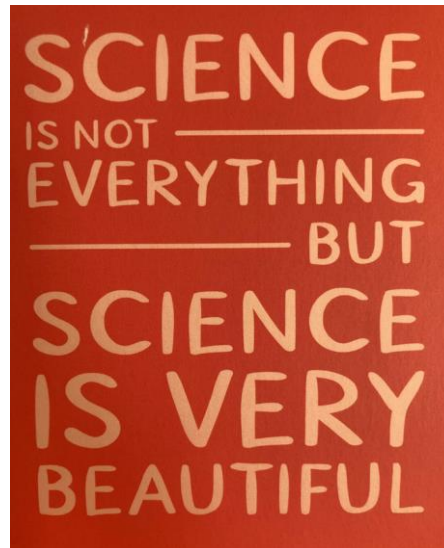


# "The art of teaching"

How to communicate scientific content to a non-scientific audience



20./21. April 2023

**Physics Center Bad Honnef**

Evelyn Stahl, Bonn

# Contents of the workshop

---

## ➤ Basics

- speaker and target group
- technical language or "lay language"?

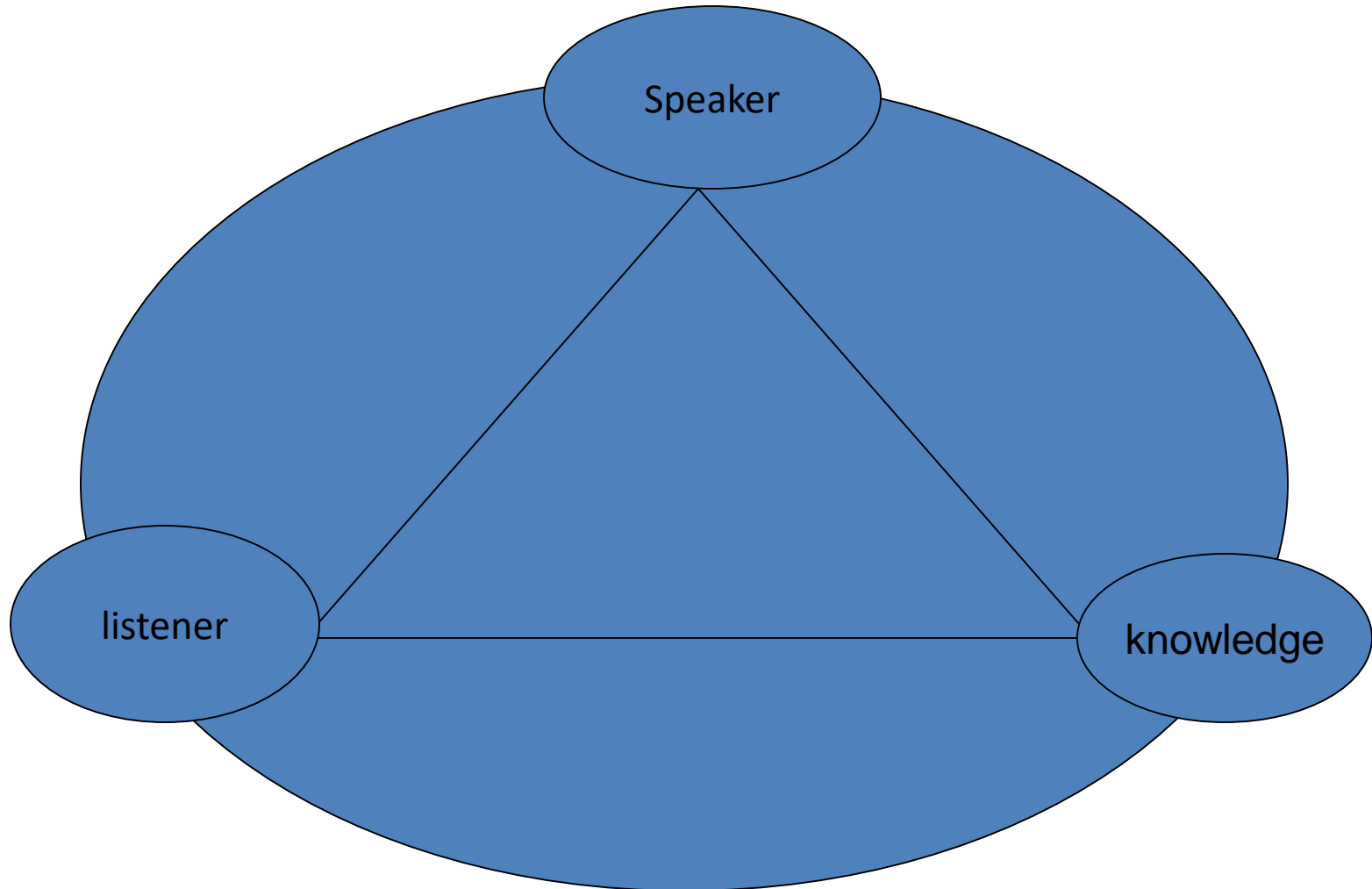
## ➤ Conception and structure of course/presentation

- different phases
- motivation and activation of listeners/students
- performance and media

## ➤ **Individual presentation training**

# The lecture world is triangular

---



# The lecture world is triangular

---

The teaching-learning triangle tries to model the complex relationships of a learning process

1. Knowledge cannot be imparted directly, but must be **actively acquired** by the listener
2. Listeners must **get in touch with the topic themselves**

→ When planning the course, a few thoughts should be about the speaker and the target group

Role models - good and bad - often influence our actions

## **Do you have role models?**

- What are the characteristics of your role models?
- YOU, as a speaker, are of course also a **ROLE MODEL** for your students

# The speakers

---

- [TED's secret to great public speaking | Chris Anderson - YouTube](#)
- Text TED Talks EXERCISE → the ideal public speaker



# The target group

---

*"The worm must taste good to the fish, not to the angler!"*

## **Do you know your target group?**

- prior knowledge, needs and expectations?
- learning and attention barriers
- learning types
- **Example:** High school students →...

# Needs of older teenagers

---

- Pupils in the upper school: grown up mentally, but sometimes they are still “kids” (phase of "late adolescence" → identity formation processes are still going on)
- “Coming up with the right solution by myself” - this is the motto of adolescents
- Bearers of a large amount of prior knowledge → learning experts
- Clueless beginners, quickly overwhelmed
- need to be motivated for a new topic/subject



# How does learning work?

→ Obstacles to learning and attention

**You can help!**

# Obstacles to learning and attention

---

Students need good teachers and good teaching strategies – This is **your job!**

- The brain needs points of contact to store new information → **activate prior knowledge**
- Listeners must **get in touch with the topic themselves**
- Learning/listening is exhausting → **please show love and understanding (-:**
- We only learn what interests us → **students need motivations → make things interesting!**
- Learning/listening requires structure → **create an understandable structure of the lesson or the presentation!**
- As learned/heard, so forgotten → **appeal to several senses / use repetitions**

# Learning Types

---

➤ 3 different sensory-specific learning types

1. Learn visually
2. Learn auditory
3. Learn kinaesthetic

➤ Different didactic approaches

1. By illustration
2. By audio samples
3. Be active himself/herself

Presentate your topics in a way that different types of learners are addressed

→ Whats your learning type?

# Material transfer: Learning style matrix

---

Three different approaches to the lecture material

1. "What?" - style

- Listener needs information/knowledge (input of facts)

2. "How?" - style

- Listener understands through experience (exercises)

3. "Why?" - Style

- Listener needs reference before understanding

# Presentation – Preparation

---

## ➤ Collect and select material

What is important, what is dispensable?

What does the target group need?

## ➤ Compress

Keep an overview and don't lose yourself in the details

## ➤ Visualize

Create a meaningful and understandable presentation of the content

# Presentation - Getting Started

## Opening

- What is important?
- Discussion with colleagues

# Presentation – Opening (1)

---

**Strategy** : Attention from the start

- Greeting
- Reason, topic, goal
- Creating personal concern – “connect“ the audience to the presentation
- Short "sightseeing flight" over the lesson/presentation
- Give an overview and stick to it linguistically (“There are three different topics today, first, second, third...use your fingers showing one, two, three)
- Maybe use an anecdote from your own school/study time

# Presentation – Opening (2)

---

## TIPS for success

- Be positive → good mood and good attitude
- Schedule - verbal or written “red thread” (gives orientation to your audience)
- Start your lecture/presentation on time
- Make (visual) contact and create a good atmosphere
- Use moderation cards or keyword list on screen
- You have to speak loud, clear, friendly, binding



# Presentation- Main part (1)

---

- Structure: following a „red thread”
- How to structure the lecture
  - Order of facts is important
  - Link learning content (also linguistically) with one another and build on one another
- Define main and sub-points (*Less is more!*)
- Establish a connection to the world of experience of the listeners

# Presentation- Main part

---

- **Structure** provides orientation and conveys security (reliability) → create a positive learning atmosphere
- Structure options
  - Genetic structure (contents by time: what was first, what was then, and what was after this..)
  - “Rule of three”: What was?What is?What will be?)
- This includes a **linguistic structure** at the beginning of the course (e.g.: "Today three points are important: first..., second..., third...). This creates **clarity** for the students.
- Start with an **overview**

# Presentation- Main part (3)

---

- Generate **attention** →
  - structure the presentation by asking some questions
  - provide variety in media
  - divide material into short presentation sections and take breaks
  - visualize usefully
- Use **examples** and metaphors
- Speak in **short sentences** with deliberate **pauses**

# Presentation – Closing

---

**Strategy** : What should be remembered?

- Significant “last” words– give a short summary
- Create a bridge to the opening
- Give an exciting thematic outlook (for the next event e.g.)
- Optional: Ask for direct feedback
- **Optional: One minute paper → .....**
- Don't forget to say „thanks!“ to your audience

# Presentation – Closing

---

## One minute paper

- A one-minute paper is a short activity (you can set a timer at 1 minute) you can use for feedback
- Students answer **two questions**:
  1. What was the most important thing you learned today?
  2. „hat didn't you understand / what was least important?

# Presentation – a word on the language...

---

## **Technical language/ jargon**

- High information density in long sentences
- Many nouns
- Professionally defined terms
- kind of slang that no one outside your bubble will understand

## ↔ **Everyday (lay) language**

- Information in many short main and subordinate clauses
- Many verbs
- Commonly known terms
- Many examples, metaphors

# The simpler the better

---

- Use **active** wording (instead of passive)
  - Present processes in the **correct order**
  - Make **logical references clear in language** (by, because, after, as a result, ...)
  - It is better to have several **short main and subordinate clauses** with many **verbs** than one or a few sentences in the nominal style (means many nouns)
- **helps your students stay focused and engaged**

# Performance

---

- Body language and facial expression
- Voice
- Media use



# Appearance and body language

---

## Non-verbal signals

- Outer appearance
- Includes posture, gestures, facial expressions (including eye contact)
- **TIP:** Do **hands gestures** only underneath **a thought line** at the level of your chest - don't go any higher (-> this is irritating)
- **Body language** is instinctive and it is a **very old** type of language -> highly believable for us; we have a **deep trust in non-verbal signals**
- It's important to be **congruent**: Your body language has to fit to what you're saying

# Body language: Credibility

---

- Body language **55%**
- Voice **38%**
- The said **7%**

# SMILE experiment

---

Body language not only has a one-way effect, it also affects ourselves

***Improve your mood!***

Clamp a pencil between your teeth for about a minute without touching your lips. - This engages the same facial muscles that you use when smiling. This leads to a hormone release that actually improves your mood: your smile will become "real".

# Human beings: so called "eye animals"

---

- 80% of the stimuli are received by the eye
- Therefore: **Keep eye contact**
- Good eye contact is not rigid (no starring)
- Sign of commitment, respect and appreciation

# Voice

---

This is important

- Speech modulation
- Speech comprehension (voice speed - slow/fast)
- Volume (talking too loudly or too quietly)

# Voice

---

- Try **raising and lowering** your voice and pay attention to **pauses in speaking**, otherwise it will become **boring** and the listener will **mentally drop out**
- Even if you only **have a little time** and **a lot of material** to convey: **Don't** be tempted to **speak** very **quickly** in order to mention as many facts as possible
- → It is better to name links or to prepare a script or to give homework

# Media use

---

Key word: PowerPoint

- A good slide cannot stand alone; it's not explanatory - it needs you!
- The presentation should support YOU, not the other way around!
- Mind reading energy robbers!
- Using Pp: Never turn your back to the audience and don't neglect interaction
- **Don't become a talking robot!**

# Simple "rules of conduct" for speakers

---

## Show your presence!

- Adopt an open, welcoming attitude
- Speak kindly and articulate clearly
- Maintain eye contact
- Never show your back to the audience.

**Always be yourself!**



# Evaluating the Presentation / Feedback to speaker

Evaluation matrix for presentations

			A	B	C	D	E	
			very well fulfilled	well fulfilled	Fulfilled	insufficiently fulfilled	not fulfilled	
1	structure	clearly structured, common thread, comprehensible						incomprehensible, no visible structure, causes confusion
2	Contents	factually correct throughout						serious factual errors
3	relevance	relevant, exciting and appropriate						irrelevant, no value, inappropriate
4	presentation documents	appealing, supportive media support						unappealing, confusing, way too big, or too little
5	language and expression	understandable and comprehensible, appropriate vocabulary, rhetorical security						not understandable, little vocabulary or overly complicated expression
6	rate of speech	takes breaks, appropriate pace, continuous flow of speech						No breaks or too long breaks, too slow or too fast, halting
7	Voice	good intonation, one likes to listen, appropriate volume						monotonous, drowsy, too quiet or too loud, difficult to understand, listening is exhausting
8	eye contact	free lecture, eye contact with the entire audience						No eye contact, fixing or reading slides or cards
9	Gestures & facial expressions	open and inviting attitude, facing the audience, facial expressions are relaxed and appropriate to the topic						reserved or stiff posture, turned away from the audience, exaggerated or understated facial expressions, irritating gestures