation – asking to explain a process or phenomenon	How is organic waste different from other waste?
Higher order: Analysis – asking to explain the elements of the topic, taking a concept into parts, comparison questions	What are the differences between separating organics from other waste at home and at a waste facility? What makes organics collection effective?
Conceptual change: Application – asking to put information into concrete situations	What is needed to put in place an effective separate collection of organics in your municipality?

Questions can also be longer than just one sentence. For example, when we want to teach about productive failure design (read more about it from the *Main principles of teaching* chapter), then instead of first explaining what it is and only asking “What are good teaching methods?”, we could open the session with this kind of example:

Two teachers have different teaching strategies for teaching complex systems, like circular economy. Which teacher has an effective strategy? Why? Which one has an ineffective strategy? Why?

A: Teacher X starts with giving a complex problem to the students (how to make a specific sector more circular)

- *Students then have to find different solutions for the problem*
- *After that and hand-in-hand with discussing the solutions of students, teacher X gives direct instruction and offers expert knowledge of the topic*

B: Teacher Y starts with introducing and explaining the topic (circular economy)

- *Then students will be presented the complex problem and asked to solve it*

Instead of introducing the topic of different teaching methods, the topic is presented as real life situations and learners are asked to give their opinion about them.

What is the most important element of this exercise?

¹ Yip, D. Y. (2004) Questioning skills for conceptual change in science instruction, *Journal of Biological Education*, 38:2, 76-83.

There are of course several important elements, but perhaps the most important is the question “Why?”, because this gives us information about the reasoning behind the answers and this is what we want to know. Sometimes the answers might be correct just by chance and the logic behind it incorrect. Also the reasoning process is where the learner is actually constructing knowledge him/herself and can discover his/her knowledge gaps and this is where the discussion starts. So it’s the why-element that should be part of all learning sessions, asking questions starting with “How?” can also be good.

In general the questions should initiate a deeper thinking in the learner’s brain. So also the questions should be more than just with yes-no answers, open rather than closed. For example, a question like “Isn’t landfilling all the waste the most expensive option?” is closed, leaving only yes or no answer and implying what answer is expected. Instead it could be “Why are the waste management costs high?” or “How could the costs from waste management be lowered?”



On how to create learning evaluation questions, check the *Learning assessment* chapter.

What kind of questions should the learners ask?

As educators we should direct our learners towards starting to ask questions, if they don’t have that habit to do so. We would want the learners to start thinking deeply about the topic at hand, so we should direct the questions towards the underlying principles, not just the superficial details which might distract both the educator and the learners. It’s ok to also say if some questions are not relevant, but then there should also be an explanation why.

One important aspect is also the learners’ self-reflection of their level of understanding of the issues, their knowledge gaps and what they would need to learn more about. This is connected to the skill of metacognition, which is tackled briefly in the *Metacognition* chapter.

Are questions more important than answers aka the expert knowledge?

When we as experts are presented with problems (or new solutions) in our field, we start asking detailed questions in our head, in order to get a better understanding of how to form our expert opinion around it. This is actually how the expert knowledge is activated – beginners either don’t have any questions to ask or their questions are much less detailed. So again the art of becoming an expert is the skill of asking the right questions. When we teach through our questions it also makes our expert thinking visible to the learners and can help them to start asking more detailed questions as well.

So in the end, yes, the expert knowledge is also important, but it’s the questions that make people want and understand our expert knowledge.

FREQUENTLY ASKED QUESTIONS

Before reading the answers, think to yourself: **how would you answer them?**

1. What if the learners don't want to answer my questions and there is this awkward silence?
2. Isn't there a risk of getting lost in learners' questions and don't we have to finally also give our information in the lesson?
3. Is it possible to over-do it with questions?

1. What if the learners don't want to answer my questions and there is this awkward silence?

First – your time as educator runs in our subjective perception much faster than theirs – when they might just start to get their head around “What was just asked from us?”, you already feel the inner panic (“They probably roll their eyes and think it is stupid/obvious/obscure question!”). **The awkward silence can happen and it's also something that we as educators should get comfortable with.** The reason for the silence is usually not that people don't have any answers in their head, there is always some pre-knowledge, mostly it's the case that people are not used to being active in learning situations or they fear of sounding stupid, or they simply need time to truly think about it. After a certain point someone will break the silence and answer, or as educators we can also ask specific people to answer. You can also count to 10 in your head to pass the time before breaking the silence. In the end we need them to be the ones speaking, so this is also something that can be already communicated before the session or at least at the start of it, that the educator will be asking questions and the session will involve discussion.

2. Isn't there a risk of getting lost in learners' questions and don't we have to finally also give our information in the lesson?

Yes, there is that chance and facilitating this process is one of the tasks of the educator. But without asking questions from learners and allowing them to come up with their own questions we run the much higher risk and that is not activating their thinking at all or keeping their misconceptions intact. If we just present our information without the learners feeling the need for it and without discovering it on their own, it is much less likely that they would attach it to their pre-knowledge.

3. Is it possible to over-do it with questions?

Yes it is. This is the part where the educator should follow the three basic psychological needs of the learners and make sure they are not suppressed, perhaps the need of competence in this case the most – the feeling of tasks (or questions) being not too easy and not too difficult. Questions are meant to activate learners' thinking and make them struggle a little bit, but not to interrogate or exhaust them. It is the task of the educator to find that balance of not overwhelming the learners with too many, too difficult, or too trivial questions and creating just enough mental effort for them to want the answers from the educator.

In order not to over-do it with questions in this chapter, just two ending questions to further reflect upon:

- What would you ask from your learners if you wanted to get them interested in your topics?
- What makes a question good?

