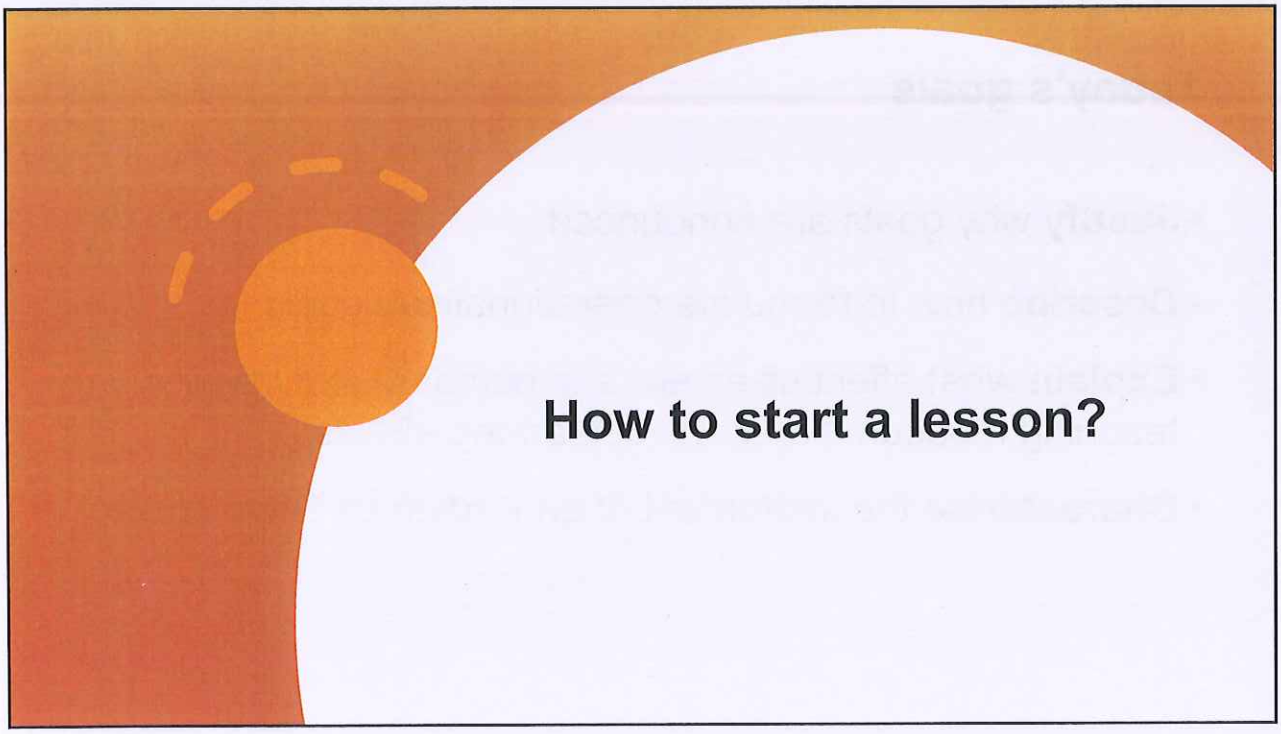
# Unit 2

## Today's goals

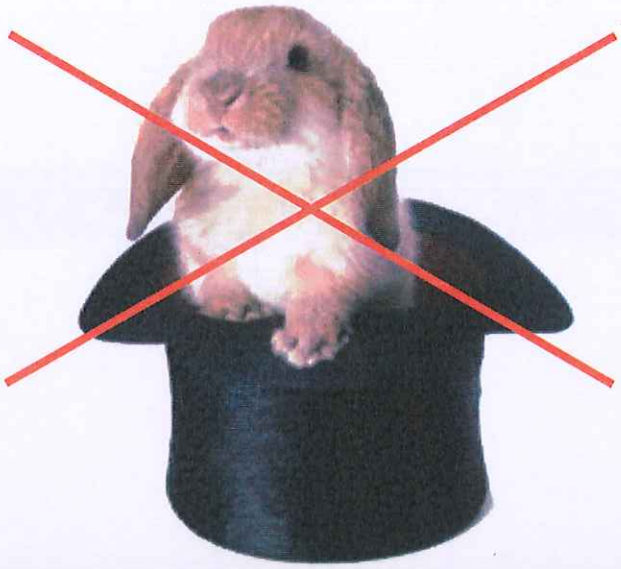
- **Justify** why goals are announced
- **Describe** how to formulate operationalised goals
- **Explain** what effect sizes are and compare individual teaching measures in terms of learning effects
- **Characterise** the instrument of an «Advance Organizer»

## Steps of today's lesson

- The meaning of transparency in education
- Goals and steps
- Meta-level: Effect sizes
- Advance Organiser
- Goal-driven education. Why?
- Operationalise: What does that mean?
- Practice for today's content



## No pulling a rabbit out of the cylinder ...



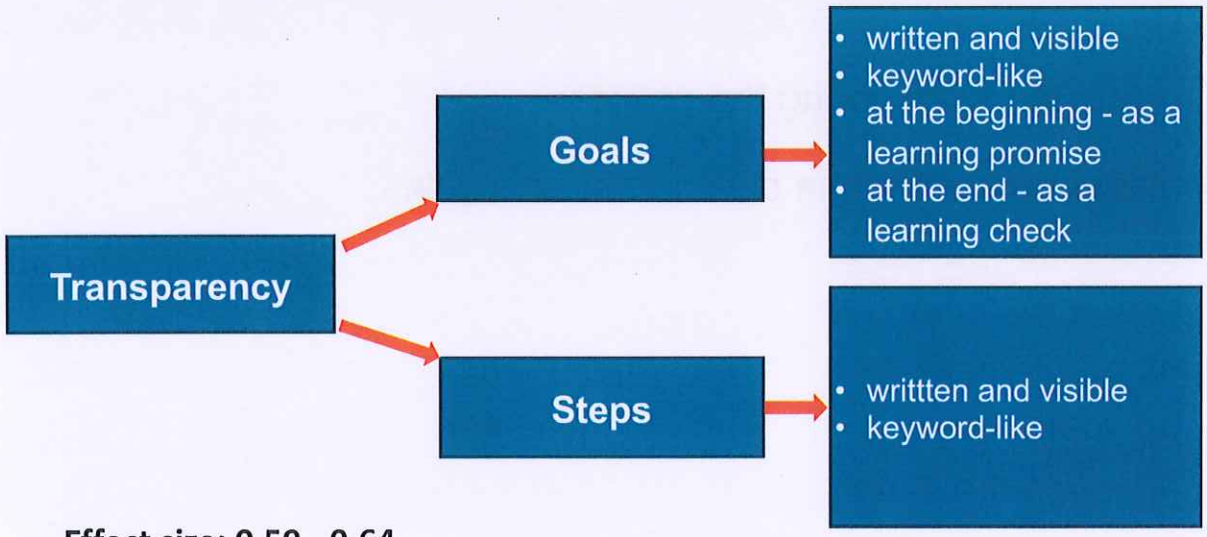
## ... but transparency instead

- by clearly declaring the process
- by announcing the operationalised goals

## Goals and Steps

10

## GOals and STeps (GOST)




**Effect size: 0.59 - 0.64**

## Reason GOST

- Students understand the objectives and expectations of a learning unit
- Basis for targeted learning
- Understanding and motivation are encouraged
- In short: **We are increasing the effect size!**

## Let's talk about the effect sizes

Meta Level

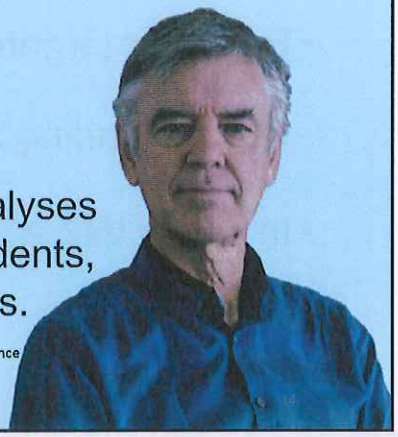
- Shows how effective a measure is in the classroom
- "Normal" lessons have an effect of 0.00
- From 0.25 an effect is good and the measure is successful
- From 0.40 the effect is considered spectacular[1)]
- According to Karl Frey, GOST has an effect of 0.59

[1)] Karl Frey Lecture Notes "General Didactics", Zurich, 1997

Meta Level

## John Hattie

- World-renowned, award-winning education researcher
- What works best in student learning and achievement
- **Visible Learning** - a data-driven meta-analyses of 90,000 studies and over 300 million students, that proves what actually works for learners.



- https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/
- We have determined the pooled standard deviation with a value of 40. Cohen's d is now calculated from the difference between the two mean values divided by 40, in the example: (173-167)/40 = 6 / 40 = 0.15.

Meta Level

## 10 Examples

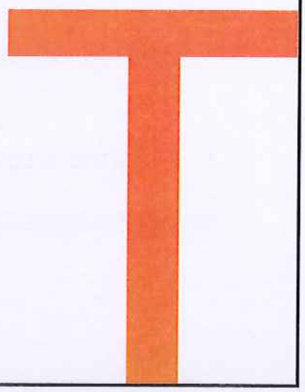
1. **Feedback (d = 0.70)**
   One of the most effective methods for improving learning outcomes. Effective feedback should be specific, timely, and constructive to support the learning process.
2. **Learning Goals and Success Criteria (d = 0.68)**
   Clearly defined learning goals and transparent success criteria help students understand the purpose of learning and monitor their progress.
3. **Direct Instruction (d = 0.60)**
   Involves structured, teacher-led methods where content is systematically presented and explained.
4. **Metacognitive Strategies (d = 0.60)**
   These strategies enhance students' awareness of their own learning processes, helping them to plan, monitor, and reflect more effectively.
5. **Cooperative Learning (d = 0.55)**
   Where students work together in small groups, fosters social and cognitive skills through idea exchange and collaborative problem-solving.
6. **Activating Prior Knowledge (d = 0.93)**
   Helps students process and connect new information by building on what they already know.
7. **Classroom discussion (d = 0.82)**
   Envolves the entire class in a discussion. Teacher stops lecturing and students get together as a class to discuss an important issue. Everyone learns from each other.
8. **Setting Standards for Self-Judgement (d = 0.62)**
   Students who reflect on and assess their own learning processes and outcomes develop a better understanding of their strengths and weaknesses, enabling targeted improvements.
9. **Peer Tutoring (d = 0.53)**
   In peer tutoring, students support each other's learning, benefiting both the tutors and the tutees by deepening their understanding of the material.
10. **Teacher-Student Relationship (d = 0.52)**
    Effective classroom management, including clear rules, routines, and positive relationships, creates a conducive learning environment and reduces disruptions.

## Task 1: Considerations on effect sizes

**Task:** Please study the list on the slide with the 10 examples, on script U2. Think about,
**a)** which of the measures you already use regularly
**b)** which of the measures you will use in your next teaching unit.
**c)** After 10 minutes, inform the person next to you about b) and explain your choice.
**d)** In the next didactics event, you may give a short statement about your experience.

**Interaction pattern:** > Individual work (a, b)
> Partner work (c)

**Location:** Seat
**Medium:** Notes / Flip chart
**Time:** 10 minutes for a) and b)
5 minutes for c)

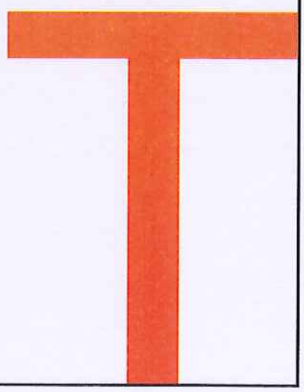


## Task 2: Engage with «Visible Learning»

**Task:** **a)** Have a look at John Hattie's website. Study the menu item "Infographics" in particular https://visible-learning.org
**b)** Share your most important observations with the person next to you.

**Interaction pattern:** **a)** Individual work
**b)** Partner work

**Location:** Part 1: Seat
Part 2: Free choice of location
**Medium:** Laptop, notes
**Time:** 15 minutes for a)
10 minutes for b)



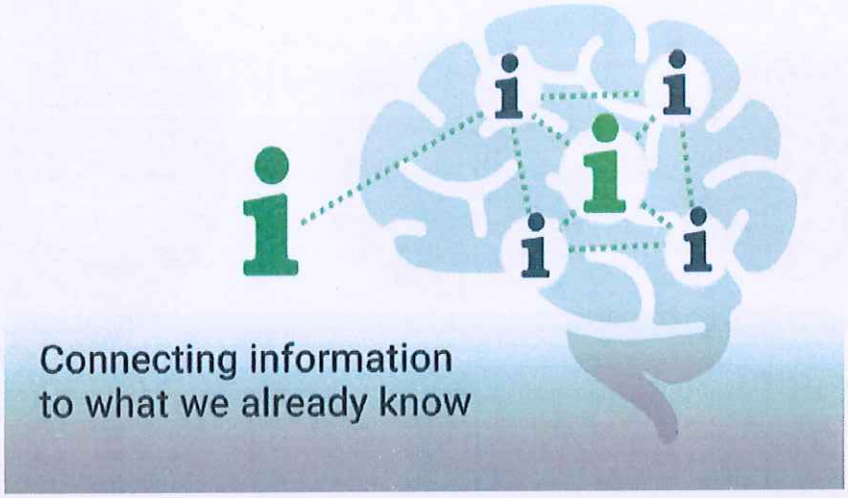
# Let's boost it with an Advance Organiser (AO)!

## Activating prior knowledge, but how?

- Address important contents of the following lessons
- Brief justification for the choice of content
- Discuss a term from the upcoming lesson

https://www.youtube.com/watch?v=yAgjZDZD0Hs

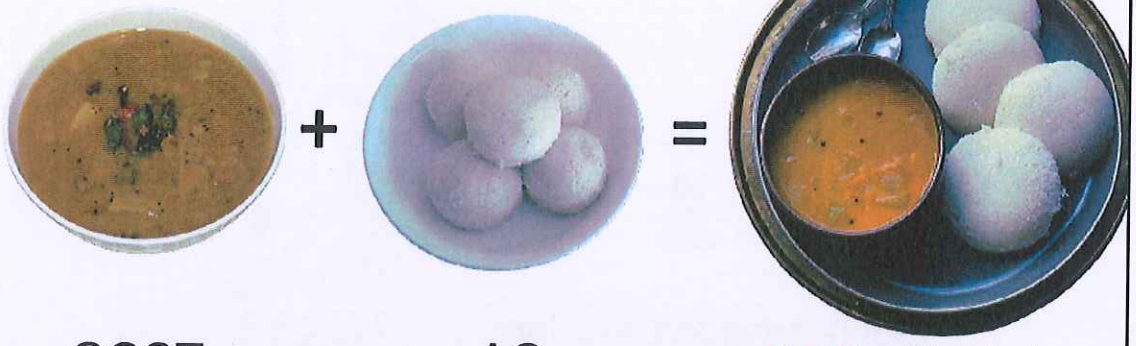
## Advance Organiser




## Task 3:

| | |
|---|---|
| **Task:** | Read in the script U2 the text »Advance Organizer. How can I create an advance organizer and use it effectively in my course?». Create according to the instructions an AO for one of your courses. |
| **Interaction pattern:** | Individual work |
| **Medium:** | Laptop, Powerpoint |
| **Location:** | Private |
| **Product:** | AO for one topic introduction of your lesson/course |
| **Time:** | Recommendation: invest max. 40 minutes |

**Let's be amazed!**



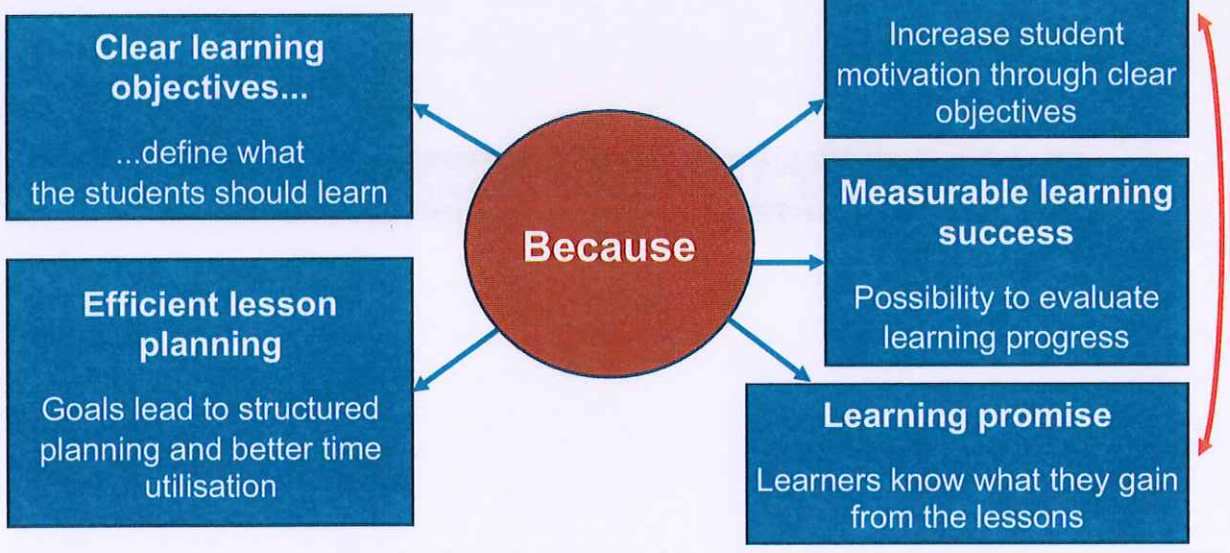
GOST + AO = **0.93** effect size

Meta Level

# An effect size of 0.93 is absolutely spectacular!

## But now to the details!

## Goal-driven education. Why?



## How do you formulate goals?

- As factual and clear as possible
- Operationalised
- Cognitive Levels according to Benjamin Bloom

## Operationalised Goal Formulation

## "Operationalised" - what does this mean?

A goal formulation is **operationalised** if it states what a student will be able **to do** once the goal has been achieved. The verbs used are decisive.

**Examples:**

**Remembering**
- memorize
- repeat
- list

**Understanding**
- discribe
- discuss
- explaine

**Applying**
- solve
- demonstrate
- implement

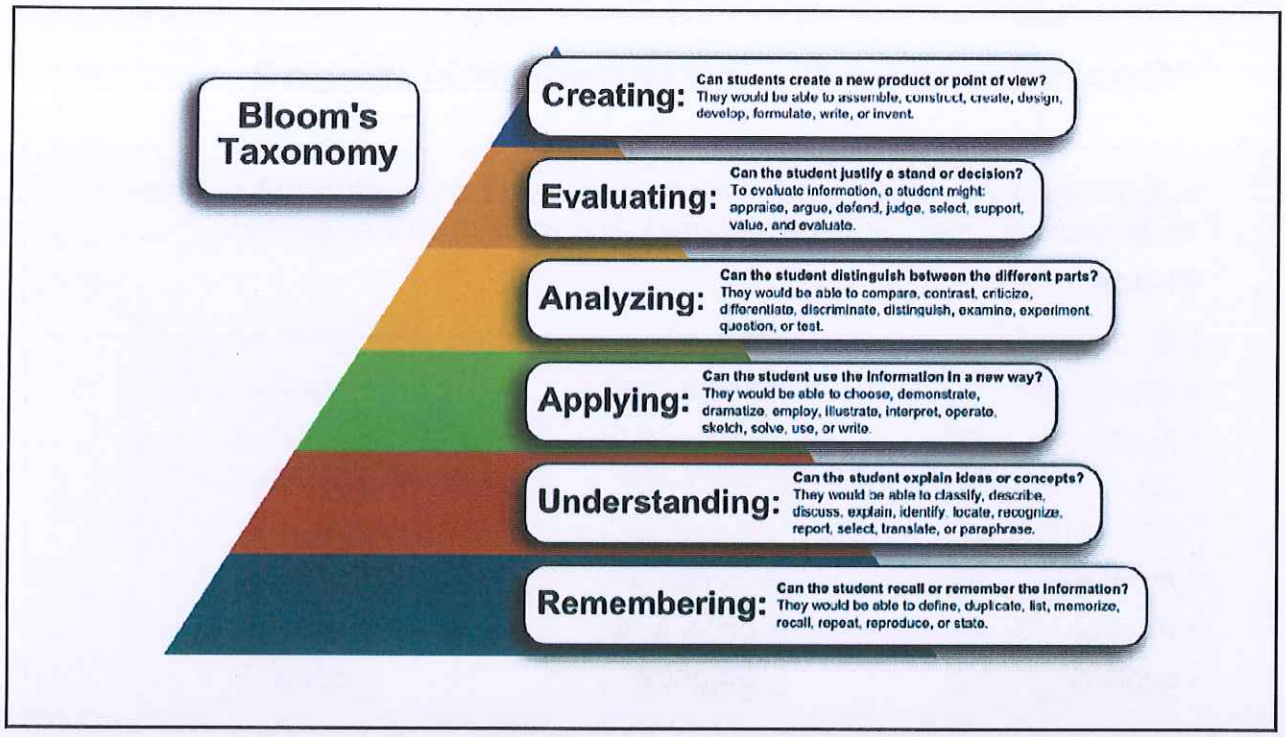
**Analyzing**
- compare
- distinguish
- organize

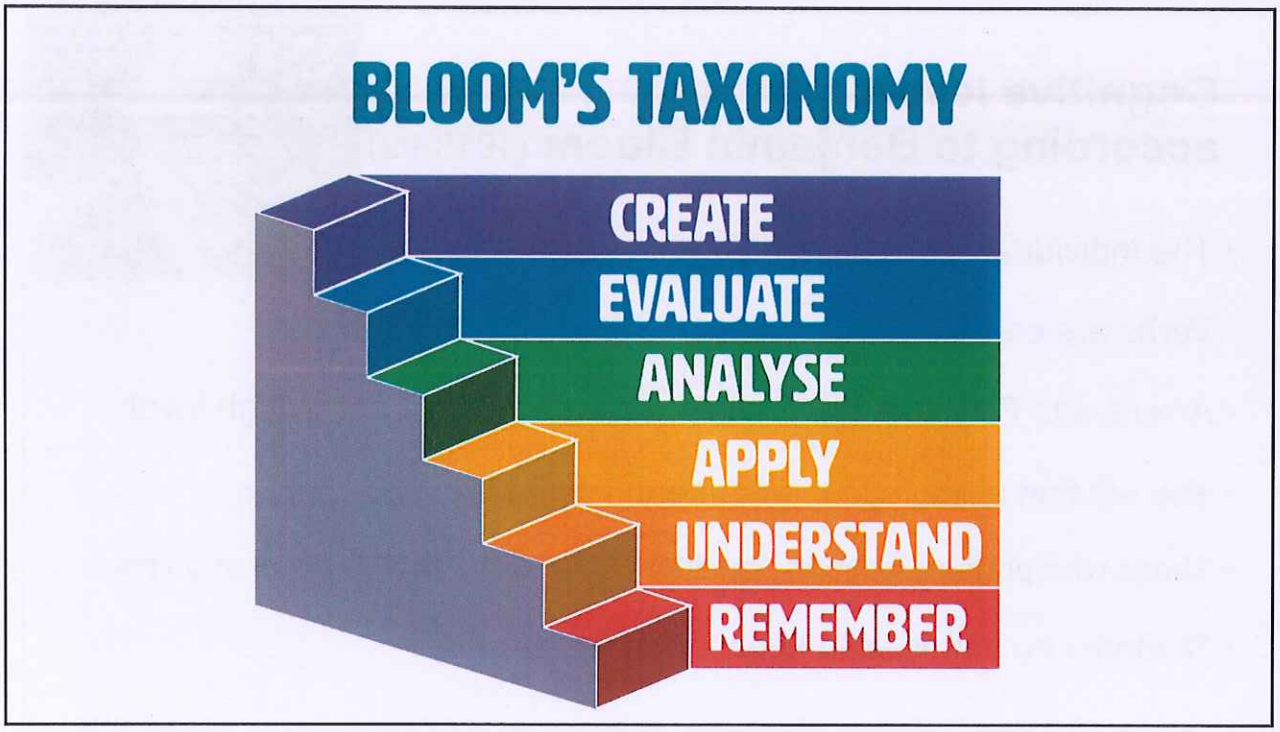
**Evaluating**
- argue
- judge
- critique

**Creating**
- construct
- develop
- design

## Cognitive levels according to Benjamin Bloom (1913-99)

- The individual verbs have different cognitive levels
- Verbs are categorised according to the level they express
- A verb with C1 has a low level and a verb with C6 has a high level
- You will find a list in your documents, script U2
- Those who prepare lessons pay attention to **different levels** of cognition
- Students do not need to know the C levels


Bloom's Taxonomy
Creating: Can students create a new product or point of view? They would be able to assemble, construct, create, design, develop, formulate, write, or invent.
Evaluating: Can the student justify a stand or decision? To evaluate information, a student might: appraise, argue, defend, judge, select, support, value, and evaluate.
Analyzing: Can the student distinguish between the different parts? They would be able to compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, or test.
Applying: Can the student use the information in a new way? They would be able to choose, demonstrate, dramatize, employ, illustrate, interpret, operate, sketch, solve, use, or write.
Understanding: Can the student explain ideas or concepts? They would be able to classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, or paraphrase.
Remembering: Can the student recall or remember the information? They would be able to define, duplicate, list, memorize, recall, repeat, reproduce, or state.


BLOOM'S TAXONOMY
CREATE
EVALUATE
ANALYSE
APPLY
UNDERSTAND
REMEMBER

## Task 3: Review

**Task:** Please check the cognitive levels in your education plans using the list of verbs in your documents. There will be some differences. Write the "new" cognitive levels next to the "old" ones today and discuss with your faculty in the next few days whether there is reason to adopt the change or not.

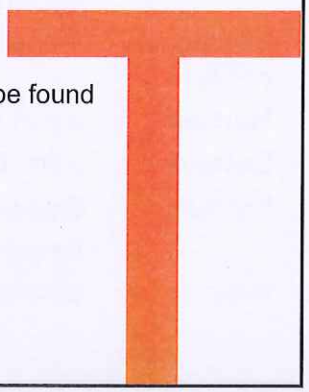
**Interaction pattern:** Individual work, unless other people from your faculty are present. Then it will either be partner work or group work.

**Location:** Classroom (for group or partner constellations, a room can also be found outside the classroom)

**Resources:** Education plan

**Product:** Correction entries

**Time:** 45 minutes. You don't have to finish



## Task 4: Lesson introduction

**Task:** Now you go to the level of your lessons. For the next 2 teaching days, you formulate a lesson introduction with GOST and AO for each lesson. You formulate the presentation for your AO in full. Your rough structure follows **AKIDE**.

Individual results are presented.

**Interaction pattern:** Individual work. However, if other people from your faculty are present, it can be a partner or group work.

**Location:** Classroom (in the case of group or partner constellations, a room outside the classroom can also be found)

**Medium:** Laptop, modules

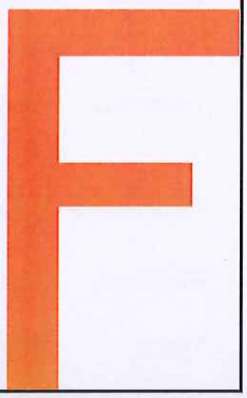
**Product:** Sequences / target formulations / 2 formulated AOs (all three elements for 2 teaching days / **presentation**

Work in such a way that you can present the results, i.e. from the abstract to the concrete

**Time:** **90 minutes (70 min. in class, 20 min. at home)**

## Feedback

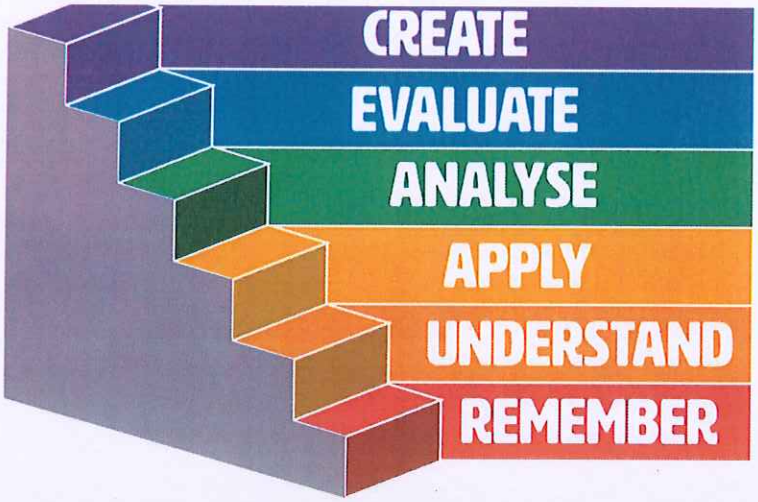
| | |
|---|---|
| **Task:** | Appoint a person to lead the discussion<br>Discuss the following questions in plenary:<br>**1)** Have the objectives been achieved?<br>**2)** Were the work phases long enough?<br>**3)** Was there any content today that met with your inner resistance?<br>**4)** Can you imagine working like this? Why? |
| **Interaction pattern:** | Plenary |
| **Medium:** | sheet and pencil |
| **Location:** | own choice, preferably out of earshot of another group |
| **Product:** | Discussion / Discussion leader records votes in keywords for report to the lecturer. |
| **Time:** | 20 minutes |



## Today's goals

- **Justify** why the goals are announced ✓
- **Describe** how to formulate operationalised goals ✓
- **Explain** what effect sizes are and compare individual teaching measures in terms of learning effects ✓
- **Characterise** the instrument of an «Advance Organizer» ✓

## Thank you for your attention!



Didactics at the BSDU
Unit 2

# Operationalised verbs
# About John Hattie
# Effect sizes
# Classroom discussion
# Advance Organizer

# A list of operationalised verbs – Bloom's Taxonomy

**Remembering (C1)**
List (C1)
Define (C1)
Recall (C1)
Identify (C1)
Recognize (C1)
Name (C1)
Label (C1)
Describe (C1)
Retrieve (C1)
State (C1)

**Understanding (C2)**
Explain (C2)
Summarize (C2)
Paraphrase (C2)
Interpret (C2)
Compare (C2)
Classify (C2)
Discuss (C2)
Predict (C2)
Describe (C2)
Translate (C2)

**Demonstrate (C3)**
Use (C3)
Execute (C3)
Implement (C3)
Solve (C3)
Illustrate (C3)
Operate (C3)
Perform (C3)
Practice (C3)
Applying (C3)
Apply (C3)

**Analyzing (C4)**
Analyze (C4)
Differentiate (C4)
Organize (C4)
Compare (C4)
Contrast (C4)
Examine (C4)
Experiment (C4)
Question (C4)
Break down (C4)
Categorize (C4)

**Evaluating (C5)**
Evaluate (C5)
Judge (C5)
Critique (C5)
Assess (C5)
Defend (C5)
Justify (C5)
Appraise (C5)
Argue (C5)
Recommend (C5)
Support (C5)

**Creating (C6)**
Create (C6)
Design (C6)
Construct (C6)
Develop (C6)
Formulate (C6)
Plan (C6)
Assemble (C6)
Compose (C6)
Generate (C6)
Invent (C6)

**But *never* use verbs like:** *know, can, understand*, etc., because the question can always be asked what the students can do for an action so that you can see and measure that they *know, can, understand*, etc., something.

## About Professor John Hattie

Professor John Hattie is an award-winning education researcher and best-selling author with over 40 years' experience examining what works best in student learning and achievement. Over the years, he has authored over 38 books, published and presented over 1200 research papers, supervised over 200 theses, and keynoted at more than 350 conferences. It is no wonder that Professor Hattie was once called "possibly the world's most influential education academic" by the *Times Educational Supplement*.

Currently, he is Laureate Professor at the University of Melbourne and Chair of the Australian Institute of Teaching and School Leaders.

His most recognised work is his research into visible learning, the culmination of over 25 years of examining what works best for student learning and achievement. His research synthesises more than 1500 meta-analyses, including more than 90,000 studies involving over 300 million students around the world. Through this profound research, and in partnership with Corwin, he has also developed Visible Learning Plus, professional development aimed at translating his groundbreaking research into a practical model of inquiry and evaluation for schools worldwide.

Professor Hattie has been the recipient of the Hedley Beare Award for Writing in Education (ACEL), AERA Outstanding Reviewer for Educational Research, University Teaching and Supervision Award, Inaugural Secondary Principals Association Leadership in Education Award, Computerworld Excellence Award for Use of IT in Education, and was elected Fellow of the American Psychological Association as well as Highly Commended in the BearingPoint Awards for Innovation in Technology. He has also been awarded the Order of Merit for New Zealand for services to education by the NZ Government.

His notable publications include *Visible Learning*, *Visible Learning for Teachers, Visible Learning and the Science of How We Learn*, *Visible Learning into Action*, *Visible Learning for Mathematics, Grades K-12*, and *10 Mindframes for Visible Learning*.

Source: https://www.teachertraininguk.com/post/professor-john-hattie

# Hattie Ranking: 252 Influences And Effect Sizes Related To Student Achievement

https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/

## 10 Examples

Meta Level

1. **Feedback (d = 0.70)**
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   Clearly defined learning goals and transparent success criteria help students understand the purpose of learning and monitor their progress.
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   Involves structured, teacher-led methods where content is systematically presented and explained.
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   These strategies enhance students' awareness of their own learning processes, helping them to plan, monitor, and reflect more effectively.
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   Helps students process and connect new information by building on what they already know.
7. **Classroom discussion (d = 0.82)**
   Envolves the entire class in a discussion. Teacher stops lecturing and students get together as a class to discuss an important issue. Everyone learns from each other.
8. **Setting Standards for Self-Judgement (d = 0.62)**
   Students who reflect on and assess their own learning processes and outcomes develop a better understanding of their strengths and weaknesses, enabling targeted improvements.
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   In peer tutoring, students support each other's learning, benefiting both the tutors and the tutees by deepening their understanding of the material.
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    Effective classroom management, including clear rules, routines, and positive relationships, creates a conducive learning environment and reduces disruptions.

## Classroom discussion

Classroom discussion is a **method of teaching**, that involves the entire class in a discussion. The teacher stops lecturing and students get together as a class to discuss an important issue. Classroom discussion allows students to improve communication skills by voicing their opinions and thoughts. Teachers also benefit from classroom discussion as it allows them to see if students have learned the concepts that are being taught. Moreover, a classroom discussion creates an environment where everyone learns from each other

Effect size 0.82

## Calculating effect sizes

Effect sizes are statistical measures that quantify the size of the observed effect of an intervention or a correlation. They provide a way to assess the strength of the relationship between two variables independent of the sample size.
The calculation of effect size can vary depending on the type of analysis and the nature of the data, but there are some common formulas that are used. One commonly used formula is Cohen's d for comparing means between two groups, where one group is a control group without the measure being measured:

$$d = \frac{M_1 - M_2}{SD_{pooled}}$$

Wo:

- $M_1$ und $M_2$ sind die Mittelwerte der beiden Gruppen.
- $SD_{pooled}$ ist die gepoolte Standardabweichung beider Gruppen.

The effect size is often expressed as a decimal to represent the relative strength of the effect regardless of the sample size. An effect size of 0 means that there is no difference between the groups, while larger numbers indicate that the difference is greater.

For example, an effect size of 0.27, as you mentioned, might indicate that the intervention or context has a small but measurable effect. It is important to note that the interpretation of effect size also depends on the context and that there are no hard and fast rules for what is considered "small", "medium" or "large". This often depends on the discipline and the specific fields of research.

Effect sizes are usually not rounded to whole numbers in order to maintain precision and better represent subtle differences between effects.

# What is an Advance Organizer?

The basic idea goes back to Ausubel (1974), who suggested providing texts with organizational aids in advance in order to improve text comprehension. The central aspect here is to establish a basic framework ("organizer") into which new information can be incorporated more easily when reading. Applied to a course, an overview of the central topics can be provided in the same way.

The Advance Organizer is a visualized organization and orientation aid for new learning content, which is presented at the beginning of a course in a short lecture of about 10 minutes.

It includes
- the presentation of the main points of the course
- a clear and comprehensible introduction to relevant terms
- the illustration of connections and references to the students' previous knowledge.

This provides students with a learning aid in advance in the sense of an expert structure.

**How do you create an Advance Organizer?**
The basic idea is to translate the semester plan into a graphic. Imagine you were to briefly explain to a colleague which course you would like to teach and how you would like to proceed. In this case, you would certainly not quote the seminar plan and a list of topics but give an overview that is as structured as possible, containing a few key points and interesting examples and addressing the main steps to achieve the objectives of the course.

**Use the following steps as a guide to create an Advance Organizer:**
1. first collect the topics and associated terms or content.
2. then group them together to create a better overview. This allows you to work out focal points and general terms.
3. now depict dependencies, connecting elements or logical development paths. This will bring the individual contents into context.
4. now transfer the aspects into a picture, which ideally also relates to the content (examples: Notes and staves in musicology; a doctor's case in medicine).
5 In addition, present the course objectives as well as the tasks and roles of the lecturers and students.

**What other possibilities are there for using an Advance Organizer?**
After the presentation of the Advance Organizer at the beginning of the semester, it can be used regularly as a fixed medium in the further course of the course to make transitions, create summaries or give outlooks. The visualization can also be used interactively and in direct collaboration with the students to add insights from the course, open questions or examples and results that have been worked out. The Advance Organizer can thus be used as a formative, constantly expanding tool that is directly related to the course and the group and documents learning progress.
How does an Advance Organizer support learning?

The Advance Organizer shows connections and main categories early on in the learning process. The students can classify the new information precisely in this scheme and thus link it better. Another option is to encourage students to create their own Advance Organizer in the form of a mind or concept map. Individual insights and aha effects as well as their own examples or focal points can be incorporated into this.

**What are the main aspects to look out for?**

An Advance Organizer should have the following features:

- compact and clear: emphasize less the details and more the main points and aspects that promote understanding (e.g. connections). Clearly outline the beginning or the starting point and the path, including the main stages up to the conclusion.
- Comprehensible: Explain technical terms or illustrate them with examples. It can also be helpful if you point out existing prior knowledge.
- motivating: The aim is not to incorporate all technical aspects into the Advance Organizer. Instead, pursue the question of which aspects are particularly interesting for your students and promote their learning and understanding, make goals achievable for them and illustrate their skills progress.

Translated with DeepL.com

# Advance Organizer

An advance organizer is a type of introduction designed to help learners prepare for upcoming learning material by activating prior knowledge and providing a structure for the new material. Here are some features that a well-designed advance organizer should have:

1. **Clear Structure:** The advance organizer should have a clear and organized structure that helps learners understand the relationship between different concepts or ideas.

2. **Connection to Prior Knowledge:** A good advance organizer links the new learning material to learners' existing knowledge. It activates this prior knowledge and creates a bridge to the new material.

3. **Clear Goals and Expectations:** The advance organizer should establish clear goals and expectations for the upcoming learning material, so learners know what to expect and what to focus on.

4. **Visual Aids:** Visual elements such as graphics, diagrams, or pictures can be used to illustrate complex concepts and support learners' understanding.

5. **Active Learner Engagement:** A well-designed advance organizer may include interactive elements that encourage learners to actively participate in the learning process, such as questions, discussions, or brief exercises.

6. **Conciseness:** An advance organizer should be concise to maintain learners' attention and avoid overwhelming them.

7. **Adaptability:** The advance organizer should be adaptable to learners' needs and the specific requirements of the learning material.

# Advance Organizer

## How can I create an advance organizer and use it effectively in my course?

An Advance Organizer is a learning aid given in advance (*advance*), where complex content and connections are structured and visualized (*organizer*). This helps students understand fundamental aspects and relationships of the material. Early presentation allows students to better link new content with their prior knowledge and retain it. An Advance Organizer is particularly suitable for providing a thematic overview of the learning content and can be made available to students afterward. It can be revisited throughout the course to illustrate learning content.

## Objectives

- Activate prior knowledge
- Recognize fundamental structures
- Build a mental representation of new knowledge

## Instructions

1. Creation of a visual representation: Use techniques such as structural mapping (*see below*) to depict the main terms and concepts of the subject in their logical structure. Allocate at least one hour for creation, depending on the complexity.
2. Development of an "Expert Structure": Use analogies, stories, graphics, and images to illustrate the topic while keeping the basic structure simple. Concept maps are a popular example.
3. Presentation of the Advance Organizer: At the beginning of a class, develop the Advance Organizer step by step, explaining terms and connections (causal, logical, chronological, hierarchical, etc.). This presentation should take about 10-20 minutes, depending on complexity.
4. Providing the Organizer to students: Make it available in a lasting format (copy, photo, PowerPoint slide).

### Structural Mapping Technique

This method is used to structure and graphically represent complex content by logically arranging key terms of a topic to clarify their relationships.

**Instructions:**

1. Brainstorm: Collect terms related to a topic and write them on cards or post-its.
2. Cluster: Group related terms.
3. Find umbrella terms: Name the clusters with overarching terms.
4. Create a structure: Develop a structure from the umbrella terms (e.g., chronological, hierarchical, causal).

This technique is useful for preparing a lesson (e.g., creating an Advance Organizer) and helping students build individual knowledge structures during or after a lesson. Different learning goals can be achieved: (1) recognizing and mapping structures, (2) structuring complex relationships, and (3) activating prior knowledge.

## Digital Setting

An Advance Organizer can be easily created in PowerPoint. The slide can be shown at the beginning of a virtual session in online meeting platforms (e.g., Microsoft Teams). Using the animation function in PowerPoint, the Advance Organizer can be developed step by step and explained.

**References**


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Wahl, D. (2005). *Lernumgebungen erfolgreich gestalten. Vom trägen Wissen zum kompetenten Handeln.* Klinkhard

## Videos - Advance Organizer

https://www.youtube.com/watch?v=Z61myaubxH8

https://duckduckgo.com/?q=advance+organizers+in+education&t=brave&iar=videos&iax=videos&ia=videos&iai=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DARFKDv8aUik