

**howest**  
hogeschool



**Universal design for learning in  
the classroom: best practices  
for inclusive assessment:  
DESIGN of an EXAM**

# Content

1. Introduction
2. What do you want to measure with your assessment?  
(purpose)
3. In what different ways can you achieve this goal?
4. How do you avoid confusion?
5. A tip of the iceberg

# Introduction

# Short introduction

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Programme coordinator of

- Biomedical Laboratory Sciences (bachelor)
- Bioinformatics (advanced bachelor)

Introduction of UD(L) in 2014-2015

- Learning (→ study material)
- Assessment: current focus



Mieke Demeyere



**Anneleen Cottyn**

# Assessment according to UDL

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5 principles:

- Principle 1: What do you want to measure with your assessment? (purpose)
- Principle 2: In what different ways can you achieve this goal?
- Principle 3: Which support measures do you allow?
- Principle 4: How do you avoid confusion?
- Principle 5: When do you test?

Focus on “**design of an exam**”

- Only BEFORE the examination
- NOT practical assessments (e.g. in the lab)

What do you want to measure with your assessment? (purpose)

# What do you want to measure with your assessment? (purpose)

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Think carefully about what you **really want to measure**

→ Useful testing measures the knowledge and skills of students linked to the stated objectives of the course unit



# What do you want to measure with your assessment? (purpose)

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Before the exam questions are drawn up: develop a **test matrix**.

In the matrix you link the questions to the learning objectives.

- divide them into knowledge, insight, application of knowledge and insight and skills/behavior (if applicable)
- the more important the learning objectives, the higher the number of questions and the distribution of marks



Makes your evaluation **valid** (= when the right competences are evaluated, one tests effectively what one should test)

Also makes your evaluation **reliable**: are the evaluation criteria comparable for all students (also with those of previous year and next year)?



# What do you want to measure with your assessment? (purpose)

Course unit: ...							
Evaluator: ...							
Student group: ...							
Fill in the test matrix							
1. complete the learning objectives							
2. assign a % per learning objective, important learning objectives get a higher evaluation %							
Learning outcome	Learning objective	Knowledge questions (%)	Insight questions (%)	Application of knowledge and insight (%)	Skills/behaviour (%)	total (%)	control
		20			10	30	
			20			20	
				10		10	
					10	10	
		10				10	
			10			10	
				10		10	
						0	
						0	
	Control	30	30	20	20	100	100
	Total					100%	



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Is this a test matrix of a first or last year bachelor exam?

# What do you want to measure with your assessment? (purpose)



Determine the number of marks per type of question according to the test matrix

Fill in the yellow box the total result of the exam and the point per learning objective and type of question will appear

Learning objective	Knowledge questions (number of marks)	Insight questions (number of marks)	Application of knowledge and insight (number of marks)	Skills/behaviour (number of marks)	total (number of marks)	tested in question number ...
	4	0	0	2	6	
	0	4	0	0	4	
	0	0	2	0	2	
	0	0	0	2	2	
	2	0	0	0	2	
	0	2	0	0	2	
	0	0	2	0	2	
	0	0	0	0	0	
	0	0	0	0	0	
Control	6	6	4	4	20	
Total					20	



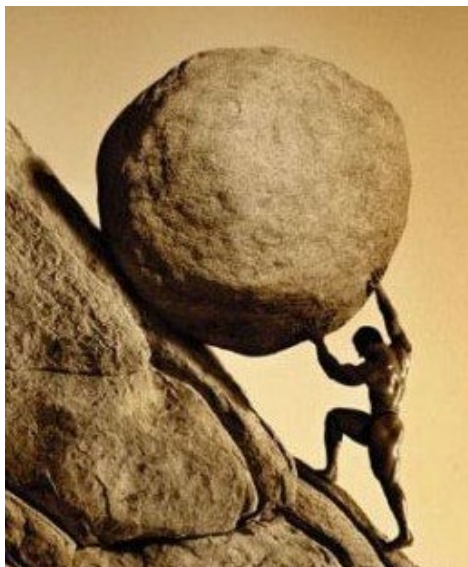
# What do you want to measure with your assessment? (purpose)

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Different templates

Reviewed by the 'second pair of eyes'



Development of learning objectives

- In the beginning: huge work
- Then:



# What do you want to measure with your assessment? (purpose)

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## Remove barriers contained in the objectives

Sometimes objectives contain barriers that prevent some students from reaching them e.g.: the objective also describes how (means) or under what conditions (e.g. time limit, location ...) it has to be demonstrated



Are these learning objectives the same?

LO1: the student gives a PowerPoint presentation

LO2: the student gives a presentation

In what different ways can you  
achieve this goal?

# In what different ways can you achieve this goal?

**Variety of evaluation:** offer a variety of questions in an exam: reproduction questions, insight questions, application questions ...

- Foreseen in the test matrix



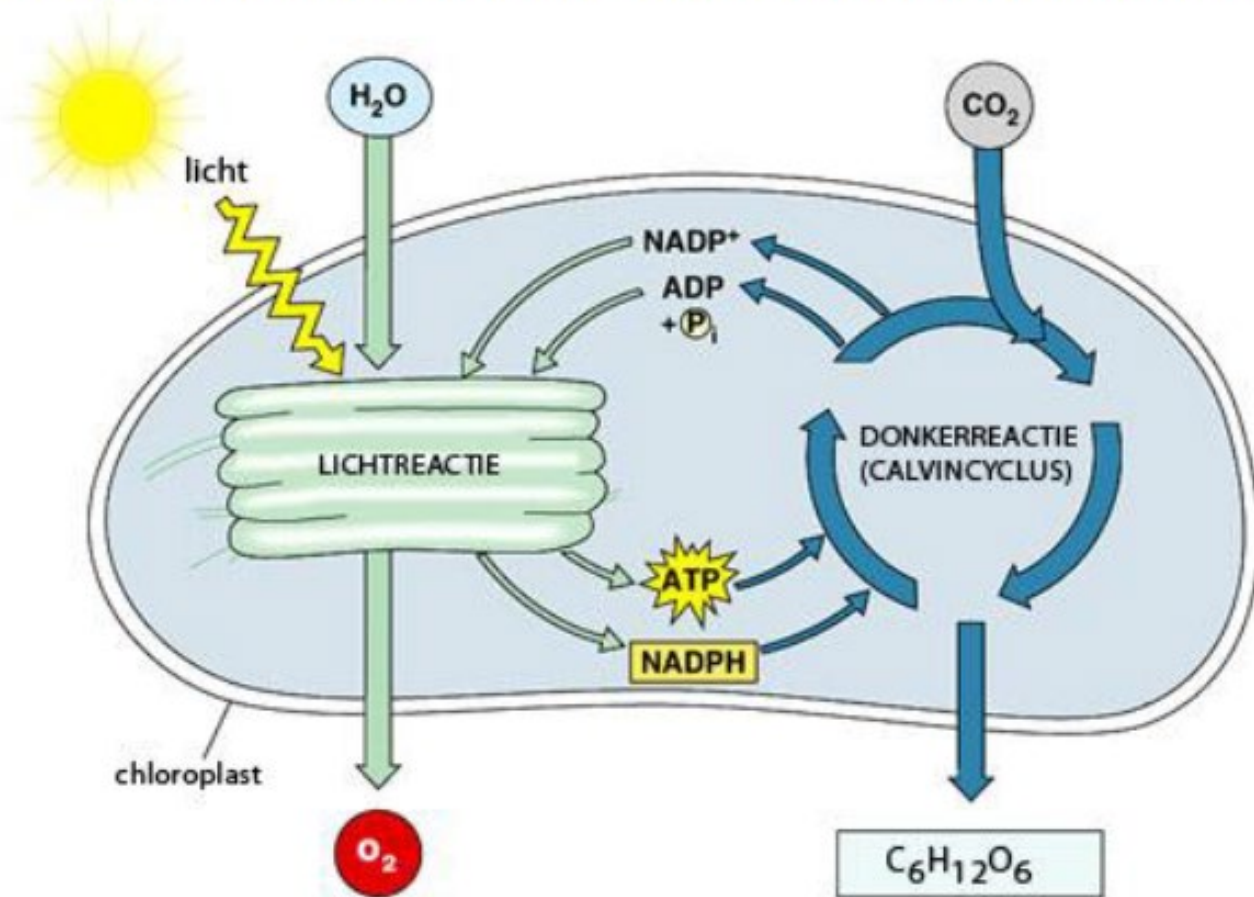
Learning outcome	Learning objective	Knowledge questions (%)	Insight questions (%)	Application of knowledge and insight (%)	Skills/behaviour (%)
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# In what different ways can you achieve this goal?

4 different questions, all the same answer

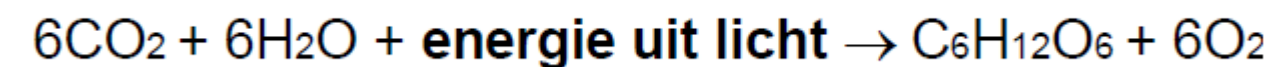
1. Welk biochemisch proces wordt door onderstaande afbeelding weergegeven?



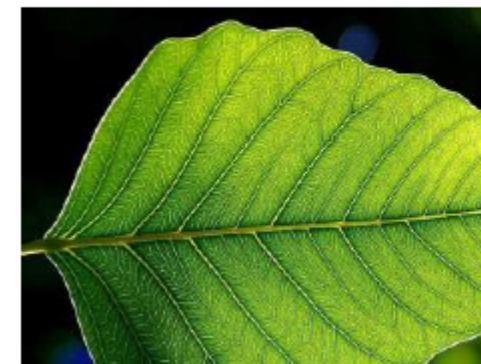
Welk proces wordt hieronder omschreven (bron: Wikipedia)?

is een proces waarin lichtenergie wordt gebruikt om koolstofdioxide om te zetten in koolhydraten, zoals glucose. Het proces komt voor in planten en sommige bacteriën.

Voor welk scheikundig proces is dit de formule?



Voor welk chemisch proces is een blad de voornaamste locatie in een plant?



# In what different ways can you achieve this goal?

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**Variety of evaluation:** use **different methods of evaluation:** individual or group work, written exam, oral exam, presentation ...



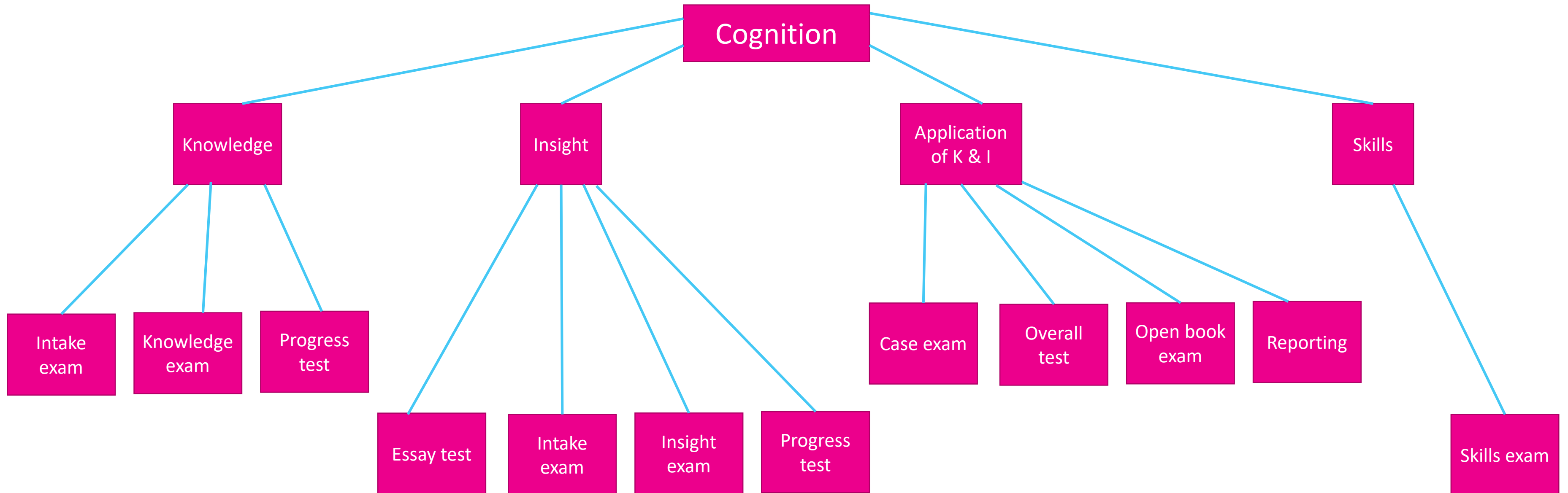
- Foreseen in the study guides

Type of evaluation

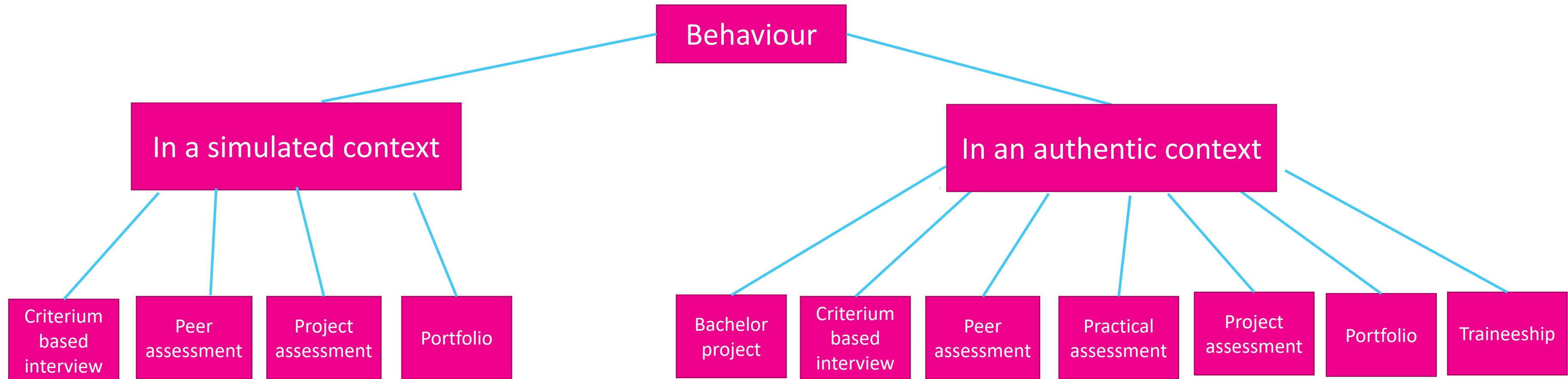
- Reporting
- Case exam
- Open book exam
- Skills exam



# In what different ways can you achieve this goal?



# In what different ways can you achieve this goal?

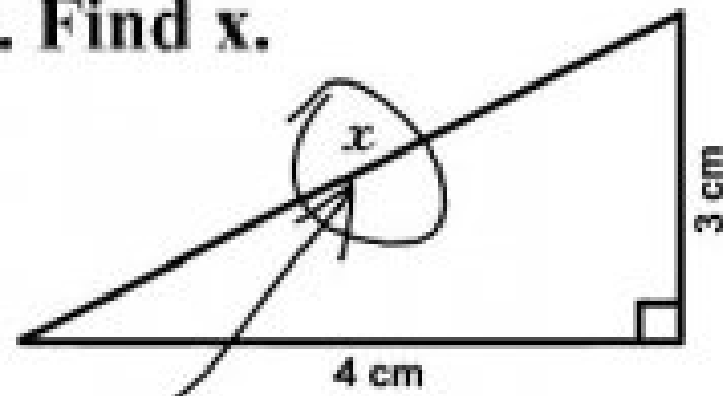


How do you avoid confusion?

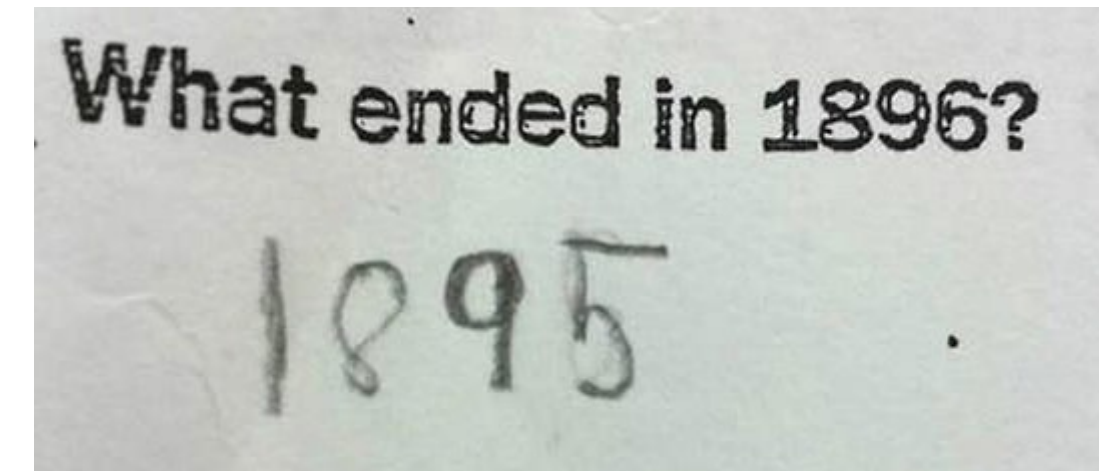
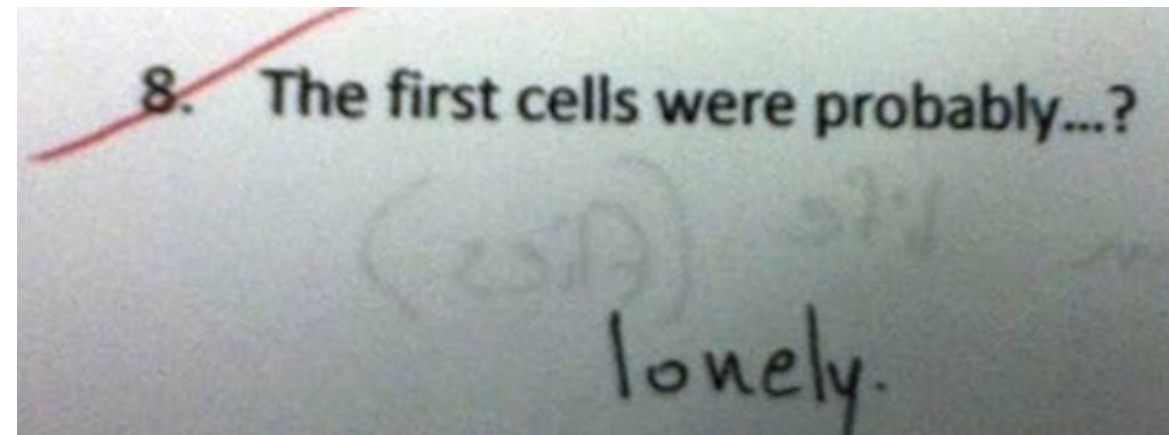
# How do you avoid confusion?

As a lecturer, you have clear expectations of an assignment or question. However, many students do not understand what is being asked or expected and therefore fail.

3. Find  $x$ .



*Here it is*



# How do you avoid confusion?

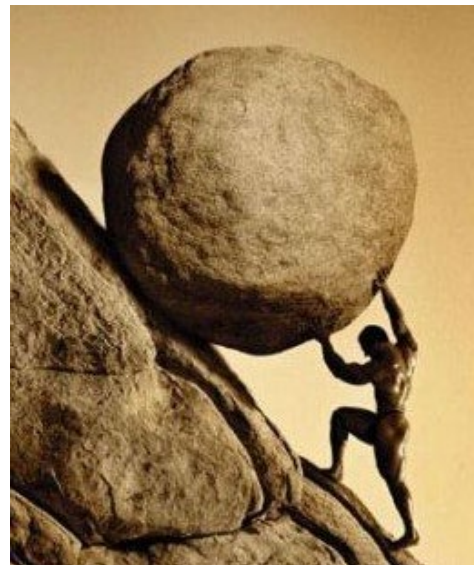
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## Formulate your questions and assignments clearly

Avoid complicated sentences and difficult words



- Checklist for written and oral exams
- Also reviewed by the “second pair of eyes”



- Checklist: none
- SPE: see separate slide

# How do you avoid confusion?

## Formulate your questions and assignments clearly



### Formulating questions

#### **For all question types**

- Are information and questions clearly separated?
- Is the most direct "instruction" used (give, describe, sum, draw, calculate ...)?
- Are complicated sentence structures avoided?
- Are there no double negatives?
- Is everything written in full?
- Are the question parts clearly distinguishable from each other?

#### **Specific for open-ended questions**

- Does the question contain sufficient information on the desired length (and form) of the answer?
- Are open questions restricted?<sup>1</sup>

#### **Specific for multiple choice questions**

- Is it clear to the student whether it is a multiple choice question or not?
- Are the wrong answer possibilities plausible?
- Are the answer options about the same length?
- Are the correct answers spread across all response options?
- Is there an appropriate number of alternatives (4/5)?

**TIP:** Have a colleague solve the questions to check whether the formulating of the questions is unambiguous.

<sup>1</sup> Not: Compare the culture of the Dutch and Belgians. But: Compare the culture of the Dutch and the Belgians. Give three differences OR Give three similarities

# How do you avoid confusion?

## Formulate your questions and assignments clearly



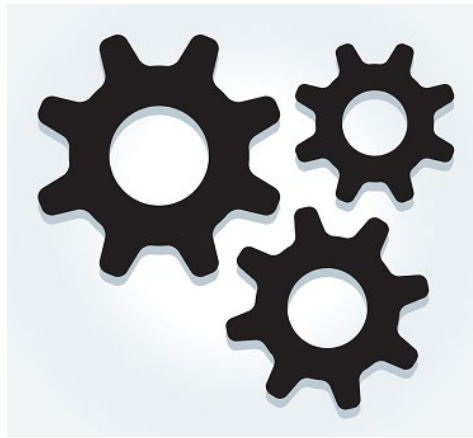
### Drawing up the exam

- Does the form of evaluation correspond to what is included in the ECTS sheet?
- Is the examination representative of what is intended with this course unit (in line with the learning objective(s))?
- Is the degree of difficulty of the whole exam acceptable?
- Do I ask independent questions in my exam?<sup>2</sup>
- Have I prepared a correction key for each question?
- Have I specified the maximum number of marks for each question?
- Have I specified a scoring principle for each question?
- Have I taken into account the time available for students to solve the question when designing my exam?
- Have I taken into account the time available for correcting when designing my exam?

**TIP:** Have a colleague evaluate an exam (using the correction key and scoring principles) and see if he/she gets the same score.

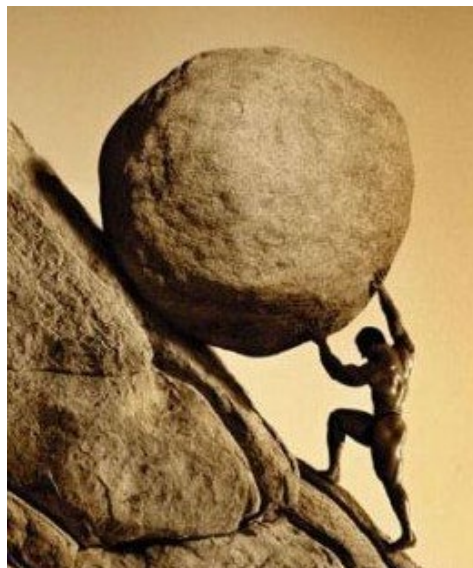
<sup>2</sup> If the answer to the first question is needed to solve the second, then students who answer the first question incorrectly will have no more chances at the second question.

# Second pair of eyes-principle



SharePoint-list:

- Not a member of the “module team”
- Not the same as last year
- TO DO:
  - Check test matrix
  - Check answer key
  - Check questions formulated cf. the checklist



In the beginning: fear of not being capable enough

Then:



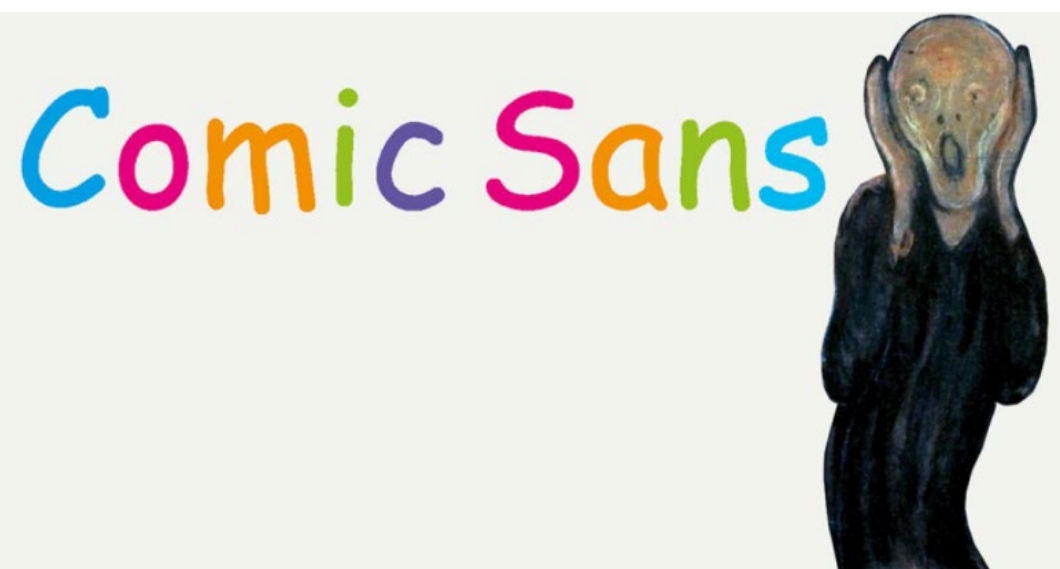


# But also ...

## In which font?



Sans-serif font: **Verdana 10 pt** for all communications with the students: emails, electronic learning platform, exams, course material ...



AaBbCc

AaBbCc



A tip of the iceberg

# A tip of the iceberg

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- Principle 1: What do you want to measure with your assessment? (purpose)
  1. Think carefully about what you really want to measure
  2. Remove barriers contained in the objectives
  3. Inform your students clearly about the objectives to be achieved
- Principle 2: In what different ways can you achieve this goal?
  1. Allow students to demonstrate their abilities in different ways
    - A. Differences in recognition of content
    - B. Differences in strategic expression
    - C. Differences in commitment
  2. Variety of evaluation
    - A. Offer a variety of questions in an exam
    - B. Use different methods of evaluation
  3. Allow content choices

# A tip of the iceberg

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- Principle 3: Which support measures do you allow?
  - Allow daily aids and support
- Principle 4: How do you avoid confusion?
  1. Formulate your questions and assignments clearly
  2. Provide clear guidelines for all questions and assignments
  3. Give (excellent) examples of all assignments
  4. Offer your information in your test in different ways
- Principle 5: When do you test?
  - Don't limit your testing to an exam at the end

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## MORE INFORMATION?

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