Teachback

Learning by explaining what we have been taught

Potential impact: High
Timescale: Medium (2-5 years)

Teachback is a way to understand a topic, and to show that you have understood it, by means of a structured conversation. One person (usually an expert or teacher) explains something they know about a topic to another person (usually someone new to the topic). Then the novice tries to teach their new understanding back to the expert. If the novice gives a good response, the expert goes on to explain some more about the topic. If the novice is struggling to teach back, then the expert tries to clarify the explanation and the novice teaches it back until they reach a shared understanding.

Say, for example, an apprentice is trying to understand the basics of how a car engine works. The experienced car mechanic explains the 'four-stroke' engine cycle of sucking in air and fuel, compressing it, igniting it, and pushing out the exhaust. Then the apprentice tries to explain the four stages back to the mechanic, step by step, perhaps with diagrams. If the apprentice makes a mistake, then the mechanic explains again and asks the apprentice to teach back, until they both agree on the explanation.

Learning through conversation

The concept of teachback originated in the 1970s with the educational technologist Gordon Pask, as part of his grand theory of 'learning through conversation'. Pask emphasised that this method need not always involve a trained teacher or expert. It could involve two people with similar knowledge of a topic – each person in turn asking the other to expand on the topic, and then attempting to explain back, until they both gain a better shared understanding.

Three aspects of teachback are particularly important.

1. The process of learning should be visible and explicit, with the conversations heard by both participants and anyone else who cares to listen.

2. Both partners should gain from the conversation. The one with more expertise has the opportunity to explain that knowledge in a structured way and to find out whether it is being understood. The less-expert person learns by receiving direct instruction and also by going through the process of recalling and teaching back the new knowledge, to find gaps in understanding.

3. There should be some way of verifying the new understanding, for example through a teacher-marked test to apply the knowledge, to ensure that what has been taught is accurate.
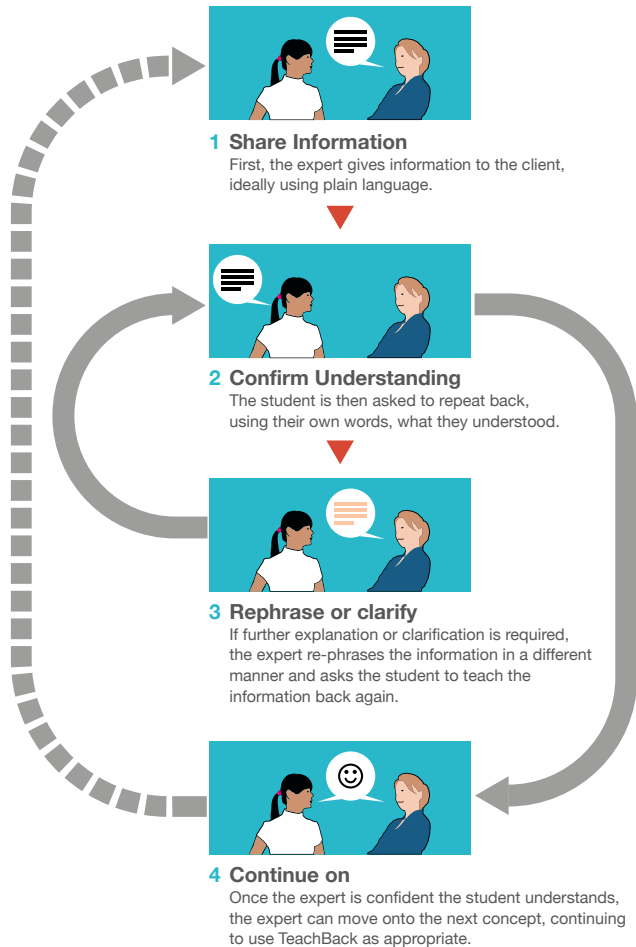
Teachback can be used for any type of teaching and learning, including sports coaching, science teaching and language learning. It can also be used for people with similar knowledge to explore a complex topic from multiple perspectives.

Teachback in healthcare

Some medical professionals have adopted a form of teachback to make sure that patients with ailments such as diabetes or heart failure have understood instructions about how to manage their medication. In a study of people with diabetes, 43 patients with low levels of literacy took part in three weekly 20-minute sessions with a nurse. The nurse used teachback methods to confirm their understanding. They asked questions such as, "When you get home, your [husband/wife] will ask you what the nurse said. What will you tell them?" When tested six weeks after the final session, the patients who learned through teachback had significantly better knowledge of diabetes, and of keeping to their diet and

medicines, than those in the control group who had spent similar times with the nurse in normal consultations.

Other studies of teachback for patients also found positive results. More research is needed to check whether the results in healthcare are better than other methods such as giving the patient a well-designed leaflet with pictures and talking about it step-by-step.

1 Share Information
First, the expert gives information to the client, ideally using plain language.

2 Confirm Understanding
The student is then asked to repeat back, using their own words, what they understood.

3 Rephrase or clarify
If further explanation or clarification is required, the expert re-phrases the information in a different manner and asks the student to teach the information back again.

4 Continue on
Once the expert is confident the student understands, the expert can move onto the next concept, continuing to use TeachBack as appropriate.

The teachback process in healthcare

Teachback in the classroom

The teachback method could be used for school and university teaching, but has not yet been widely adopted. A small study of school science students showed that after teaching back their current knowledge (but not receiving any new teaching) the students produced richer diagrams to explain how objects move under gravity than the ones they had drawn before the teachback.

In a school classroom, a teachback session might involve students working in pairs. They start by explaining to each other what they know about a topic. Next, they receive instruction from a teacher or a video presentation. One student in each pair teaches back to the other what they have learned. The other student questions the explanation, using queries such as, "What do you mean by that?" If either is not sure, or they disagree, then they ask the teacher. They may also write a brief explanation, or draw a diagram, to explain their new understanding.

> **"** we can learn by explaining what we know to another person, who then explains what they know **"**

Reciprocal Teaching is a similar method to teachback. Students work in groups to read a text, then take it in turns to act as teacher. First, they combine their knowledge to understand what the author means, or to *predict* what will come next in the text. Then, they *question* their knowledge by asking about puzzling information or unclear sections of the text. Next, one of them is chosen to *clarify* the text and attempt to answer the questions. Finally, another student will *summarise* the text by pointing out its most important parts. This is a more complex procedure than teachback and requires a teacher to understand the purpose of each activity and how to assign students to the different roles.

Teachback online

Teachable agents are computer characters that students attempt to teach. In one example, a student starts by creating a picture of the agent on the screen. Then the student goes into the agent's 'brain', shown on the screen as a set of cards representing key concepts of the topic. The student connects these items with arrows to form a concept map. Artificial intelligence software creates a representation

of the agent's knowledge, based on what the student has taught it. The agent can answer questions asked by the student, with the concepts lighting up when they are activated. Students then enter their agents in an online competition to discover which one gives the most accurate answers to questions about the topic.

Another variation on teachback comes from Rudman's work on computer-assisted teachback by phone. In this study, one person learns a new topic (herbal remedies) from a book and becomes the teacher. Another person tries to learn about the same topic through a phone conversation with the teacher. The novel part is that the phone conversation is continually monitored by software that recognises keywords in the spoken conversation. As soon as the software recognises a word related to herbal remedies (such as the name of a herb, or its medicinal properties), it displays helpful information on the learner's screen but not on the teacher's screen. In this way, the conversation becomes more balanced. The teacher has some basic book knowledge of herbal remedies, and the learner is provided with instant information to help with asking relevant questions or clarifying the teacher's information.Teachback is a simple but powerful idea, that we can learn by explaining what we know to another person, who then explains what they know. The conversation continues until both reach new understanding. It is used routinely in healthcare to make sure patients understand how to manage their medicines, but has not yet been widely taken up in classrooms.

Resources

An introduction to teachback in healthcare from the Scottish Health Council, with a video of the technique being used for a patient interview:
bit.ly/2aY7bFu

Toolkit to help health professionals learn to use teachback:
www.teachbacktraining.org

The original formulation of teachback from Gordon Pask. The book is a fascinating exploration of how to formalise the learning process, but is a challenging read.
Pask, G. (1976). *Conversation Theory, Applications in Education and Epistemology*. Amsterdam, The Netherlands: Elsevier. A photocopy of the book is available online at:
bit.ly/2aY5Y1c

Review of 12 published articles on teachback for patients. The methods showed positive effects on a variety of outcome measures, though not always statistically significant:
Dinh, T.T.H., Bonner, A., Clark, R. Ramsbotham, J. & Hines, S. (2016). The effectiveness of the teach-back method on adherence and self-management in health education for people with chronic disease: a systematic review. *JBI Database of Systematic Reviews and Implementation Reports*, 14(1), 210-247.

The use of teachback for science learning:
Gutierrez, R. (2003). Conversation theory and self-learning. In D. Psillos, P. Kariotoglou, V. Tselfes, E. Hatzikraniotis, G. Fassoulopoulos & M. Kallery (Eds.), *Science Education Research in the Knowledge-Based Society* (pp. 43-49). Springer Netherlands. An extract with the section on teachback is available at:
bit.ly/2bjO6QA

Study of the use of teachback with diabetes patients:
Negarandeh, R., Mahmoodi, H., Noktehdan, H., Heshmat, R. & Shakibazadeh, E. (2013). Teach back and pictorial image educational strategies on knowledge about diabetes and medication/dietary adherence among low health literate patients with type 2 diabetes, *Primary Care Diabetes*, 7(2), 111-118.
bit.ly/2aWak5y

The method of reciprocal teaching:
Palincsar, A.S. & Brown, A. (1984). Reciprocal teaching of comprehension-fostering and comprehension monitoring activities. *Cognition and Instruction*, 1(2), pp. 117-175.
bit.ly/1mBKkT8

Teachback by phone:
Rudman, P. (2002). *Investigating domain information as dynamic support for the learner during spoken conversations*. Unpublished PhD thesis, University of Birmingham.
bit.ly/2fqslvc

Websites on Teachable Agents, from Stanford University and Vanderbilt University:
aaalab.stanford.edu/research/social-foundations-of-learning/teachable-agents/

www.teachableagents.org/