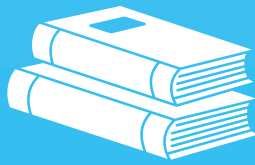
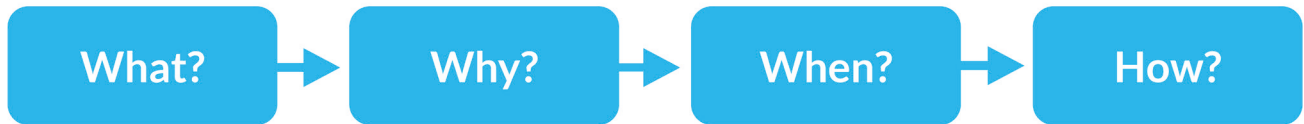


Theory Guide:



Instruction for initial understanding

Instruction for initial understanding: Overview



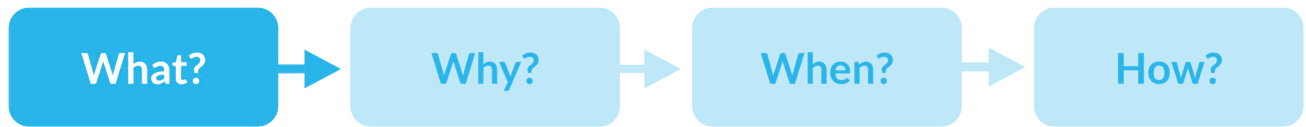
In this theory guide you will understand:

- what instruction for initial understanding is
- why it is so important for teachers to think about instruction for initial understanding
- when instruction for initial understanding is important
- how teachers can use instruction for initial understanding



Instruction for initial understanding:

What is instruction for initial understanding?



Instruction for initial understanding is about how teachers explain new ideas, model new processes in ways that enable students to grasp the key ideas and processes in ways that enable them to be learned for the long term.

Instruction for initial understanding is its own theory guide in our curriculum because it is an important part of a teacher's practice. When teachers introduce something new to students, this is a fragile time for the memories they form. Learning can either start down a better or worse path towards or away from the teacher's goal of long-term student learning.

Everyone can think of those topics where they recall the key ideas years later. This is often because they made the content meaningful in the first place. Meaningful learning is where new ideas link to our existing knowledge. If teachers can support students to make strong connections between new ideas and what they already know, learning is sent down the better path.

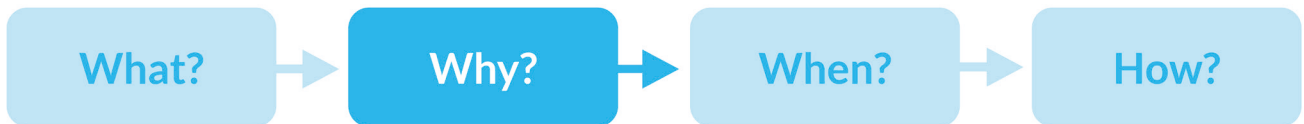
Linked to meaningful learning is the concept of cognitive load. When students process information, this happens in their working memories. Working memory has a finite capacity and can become overloaded with information. If this happens, it's hard for learning to occur. This means it's part of a teacher's role to manage the way information is processed in students' working memories. The reason this is linked to meaningful learning is because if teachers harness students' relevant existing knowledge when they introduce new ideas, cognitive overload is less likely to occur. However, there are many other ways a teacher can think about managing cognitive load during initial instruction, which we will look at in the 'when' section of this theory guide.

For now, we need to understand that there are two types of cognitive load. The cognitive load associated with the difficulty of learning the content itself for our students is called 'intrinsic load'. If our learners lack useful prior knowledge, the intrinsic load of new ideas can be high and we have to use techniques such as breaking down ideas into chunks or steps. Teachers can also be aware that when students' knowledge of a topic increases, these approaches to managing load may actually themselves be overloading; teachers can make tasks challenging for students.

The cognitive load associated with how a task or information is presented is called extraneous load. Teachers can work to minimise this as, whilst they can't eradicate it entirely, they don't want students spending a lot of time and cognitive capacity working out how to do the task; they want them thinking about the new ideas.

Instruction for initial understanding:

Why is it so important for teachers to think about instruction for initial understanding?

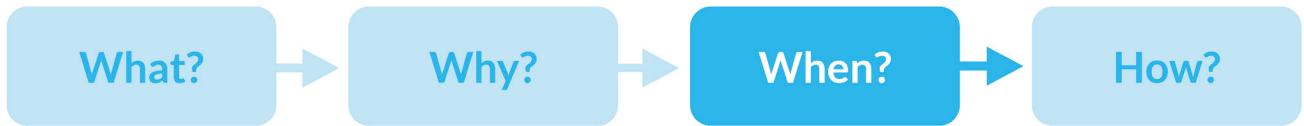


Instruction for initial understanding is important because whilst some ideas are new to students, they shouldn't feel new. They should feel like a logical extension of what they already know. If new ideas connect to one another then students can form stable bodies of knowledge that they can access in the long term. This depends in part upon how the curriculum is organised. Curricula that are sequenced carefully to develop students' understanding of key ideas are perhaps more likely to support teachers to teach in this way.

Another key reason we have touched upon is avoiding cognitive overload. Teachers have to be cognisant of the level of prior knowledge their students have and how stable this is. When teaching new ideas, teachers must think about how they are introducing them to manage intrinsic load and minimise extraneous load or learning will be affected.

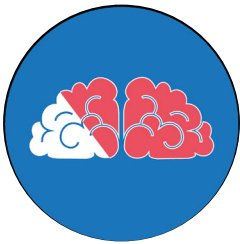
Instruction for initial understanding:

When is instruction for initial understanding important?



When introducing a new idea or process to students, teachers should consider how they are making it meaningful and managing intrinsic load or minimising extraneous load. Here are some specific times and ways this can be achieved.

When considering how to manage intrinsic load, teachers should consider the following:



Element Interactivity Principle

Think deeply about the way new information is introduced.

- How many new items of information are you introducing at the same time?
- To what extent does it build on existing knowledge and therefore reduce cognitive load?
- To what extent is the new information interrelated - and therefore creating additional load?



Segmenting

Breaking down into small logical, connected, steps none of which have the capacity to overload the working memory.



Dual Coding

Dual coding is the process of combining verbal materials with visual materials. There are many ways to visually represent material, such as with infographics, timelines, cartoon strips, diagrams, and graphic organisers.

When you have the same information in two formats - words and visuals - it gives you two ways of remembering the information later on and has a smaller impact upon cognitive load.



Worked Examples

Teacher led demonstrations of each step so learners understood the procedure. Ensure that capacity is focused on learning the concepts rather than thinking about replication.



Signalling Principle

Highlight, visually, the step you are on and what you are doing and thinking at each stage of a worked example.

When considering how to minimise extraneous load, teachers should consider the following:



The Coherence Principle

This is all about removing distractions, having clear explanations and ensuring that only information directly related to the task at hand is being presented.

This means the elimination of irrelevant content and ensuring clarity of both material and instructive input. Gradual release, such as 'I do, we do, you do' can help with this.



The Redundancy Principle

Avoid excessive instruction, only present what is sufficient to achieve aims. For example, don't include detailed textual information on a screen where a visual and a voice over are sufficient to achieve your aims.



The Split Attention Effect

Ensure that relevant information is presented in the same place at the same time. If learners are having to "context switch" between learning environments and reference materials this can generate extraneous load.

When you have the same information in two formats - words and visuals - it gives you two ways of remembering the information later on and has a smaller impact upon cognitive load.



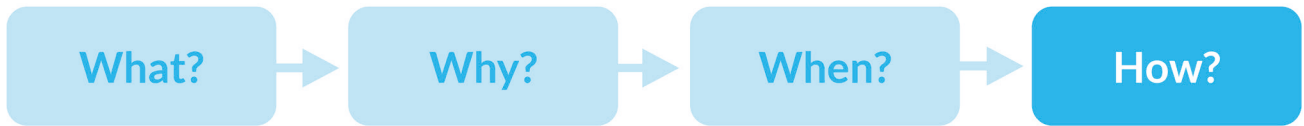
The Transient Information Effect

Learning can follow a linear narrative in which key information can be missed or forgotten at the start of the process which is required later on. This can be a source of cognitive load.

Ensure that learners can reference key information throughout the lesson.

Instruction for initial understanding:

How can teachers use instruction for initial understanding?



How best to introduce new ideas and processes will depend upon the relevant prior knowledge of the students and other considerations like their self-efficacy and motivation. However, there are some key principles that may help teachers decide how to do it best.

Determine students' existing knowledge: it is vital to have the clearest sense possible of what students already know if the teacher is to connect to it and manage intrinsic load. Beginning with a task/questions that gauge this level of existing knowledge before introducing new ideas is therefore very important.

Build in checks for understanding: as you do initial instruction, it's important to build in checks for understanding ([see our theory guide](#)) and adjust teaching appropriately.

Keep cognitive load in mind: when planning and delivering lessons, keep in mind the students' cognitive load and use this to inform instruction.

Always build from what they know: see teaching a new idea as picking up a thread of existing knowledge. Introducing ideas 'cold' is unlikely to lead to long-term learning.

Any technique will only be effective if it is linked to a well-understood problem. Reflect on and define the problem you are trying to solve or do so with your coach. Then, you can use our decision tool for suggestions as to techniques you can adopt, adapt and test.

Problems related to this area:

- *How do I explain difficult ideas so that students understand them?*
- *How do I model processes so students can do them?*
- *How do I avoid overloading students?*
- *How do I help students make ideas meaningful?*

Instruction for initial understanding:

References and further reading

Sweller, J., Van Merriënboer, J. J., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational psychology review*, 31, 261-292. Available [here](#).

Willingham, D. T. (2009). Why don't students like school? Because the Mind Is Not Designed for Thinking. *American Educator*. Available [here](#).

Please click below to visit our Instruction and Scaffolding theory module.

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