Active learning

A varied approach to teaching in higher vocational education

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This article is composed of practical questions that are frequently encountered by teachers in higher vocational education programmes. It looks at questions such as: How do I prepare my lessons, training programmes or workshops? How can I give more captivating lessons? How can I challenge my students? How can I deal with the differences between students?
The contents of this article will help you take a more conscious and varied approach to designing your lessons, workshops or training programmes. The main emphasis of the article is on the didactics of designing and implementing instruction.

- **Didactics is the science concerned with the question of how knowledge, skills and attitudes can be taught to students by instructors (Hiemstra et al., 2013).**

Didactical models can be helpful and can assist in establishing the structure required. The didactical model (see Figure 1) presented in this article has been inspired by Van Gelder's model of didactical analysis (Katsma, 1991).

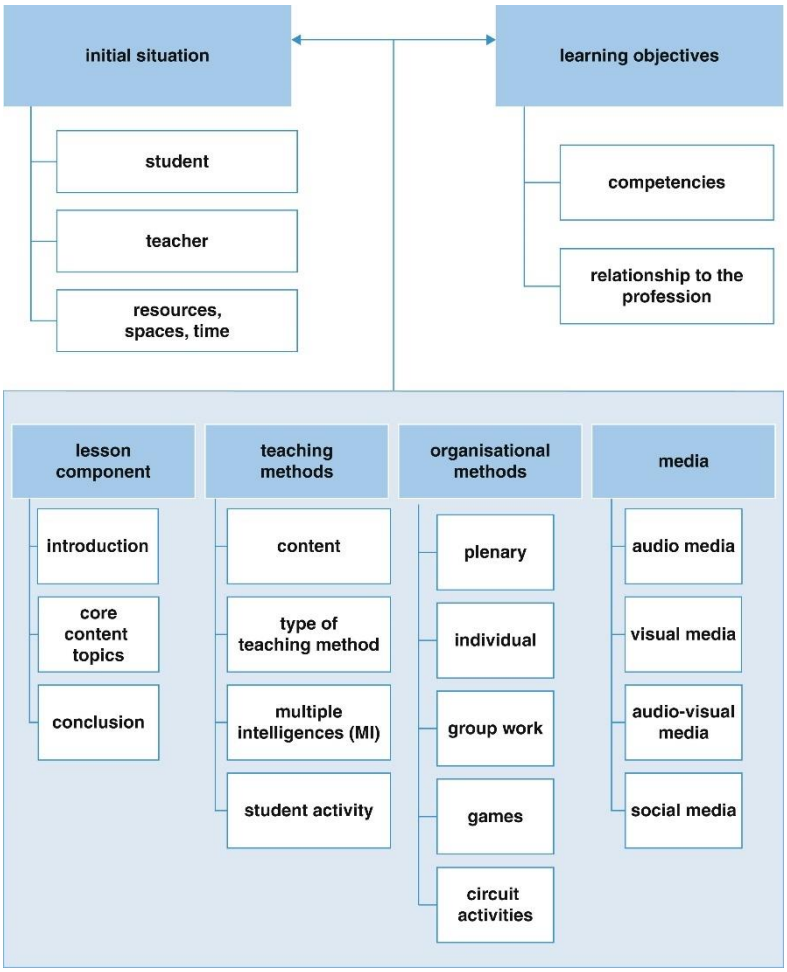
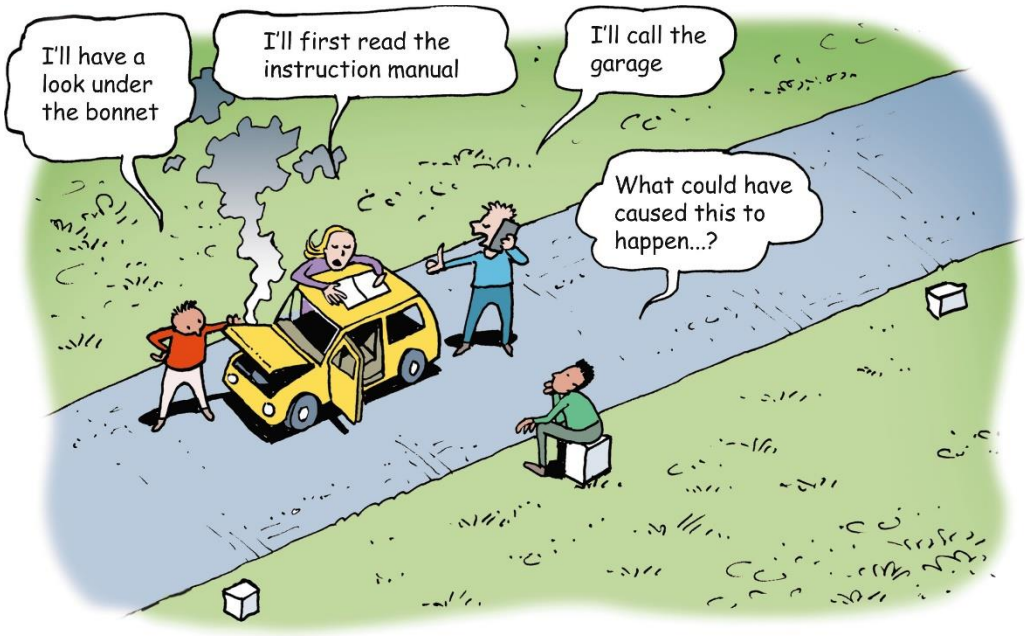


Figure 1 Didactical model

English summary of Bijkerk/Van der Heide: *Activerende didactiek. Gevarieerd lesgeven in het hoger beroepsonderwijs*.

Are you a teacher who commands a high level of expertise and values extensive knowledge? There's nothing wrong with that.... active learning simply goes one step further. You will learn how to help students mobilise their knowledge and make the important transition from theory to practice.

1. Learning styles and experiential learning



If you are interesting in taking student learning styles into account during your lessons, it is important to first clearly understand what the term learning style encompasses.

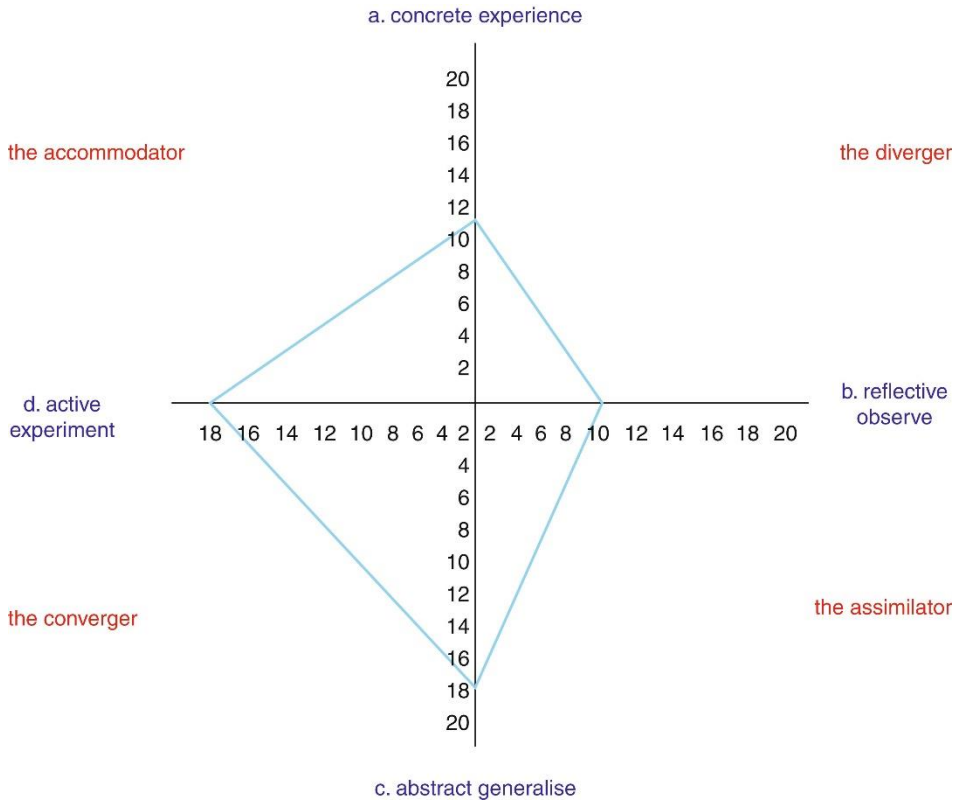
- **A learning style is a relatively stable pattern representing the way someone learns (Vermunt, 1992).**

1.1 Kolb's learning styles

Kolb (1984) identified four learning styles. Kolb's four learning styles are:

1. The accommodator
2. The diverger
3. The assimilator
4. The converger

Kolb does not depict the learning styles as being either positive or negative. Every learning style has its own benefits and limitations. The following investigates the characteristics associated with each learning style. As a teacher, you can motivate your students by relating to their preferred learning styles and challenge them by helping them compensate for their weaker points.



a. Accommodator

Accommodators prefer diving right in and trying things out rather than listening to the teacher's explanation of theory. They enjoy having the freedom to engage in ample practice opportunities. The strength of accommodators lies in their readiness to take action ('anything is better than sitting and listening'), carrying out tasks and testing out different solutions. Accommodators are enthusiastic and get along well with others.
The weaknesses of accommodators are: impatience and a tendency toward hasty decisions. These can result in a failure to read step-by-step procedures or forms listing artefact requirements before going ahead with a task, possibly leading to poor assessment scores that could have been avoided by first reading all of the information provided.

b. Diverger

Divergers are eager to gain new experiences and examine things from various perspectives. They prefer working in groups with other students to collectively seek out solutions or plans of action. Their strength lies in their imaginative skill and ability to describe their emotions. Divergers often have a broad interest in both culture and people. Divergers are often brimming with ideas, but their weaknesses are: difficulty in choosing and making decisions. It can be uncomfortable for divergers to work under pressure as they often find themselves going back and forth between options.
Responses to questions are often of secondary importance, but are generally more thought through. This means that it is important to allow divergers time to think before having to answer questions from the teacher.
Divergers often have difficulty meeting deadlines as they tend to linger too long in the initial stages of a project.

c. Assimilator

Assimilators prefer to be well-prepared, to gather information and to research the circumstances behind the issues at hand. The value of information is assessed by examining the expertise of the teacher providing the information or the level of evidence provided by the theories or models being discussed. Assimilators enjoy theory and are at their best when discussing and elaborating on theoretical models. Their strength lies in their logical reasoning skills. They prefer to first reflect upon new ideas themselves before working together with others. Assimilators tend to be precise and are often good at debating. Their weaknesses are that they often have difficulty changing their minds and place less emphasis on practical experience.

d. Converger

Convergers enjoy well-structured programmes with an informative approach. Convergers prefer to first clearly understand the theoretical side before continuing on to a practice situation. They enjoy testing theory in practice. When they see the benefits of a model, they can become incredibly enthusiastic and attempt to share their enthusiasm with others. They perform best in situations where a question has only one possible answer. Their strength lies in being goal-oriented, systematic and decisive. When working in a group, their persuasive powers can sometimes result in others feeling overpowered.
Convergers are more interested in results than in social contacts and do not openly display their emotions. Their weaknesses are making rash decisions, potentially placing quality at risk.

1.2 Experiential learning model

Many students who take learning style tests are often able to identify with the results. A wide range of research shows that taking learning styles into account leads to an improvement in student performance and allows students to feel more comfortable in the learning environment (O'Neil, 1990). This is reason enough to strive for its inclusion in instruction. It is certainly difficult to address each and every student according to their preferred learning style. However, this is also unnecessary, as it is beneficial for students to learn to process information in ways different to what their first choice might be. For this reason, it is recommended to allow all learning styles to be addressed in the lessons. The experiential learning model (see Figure 2) is therefore a useful resource regarding this matter.

The experiential learning model is based on the four stages identified by experiential learning: experiencing, reflecting, conceptualising and experimenting. All of these stages have their own specific purpose and are important in completing the learning process. Concentrating on all of the stages helps to avoid repetitiveness.
Completing the learning process means undergoing all of the stages of experiential learning. In doing so, student preferences for various learning styles will be addressed.
The experiential learning model can be used in every lesson. The teacher ensures that students go through each of the stages for every learning objective.
Afterwards, the distinguishing characteristics of each stage are addressed, where a constant variety of student and teacher activities are utilised.

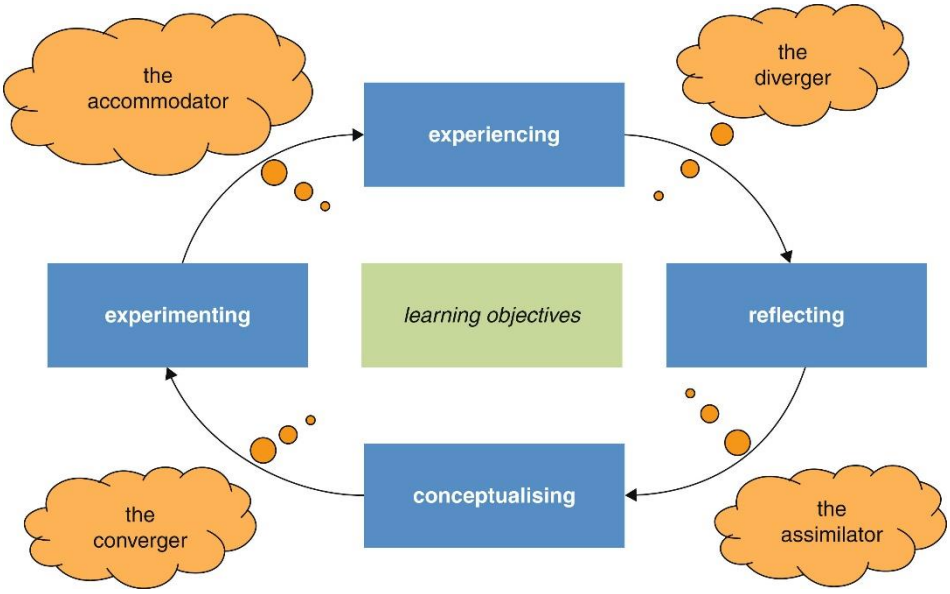


Figure 2 Experiential learning model with Kolb's learning styles

a. Experiencing

Students contribute their own individual opinions or experiences based on lesson material such as questions, stories, quotes, films, illusions, cartoons or photos. At times they will perform activities, gaining direct experience in a way that is appropriate to the subject matter. The general concept behind this stage is allowing students to get a feel for the subject matter. It is an initial exploration of the question: what do they already know and what emotions play a role?
This can be seen as a kind of warm-up exercise where the level of answers given do not necessarily go in-depth.
The hallmark of this stage is: 'Speak up...'

b. Reflecting

Students think about their emotions as well as the advantages and disadvantages of certain products. No value is given to superficial answers. The central focus is to ask follow-up questions and to think things through. The following applies to both experiencing and reflecting: there are no wrong or right answers; student experience is key. This means that the experiencing and reflecting stages can often be linked together for teaching methods that incorporate the experience of the student. Eliciting an initial reaction to material such as quotations, cartoons, commercials and stories, and then immediately following up with more in-depth questions or tasks.
The hallmark of this stage is: 'One step further ...'

c. Conceptualising

In many cases, the teacher or trainer will present an explanation of the theory. Explanations consist of a short presentation of the main points of the theoretical material, an underlying step-by-step plan or model.
Films, photos, examples and demonstrations can be utilised during these explanations to help convey the theoretical information as effectively as possible.

The hallmark of this stage is: 'Now it's the teacher's turn.'
In some cases, a video of a teacher can be used or students can be allowed to process the theory in another way. For example they can read an article, search for information themselves or watch videos explaining the theory. The educational concept of 'flipping the classroom' is based on the idea of students working on theory at home during the 'conceptualising' stage. This allows lesson time to be used to cover the basic theory more extensively and leaves more time to process and apply the information.

d. Experimenting

Students complete assignments involving the application or testing of the theoretical material discussed. In the process, they are able to make use of the knowledge or skills presented in the lesson. The hallmark of this stage is: The 'proper or improper understanding (tests) or application' of definitions, models, step-by-step procedures, etc.
Collecting the results of assignments, discussing case studies, presenting outcomes are all a part of this stage. Relevant feedback from the teacher is essential for the student learning process.

1.3 Experiential learning model in practice

Consistent application of the experiential learning cycle helps to avoid a repetitive approach to learning. Your lessons will contain ample activity and variety, finding something for every student. The more you fully understand how to implement the stages of experiential learning, the more students will be able to learn from their experiences and the better their chances will be of actually retaining and applying what they have learned.
Incorporating student learning styles means that you sometimes have to choose teaching methods that you do not personally enjoy. It can be inspiring to expand your horizons and see how well some students respond to the method. The majority of students find the learning activities that correspond to their preferred learning stage(s) the most enjoyable. Those methods inspire them and allow them to show their enthusiasm.
However, students can often learn the most in the stages that do not correspond to their preferences. Students often label learning activities that correspond to the experiential learning stage as uninteresting or useless. Completing the activities despite these feelings will enable them to further develop within that particular learning style. This can also be explained to the students. As the teacher, you will often have to put in some additional effort to help inspire or support students through these stages.

The time that you spend on each stage is very dependent on the subject matter. In principle, it does not make a difference which of the stages comes first in the lessons. In practice, it appears that starting with the stage that is generally viewed as most positive is preferable. You can use student comments and examples during the 'conceptualising' stage to support your explanation.

2. Lesson planning

A lesson plan can help you structure your lesson preparations. It helps to ensure that you have considered all of the most important didactic components in your lesson.
The following paragraphs will take a closer look at various components involved in lesson planning.

2.1 Initial situation

Before actually creating a lesson, it is important to first analyse the initial situation.

- **The initial situation contains all of the personal, school and situational information that could have a meaningful influence on the progression and outcomes of the educational learning processes related to the achievement of the instructional objectives.**
  (Baeten, Finet and Depoorter, 2011)

The following elements can be considered here:
- People: students and teacher
- Resources
- Spaces
- Time

The initial situation influences the achievable outcomes of the lesson. All of the different aspects of the initial situation have an influence on each other.

2.2 Learning objectives

Before creating a lesson plan, it is important for you to determine the learning objectives that the students will be working on during the lesson.

- **Learning objectives state what you would like to achieve with instruction. A learning objective clearly and concretely specifies what you want to achieve regarding knowledge, insight, skills and/or behaviour.**

The different learning objectives for each lesson lead toward the learning outcomes for the entire unit of study. The description of outcomes is often a combination of a number of learning objectives and describes what *knowledge and insight, skills or behaviour* you will test the students on after completion of the unit of study. In competency-based education, the description of outcomes is often linked to one of the indicators of a competency.
The most difficult part of formulating learning objectives is creating learning objectives that are both measurable and that correspond explicitly to the lesson. Depending on the time available, one or more learning objectives can be achieved for each lesson.

Requirements for formulating learning objectives

1. The learning objective contains an active verb and a content component
Always begin the learning objective with the following expression:
'By the end of the lesson, the student **will be able to** ...', followed by an active verb (concrete behaviour!) and defined lesson content.
Learning objectives containing 'has insight into ...' or 'knows...' do not include an active verb and are therefore not measurable.

2. The learning objective can be measured during the 'experimenting' stage of the lesson
In the 'experimenting' stage of the experiential learning model, the lesson material is processed by means of a measurable task or more creative assignment.
The lesson material can also be measured through the use of a case study or in a student's individual work situation. In addition, the skill pursued can be practiced.

2.3 Lesson component

In Figure 3, you can see that every lesson is composed of a(n):
a. Introduction
b. Core Content
c. Conclusion

Various activities are carried out during these lesson components. Once the initial situation and learning objectives have been clarified, these activities can be added.

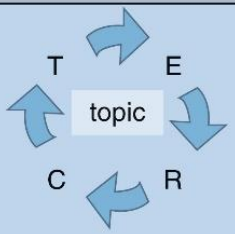
lesson structure		
introduction	**core content**	**conclusion**
• active opening • focus • agreements* • getting acquainted* • review*	 complete experiential learning cycle for each topic	• homework* • evaluation • engaging conclusion

Figure 3 Content of a lesson (* = if required)

a. Introduction

Active opening

The beginning of a lesson frequently determines the atmosphere in which the lesson will be given. For this reason, you should begin with an active opening. An active opening consists of the teacher introducing a sentence, story, quote, film or similar material. After introducing the material, students exchange their experiences. The objective of an active opening is to gain the attention of the students and to get them involved in the subject matter. An active opening is not intended as a test of knowledge.

Focus

During the introduction of the lesson, it is important to help students gain focus.

– *Competencies*

When instruction is competency-based, it can be beneficial for you to clarify for the students what competencies are going to be dealt with during the lesson. In addition, you can also highlight any relationships with the profession or professional field.

– *Programme for the unit of study*

When the lesson is spread over multiple weeks, it is important to give an overview of the entire programme during each lesson. The advantage of doing this is that it allows students who value structure to keep an overview: where are we and what is still to come? State clearly where the lesson falls within the programme, for example by using colour or bold letters.

– *Learning objectives*

After the students have gotten in the right mood for the lesson, you can present the lesson's learning objectives. It is also recommended to share these learning objectives with the students ahead of time, for example in the description of the unit of study in the student manual.

– *Programme for the lesson*

The learning objectives must be integrated seamlessly with the programme. Three learning objectives means three topics.

Agreements

If required, the introduction can also be used to come to agreements with the students about any expectations. This can concern rules such as not eating or drinking, not using telephones, and so on. At this time, you can also come to agreements with new groups about preferred interactions.

Teacher introduction

Students enjoy getting to know who their teacher is. Some find your expertise the most interesting aspect, while others find it more important to know a bit about your private life.
If the group is already familiar with the teacher, this component can be left out.

Getting acquainted

If the students have not yet met, it is worth considering giving them an opportunity to get to know each other. It is preferable to partially connect the getting to know you exercise to the topic, so that students can relate what they tell about themselves to the subject matter.

Review

If the lesson is part of a series, you can plan time for a review of the past lesson and the literature read after the introduction. One way of ensuring that students have read the literature is to have them formulate questions themselves and submit them before the lesson. This leads to more active processing of the learning materials. With or without the support of ICT, it is fairly easy to create a good quiz reviewing the material from the previous lesson.

b. Core Content

The core content of the lesson is composed of one or more topics. Give the topics a clear title that reflects the content. Each topic will cover all of the stages (experiencing, reflecting, conceptualising and experimenting), allowing for a complete learning process to be achieved. On average, a minimum of 45 minutes is necessary to achieve a full cycle for each topic.
When you begin *developing* a lesson, it is wise to start with the ‘experimenting’ stage. Ultimately, this is the stage in which the learning objective is tested. Think of a teaching method or an assignment that is appropriate to this stage and consider how you will give the students feedback on the outcomes of the assignment. This is your opportunity to test to what extent the learning objective has been achieved.
If you know how you will assess the learning objective, you can determine what information the students will require and how you will provide this information to students during the 'conceptualising' stage. You can hold a talk or a demonstration or let them watch a video. It is important that the information is clearly aimed at achieving the learning goal.
After creating these two stages, you can then turn your attention to the 'experiencing' and 'reflecting' stages. Now that your end goals are clear, you can take a closer look at the information the students have already gained through their past experiences, for example through the media, part-time jobs or internships.
Once the topics have been determined, you can select the teaching methods.
After establishing the topics, you can finish creating the lesson plan with the introduction and the conclusion.

c. Conclusion

Homework

At the end of the lesson, you can assign homework for the following lesson if required. This can take the form of an assignment designed to apply information pertaining to the current lesson topic, but can also consist of a preparatory assignment for the following lesson topic. Reflective assignments can also be assigned as homework. Clearly describe how you intend to deal with the homework during the next lesson. Some teachers allow homework to be submitted on paper or electronically via email or the digital learning environment, stipulating that homework submission is a prerequisite for participating in the following lesson.
Other teachers ask the students to get going actively with the homework and use it as input for a method during the following lesson.

Evaluation

Choose a form of evaluation that is appropriate to the outcomes you would like to measure: does it mainly involve responses or the transfer of learning? Perhaps you have included questions that cover a number of levels.

Engaging conclusion

The teaching methods appropriate for the conclusion of the lesson are the same as the methods that can be used in the active opening. The biggest difference is that in an engaging conclusion, the video, story or quote is not intended to elicit any interaction with the students. Rather, it is intended as a summary or profound statement.
If you are continuing with the same subject matter in the next lesson, you could begin with the teaching method used here while also asking for the opinions of the students.

2.4 Teaching methods

A teaching method is an approach taken by a teacher to help students reach a certain learning goal.

Teaching methods can be divided into various categories (Bijkerk and van der Heide, 2006). It is also possible to create subcategories within each type of teaching method, based on the method's intended function.
The different categories of teaching methods are:

1. **Ice breakers.** This category includes all teaching methods used for active openings, other getting to know you methods and evaluation methods. Teaching methods intended to form groups or as eye-openers for clarifying theoretical information also fall under this category.
2. **Discussion methods.** This category includes all brainstorming activities, mind mapping assignments, and working on argumentation or debating skills
3. **Teacher-centred methods**. This category includes presentations and demonstrations of the learning material by the teacher as well as metaphorical explanations
4. **Games.** This category includes role plays, game simulations and quizzes.
5. **Work assignments.** This category includes both creative and conventional assignments intended to process explanations of the material. Case study assignments and practical assignments fall under work assignments.

A variety of methods are available for you to use during your lesson, but that does not mean that any one method is better than another.
What is important is that the method is appropriate to the situation and helps to achieve optimal results. One way or the other, it is important to provide a good variety of teaching methods.

2.5 Organisational methods

An organisational method is a structure that the teacher can apply during a lesson to help students use the available time and resources as effectively and efficiently as possible.

Lessons can be organised in various ways:

a. Plenary

You can choose to discuss the lesson material with the entire group together. The advantage here is that everyone receives all of the information together and no time is lost in forming groups or searching for assignments. The disadvantage is that this organisational method can soon become boring as communication is always managed by the teacher. Not everyone is comfortable expressing their opinions in a plenary arrangement.

b. Individual

Students work individually on an assignment. The assignment can be identical or different for each student. Allowing students to work individually offers some organisational advantages. There is less noise, there is no need to form groups and you do not need to correct collaborative work.
The results of the assignment and what the student has learned from it are also immediately clear. Afterwards, the assignment results are often discussed in a plenary arrangement. This makes it difficult for students to obtain personal feedback.

c. Group work

Students work together in groups on the assignment. Here, the assignment may also be identical or different for each of the groups.

d. Games

Another organisational method is linking assignments to a (board)game. A variety of teaching methods or assignments fall under this organisational method.
The game rules determine what assignments will be completed by the students or the group and in what order. The game itself has no substantive value unless it is being used as a teaching method.

e. Circuit activities

The key feature of a circuit activity is that a group of students completes 3 to 8 assignments within a given period of time. After the period has ended, the groups change until everyone has completed all of the assignments.
There are two variations of a circuit activity:

- *Learning circuit:* in this case, the teacher remains present as a part of the group. As students are placed in small groups, more individual attention can be given to such things as improving skills or giving feedback on the progress of a project or on completed projects.
- *Training circuit:* in this case, the teacher circulates and acts as a coach for all the groups.

2.6 Media

- **A medium is a data carrier that helps support communication between teacher and student.**

Nowadays, teachers have a wide variety of media available to them to support their lessons. However, many teachers are still hesitant to incorporate new media. Don't all of those bells and whistles act as a major distraction to the central learning process? Without media, teachers only have their voices to convey information to the students. By incorporating more of the senses, the teacher's message is emphasised and the chance is greater that the message will be retained.

Available media can be divided into four groups:

- audio media. This category includes all information that is transmitted via the ears
- visual media. This includes all information that is transmitted via the eyes
- audio-visual media. This includes all information that is transmitted via the eyes and the ears
- social media. This includes the information transmitted over devices in student possession such as telephones, laptops or tablets like the iPad. In this case, students use the same software as is used for social communication.

3. Multiple Intelligences (MI)

Howard Gardner explains that many intelligent behaviours can be learned and influenced. He sees intelligence as a set of possibilities that can lead to excellent performance within certain areas.

- **'An intelligence is the ability to solve *problems* or to create products, that are valued within one or more cultural setting' (Gardner, 1993).**

Some individuals are extremely developed in one particular intelligence. In other words, they have a talent. Many activities require various intelligences to work together.
The following includes a definition and the most important attributes of each of the intelligences. After the description of these attributes, a number of practical tips for teachers have been included on how they can inspire students to use their various intelligences.

3.1 Verbal-linguistic intelligence (VL)

Attributes

- **Verbal-linguistic intelligence is the ability to read, write and communicate.**

This intelligence is often called language skills. People who score highly in this intelligence are especially focused on stories, rhymes, verses and other forms of expressive linguistic usage. They can easily formulate ideas into words and are avid readers, quickly gaining insight into what they read and expressing an interest in literature. They enjoy puns and often see multiple meanings of a word in context. They also think in words. They can argue well and enjoy writing stories and poetry.

Examples of teaching methods for verbal-linguistic intelligence

- Exchanging experience through the use of proverbs, metaphors and quotes
- Making statements and discussing them
- Interviewing people
- Doing a creative writing assignment
- Holding a debate
- Making up mnemonic devices
- Creating a word cloud with the help of ICTs such as Wordle or Tagxedo

3.2 Logical-mathematical intelligence (LM)

Attributes

- **Logical-mathematical intelligence is the ability to understand logical correlations, think causally and easily calculate and work with numeric symbols.**

This intelligence is recognised by its use of analytical, logical and ordered steps in patterns of thinking. People that score highly in this intelligence express a preference for puzzles and assignments that rely on logical insights. They can work in an orderly fashion, systematically and base conclusions on an abstract level. They are often good at calculating numbers and can quickly figure out principles and solutions.

Examples of teaching methods for logical-mathematical intelligence

- Assignments with numerical figures: sums, budgets, calculations, etc.
- Placing procedural steps in order
- Creating diagrams or graphics
- Analysing cause and effect in case studies
- Conducting research with statistical reports
- Creating a crossword puzzle with the help of ICTs such as Puzzlemaker

3.3 Visual-spatial intelligence (VS)

Attributes

- **Visual-spatial intelligence is the ability to perceive and think in pictures.**

This intelligence is characterised by the ability to imagine objects in space or in pictures. This picture can be elicited with the help of language or photographs, images or figures. People that score highly in this intelligence enjoy drawing and have a feeling for colour, shape and proportions.
They often doodle while listening. The most frequently occurring doodles are figures, circles, squares, arrows and flowers.
They understand things better when they are supported with images and often make use of supporting materials, images, etc., in presentations.

Examples of teaching methods for visual-spatial intelligence

- Photo associations or optical illusions
- Making a mind map
- Creating a collage or moodboard
- Drawing
- Making a film
- Making an animation with the help of ICTs such as Powtoon or Moovly
- Creating a graphic with the help of ICTs such as Piktochart or Canva

3.4 Musical-rhythmic intelligence (MR)

Attributes

- **Musical-rhythmic intelligence is the ability to appreciate and work with melodies, rhythms and sounds.**

People that score highly in this intelligence easily pick up melodies and enjoy playing musical instruments. They have a strong feeling for rhythm and measure. They are captivating storytellers. They react to music, but also strongly to sounds.

Examples of teaching methods for musical-rhythmic intelligence

- Listening to a song with a text
- Listen to their own music while working on assignments
- Creating a summary in poetic forms such as a haiku or limerick
- Making up lyrics for an existing melody
- Writing a rap and performing it
- Searching for music or lyrics for a specific subject matter with the help of ICT

3.5 Bodily-kinesthetic intelligence (BK)

Attributes

- **Bodily-kinesthetic intelligence is the ability to effectively perform (fine and gross) motor skills.**

People who score highly in this intelligence have a good mastery of their gross and fine motor activities. They are confident of their movement. They are often fearless and enjoy being active. They enjoy expressing their emotions through movement and facial expressions.

Examples of teaching methods for bodily-kinesthetic intelligence

- Writing something down themselves on a flip-chart, grabbing a marker, hanging post-its
- Expressing their position by forming line-ups
- Participating in yes/no quizzes where you stand if the answer is 'yes' and remain sitting if the answer is 'no'
- Playing 'Runaround' with multiple choice questions
- Depicting something in a 'slideshow'
- Creating something by hand, such as folding paper airplanes, building structures, creating models
- Roleplays
- Searching for sports images as a metaphor for a specific subject matter with the help of ICT

3.6 Naturalistic intelligence (N)

Attributes

- **Naturalistic intelligence is the ability to order, to see connections and point out relationships.**

More often than not, this is related to nature. People that score highly in this intelligence have excellent perceptive and/or observational abilities, and as a result, are good at verbalising what they see, hear, taste or smell. They usually work according to the following principle: look, observe, analyse and reason.
Everything that grows and blooms is of interest but they also find things such as natural phenomena, the weather, climate, stones, minerals, animals interesting. They often build collections, where everything will be recorded, described and preserved.

Examples of teaching methods for naturalistic intelligence

- Making up a metaphor with an animal or natural phenomena
- Perceiving changes, seeking out differences
- Building associations using objects found in nature
- Classifying information
- Starting a collection
- Searching for natural images for a specific subject matter with the help of ICT

3. 7 Interpersonal intelligence (IR)

Attributes

- **Interpersonal intelligence is the ability to perceive and understand the needs and emotions of others.**

This pertains to the ability to learn from and with each other. The reactions of others are influential in their own development. People who score highly in this intelligence are very focused on others and also express an interest in others. They can easily sympathise with the emotions and feelings of others. They enjoy working together in groups and easily make contacts. They are comfortable relying on others and are also prepared to help and assist others.

Examples of teaching methods for interpersonal intelligence

- Determining who they are going to work with themselves
- Doing collaborative projects
- Creating a group product where everyone contributes
- Creating and playing games
- Interviewing people from a professional environment
- Analysing and discussing group processes
- Starting a discussion forum about a specific subject matter with the help of ICT

3.8 Intrapersonal intelligence (IA)

Attributes

- **Intrapersonal intelligence is the ability to introspect.**

That requires the ability to (be able to) consider personal actions, to engage in self-reflection and to learn from the process. People that score highly in this intelligence enjoy working in the background or working alone. It may appear as if they live in their own world. They are highly aware of their strengths and weaknesses and know exactly what they want. As a result, they act purposefully and have considered all aspects very carefully. They have a feeling for reflecting on things and events and are able to deal with major life issues at an early age.

Examples of teaching methods for intrapersonal intelligence

- Completing an assignment alone
- Doing a self-test
- Naming their individual qualities and pitfalls
- Bringing in a case study of their own
- Talking about their own feelings
- Describing an image of the future
- Giving their own opinions with the help of ICT in a blog report or with Blogger

3.9 Tips for teachers

The theory of MI can be applied alongside the principles of stretching and matching. Appealing to a students' strongest intelligence and incorporating their preferences can make an enormous impact on motivation. Their commitment will increase together with their enjoyment and enthusiasm for learning.
Help students improve their weaknesses by utilising their stronger intelligences to better process or retain the most difficult learning material.

Stretching:

- optimal development and stimulation of all the intelligences;
- attention and activities are aimed at the weaker intelligences.

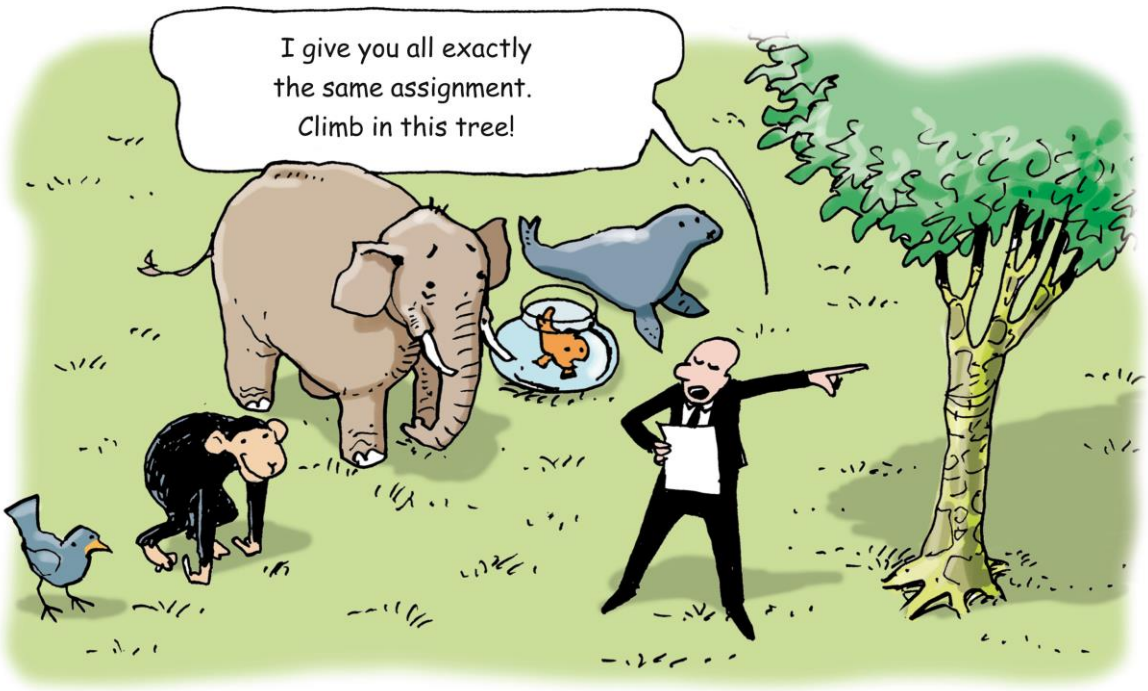
Stretching helps increase student capabilities

Matching:

- making use of students' stronger sides and what they enjoy doing;
- connecting learning material to a preferred intelligence to help strengthen the weaker intelligences.

Matching helps increase student motivation

4. Differentiation during the lesson



- **Differentiating is the way in which teachers deal with differences between students.**
- **Personalisation is customised learning. Students can choose from activities that best fit their opportunities, talents and learning styles.**

Educational institutions strive to give every student an equal chance at succeeding in their education. They hope to help each student maximise their educational growth in ways that are appropriate to their individual capabilities. For instruction, that means that you must:

- gear the lessons to student attributes as much as possible.
- take the diversity of student backgrounds into consideration.
- know the possibilities offered by the educational institution to help individual students eliminate their limitations. Students with a disability or serious academic impairment require additional support. Adequate resources must be present to provide for this.
- give students regular opportunities to choose a personalised path to learning.

It is becoming increasingly important for teachers to actively deal with differences that may be concealed in arbitrarily composed groups. Utilising this diversity systematically and consciously is one of the challenges facing instructors. Cultivating the different capabilities and competencies of all students is not easy but especially motivating when it succeeds.

Effects of differentiation

Bosker (2005) defines the potential effects of differentiation on instruction:

- *Undifferentiated instruction.* Performance increases after a period of instruction, but differences between students remain the same.
- *Convergent differentiation.* The teacher sets minimum targets for all students to achieve. The efforts of the teacher are aimed primarily at the students performing at the lowest level. After a period of instruction, performance of students performing at the lowest level has increased the most and the difference between the students has decreased. Convergent differentiation can inhibit the development of students performing at the highest level, unless they are given the opportunity to coach their fellow students.
- *Divergent differentiation.* Differentiated instruction that attempts to establish the best possible situation for each student; allowing for immense progress for all students, but also potentially leading to increased differences between students.

4.1 Skill-based differentiation

There are various opportunities to make use of differences in capabilities during a lesson. You can differentiate the learning material provided, you can allow the students to work alone or in groups, you can allow them to complete assignments at a different pace or give them different assignments depending on the level of the student.

a. Methodological differentiation

If there is one established learning objective, then methodological differentiation can help you provide different paths toward achieving that learning objective.
The type of guidance offered varies. For example, an independent approach allows you to give e-learning feedback via the digital learning environment. A classical approach, on the other hand, allows you to give more feedback and guidance during the lesson.

b. Differentiated pace

Differentiation in learning pace gives students the opportunity to complete assignments at their own pace. Provide one or more additional assignments for quicker students after they receive a positive result for the assignment. This helps students who are faster as a result of prior knowledge, higher abilities or other factors, avoid the possibility of getting bored.

c. Differentiated levels

Differentiation in learning levels allows the teacher to provide different assignments according to the level of the student, such as assignments for beginners, intermediate and advanced students. Differences in levels can be based on knowledge or skills.
To reduce stigmatisation, some educational programmes work with bronze, silver and gold assignments rather than easy, intermediate and difficult.

4.2 Motivation-based differentiation

There are various opportunities to make use of differences in motivation during the lesson. Differentiation can be based on different learning objectives, on interests or on learning styles or intelligences.

a. Differentiated learning objectives

When working with differentiated learning objectives, students determine their learning objectives for a specific subject matter. In some cases, students may create learning objectives themselves, while in other cases they may formulate (supplementary) personal learning objectives in addition to the existing learning objectives.

b. Differentiated interests

When working with differentiated interests, the teacher asks students to complete the assignment in a way that suits their interests.
This allows everyone to complete the same assignment but in their own individual *context*. Students choose their own context for completing the assignment.

c. Differentiated didactics

Differentiated didactics originates from various experiences including the concept that one methodology is rarely ideal for every student in a group.
Assignments can vary based on different *learning styles*, for example. Students choose an assignment that fits their learning style or one that does not fit their learning style, allowing them to learn even more.
Tasks can also be assigned that are appropriate for a number of different intelligences. Students select an assignment that fits their preferred intelligence (matching) or one that does not fit their preferred intelligences at all, allowing them to learn more (stretching).

4.3 Outcome-based differentiation

The approach offered by Vermunt (1992) provides an excellence basis for differentiation if the focus is on the outcomes of learning.
Vermunt distinguishes between learning styles pertaining to quality of learning and those pertaining to reflecting on learning. He identifies differences between the undirected, reproduction-directed, application-directed and meaning-directed learning styles. As a teacher, you can use Vermunt's learning styles by offering tests or application-based assignments on different levels, giving students the choice of which level they want to attempt with the learning material. The intention is to allow students to advance from reproduction-directed learning to application-directed and/or meaning-directed learning.

a. Reproduction-directed assignments

Reproduction-directed assignments involve the reproduction of learning material. Students can devise their own questions about the learning material to test their knowledge.
They may also complete assignments aimed at helping them retain content, such as creating mnemonic devices, diagrams and mind maps.

b. Application-directed assignments

Application-directed assignments involve the application of learning material, for example by solving a problem or doing a role play. Another possibility is for students to submit an artefact that is useful in professional practice.

c. Meaning-directed assignments

Meaning-directed assignments lead to more introspection and encourage self-learning. Student are asked to identify relationships, reflect or give meaning to the learning material. Another possibility is for students to submit an artefact establishing relationships with another subject area or subject matter. Any reflective activity where students learn to reflect critically on their own actions and where the insight gained in processing the subject matter is central fall under meaning-directed assignments.

5. Designing learning pathways

Designing a new unit of study (a minor, module, training programme, workshop or lesson series) requires you to look beyond preparing and implementing just one lesson. Designing learning pathways is more than just a simple accumulation of lessons. You must ensure that the unit of study corresponds to the overall educational plan and shares the same vision of instruction.
You must link the educational competencies to the learning objectives and consider how best to assess the competencies. This is aimed at ensuring that all the lessons together lead to the desired learning outcomes. In addition to all of the previously mentioned didactic components, two further points are also important to consider. The first is to take the most important brain tips into account when developing instruction. The second is to keep your students well informed by creating a student manual. Whenever you begin a new unit of study, it is well worth remembering that learning outcomes are higher the more students understand what and why they are doing something. Therefore, part of designing a unit of study includes developing a student manual. An array of practical questions will be answered for the students as a result: when are the contact hours, what must I prepare and how do assessments work?

5.1 Take the most important brain tips into account when designing instruction

When designing learning pathways, it is important to take into account a number of brain tips in addition to the various learning styles, intelligences and possibilities for differentiation.

Below is a list of the most important tips:

a. Establishing a focus

Considering the brain of an adolescent, which does not yet have much of a helicopter view or inclination toward planning, the first brain tip is: help students focus.
Establishing focus and attention is reinforced by:

- giving students an assignment in advance;
- drawing a link between the subject matter and the vision, profession or competencies during the introduction of the lesson;
- formulating an achievable goal. This allows attention to be focused on what is necessary.

b. Providing review opportunities

The key points for the brain tip 'Providing review opportunities' are:

- Pairing repetition and variation, providing new and ongoing challenges for the brain.
- It is important to provide ample practice opportunities, but in a way that uses a variety of situations to help facilitate full flexibility in thought and behaviour development.
- Encourage practice rather than placing an emphasis on obtaining results.

Repetition is necessary in order to retain information in the brain. Ample repetition reinforces these connections. However, the brain quickly gets bored and sluggish after repeatedly doing the same activity. At that point, the brain will no longer retain anything.

c. Awakening emotions

Research on the brain function of adolescents shows us that students are more often led by emotions than by rationality and that they are particularly responsive to short term rewards. We also know that the more neurotransmitters are created, the more stimuli can be effectively transmitted. The third brain tip is to stimulate the release of neurotransmitters by awakening emotional responses. That can occur in two ways:

Promote the release of dopamines and endorphins by:

- awakening curiosity;
- increasing emotional involvement;
- offering unexpected rewards;
- giving compliments and positive feedback;
- providing successful experiences: the feeling of satisfaction after successfully completing an assignment.

Encourage the release of adrenaline by including:

- time pressure;
- an element of competition.

d. Being a role model

The fourth brain tip is to utilise the functionality of mirror neurons by demonstrating an action or showing exemplary teacher behaviour.

e. Finding the glue

If you want students to consciously retain information in the long term, then it is a good idea to first activate the knowledge they already have available to them. That is what it means to find the *'glue'.*

Retaining new information is easier if you 'stick' the new piece of information to knowledge already acquired. You can use this glue to help students in a variety of ways.

- Activate prior knowledge during the active opening and the ‘experiencing‘ and ‘reflecting‘ stages, all the while looking for the ‘glue’.
- Incorporate student examples during the explanation.
- Make sure to have your own examples ready in case students do not have much prior knowledge.

f. Using all of the senses

The sixth brain tip is to energise the various senses during instruction in order to allow more neurons to be released.

Figure 4 displays Bale's learning pyramid. It demonstrates the relationship between the way information is transferred and the amount of new information that is retained after a 24 hour period. If someone simply tells you something, there is little guarantee that you will have really learnt anything. But the more opportunity you have to do something yourself, the greater your potential for learning. Today's student must learn to relate differently to knowledge. A great deal of information is available (including digital communications, internet, etc.), but it is more important for students to know where to find useful and necessary information to be able to both make a critical selection and test the value of the information.

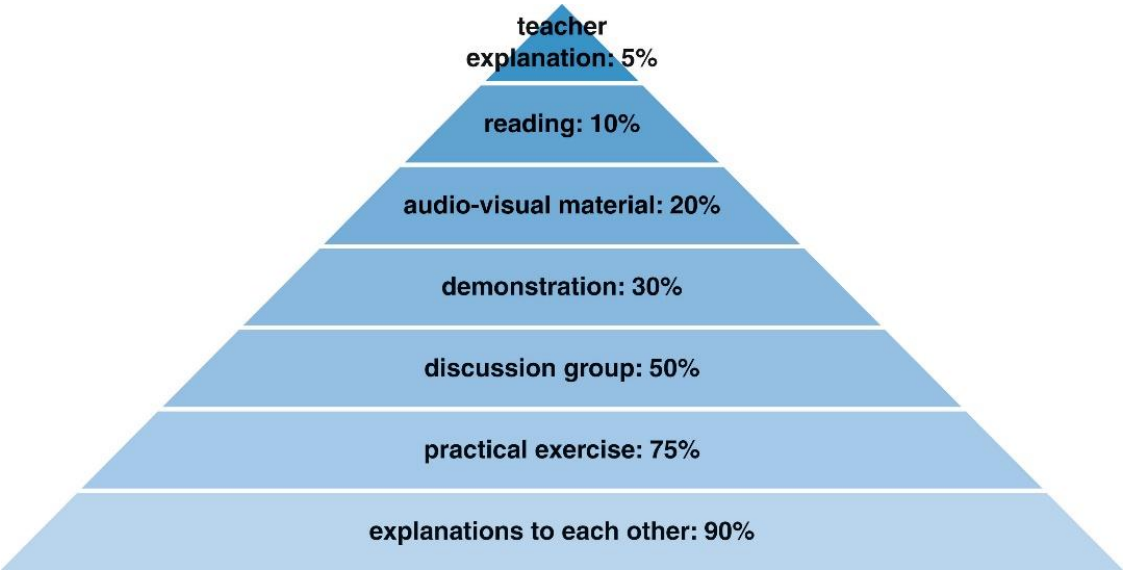


Figure 4 Bale's learning pyramid (1969)

- It is preferable to present images and sound at the same time without any overlap in information.
- Provide a nice 'package', including aspects like colour, shape and structure.
- Avoid cognitive overload.
- Use movement to improve memory.
- Use the impact of (Baroque) music.

g. Requiring active involvement

Within the scope of knowledge concerning information transfer and memory, it is important to avoid permitting students to be passive and to allow them to be actively involved with the learning material. Active practicing helps students retain information in their long term memories. The seventh brain tip is to allow students to get actively involved to help process the learning material. Let them discuss, do projects or explain theory while incorporating a variety of teaching methods. This is also possible to accomplish during lectures.
One very familiar definition of a lecture is:

- **'A lecture is a form of instruction where the teacher gives a long verbal presentation, which in principle is not limited to the number of participants. This often involves the concept of one-way traffic: the teacher is the one who speaks and there is little interaction with the participants' (Smuling et al., 1993).**

Such traditional lectures have very little effect on learning. After 24 hours, 80% of the contents of the lecture has entirely disappeared from a student's memory. Research has shown that students are capable of actively retaining information for only twenty minutes. After that their concentration wanes.
Active learning can also be applied to lectures.
The lack of concentration can be remedied by dividing the lecture presentation into twenty minute to half an hour sections. The presentation can be divided into topics and the students can be put to work in between covering the topics.
This will not only allow the contents to sink in, but will also allow students to listen more attentively afterwards (see Figure 5).

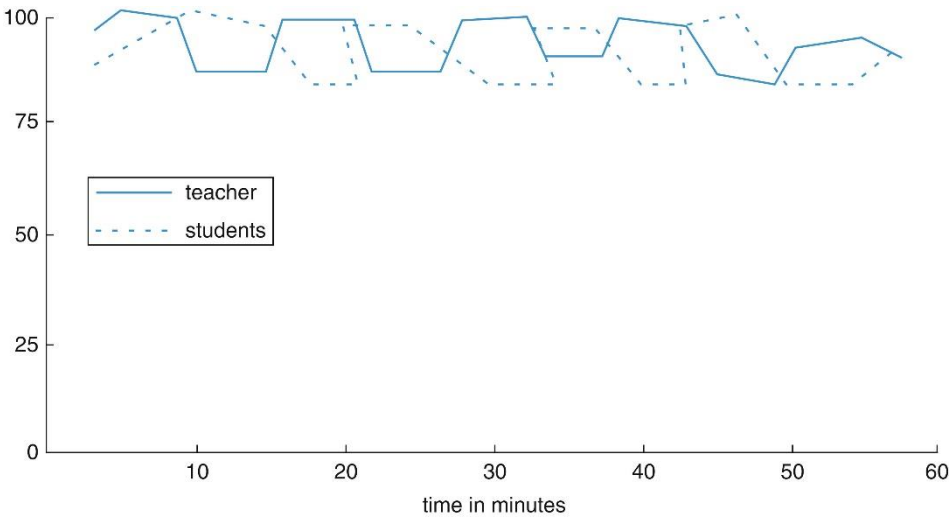


Figure 5 Attention curve during a lecture (Kallenberg et al., 2003)

5.2 Describing the unit of study in a student manual

Teachers develop activities for students within instructional units of study: students are given lessons or lectures and must complete assignments and exams or projects. It is common for students to not fully appreciate the objective of the activities, teaching methods or means of assessment.
In many cases, this is due to the fact that the target of the unit of study is not made clear to the students. What is the purpose of the various activities? What are all of these efforts leading toward?
Students can lose their motivation if no clear focus is established. This is unfortunate, as teachers generally put in a lot of time, energy and good will into developing the units of study. Teachers make a selection from a multitude of topics based on their professional expertise. Because they are on top of the material and have knowledge of the professional field, the relationships between topics are clear to them, but is that also the case for students? Do students understand why they need the information for their professional practice? A student manual provides an opportunity to bring this focus to their attention.

The following section describes the points to highlight in a student manual.

a. General Information

Give an overview including the name of the unit of study, the period, the specialisation, and the study hours, divided into contact hours and self-study.
Some educational programmes begin the student manual with a title page and captivating image. This helps students make an immediate association with the subject matter contents.

b. Relationship to the profession or professional field

One of the most important components is an inspiring text about the relationship between the unit of study and the profession or professional field. This gives focus to the students, motivation for the subject matter and a higher chance of transferring the knowledge acquired. It is important for you to speak to the students in an informal tone and to make a connection for them to the tasks that they will be required to do.

c. Description of the teacher(s)

Many students find it interesting and enjoy learning more about who the teacher is and who is giving the lessons. Students with an assimilator learning style find it important to assess the value of the teacher's expertise. It is therefore wise to include a brief biography about your education and experience in the student manual. If the unit of study is to be given by multiple teachers, all of the instructors should include a short text.

d. Competencies and indicators

In the student manual, identify the competencies linked to your lessons and give the indicators that can be tested.

- **A competency can be described as the ability to successfully carry out tasks in professional practice.**

In other words, students are able to properly fulfil professional tasks in a relevant professional context and are able to reflect on their experience. This includes utilising and building upon expertise such as knowledge, insight, skills and attitudes within the professional domain.
Competency-based education is aimed at developing the competencies of the students. One of the key features of competency-based education is that training is related to the professional sphere. This means that the objective is to be able to handle critical professional situations adequately.
With competency-based education, students learn actively and take personal responsibility for their learning process. Students receive appropriate guidance in their development toward independence.
A competency can be sub-divided into qualities, attitudes, skills and knowledge (see Figure 6).

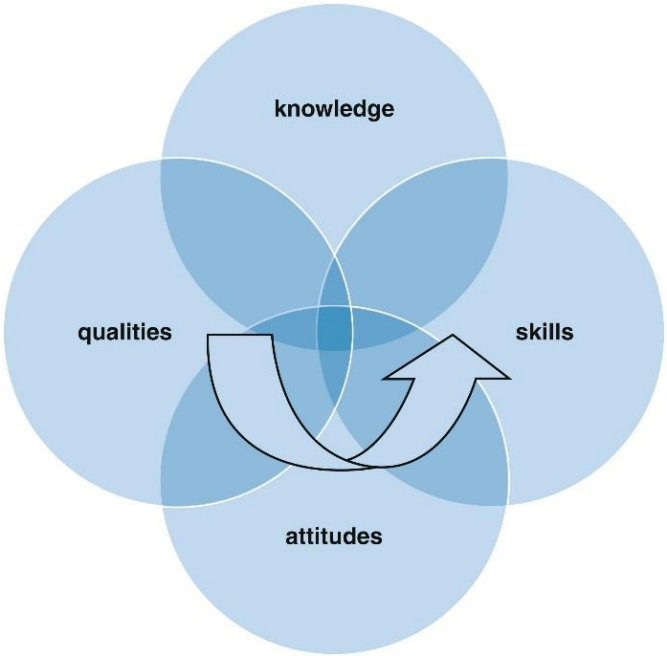


Figure 6 Competency model. The arrow indicates the desired development from qualities to knowledge.

The descriptions of the components of a competency are called *indicators*.
In order to be able to evaluate the skills, attitudes and personal characteristics that are associated with a certain competency, we use measurable behaviour indicators. The emphasis is therefore on indicating the presence of a competency through demonstrating a certain behaviour. Not all of the indicators are applicable at every moment of instruction and in every unit of study.

For professional educational programmes, indicators can be divided into three levels:
- Beginner: What can the student do after the first year?
- Advanced: What can the student do after the second year?
- New professionals: What can the student do at the end of the educational programme?

e. Planning of activities

In the student manual, describe the planning of the lessons and topics clearly. Give the content of the lessons and describe the learning objectives for each topic. Also briefly state what the students must or should be able to do in preparation for the lesson in the student manual.
The activities must be realistic, appropriate and aimed at the competencies and indicators that are to be achieved. Activities such as internships, guest lectures, practical assignments and professional visits are included in the activities possible for students to complete to achieve the competencies.

f. References

Describe the mandatory and recommended literature correctly according to the reference style of the American Psychological Association (APA).

g. Procedures, agreements, rules

Before beginning the lessons, it is important to give the students an overview of the rules that they will be expected to follow. This may be in connection with laws, educational programme regulations or the agreements you find important.
Clearly describe which agreements you want to make with the students, including those pertaining to attendance, preparation, attitudes, etc. Also provide the consequences for students if they do not abide by the agreements.

h. Exams

Before beginning with the lessons, provide the students with a clear description of the exams in the student manual, including the criteria.

Epilogue

This article is a summary of the book by Lia Bijkerk and Wilma van der Heide (2016)
Activerende didactiek, Gevarieerd lesgeven in het hoger beroepsonderwijs [Active learning, a varied approach to teaching in higher vocational education]. Houten, Bohn Stafleu van Loghem.

We would like to wish all of the teachers every success in obtaining their basic teaching qualification. We believe that this article makes a useful contribution to the improvement of the quality of lessons given in higher professional education.
We hope that this article will help you take on that challenge and translate theory into practice. With that, we hope that you enjoy teaching your own lessons as much as we do every day.

Lia Bijkerk (author) and Titia van der Ploeg (trainer)

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