



This work is based on the book Wijze Lessen (T. Surma, K. Vanhoyweghen, D. Sluijsmans, G. Camp, D. Muijs & P.A. Kirschner) and the blog te-learning.nl (W. Rubens).

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This slide deck contains 12 evidence informed principles for teaching and designing education. These principles are based on educational research and have shown to be effective over and over again.

There is no golden bullet for teaching (if there was, someone would have found it). Each student is different, each class is different, and each lecturer is different. Although there isn't one solution to rule them all, these twelve principles have been proven successful for other educators. Hopefully, they will be helpful and support you in your teaching journey.

12 evidence informed principles



Activate prior
knowledge



Provide clear,
challenging
instruction



Use (worked)
examples



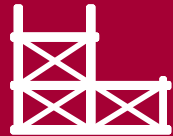
+
Words
Combine
words and
images



Use active
learning
strategies



Check for
under-
standing



Provide
scaffolds



Space
practice
over time

A B C
A C B
B A C

Interleave
with
strategies



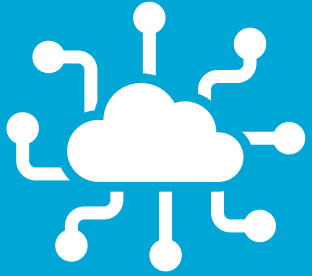
Assessment
as learning
strategy



Feedback that
stimulates
thinking



Teach effective
learning
strategies



Activate prior knowledge

What you already know determines how fast you'll learn. New information accommodates better when it 'sticks' to prior knowledge.

Actively repeat the prior knowledge students need to learn the new content

Provide a framework to connect new content to prior knowledge and use this as a direction your lecture



Activate prior knowledge



Quiz

Let students do a quiz before the lecture in the LMS. Monitor the results and adapt your lecture accordingly.



Polling

Start your lecture with a polling quiz to active prior knowledge.



Advance organizer

Offer a (digital) advance organizer for your students, like an illustration, animation, poster, or course graph.



Recap

Create short videos or podcasts to give a recap of the most important prior knowledge (this can also be combined with a quiz).



Stumble stones inventory

Make an inventory of stumble stones (the most difficult topics/exercises). Use a discussion board, interactive video/documents, or an online whiteboard.



What they already know

Ask your students to write down what they already know about a topic or previous topics. Let them discuss this in pairs and complete their notes.

Provide clear, challenging instructions



It is essential to offer clear, challenging and activating instructions for your students.

Delimited lecture
phases and goals offer
structure for students

Set challenging goals
where you expect a lot
from each student

A warm, positive
classroom environment
motivates students to
learn



Provide clear, challenging instructions



Small Steps

Offer new information in small steps. Offer a lot of support by modeling or by thinking out loud.



Summaries

Give regular recaps and summaries of the content. You can do this verbally, written or by using media like videos, infographics, mind maps, or podcasts.



Explain the course setup

Explain your course setup. This can be done in a video or during the first lecture.



Clear LMS

Make sure that your LMS has a clear structure, titles, messages, learning tasks, clear deadlines, and expectations (see also the Brightspace matrix).



Advance organizers

Use advance organizer at the start of a week, module, or lecture to put the current content in a bigger perspective.



Introduce new tools

When using a tool for the first time, introduce the technology, let students practice with it, and explain the expected use (etiquette).

Use examples



Use examples (both context-, as worked examples) to acquire and practice new knowledge and skills.

Use worked examples
to explain how
exercises are solved

Demonstrate new skills
to your students

Illustrate content with
concrete examples



Use examples



Step-by-step

Offer a step-by-step guide for solving problems. This can be in text (PDF), but also video or an (interactive) infographic.



Video demonstration

Create or find a video which demonstrates the problem-solving process or another aspect of the content.



Collect examples

Let students collect examples and post them on a discussion board or chat.

Step 1
Step 2
Step 3

Worked examples

Provide students with worked examples (PDF, video, photos, drawings). A worked example is a step-by-step demonstration of how to perform a task or how to solve a problem"



XR and applets

Use VR/AR, applets or applications and let your students experience the materials in another way.



Interactive content

Use interactive video to enrich examples or step by step guides.

Combine words and images



Students process information in both words and images. By combining the two, students will learn more.

Enrich words with images, but
beware of cognitive overload

Keep the principles for
multimedia learning in mind in
your lectures and materials



Combine words and images



Less = more

Reduce the written text in your slides and videos. Remove written text and tell your story.



Visuals

Use images, graphs, keywords, and other visuals which support your story.



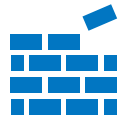
Highlight

Highlight important elements on your slides, using colors or visual indicators.



Title slides

Use title slides (in a bright, and different color) to indicate the different sections in your presentation/video. Also take some time to introduce a new section.



Break it down

Break down complex slides and visuals into multiple steps/slides. This way students will not get overloaded with new content.



Don't read out loud

Do not read your slides out loud! Let students read the slides or replace written text with relevant images, graphs, or other visuals.



Use active learning strategies

Students learn more by using productive learning strategies and by actively producing products, instead of 'consuming' content.

Let students create
diagrams or
summaries

Let students explain
content to themselves
or peers

Explicitly teach these
strategies to your
students



Use active learning strategies



Mapping

Let students create concept maps, mind maps or other visual representations of the content.



Make summaries

Let students create summaries of the content. Students can share these summaries in discussion boards or other places



Collaborative reading

Use collaborative reading where students ask questions in the textbook/article. Stimulate Q&A by students.



Videos by students

Student generated content: Let students generate explanation videos, podcasts, infographics on specific topics. Make sure that students don't spend too much time, by offering templates, tutorials, or other resources.



Interactive content

Use a advance organizer at the start of a week, module, or lecture to put the current content in a bigger perspective.



Short lecture activities

Use short activities during lectures like think-pair-share or the one-minute-summary to stimulate students to create summaries, elaborate on content, or to explain content to their peers.



Check for understanding

Regular checking the understanding of students will keep them engaged and focused on further learning.

Ask questions regularly that provide insight in the level of understanding

Don't focus too much on the performance of an individual student in a specific moment, learning is a long-term process



Check for understanding



Polling

Use a polling tool to ask questions during the lecture. Such a tool will provide insights of the understanding of students.



Online quizzes

Add quizzes to the LMS. Students can do this before or after a teaching session. It will help them to apply the content and provide you with insights of their understanding.



Peer instruction

Let students individually answer a poll. If less than 60% give an incorrect answer, let students explain their answer to their neighbors. Poll again, and most students will give the correct answer.



Muddiest point

Ask students what the muddiest (most confusing/unclear) point is of the lecture/content. This will give you the possibility to explain or elaborate.



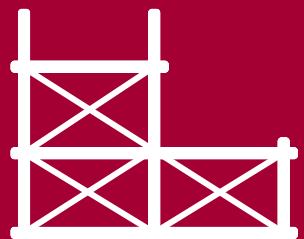
Use data

Use data from the polls, quizzes, and other learning tools to check the understanding of the students. Change your teaching sessions accordingly.



Exit ticket

Use an exit ticket at the end of a lecture. Ask students what they've learned, what they want to learn, or what questions they still have. Use a polling tool, or a web form for the exit ticket.



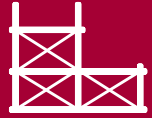
Provide scaffolds for difficult tasks

When students cannot complete exercises individually, temporary, individual, and adaptable support (scaffolds) from lecturers are necessary.

Offer your students
guided practice the first
time they encounter
new topics

As students become
more proficient,
lecturer support
fades/decreases

Provide individual
practice opportunities
when your students
are capable



Provide scaffolds for difficult tasks



Modeling

Show students how an expert (/you) solves a problem. Think out loud, describe the choices you make, and why. This can be done in lectures, video, or other media formats.

Step 1
Step 2
Step 3

Worked examples

Provide students with worked examples (PDF, video, photos, drawings). A worked example is a step-by-step demonstration of how to perform a task or how to solve a problem.



Show ► together ► alone

For new content, first show how to apply/solve it, then do a similar problem together with the students (step by step), and finally let students solve it alone.



Checklists

Provide checklists which students can use to check their work. Use them for assignments, presentations, papers, etc.



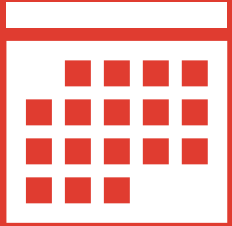
Hints

Provide hints for the students during explanations, but also in (digital) practice materials (like quizzes or other platforms).



Fade support

When students become more proficient with the content, fade the support, in order to match the difficulty of the task with their current skill level.



Space practice over time

For remembering and applying, it's more effective to spread practice over time. Use more and shorter practices sessions, instead of one longer session.

Ensure that basic skills and knowledge are practiced multiple times during a course or academic year

Provide self-study that addresses previous covered subjects

Start your lecture with an active recap of previous topics



Space practice over time



Digital spaced practice

Include exercises from previous weeks/courses in quizzes or other digital practice materials (e.g., include a couple of exercises of week 2 and 3 in the quiz of week 5).



Self-assessment

Offer self-assessment activities, like a quiz, interactive content, or provide a list of textbook exercises. Include relevant exercises from previous weeks/courses.



Active recap

Start your lecture with an active recap of previous weeks. Use a quiz, think-share-pair, or a short exercise (also see the principle: activate prior knowledge).



Practice tests

Offer formative tests in your course. Provide feedback and let students experience a test where all content is combined.



Repeat content

Use a part of your teaching session to repeat content of previous weeks/courses. Show in an interactive way how content is related.



Offer a study schedule

Provide your students with a study schedule. Include activities/exercises of previous weeks so students will repeat content.

Interleave with strategies

A B C

A C B

B A C

By varying different exercise types and content, students learn to use and choose different solution strategies.

Alternate between
similar-looking
exercises

Alternate worked
examples with regular
exercises and partly
worked examples

Alternate between
productive learning
strategies

Interleave with strategies



Digital interleaving

Alternate between similar looking exercises in online assignments / quizzes / tests (combine this for example with spaced practice).



Productive strategies

Alternate between productive learning strategies like mapping, visualizing, summarizing, self-explaining, self-testing, and teaching others.

Step 1
Step 2
Step 3

(Partly) worked example

Alternate between worked examples (let your students answer questions), partly worked examples (fill in the blanks) and regular exercise (solve the exercise).



Links and connections

Stimulate your students to find the links and make connections between the topics/strategies/etc. Provide them with (online) tips, hints, and explanations.



(Online) Feedback

Provide your students with feedback on how to choose the right strategy/rule/approach. This can be done in a teaching session or using video, podcasts, interactive content or other media.



Change the sequence

Don't use the same sequence over and over. Make sure there is a (random) variance in the sequence of exercise types.



Assessment as learning strategy

When students actively retrieve information from their memory (retrieval practice), information will be strengthened in their long-term memory. This is more effective than passive learning strategies.

Give regular (formative)
practice test at the beginning
or the end of a lecture

Any activity where students need
to remember information, is a
successful example of retrieval
practice



Assessment as learning strategy



Entry test

Let your students do a quiz before (e.g., in the LMS) or at the beginning of your lecture (e.g., using polling). Monitor the results and adapt your lecture accordingly.



Knowledge dump

Ask your students to write everything down what they still remember from previous weeks. Discuss this in the lecture and ask them to add new info to their notes.



Practice tests

Offer practice test to your students. This can be from a textbook, old (digital) exams, or newly created practice tests.



Question at the end

Provide practice questions at the end of a chapter or at the end of a week. This can be done in a quiz.



Exit ticket

Use an exit ticket at the end of a lecture. Ask students what they've learned, what they want to learn, or which questions they still have. Use a polling tool, or a web form for the exit ticket.



Retrieval spaced practice

Combine retrieval practice with spaced practice. Include exercises from previous weeks and include them in quizzes, entry tests, etc.

Feedback: let students think



Feedback provides students information on where they stand and provides guidance on how to achieve the learning goals. Feedback should stimulate students to think and act.

Provide feedback that prompts students for 'detective work'

Direct feedback is important at the start of the learning process

When students do not (yet) understand feedback, additional instruction is more effective



Feedback: let students think



Sherlock Holmes

Provide feedback, not answers. Prompt your students with 'detective work', to stimulate reflection on potential improvements of their work.



Peer feedback

Peer feedback can also be very valuable for your students. Make sure you use clear instructions, feedback criteria, and instruct students on how to provide effective feedback.



Automated feedback

Add automated feedback to quizzes or assignments. Include hints to help students solve difficult exercises or refer them to a resource which can help them (a textbook, video or something else).



Reflection on feedback

Some tools include a reflection step after students received (peer) feedback. Let your students reflect on how they will use the feedback to improve their learning.



Feedback formats

Experiment with different feedback formats. It can be written, annotated, a spoken recording, a video, drawing, or something else.



New sequence

Don't use the same sequence over and over. Make sure there is a (random) variance in the sequence of exercise types.



Teach effective learning strategies

Teach your students explicitly how to plan, monitor, evaluate, and adjust their own study practices. This will help your students to become better learners.

Teach learning strategies
explicitly to your students

Always link learning strategies to
concrete context



Teach effective learning strategies



Teach effective strategies

Teach effective strategies to your students. Explain how they can apply them to their own studies. You can use parts of lectures, or materials that are already out there.



Make it explicit

Explain when you're using an effective strategy and explain why you've included it in the course/lecture. E.g., explain when you're activating the prior knowledge and why you're doing this.



Think out loud

It helps students to learn from an expert, they act as a learning guide. Explain why and how you would prepare for the exam.



Add reflective questions

Add reflective questions and hints to assignments, quizzes, polling questions, or student evaluations. Ask how students used the strategies, how it went, and how they can improve their study skills.



Reflective assignments

Ask students to create a blog/vlog/podcast/written reflection on how they planned, monitored, evaluated, and adjusted their way of studying.



Provide feedback

Provide students with feedback on their learning process. This can be individual feedback, but also more general feedback to all learners.