



Theme 6 - Asking questions



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Structure of this theme

Learning objectives

The 'problem' in asking questions

How can we develop questions that invoke higher cognitive processing levels?

Using response technologies in the (online) classroom

Students developing their own questions

Your task in relation to asking 'questions'

Checklist to evaluate the 'questions' assignment

Planning

References

'Asking questions is a recurrent approach in educational interaction and communication. But few teachers actually reflect on the nature and quality of the questions they pose and raise during their instructional activities. This is critical since a question incorporates expectations about the 'content' and the 'behavior' expected to be tackled by a student. Teachers often underestimate the importance of raising well-designed questions. Moreover, the success of the themes tackled earlier in this course, often build on the quality of these questions. This makes it even more urgent to study the way we ask questions or invite students to ask questions.



Learning objectives



Learning objectives

- Explaining why questions lead to student active learning.
- Classifying questions according to Bloom's revised taxonomy (content and behaviour).
- Designing questions to be used during a face-to-face lecture.
- Evaluating the adequacy of a list of questions/task/problems in a summative/formative evaluation setting.

The 'problem' in asking questions



It looks irrelevant to study the nature and quality of the questions we raise as teachers in our classrooms. Questions are so central to our teaching practices that it sounds strange to focus on "questions". It even sounds boring. Why would that matter? As will become clear in this theme, questions are the backbone of instruction. They drive the actual learning process of students and either hinder or boost their "active" engagement in the process.

The following article of Gall (1970) positions questions as 'truism' en leraren worden gezien als een 'professional question maker'. Read the article to understand this perspective (see [1169463.pdf](#)):

THE USE OF QUESTIONS IN TEACHING

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It is a truism for educators that questions play an important role in teaching. Aschner (1961), for example, called the teacher “a professional question maker” and claimed that the asking of questions is “one of the basic ways by which the teacher stimulates student thinking and learning.” Also, asking questions is one of the 10 major dimensions for studying teachers’ behavior in the widely used System for Interaction Analysis (Flanders, 1970).

In contrast to this optimistic perspective of teachers, we observe how students react less positive. They raise issues about implicit questions, incomplete questions, a lack of fit between what was studied and the questions, confusing questions ... To better understand this confusion, let's look at the critical perspective of [dr. Kamran Moosa](#) when he discusses questions in today's exam practices:

How to make Exam Papers using Bloom's Taxonom...



What did you learn from this videoclip? It seems many teachers rather focus on the lower cognitive processes when developing exam questions. As you will experience in the portfolio activity, this is what we expect you to do differently: go beyond the basic level and go for the complex questions.

In this theme, we look at this by studying three subthemes:

- How can we develop questions that invoke higher levels in cognitive processing?
- Using response systems in the (online) classroom
- Inviting students to develop their own questions

How can we develop questions that invoke higher cognitive processing levels?

From the literature you will learn that discussions about classifying "questions" are endless. Every author seems to have their own opinion, ideas, insights, ... Tofade and collega's (2013) describe a variety of classification approaches. In this first classification approach, questions are clustered in ways they look alike:

Table 1. Types of Nonhierarchical Questions Used as Teaching Tools^{1,2,12}

Question Type	Description	Sample Question (Content Area: Analgesics and Pain Management)
Convergent	Closed, not offering many options; converges on a single or narrow list of "best" answers; encourages focused, succinct response	What percentage of the population is a poor metabolizer, and therefore, unlikely to have an adequate analgesic response to codeine?
Divergent	Open, having many responses; permits the exploration of diverse perspectives; encourages dialog	Codeine isn't used as much today for analgesia as it once was. Why?
Focal	Student must choose or justify a position.	Would you recommend the use of a fentanyl patch in a patient with a history of substance abuse? If so, why? If not, why not?
Brainstorm	Questions that generate a list of ideas or viewpoints.	If you could create the ideal analgesic product, one that could be widely used in any population for various causes of pain, what features would it have?
Shotgun	Questions containing several content areas with no particular link.	What are the potential risks of using NSAIDs? When was aspirin first synthesized? Methadone is available in what dosage forms? What patient-specific data should be obtained prior to initiating tramadol therapy? What the best way to manage opioid-induced constipation?
Funnel	Multiple questions starting broadly and gradually leading to more focused inquiry.	What federal laws and regulations apply to the sale of narcotic analgesics? What are the record keeping requirements for a pharmacy that stocks and dispenses narcotic analgesics? What are the potential benefits and risks of the narcotic prescription monitoring program requirement in our state? Can a pharmacist legally dispense an orally transmitted prescription order for methadone?

Abbreviations: NSAIDs = nonsteroidal antiinflammatory drugs.

Following this second classification approach, questions are structured following a cycle in an instructional discourse:

Table 4. Sequencing of Questions Using the Socratic Method of Questioning as an Effective Teaching Tool

Content Area: Opioids and Pain Management
<ul style="list-style-type: none"> • Why does the group Physicians for Responsible Opioid Prescribing want to limit the dosing, supply, and duration of opioid analgesics for chronic, non-malignant pain? (Exploratory) • What assumptions do you think underlie their rationale? (Spontaneous) • Who is most likely to become addicted to opioid analgesics? (Focused) • How would you define legitimate opioid use? (Exploratory) • Based on your definition of legitimate use, what patient-specific data would you need in order to discriminate between the legitimate use of opioids for pain and illegitimate uses? (Spontaneous) • What does the data from other countries tell us about the positive and negative consequences of restricting the use of opioids? (Focused) • If opioid analgesic use were restricted by the FDA to a maximum of 3 months for the treatment of non-malignant pain in the United States, do you think the consequences would be similar or dissimilar to what has been observed in other countries? (Spontaneous) • Given what you know now and your values, what do you consider to be the most compelling reasons to either restrict or liberalize the use of opioid analgesics for the treatment of pain? (Spontaneous)

Abbreviations: FDA = Food and Drug Administration.

This third classification distinguishes question 'circles':

Table 5. Example of Using the Question Circles Method of Questioning²

Circle(s)	Sample Question (Content Area: NSAIDs and Pain Management)
Subject Matter	How do NSAIDs work in terms of reducing pain?
Personal Response	Under what circumstances have you used an NSAID for pain?
External Environment	According to the American Academy of Family Physicians, what are some circumstances when we should recommend against the use of NSAIDs for pain?
Subject Matter & Personal Response (Enriched)	If you had safety concerns about chronic NSAIDs use by one of your patients with persistent pain, what strategies would you use to discourage continued use?
Subject Matter & External Environment (Enriched)	What public policy changes related to the prescribing of NSAIDs would have a positive impact on patient outcomes?
Personal Response & External Environment (Enriched)	If NSAIDs were no longer available over the counter, what would you do to manage your pain?
Subject Matter, Personal Response, & External Environment (Dense)	After verifying the physician's intent and the patient's desire for treatment, under what circumstances would you refuse to fill a prescription for an NSAID?

Abbreviations: NSAIDs = nonsteroidal antiinflammatory drugs.

In this theme, we build on the most dominant approach to discuss questions that is based on the Taxonomy of Learning Objectives of Benjamin Bloom. The taxonomy helps to look in a structured way at the aims of your course, program, class activities. We know that aims vary from easy to complex. A key characteristic of "Taxonomies" is that they are hierarchical and as such imply that higher level objectives imply you master lower level objectives. This comes in handy, because otherwise we would have to define all underlying learning objectives; also when explaining what we pursue at a very advanced level in our teaching. Bloom's original taxonomy has been updated by later experts. We therefore use the latest - still influential - version of Anderson, L., Krathwohl, D., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., Raths, J., & Wittrock, M. (Eds.) (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York: Addison Wesley Longman, Inc.

There is a number of fundamental differences between the old and the revised

version.

- The taxonomy is now stated to reflect cognitive processing dimensions. Each level reflects a subsequent set of more complex cognitive processes as depicted in table 3 below.
- In the revised version, cognitive processes are linked to content levels. This implies that teachers are always asked to define next to what they expect their students to 'DO', they also define in relation to what content; see table 2 below.

Tables below are copied from Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into practice*, 41(4), 212-218. Key is that the authors distinguish between a structuring of the content focus. This means that the subject content is sorted to the extent they focus on facts, concepts, procedures or metacognition. This sorting is hierarchical, to develop concepts, one needs facts. To develop procedures, one has to build on facts and concepts. And to develop metacognition (thinking about your own thinking) one has to build on facts, concepts and procedures. The second dimension in the taxonomy sorts the expected behavior in our students: is it mere memorisation, or do we expect insight. Or do we expect more by pushing them to apply what they memorize and understand? Next, do we expect them to analyse what has been applied, understood and memorized. or do we want to evaluate the former. And lastly, we can - ultimately - expect them to create their own content. the latter implies the former behavioural levels.

Taxonomy of expected learning 'content':

Table 2
Structure of the Knowledge Dimension
of the Revised Taxonomy

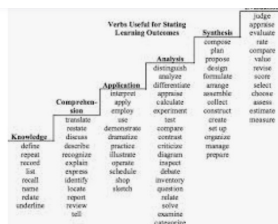
- A. *Factual Knowledge*** – The basic elements that students must know to be acquainted with a discipline or solve problems in it.
- Aa. Knowledge of terminology**
 - Ab. Knowledge of specific details and elements**
- B. *Conceptual Knowledge*** – The interrelationships among the basic elements within a larger structure that enable them to function together.
- Ba. Knowledge of classifications and categories**
 - Bb. Knowledge of principles and generalizations**
 - Bc. Knowledge of theories, models, and structures**
- C. *Procedural Knowledge*** – How to do something; methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.
- Ca. Knowledge of subject-specific skills and algorithms**
 - Cb. Knowledge of subject-specific techniques and methods**
 - Cc. Knowledge of criteria for determining when to use appropriate procedures**
- D. *Metacognitive Knowledge*** – Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.
- Da. Strategic knowledge**
 - Db. Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge**
 - Dc. Self-knowledge**

Taxonomy of expected 'behaviour':

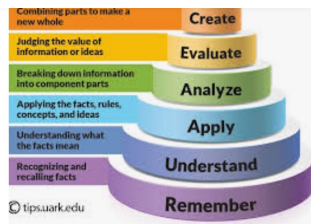
Table 3
Structure of the Cognitive Process
Dimension of the Revised Taxonomy

- 1.0 Remember** – Retrieving relevant knowledge from long-term memory.
- 1.1 Recognizing**
 - 1.2 Recalling**
- 2.0 Understand** – Determining the meaning of instructional messages, including oral, written, and graphic communication.
- 2.1 Interpreting**
 - 2.2 Exemplifying**
 - 2.3 Classifying**
 - 2.4 Summarizing**
 - 2.5 Inferring**
 - 2.6 Comparing**
 - 2.7 Explaining**
- 3.0 Apply** – Carrying out or using a procedure in a given situation.
- 3.1 Executing**
 - 3.2 Implementing**
- 4.0 Analyze** – Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.
- 4.1 Differentiating**
 - 4.2 Organizing**
 - 4.3 Attributing**
- 5.0 Evaluate** – Making judgments based on criteria and standards.
- 5.1 Checking**
 - 5.2 Critiquing**
- 6.0 Create** – Putting elements together to form a novel, coherent whole or make an original product.
- 6.1 Generating**
 - 6.2 Planning**
 - 6.3 Producing**
-

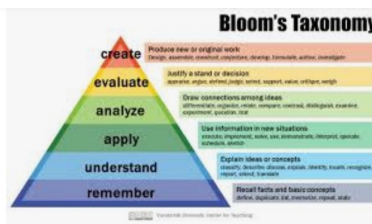
The former sounds complex, but is easier to grasp than you think. On the Internet, you can find thousands of websites, tools, schemes, structures ... helping teachers to use Bloom's taxonomy in their instruction. In most cases, the taxonomy offers - for each level in the structure - concepts, verbs, examples, ... to influence instructional practices. To exemplify what you actually find as 'pictures' on the internet when you type in Bloom's taxonomy, look at the following screen dump:



Bloom's Taxonomy | Taxonomy, Bloo... pinterest.com



Using Bloom's Taxonomy to Write Effecti... tips.uark.edu



Bloom's Taxonomy | Center for Teaching | Vanderbi... cft.vanderbilt.edu

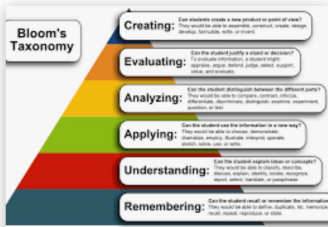


Correlation of lear... researchgate.net

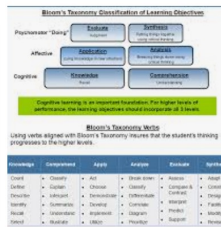
46 11. Bloom's Taxonomy of Educational Objectives for Knowledge-Based Goals

Level of Expertise	Description of Level	Example of Measurable Student Outcome
Knowledge	Recall or recognition of facts, lists, concepts, theories, etc.	What is the first step of mitosis?
Comprehension	Translation, interpretation, comparison, but not use of language or transfer to other situations, objects, or thought processes.	What does the acronym mitosis represent?
Application	Apply information, general principles, or methods to specific concrete situations.	What would Earth's seasons be like if it was perfectly circular?
Analysis	Separation of a complex into its parts, including making the distinction between essential and non-essential, between relevant and extraneous variations.	Why are seasons reversed in the southern hemisphere?
Synthesis	Creative, novel combination of ideas and concepts. Use multiple sources to form a new, integrated, and meaningful pattern subject to given constraints.	If the longer day of the year is in June, why is the southern hemisphere colder in August?
Evaluation	Make a judgment of ideas or methods using learned evidence or self-selected criteria established by clear criteria.	What would be the important variables for predicting seasons on a newly discovered planet?

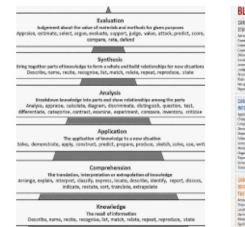
Bloom's Taxonomy of Educational Objec... alabamapathways.org



Bloom's Taxonomy of Learning Objectives courses.dcs.wisc.edu



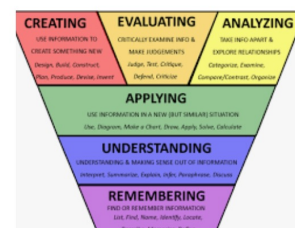
Bloom's Taxonomy and Learn... acuityinstitute.com



Bloom's taxonomy of ed... researchgate.net

46 201. Verbs for Use in Writing Learning Objectives

Level	Comprehension	Application	Analysis	Synthesis	Evaluation
Knowledge	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline
Comprehension	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline
Application	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline
Analysis	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline
Synthesis	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline
Evaluation	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline	locate, identify, describe, explain, recall, relate, underline



Below, we go one step further as compared to most tools to guide teachers. In the following tables you find - for each level in Bloom's taxonomy of 'behaviour': 'starters'. These starters can be used by teachers to develop their own questions. This helps teachers to adopt a sufficiently sophisticated language when developing the questions. Moreover, they help teachers refraining from focusing all the time on the lower levels in the taxonomy. By asking higher level questions, they imply the lower levels.

Sample Question Stems Based on Revised Bloom's Taxonomy

Remember	Understand	Apply
Who?	What does this mean?	Predict what would happen if ...
Where?	Which are the facts?	Choose the best statements that apply.
Which one?	State in your own words.	Judge the effects of ...
What?	Is this the same as ...?	What would result ...?
How?	Give an example.	Tell what would happen if ...
Why?	Select the best definition.	Tell how, when, where, why.
How much?	Condense this paragraph.	Tell how much change there would be if ...
How many?	What would happen if ...?	Identify the results of ...
When?	Explain why ...	Write in your own words ...
	What expectations are there?	How would you explain ...?
What does it mean?	Read the graph (table).	Write a brief outline ...
What happened after?	What are they saying?	What do you think could have happened next?
What is the best one?	This represents ...	Who do you think ...?
Can you name all the ...?	What seems to be ...?	What was the main idea ...?
Who spoke to ...?	Is it valid that ...?	Clarify why ...
Which is true or false?	What seems likely?	Illustrate the ...
	Show in a graph, table.	Does everyone act in the way that ... does?
	Which statements support ...?	Draw a story map.
	What restrictions would you add?	Explain why a character acted in the way that he did.
	Outline ...	Do you know of another instance where ...?
	What could have happened next?	Can you group by characteristics such as ...?
	Can you clarify. ...?	Which factors would you change if ...?
	Can you illustrate ...?	What questions would you ask of ...?
	Does everyone think in the way that ... does?	From the information given, can you develop a set of instructions about ...?

Adapted from the following sources: Pohl, Michael. *Learning to Think, Thinking to Learn: Models and Strategies to Develop a Classroom Culture of Thinking*. Cheltenham, Vic.: Harker Education Inc., 2000; Turlington, Dennis. "Bloom's Revised Taxonomy." Powerpoint, www.untar.ispaui.edu/cdi/akl/docs/Bloom_revised021.doc, February 8, 2006; [http://apcentral.education.nsw.edu.au/10101/index/Bloomstaxonomy\(revised\).htm](http://apcentral.education.nsw.edu.au/10101/index/Bloomstaxonomy(revised).htm)

Sample Question Stems Based on Revised Bloom's Taxonomy

Analyze	Evaluate	Create
What is the function of ...?	What fallacies, consistencies, inconsistencies appear?	Can you design a ...?
What's fact? Opinion?	Which is more important, moral, better, logical, valid, appropriate?	Can you see a possible solution to ...?
What assumptions ...?	Find the errors.	If you had access to resources, how would you deal with ...?
What statement is relevant?	Is there a better solution to ...?	Why don't you devise your own way to ...?
What motive is there?	Judge the value of ...	What would happen ...?
What conclusions?	What do you think about ...?	How many ways can ...?
What does the author believe?	Can you defend your position about ...?	Can you create new, unusual uses for ...?
What does the author assume?	Do you think ... is a good or bad thing?	Can you develop a proposal which would ...?
State the point of view of ...	How would you have handled ...?	How would you test ...?
What ideas apply?	What changes to ... would you recommend?	Propose an alternative ...?
What ideas justify the conclusion?	Do you believe ...?	How else would you ...?
What's the relationship between?	How would you feel if ...?	State a rule.
The least essential statements are ...	How effective are ...?	
What's the main idea? Theme?	What are the consequences of ...?	
What literary form is used?	What influence will ... have on our lives?	
What persuasive technique is used?	What are the pros and cons of ...?	
Determine the point of view, bias, values, or intent underlying presented material.	Why is ... of value?	
Which events could not have happened?	What are the alternatives?	
If ... happened, what might the ending have been?	Who will gain and who will lose?	
How is ... similar to ...?		
What do you see as other possible outcomes?		
Why did ... changes occur?		
Can you explain what must have happened when ...?		
What were some of the motives behind ...?		
What was the turning point?		
What are some of the problems of ...?		
Can you distinguish between ...?		

Adapted from the following sources: Pohl, Michael. *Learning to Think, Thinking to Learn: Models and Strategies to Develop a Classroom Culture of Thinking*. Chesham, Va.: Hawker Braverman, 2000; Tardif, Dennis. "Bloom's Revised Taxonomy." Powerpoint, www.utoronto.ca/~tdt/docs/Bloom_revised021.doc, February 8, 2006; [http://opencollege.edu/10102/index/Bloomtaxonomy\(revised\).htm](http://opencollege.edu/10102/index/Bloomtaxonomy(revised).htm)

Using response technologies in the (online) classroom

What is it about?

It sounds new: asking online questions. But it already is a long-standing tradition. Early approaches towards distance education - especially since educational technology came available - were among the first to embrace interactive questions. These approaches have influenced later on traditional face-to-face teaching in e.g., lecture halls and in dealing with large groups.

The following article focuses on the use of interactive questions in the "large" classroom of a lecture hall. It centres on the way we use or do not use questions during our lectures and hardly succeed in engaging students in active processing: [Caldwell, J. E. \(2007\)](#).

Clickers in the large classroom: Current research and best-practice tips. *CBE-Life sciences education*, 6(1), 9-20.

Caldwell pushes the idea to ask at least every 10-20 minutes questions to students and tells intriguing stories about professors discovering in this way that they largely over-estimated the way students actively participated in their classroom and actually developed a through understanding of what was being taught. We all know how students respond to the eternal question: 'Do you understand?' In the article, Caldwell reports about the use of "clickers".

Clicker are but one example of tools that are nowadays labelled as response technologies and now even get replaced by standard tools and apps on phones, tablets and laptops. This is why we do not focus that much on the actual technology being used, but rather on the key idea of asking continuously challenging questions in the classroom. We recommend reading the full article, because it offers an in-depth introduction to the impact of continuous questioning, an overview of types of questions and the impact of the technique of both students and teachers. A typical example of the latter is found in the extract (ibid, p. 12) depicted below.

“For me, this was a moment of revelation. . . . for the first time in over 20 years of lecturing I knew. . . that over half the class didn’t ‘get it’ Because I had already explained the phenomenon as clearly as I could, I simply asked the students to debate briefly with their neighbors and see who could convince whom about which answer was correct. The class erupted into animated conversation. After a few minutes, I asked for a revote, and now over 90% gave the correct answer. . . . ” (Wood, 2004).

We recommend reading the full article text since the author gives plenty of advice, examples, describes types of questions, informs readers about ways to interweave the questions during lessons and how to deal with individual questions as related to working together when answering the questions.

What response technologies do exist?

Initially one needed specific technological devices to adopt response technology in the classroom. Below you can see examples of such 'clickers'. Students chose a letter or number and clicked on it. An RF or wireless Internet signal was picked up by a receiver and managed with a specific application on a desktop or laptop. These devices were next to being expensive also fragile and took time to distribute or collect; see e.g., Turning point, Elon, logitech ...



Nowadays, we have switched to "bring your own device". Each student can use their tablet, laptop, mobile phone ... to install a specific app that links users to a shared Internet solution where questions are developed, managed, presented, documented, ... This explains the label 'response systems'.

Advantages of the online systems are multiple: cheap, always available, independent of an extra device ... and mostly able to be integrated into general presentation software tools such as Powerpoint or Prezi.

Also, the current tools allow teachers to embed pictures, graphics, videoclips, audio ... And they can develop sets of questions beforehand that can be managed, edited, online for current and future use. Whereas early systems restricted users to presenting multiple choice questions only, nowadays systems allow for a big variety of questions (see below). Check:

- Mentimeter
- Socrative
- Shakespeare

...

The list is endless, with many regional and language related variations. Check the following website to explore a variety of

available (often free) tools and systems:

<https://www.edsurge.com/product-reviews/teacher-needs/classroom-response-system>

EdSurge News Research Events Jobs Board More ▾ Newsletter

Product Index

Teacher Needs

Classroom Response System
33 Products

Classroom Response System

These are systems that let students respond to questions and polls individually and privately using a mobile phone or clicker device.

Filter

filter Tech & Requirements ✓

filter Cost ▾

Acadly
Platform that allows students and teachers to connect during class through polls, discussion

ALL in Learning
Performance management system integrating clickers, formative assessments and

Classgrounds
Send messages to screens and monitor student's Chromebook activity

Classkick
Tablet software that lets teachers watch all their students working at once and

ClassPager
Tool for teachers to send messages to parents & students w/ out disclosing

Classroom Response - Qwizdom
Classroom response system that gives teachers real-time assessment on student data.

What system is recommended to look at (e.g., in view of your task)?

We suggest using Mentimeter (www.mentimeter.com). The basic version is free for users and nevertheless allows you to make unlimited series of (smaller number of) question. When developing questions with the free basic version, it is useful to develop series of questions for each phase in a lesson and to put them in subfolders. Take care, often institutions might provide their teachers with an institutional license; thus helping teachers out when they need more advanced options.

Surf to www.mentimeter.com.

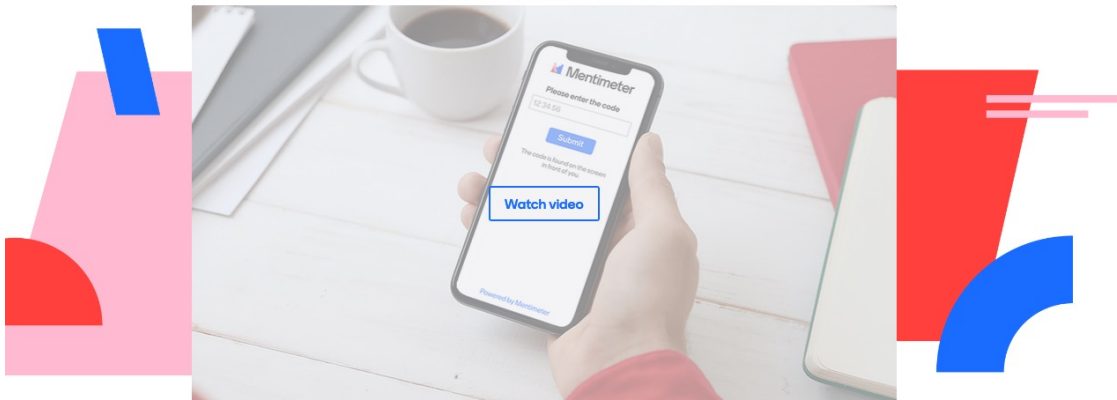
Mentimeter makes remote & hybrid work easy

Learn more

Create interactive presentations & meetings, wherever you are

Use live polls, quizzes, word clouds, Q&As and more to get real-time input - regardless if you're remote, hybrid or face-to-face

Your presentations



Below you can see how we have developed a series of questions ourselves and that they are stored in folders for different courses. If you want to get started with a question series, open it and click on 'present' in the top right corner. Below you can see some examples of questions. Moreover, you immediately see the answers of the students. After using a question set, you will be given the option to save and download the answers (as Ecell or PDF). That is an ideal basis for a feedback meeting. The first question provides answers to the assignment "Provide a possible set of solutions for $x = y^2$ ". The other answers are self-explanatory and show the variety of possible question types and answer forms.

Geef een mogelijke verzameling oplossingen bij:

Mentimeter

Vierkantswortel $y = x$	$-y, y$	$y=4, x=2$
R	1,4,9,16 ...	$y=4, x=2$
\sqrt{x}	$9 = 3^2$ of $(-3)^2$	1,14,29,316,425,5

54

Welk gevoel had je bij deze twee opgaven ?

Mentimeter



86

Welk voorbeeld sluit aan bij metacognitieve regulatiestrategie 'monitoring'?

Mentimeter



34

If you want to get started with questions, click on 'add slide / add slide'. You immediately get options; eg the type of question, its content and possible adaptations (add picture, whether or not students see the results that others enter ...). But you can also add other slides that do not directly contain a question: titles, headings, lists, images, a video clip (maybe the clip you developed yourself earlier?), Quotes, numbers ... Everything you develop is automatically stored in the 'cloud'. so you don't have to worry about losing anything. And you do not have to work on the same computer when you want to work with the questions later; eg at a lesson. If you click on 'present' after developing the questions, the screen will change to a presentation screen. At the top you can see a code that students can use to activate www.menti.com via the URL. That code remains the same for 48 hours. A few days later the system generates a different code. So pay attention when you would integrate this in a ppt. So do not place an 'old' code, but go 'live' and start the presentation from a mentimeter.

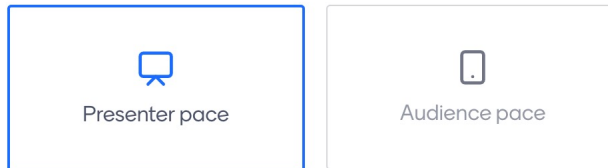
Also explore the 'settings' option; for your own presentation you can then adjust some basic settings (language, whether the students can also make comments on, for example, a Q&A slide, whether a filter is needed to filter foul language. It is also useful that you can determine here who With 'audience pace', students can independently go through all the questions (useful for a direct formative test in class'; or you can choose 'presenter pace' where you - for example during the lesson - occasionally fall back on a specific question during the explanation.

Configure

Use these settings to configure the overall experience of your presentation.

Presentation pace

The presentation pace controls how the audience can advance in the presentation.



[Learn more](#)

Language ?

This presentation language is set to **English**.

Questions from audience ?

The audience can ask you questions on **Q&A slides (if any)**. Moderation is **off**.

Comments from audience ? **NEW**

The audience can not give comments.

Quiz ? **NEW**

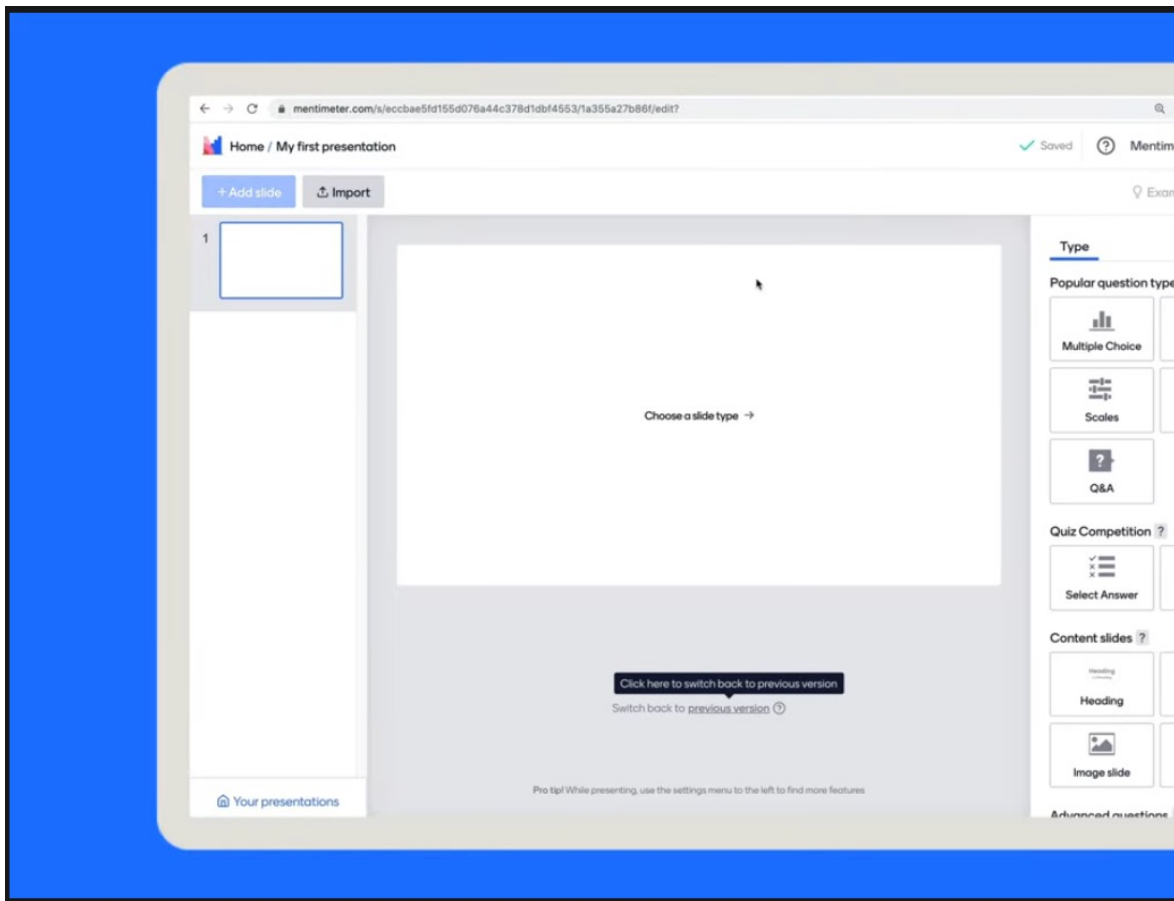
Quiz slides start **manually**.

Profanity filter ?

No language filter chosen

There are many other ins and outs of Mentimeter. you can explore it via the tool itself. And of course there are hundreds of tutorials that you can consult online about this; see e.g.,

<https://www.youtube.com/watch?v=VpbXY98R39c>



There are many online manuals available; see e.g., [Mentimeter Handleiding FGW.pdf](#)

Beginners guide to Mentimeter

Mentimeter – Faculty of Humanities

Contents

1. Introduction	
2. Getting started	
3. Questions and Output.....	
3.1 Multiple Choice	
3.2 Scales.....	
3.3 Open ended.....	
3.4 100 points.....	
3.5 Dual axis.....	
3.6 Who will win?.....	
4. Sidebar	
4. Voting.....	
5. Additional options	
5.1 Exporting the results (Excel and Blackboard).....	
5.2 PowerPoint.....	
6. Concluding.....	

Does the use of response technologies have any advantages?

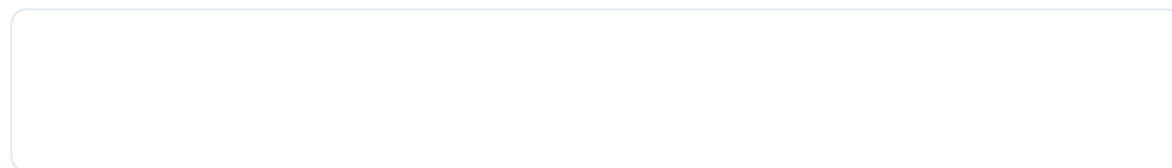
Of course, many will wonder whether working with the response technology has a positive effect and not an example of bells and whistles where you have to invest a lot of extra time. You can read the article by Aljaloud and colleagues (2015) to get an overview of the reported effect of successful use ([Aljaloud and colleagues, 2015](#)). The table we take from that publication summarizes the positive effects. You can see that there are also positive effects for the teacher.

<i>Benefit</i>	<i>Evidence</i>
Interactivity	
Assists in creating a learner-centred classroom	Beatty (2004), Caldwell (2007) and MacGeorge et al. (2008)
Increases communication among students and support for dialogue with teacher	Beatty (2004), Blasco-Arcas et al. (2013), MacGeorge et al. (2008), Mula and Kavanagh (2009) and Titman and Lancaster (2011)
Improved process of instructor-feedback	Bojinova and Oigara (2011), Chen and Lan (2013) and Lantz and Stawiski (2014)
Academic performance	
Creates deeper understanding of material and facilitates learning	Bojinova and Oigara (2011) and Chen and Lan (2013)
Improves academic performance	Caldwell (2007), Kay and Lesage (2009) and Mula and Kavanagh (2009)
Improves instructional methods	Cubric and Jefferies (2015), Han (2014a), Han and Finkelstein (2013) and Shieh and Chang (2013)
Improves long-term memory	Lantz and Stawiski (2014)
Enables students to engage in self-reflection	Bojinova and Oigara (2011) and Chen and Lan (2013)
Engagement	
Aids student engagement in learning by creating a fun learning environment	Beatty (2004), Blasco-Arcas et al. (2013), Bojinova and Oigara (2011), Caldwell (2007), Han and Finkelstein (2013), Johnson and Lillis (2010), Laxman (2011), MacGeorge et al. (2008), Mula and Kavanagh (2009) and Titman and Lancaster (2011)
Increases attendance and reported positive student attitudes	Bojinova and Oigara (2011), Chen and Lan (2013), Han (2014b) and Mula and Kavanagh (2009)
Increases desire to improve performance by identifying areas of improvement	Bojinova and Oigara (2011), Chen and Lan (2013), Hedgcock and Rouwenhorst (2014) and Johnson and Lillis (2010)

But those same authors also summarize a number of challenges associated with an integrated use of response systems: This is an honest list of challenges showing that you plan the use of this technology quite well, use it systemically, ask well-developed questions (so more than memory questions). The technical problems

appear to disappear quickly when the same system is used systemically.

<i>Challenge</i>	<i>Evidence</i>
Wasted time	
Wastes time answering technical questions, training, and distributing remote controls	Habel and Stubbs (2014), Hedgcock and Rouwenhorst (2014); Kay and Lesage (2009), Laxman (2011), Mula and Kavanagh (2009) and Titman and Lancaster (2011)
Wastes time in class-wide discussions including shifts in focus	Habel and Stubbs (2014), Kay and Lesage (2009) and Nielsen et al. (2013)
Requires excessive teacher preparation	Kay and Lesage (2009), Nielsen et al. (2013) and Shieh and Chang (2013)
Requires excessive time to formulate good questions to reduce confusion and frustration	Habel and Stubbs (2014), Kay and Lesage (2009) and Shieh and Chang (2013)
Wasted time	
Requires significant development of SRS instructor training to improve experience	Han (2014b), Koenig (2010) and Nielsen et al. (2013)
Academic inefficacy	
Increases blind guessing due to anonymous voting	Bojinova and Oigara (2011) and Nielsen et al. (2013)
Practical drawbacks	
Technical failures requiring repair and replacement	Dunn et al. (2013), Hedgcock and Rouwenhorst (2014) and Kay and Lesage (2009)
High cost of obtaining equipment, installation, training, etc.	Hedgcock and Rouwenhorst (2014) and Kay and Lesage (2009)
Restriction by language and location	Hoekstra (2009) and Latham and Hill (2013)



Students developing their own questions



A final subject in this theme shifts the attention to students. Teachers are usually speaking themselves (about 70% of the time). The question is whether this is a good strategy; especially when it comes to asking questions. Why has there been a shift in the attention that

teachers have shown in recent decades? Don't underestimate the 'power' of asking yourself questions. Developing a good question assumes that you know the answer to the question. As a student, you have to work out the basis of an answer to a question, organize it, find a starting point, find an entrance to provoke the answer ...

This approach has been developed by Alison King, among others, into a typical instructional approach. You can download here the article she puts forward as the basis for the effectiveness of this approach ([King, 1994](#)). The title of an article from the same year, succinctly expresses the potential of this instructional approach: King, A. (1994). Guiding knowledge construction in the classroom: Effects of teaching children how to question and how to explain. *American educational research journal*, 31 (2), 338-368.

What is typical about her approach? She gives the students 'starters'; these are the first words or sentence structure that force students to construct the knowledge base in a particular way. when working out their own questions. You actually recognize the approach we described earlier when using Blooms' taxonomy in the teacher elaboration of questions. King - avant la letter - developed this approach, but with a focus on the students. You certainly recognize

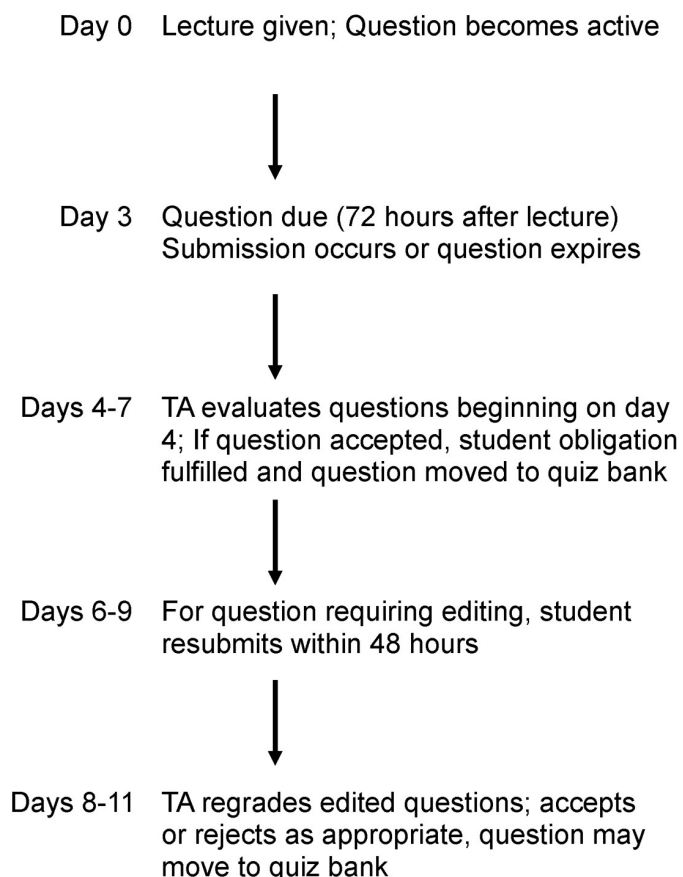
the examples below.

TABLE 1
Generic Question Stems for the Guided Student-Generated Question

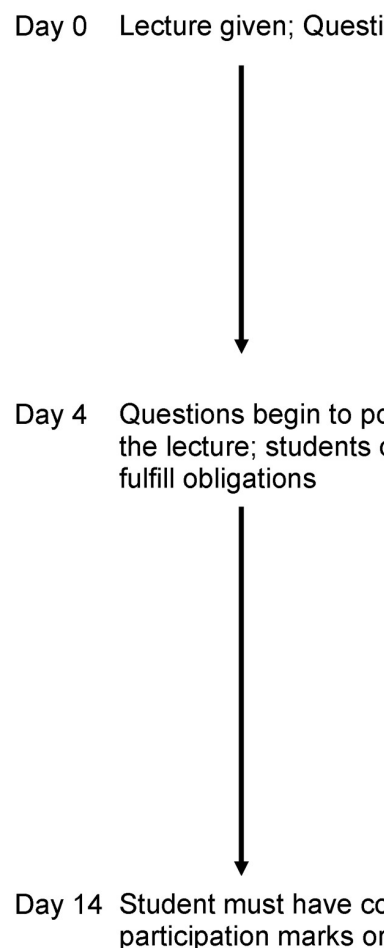
What is a new example of . . . ?
How could . . . be used to . . . ?
What would happen if . . . ?
What are the strengths and weaknesses of . . . ?
What do we already know about . . . ?
How does . . . tie in with what we've learned before?
Explain why
Explain how
How does . . . affect . . . ?
What is the meaning of . . . ?
Why is . . . important?
What is the difference between . . . and . . . ?
How are . . . and . . . similar?
How does . . . apply to everyday life?
What is the best . . . , and why?
What are some of the possible solutions for the problem of . . . ?
Compare . . . and . . . with regard to
What conclusions can be drawn about . . . ?
What do you think causes . . . ?
Do you agree or disagree with this statement . . . ?
Support your answer.

Certain teachers even use (part of) questions developed by students as the basis for a summative test (exam). Riggs and his colleagues (2020) processed the elaboration of the questions in the lessons and in the item bank (collection of questions for the exam) and this in a structured way over time. The diagram below shows this step-by-step.

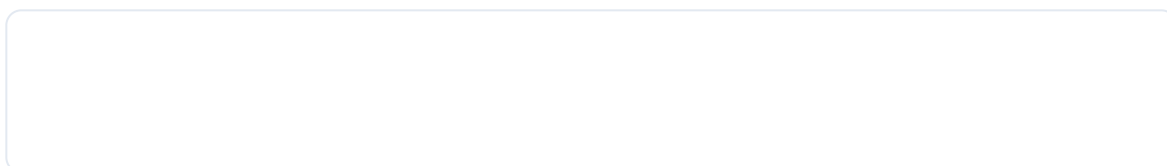
Authoring Obligations Timeline



Quiz Participation Timeline



And in this last example, the three approaches to this theme are integrated: these researchers and teachers ask students to make their own questions that are then used in a lesson with a response system; in this case, a lesson in English as a Foreign Language. Mays and colleagues (2020) use the Kahoot system. In this Taiwanese study, the use among students (end of primary and beginning of secondary education) appears to have a positive effect; not only in terms of cognitive learning effects, but especially in terms of the degree of involvement and cooperation in the group.



Your task in relation to 'asking questions'



The assignment for this theme emphasizes the adequate use of Bloom's taxonomy as a basis for developing questions. The task starts from a set of questions (20) that you derive from earlier exams or tasks given to students. It is crucial that you start from such existing 'questions'.

The task is carried out on an A4 page that is positioned in a landscape format. You can download this format here:

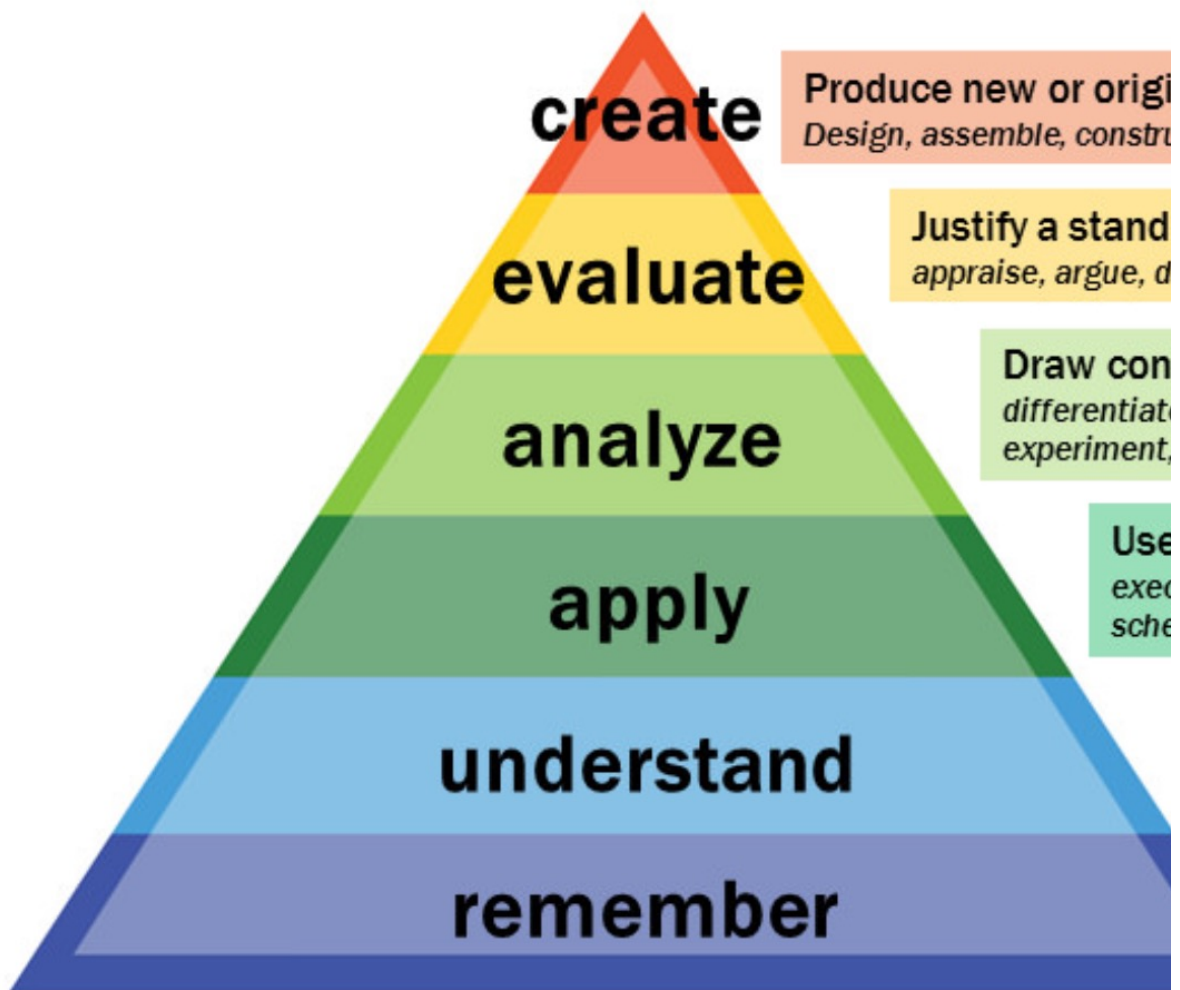
[format_task_questions.docx](#)

Original questions or task	Categorisation according to Bloom
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

1. Collect 20 tasks and/or questions that you once used to develop an exam or summative test for students. Put these in the first column of your paper. Take care! Look for a nice variety of 'old' questions and tasks that cover the with and breadth of the behavioral levels in

Bloom's Taxonomy. It hardly helps to look for basic 'remember' level questions.

2. Analyse these tasks/questions and categorize them according to Bloom's taxonomy. Remember to focus especially on the behavioural level. To help you, consult available matrices, papers, documents online. We give you an existing tool of Vanderbilt University (<https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>).

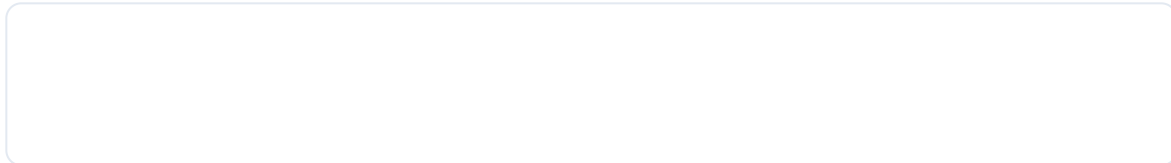


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3. Thirdly, redevelop the 'old' question or task. Choose a new level in Bloom's taxonomy and add the redeveloped task/question in the third column of the paper.

When you are done, upload the final result to your safe and name the file: Name_questions.xxx The suffix XXX refers to the type of file

you are sending; eg a PPT file, an MP4, ... it can also be an online file on the Internet (see the examples in this topic). We repeat that before uploading your final result, it is best to use the Feedback_questions.docx checklist to assess the completeness of your work yourself.



Checklist to evaluate the 'questions' tasks

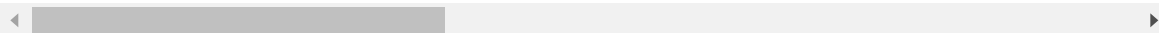


The checklist for this theme is again derived directly from the basic author we discussed in this theme: Bloom. We checked the behavioral levels when looking at 'old' questions and tasks used in earlier evaluations.

Use the following checklist: [Feedback_Questions_EN.docx](#)

The figure below shows the criteria we use when giving / receiving feedback and feedback on the feedback. You will notice that it has now become a somewhat shorter checklist.

Criterion	Feedback
'Old' questions and tasks	
Is there a nice variety that covers the full width and depth of Bloom's taxonomy?	
Analysis of the 'old' questions according to Bloom's taxonomy	
What is the quality of the analysis according Bloom's behavioral levels? Is this sufficiently correct, adequate? What are the typical errors your	
Is er voor elk gedragsniveau in Bloom's taxonomie een 'starter' uitgewerkt die past bij het gedragsniveau?	
Redevelopment of the questions/tasks	
<ul style="list-style-type: none"> a. How do you judge the choice for the new levels in Bloom's taxonomy? b. How do you qualify the redeveloped questions/tasks? 	



Planning ▼

- Deadline to upload your knowledge clip: XXXX

- Deadline to upload your feedback and feed forward for one colleague: YYY

Don't forget to use the checklist: [Feedback_Questions_EN.docx](#)

- Deadline for uploading your feedback to the feedback having received: ZZZ

Good luck with the task!

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