LEARNING ASSESSMENT aka HOW DO YOU KNOW THAT LEARNING HAPPENED

Opening questions for the reader before reading:

- What is it that you usually want to achieve with your teaching?

- Can we measure learning? How?

- Do you usually assess if your audience learned anything? How?

- When do you assess their learning?

- If and how do you assess yourself as an educator?

In zero waste and in environmental topics in general our main end goal is usually that people start to think and behave differently, that they take different decisions than before, which also incorporate environmental reasons. So we want them to start acting differently based on the new things they learned. And knowing if your teaching actually helps them to do that, is essential.

What is the best way to assess a change in behaviour?

Probably this means we should know what the behaviour was before and after the learning-teaching intervention. Would this mean that we should follow people around and see how they behave? Well, basically yes. This however is often rather difficult to do and more or less only scientific research teams with strict ethical protocols are able to do that. What is often done instead is asking people about their behaviour. But here it's important to remember that **asking people about their behavior is not always a reliable source of information.** One of the reasons for it is human psychology again – when asked about our behaviour, we tend to make things nicer than they are, tell small lies without even noticing it ourselves – most of us want to look better than we are in reality. It's also because our perception of our own behaviour is not actually the same as our actual behaviour. This can often even extend to our actual behaviour – if we know someone is watching, we can act differently than usual. So the observation usually means having to set up official scientific experiments, where the participants are informed about the study, its goals and agree with participating, but at the same time are not conscious what part of their behaviour is under the study.

Truly assessing the impact of an intervention (a learning activity) is difficult and not something we can easily do by simply asking questions to the learners, unless we are able to design a really reliable and valid set of questions, which usually takes a lot of time. So it can be quite a messy process.

But this doesn't mean that we shouldn't try to assess learning. We just need to accept that every assessment comes with some margin of error. We can still find ways to check whether the things we taught are remembered afterwards and if some concepts or skills are put into practice. If we are working with our group of learners for a longer term (e.g. consultation process for a company or municipality), then this also allows us more easily to check if and what they have learned, by noticing if they still have some misconceptions and asking inquisitive questions about that.

When it comes to assessing learning, we first need to define what it was that we wanted our learners to learn in the first place. And we need to be sure whether we are assessing:

- **A.** Their perception of their own learning
- **B.** Their enjoyment of the learning activity or
- **C.** Their actual learning

Probably in the end we are interested in the last one. So the first thing is to **define our desired learning outcome**. And more importantly, making it a realistic one. Reading through our chapters on how learning happens and how slow the process actually is, it is quite fair to say that we often **tend to overestimate what can be realistically learned** in the time given to us, for example in short one hour sessions. In that one hour we will probably not have time to enable someone to correct his/her misconception. In one hour we can probably only find out that there are misconceptions and help learners to start questioning them.

Learning cannot be hurried (as it also suppresses the feeling of autonomy), our working memory has a limited amount of new things it can process at a given time. So this is simply something we need to accept as educators.

HOW TO ASSESS LEARNING?

Take a look at this list and think which ways would be a good way to assess learning and why, and which would not be that good; why?

What have you used yourself in the past?

- Quiz right after the session
- Quiz after some time has passed after the session
- Asking people to compare their knowledge in the beginning of the session with the end of the session
- Systematic observation of people's behaviour (or traces of behaviour, like amount of trash in certain place, etc) before and after the session
- Observing what kind and how many questions learners had throughout the session and after it
- Using valid and reliable questionnaires (if there are any) about the topic you are interested in
- Asking people to send data (e.g. images) about their behaviour afterwards
- Asking people if they liked the session
- Asking people what they liked most in the session
- Asking people to solve a problem related to the session's main topic before the session and after some time has passed from the session
- Using experience sampling apps
- Asking them to keep a diary for some time

Also think about this example you might know from the *Main principles of teaching* chapter:

> *"I wanted to teach about the environmental impacts of food. I showed the students images of 2 food items: beef and avocado and asked which has a bigger impact and why. Most of them said avocado, because it comes from far away and has a big impact from transport. I then showed them a graph, which illustrates how small the impact from transport is (6%) and that the main impact comes from how the food is farmed (land use, use of pesticides etc). Everybody looked surprised and it felt like a good wow-moment for me.*
>
> *A month later, when I asked them to assess the environmental impact of different food items and how to lower that, many of them still focused on transport and even after showing the graph again, they still needed several questions from me to think about the land use impact."*

What does this story tell you about assessment of learning?
Before continuing with the rest of the chapter, reflect about both the list and this example, what does it mean for learning assessment and what are the best ways to do it?

Here are some thoughts:

- What the story tells us is that if there would have only been one session, the educator would have left the whole experience thinking that she succeeded in teaching people something new. It was only thanks to the next session a month later that she realised that this new concept hadn't actually reached her learners. So although it was a teaching failure, it was valuable information for the educator on the learning goals not being met. How often do we actually leave without checking if we made that trace into our learners' long term memory? It's not always possible to check that, but then we also need to realise that we also don't know for sure if our work had an impact.

- If you have read the *Main principles of teaching* chapter, then you probably know that it makes more sense to check whether people learned from your session some time after it happened and not right after it.

- It is always advisable to use open ended questions and not quizzes with multiple choice answers, because retrieving information is actually good for making the content also retrievable in the future. The opposite – just recognizing the right option – will not. And second, when using multiple choices, it's harder to know what were their own thoughts and where they still might have knowledge gaps or even misconceptions.

- It's natural for humans to want to be liked and we tend to ask that also about your learning activities and we feel good if people say they liked our sessions. But it's important to know that enjoyment and learning are not the same thing. They can happen together, but enjoyment is not a metric for learning, because sometimes learning can be difficult and at the same time we can also enjoy situations, where we don't learn anything new. So it's better not to ask learners about that, because it just tends to distract us as educators. Learners liking you is a bonus, but not our main focus.

- Having to solve a problem, where learned knowledge and skills need to be applied (kind of a test), is quite a good way of assessment (in the story above it would be environmental impact exercise of new food items). This also means meeting the learners at least twice, so that same problem-solving task with some time apart can be given to learners. But we have to keep in mind that in test-like situations, everything that makes people feel stressed or anxious harms the actual problem solving – for example time pressure, social comparison, high-stakes, telling them that we are testing their learning etc. And as an educator we may not always understand what aspects in a given situation may be perceived as stressful.

Should the context of the problem solving test be the same each time or different? Why?
What does the chapter on learning basics and memory tell us?

In reality we want the learned skill or knowledge to be **flexible** – meaning people are able to use it in different contexts. So the problem solving test should offer a new context for the concept learned. One way to do this is also during the learning session/ training. In our training programs we have included these parts (scheduled on the 4th and 5th day of the training):

- For the **Zero Waste Ambassadors** there is the Zero Waste City role play game, which incorporates all the knowledge and skills tackled in previous sessions and puts learners in the situations where they have to solve problems by using skills and knowledge gained on previous days.
- For the **Zero Waste Trainers** there are the teaching mini-sessions, where in the same way learners try to put into practice the main elements of teaching, and the session is then jointly analysed by the whole group.

In both programs, the expert trainers are there to first offer challenges (role playing) and observe and then give feedback. This of course is in a training setting right after the learning sessions, so ideally another assessment could be made later on, in learners' real life situations. If this is not possible, having another session or meeting later on, where learners can even try to solve hypothetical new problems, would work as well. In our training programs we offered some zero waste and training related scenarios to solve during a follow-up interview a few months after the training event.

HOW TO MAKE EVALUATION QUESTIONS?

What we often do and which is also a way to assess learning, is evaluation questionnaires to learners. Creating good questions is actually very tricky. There can be questions which actually don't give us the info we need, we are just used to asking them (like "What did you like most about the training?"). We should remember to respect the time of our learners and choose our evaluation questions very carefully, only leaving in the questions where we know clearly what information we want to get from there, how we will use this info and making sure that these questions do give us this data reliably.

Much of the rules mentioned before apply here too: questions should be open-ended and as neutral as possible, avoiding implying questions and socially desirable answers (e.g. "Were the trainers nice and supportive?" implies that you should answer "Yes") and in a good way tricking the respondents slightly so that their thinking process wouldn't be too much directed and that they are actually able to answer the questions. But you also could use scales with (rather neutral-phrased) statements about the topic that interests you and ask the learners how much they agree/disagree with these. Such scales can be used in various contexts – asking about values, attitudes, but also knowledge and behaviour; or feedback about educators, etc.

For example if we want to assess whether we met the three basic psychological needs of the learners, we don't ask that directly, because they might not be able to estimate themselves if they were met. Instead we can put it into practical context, for example:

Rate from 1 - 6 (1 - I do not agree at all   2   3   4   5   6 - I completely agree):

1. During the training I understood why the learning activities were set up the way they were
2. During the training I felt as if I were "invisible" to the trainers
3. During the training I felt, that I can slow down the pace of training to ask for additional explanations
4. During the training I felt that I could not say out loud what I really thought about the topics we learnt
5. During the training I felt that the trainers were really caring towards the group
6. During the training I was not sure how to best learn the material

Can you guess which question is about which basic need?
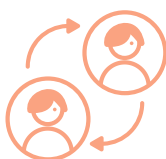
Here are the answers:

Relatedness – 2 (reversed version) and 5
Competence – 3 and 6 (reversed version)
Autonomy – 1 and 4 (reversed version)

The reverse version questions add diversity and balance to the questions, so that not all of them are framed positively and the respondent has several angles to evaluate the educational activity. Also it could help to test if the respondent actually reads the questions and doesn't just answer the same way to all of them (giving the same score to all the questions).

SUMMARY

A short summary of the messiness of assessment and how to put it in practice:

- Don't rely solely on the emotions nor the skills and knowledge your learners have **right after** your learning activity.

- If you want the material you taught to stick with your learners for a longer time, try to find ways to assess that after some time has passed from your session. Offer possibilities to retrieve the learned material (check *Main principles of teaching* chapter for more) – this helps to make the memory traces stronger.

- Use open ended questions as much as possible – this way you'll get a more correct idea of your learners' actual understanding.

- Use cases and scenarios, problems to solve in different contexts to see if the learners can apply the learned things in practice. If possible, give a problem to solve in the beginning of your learning activity and some time after, so you can compare the difference and impact of your teaching.

- If possible, test your evaluation questions with fellow-experts and also non-experts, to see if they are easily understandable, assess the aspects you planned to assess and give you the information you need.

Valid and reliable assessment is difficult and complex and requires work on the level of scientific research (e.g. observing people's behaviour without any other influences; or making a functional measurement instrument, like a questionnaire). In usual training situations we do not have the time or resources for that. There are still ways and methods mentioned above that we can use to get some sense of if and what kind of learning happened. But it is important to keep in mind that with wrong types of assessment we create the illusion of teaching for ourselves.

FREQUENTLY ASKED QUESTIONS

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

1. After my session I got many compliments from my audience and several of them said they really liked it. Can this be considered as proof of successful teaching?

2. I feel my session went a bit out of hand: people had so many questions, they wanted to discuss the topic and then the time ran out and we had to finish up in the middle of the conversation. Is this a sign of not so good teaching?

1. After my session I got many compliments from my audience and several of them said they really liked it. Can this be considered as proof of successful teaching?

Actually not, or – we do not know. If you want to assess teaching, assess (durable and flexible) knowledge. It's very nice if people are having a good time and enjoying something, but this is not necessarily connected to the fact if they learned or not. It might be that you simply offered them a lot of amusing things and told them exactly what they wanted to hear (and what they already knew). But it can also mean that you really created a learning experience – where everybody thinks, struggles, feels confused from time to time, asks substantial questions, draws conclusions, debates and so on, and while doing that, you supported their three basic psychological needs at all times. It can also mean as a side-effect of learning and with you supporting their basic psychological needs, that they enjoyed the session. The point is that praise for your session only cannot be used to assess whether learning happened.

2. I feel my session went a bit out of hand: people had so many questions, they wanted to discuss the topic and then the time ran out and we had to finish up in the middle of the conversation. Is this a sign of not so good teaching?

Although the reality here really depends on the specific situation, the questions being asked, etc, it is generally actually a good sign if people have questions and you feel there is not enough time. This of course means if the questions are related (even if related not that closely) to the topic in discussion. It means that people's thinking and pre-knowledge was activated and they wanted to know more. We can never teach everything we want and the time will always be too short. If the learners leave the session with questions and wanting to know more about it, then this is a better situation than if they just enjoyed themselves but have actually no need to ask for more – this probably means they didn't learn much new as with deeper learning, questions tend to arise.

Ending questions for the reader to reflect upon:

- What parts in this chapter were most confusing or difficult for you to understand? Why do you think it was so?

- From the examples in the chapter, what methods of learning assessment could be applied in your work? Why?

- What do you think, do we more often tend to assess the illusion of learning or actual learning? Is there anything that needs changing in that?

- What do you want to take with you from this chapter?

- If and what next steps do you want to take in your work regarding this topic?

- What do you want to know more about?