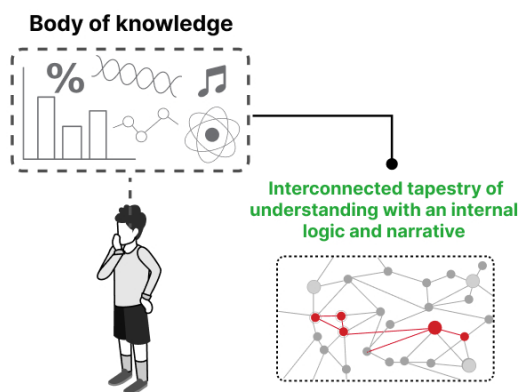


Curriculum sequencing and structure

In this section, we cover two core components of curriculum design. We examine how to **sequence** the material to enable learners to progress from simple to complex topics. Secondly, we explore how content in a unit can be **structured** to help learners build knowledge incrementally.

1 Building a body of knowledge

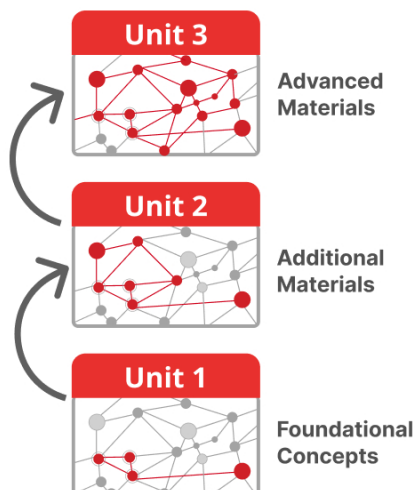
When we think about what we want students to learn, we are referring to a body of knowledge. A body of knowledge is like an interconnected tapestry with its own internal logic and narrative, shaped by the content domain. It's not a series of content material to be covered.



2 How to sequence and structure from simple to complex?

Without proper sequencing, novices can easily become overwhelmed, which makes learning harder. Good structuring and sequencing give learners the "stepping stones" they need to slowly build their understanding.

By starting with basic concepts and gradually moving to more complex topics, learners can build their knowledge step by step. This makes learning easier, reduces overload, and helps them understand the material more deeply.



3 Sequencing and structuring in practice

When sequencing and structuring content for a unit of lessons, your aim should not be to eliminate complexity. Rather, mastery of one level of complexity should provide learners with the foundation to tackle the next, ensuring smooth progression and successful learning.

To help you determine whether a unit is sequenced logically and that students have the necessary foundational knowledge, keep returning to the following central question:

Can a student accomplish Y without first knowing how to do X?

In order to be clear that you have sequenced this learning within a reasonable trajectory of understanding and that students have the knowledge they need to succeed, two helpful questions to ask yourself are:

What is there to know and be able to do in order to be successful?

What missing knowledge and skills would prevent someone from being able to do the thing(s) you want them to do?

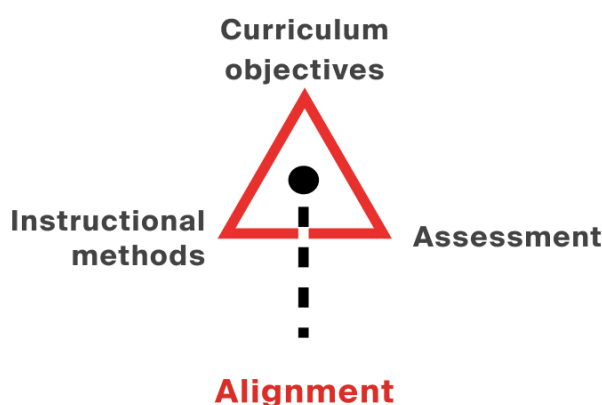


Curriculum alignment

This section explores how alignment enhances coherence across all aspects of education and delves into the potential pitfalls, such as the "backwash effect," where poorly designed assessments undermine learning. By understanding and applying alignment principles, educators can create a more meaningful and impactful learning experience for their students.

1 What is alignment?

Alignment ensures coherence between curriculum objectives, teaching methods, and assessments. When these elements are in sync, they reinforce the curriculum's goals and guide learners toward the desired outcomes. Proper alignment ensures that what is taught matches how it is assessed, maintaining consistency throughout the teaching process.

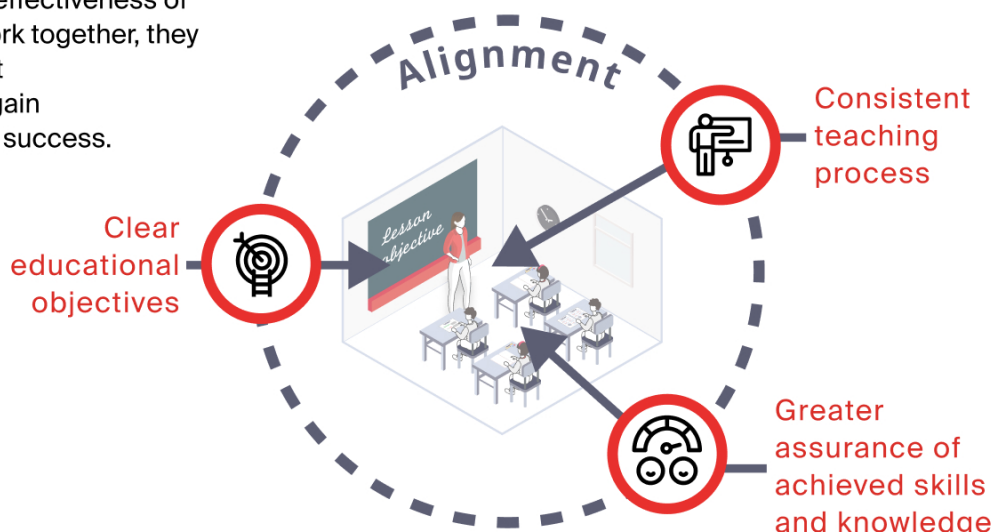
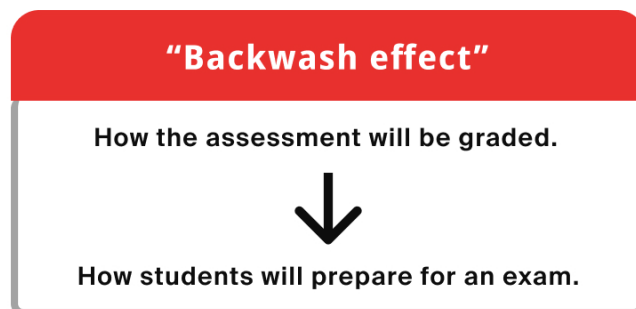


This clarity benefits both teachers and learners, helping to focus efforts and make efficient use of time and resources, ultimately improving the effectiveness of education. When all components work together, they create a synergy that boosts student performance and ensures learners gain the skills and knowledge needed for success.

2 Avoiding the Backwash effect

One common way teaching, learning, and assessment can become misaligned is when assessments or exam marking do not reflect the higher-level demands of the curriculum content. This is known as the "backwash effect," where the nature of the assessment shapes how students prepare and engage with the material.

If the assessment does not require a deeper, more integrated understanding of the topic, students are likely to provide superficial and less sophisticated responses. This not only diminishes their overall appreciation of the subject but also weakens their ability to build on that understanding in the future.



Curricular content

This section examines the relationship between **substantive knowledge**—the core facts and concepts teachers present—and **disciplinary knowledge**, which helps students understand how these facts are analyzed, interpreted, and developed within each subject.

1 Substantive knowledge

Substantive knowledge is the content that teachers present **as established fact**—essentially the "what" of teaching. It includes conventional information, core concepts, and widely accepted explanations of reality. For example, this could involve teaching students the definition of a word in language studies, understanding percentages in math, or learning about the Treaty of Versailles in history. This knowledge forms the foundation of what students need to know.

2 Disciplinary knowledge,

Disciplinary knowledge encompasses **how this substantive knowledge was established, the degree of certainty associated with it, and the ongoing processes through which it continues to evolve**. This aspect of curriculum shows students that each discipline has its own methods for seeking truth. It might involve empirical testing in science, logical reasoning in math, or argumentation in history and philosophy.

3 The Interaction between Substantive and Disciplinary Knowledge

In many subjects, the amount of content to choose from is vast, making careful selection essential. Disciplinary knowledge helps students see that what is taught is often just one interpretation among many. For instance, a history curriculum might present key dates and events as established facts (substantive knowledge) but also highlight that understanding causes, consequences, or significance often involves interpretation.

When planning lessons, it can be helpful to decide when to revisit content through a disciplinary lens. This approach views knowledge as something to question and analyze, rather than accept as absolute fact, which is the foundation of the disciplinary perspective.

Substantive Knowledge

Metaphor: A figure of speech where something is described as being something else to show a similarity, like saying "Time is a thief" to explain how quickly time can pass.



The Treaty of Versailles was a peace treaty signed on 28 June 1919. As the most important treaty of World War I, it ended the state of war between Germany and most of the Allied Powers.

Disciplinary Knowledge

Establishment of knowledge

How do we know this fact out of history?

Certainty of knowledge

How sure are we about this knowledge?
What are the reasons why it might be false?

Evolution of knowledge

In what way is this knowledge still evolving?
What might change in the future if we discover something new?

Principles of instruction

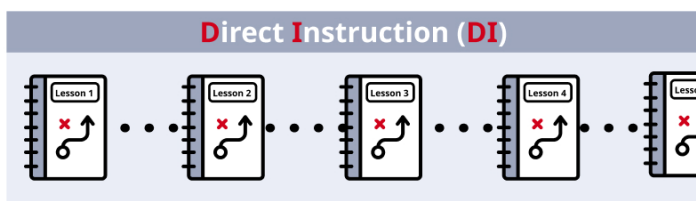
Part 1

What we teach matters – But so does how we teach it. This is the first of three sections exploring Barak Rosenshine's principles of direct instruction. Grounded in cognitive science, classroom practices, and cognitive support, these principles provide clear guidance for delivering effective instruction to all students.

In this first section, we focus on the difference between “DI” and “di” and two principles of instruction: conducting a short review of previous learning and presenting new material in small steps.

1 Direct Instruction and direct instruction: Understanding the Difference

Direct Instruction (DI), developed by Siegfried Engelmann in the 1960s, is a highly structured teaching method with over 50 years of robust evidence supporting its effectiveness. This approach features tightly prescribed curricula and scripted lessons designed to ensure consistency and clarity in teaching.



In contrast, direct instruction (lowercase d, lowercase i) is a broader term associated with Barak Rosenshine's principles of instruction. Rosenshine's framework emphasizes guiding students from basic to advanced learning through structured, engaging, and supportive teaching practices.

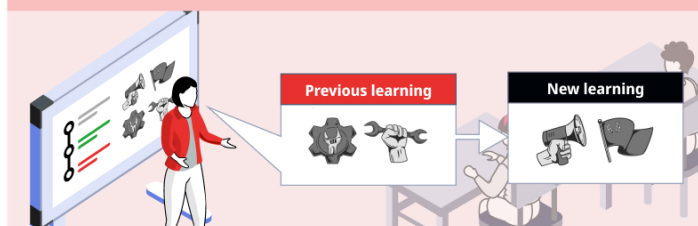
direct instruction (di)

Principles of instruction	
Principle 1	Principle 6
Principle 2	Principle 7
Principle 3	Principle 8
Principle 4	Principle 9
Principle 5	Principle 10

While both approaches share a focus on clarity and structure, they differ in application and specificity. Direct instruction (di) is a more interactive process where the teacher explains concepts clearly and coherently but then also is constantly checking for understanding through questioning.

Principle 1

Short review of previous learning



A key aspect of Rosenshine's principles is beginning lessons with a brief review of prior learning. This daily practice strengthens retention, builds connections to new material, and aids students in recalling information more effectively.

Principle 2

Presenting new learning material in small steps



Rosenshine emphasizes introducing new learning material in small, manageable steps, ensuring students practice each step before progressing. This approach reduces cognitive overload, helping students absorb and retain information. Similarly, scaffolding for challenging tasks provides temporary support, which is gradually removed as students build confidence and competence.

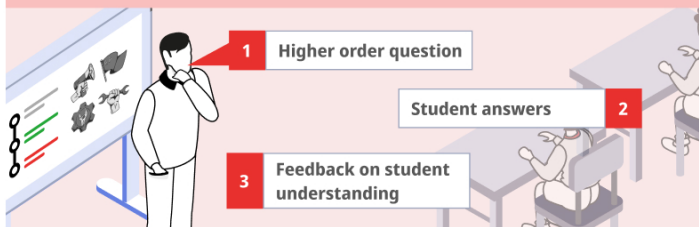
Principles of instruction

Part 2

In this second section, we focus on four foundational principles of effective instruction: questioning, providing models and worked examples, checking for understanding, and achieving a high success rate. These principles offer practical strategies to engage students actively, reduce cognitive load, provide targeted feedback, and ensure consistent progress.

Principle 3

Questioning

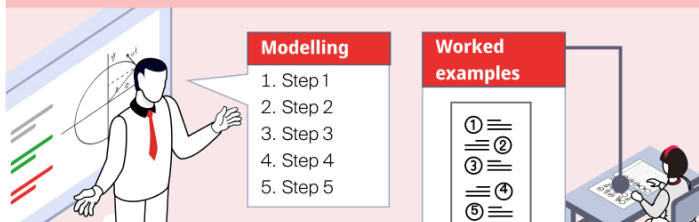


We know that the more deeply, effortfully, and meaningfully students think about information we want them to understand, the more likely it will stick.

By asking questions, particularly those that encourage higher-order thinking, teachers can guide students in making connections between new and prior learning. This constant interaction fosters active participation and can provide immediate feedback on student understanding.

Principle 4

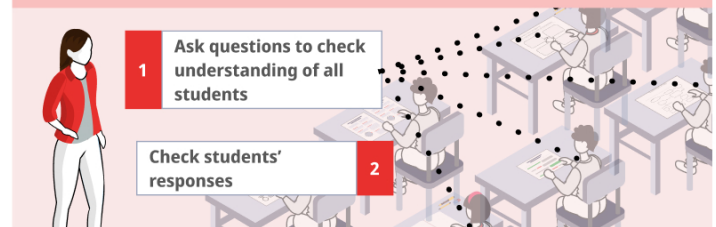
Providing models & worked examples



Providing models and worked examples is essential for supporting students in tackling complex tasks. Worked examples are particularly effective because they present the solution steps upfront, eliminating the need for students to search for a strategy. This frees up working memory, allowing learners to focus on understanding each step and how it leads to a successful solution.

Principle 5

Checking for understanding



Rosenshine highlights the importance of guiding students through practicing new material and regularly checking for understanding to ensure mastery.

Checking for understanding is not as simple as asking, "Did everyone get that?". Instead, it should involve questions related to content covered and should provide the teacher with an overview of (the level of) understanding of all students.

Principle 6

Obtain a high success rate



By checking for understanding, you also are monitoring progress and providing feedback to address misconceptions, helping students achieve a high success rate. Such success fosters self-efficacy and motivation, which are key to sustained learning.

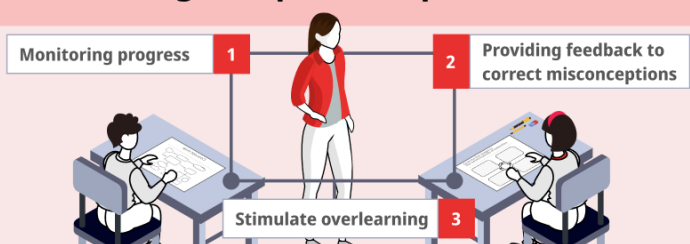
Principles of instruction

Part 3

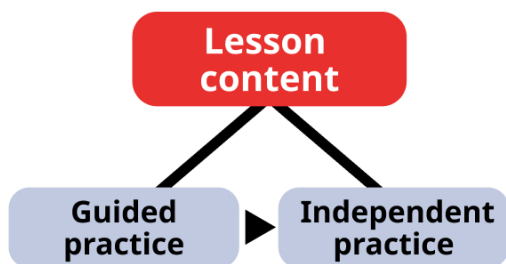
In this last section, we cover the final two principles of instruction focusing on solidifying knowledge and ensuring long-term retention. Engaging students in regular review—both weekly and monthly—keeps learning fresh and strengthens connections in their memory. Similarly, monitoring independent practice provides opportunities for students to deepen their understanding and develop autonomy. Together, these principles help transform learned material into lasting knowledge that students can build on confidently.

Principle 7

Monitoring independent practice



Monitoring independent practice is crucial for reinforcing learning and fostering student autonomy. Overlearning—practicing until tasks become automatic—is key to embedding knowledge in long-term memory.



According to Rosenshine, independent practice should closely align with the content and expectations of the preceding guided practice. It should also require students to apply what they have learned without overwhelming them.

For example, if guided practice involved creating individual compound and complex sentences, it would not be appropriate to immediately ask students to write a full paragraph with multiple compound and complex sentences.

In essence, independent practice should serve as an extension of guided practice, helping students strengthen and solidify the skills they have already begun to master.

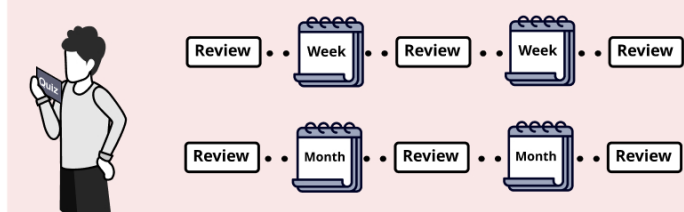
Quote

“Material that is not adequately practiced and reviewed is easily forgotten”

- Barak Rosenshine

Principle 8

Weekly & Monthly review



Engaging students in weekly and monthly reviews helps keep knowledge fresh and strengthens the connections within their schema. Teachers should routinely revisit, review, quiz, and reinforce previously covered material, ensuring that key knowledge remains active and accessible in students' minds.

When review is also varied and spaced over time, it promotes a deeper and more durable understanding of the subject matter.

The core of adaptive teaching

This section explores the concept of adaptive teaching, highlighting the importance of tailoring teaching strategies to meet the diverse needs of students. By continuously evaluating student progress and readiness, teachers can create more effective and inclusive learning environment.

1 Adaptive Expertise

Adaptive Expertise (AE) refers to a teacher's ability to flexibly apply deep foundational knowledge in varying situations. It's not just about what teachers know but **how they adapt that knowledge** to ensure that every student benefits, regardless of their starting point or learning pace.

2 Reflective Practice

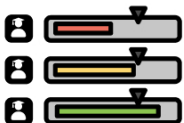
Reflective Practice (RP) is the process of teachers assessing their own methods and student responses on an ongoing basis. By reflecting on what works and what doesn't, teachers can continuously refine and adapt their strategies to better meet student needs.



3 How to adapt your teaching

Effective adaptation can involve varying the levels of support, using diverse resources, or adjusting the pace of instruction.

Levels of support



Different resources



Pace of instruction

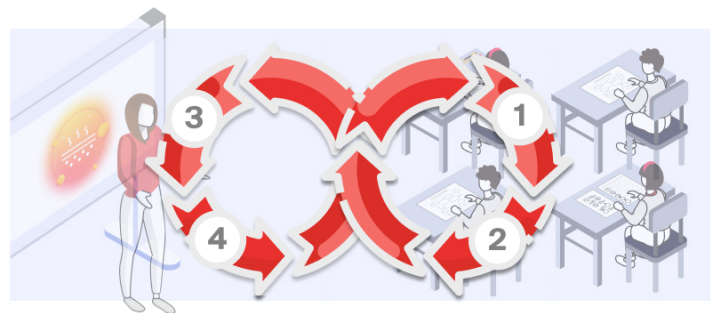


4 Adaptive Teaching

Adaptive Teaching is the practice of continuously assessing students' diverse needs and adjusting instruction to ensure all students meet high standards without being overwhelmed or under-challenged.

Adaptive teaching can be proactive or reactive.

- **Proactive Adaptive Teaching:** Teachers build strong relationships and gather insights into each student's learning journey to anticipate their needs.
- **Reactive Adaptive Teaching:** Teachers respond in real time to classroom dynamics and immediate feedback, making agile adjustments to instruction.



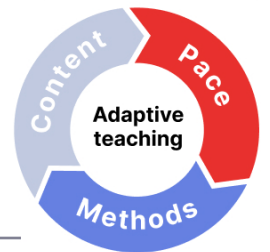
Effective adaptive teaching relies on accurately identifying each student's needs through continuous evaluation.

Teachers must know when to provide **additional scaffolding** for struggling learners or when to **scale back support** for those who are excelling. By doing so, teachers can ensure that every student is appropriately challenged and supported on their learning journey.

Adaptive Teaching in Action

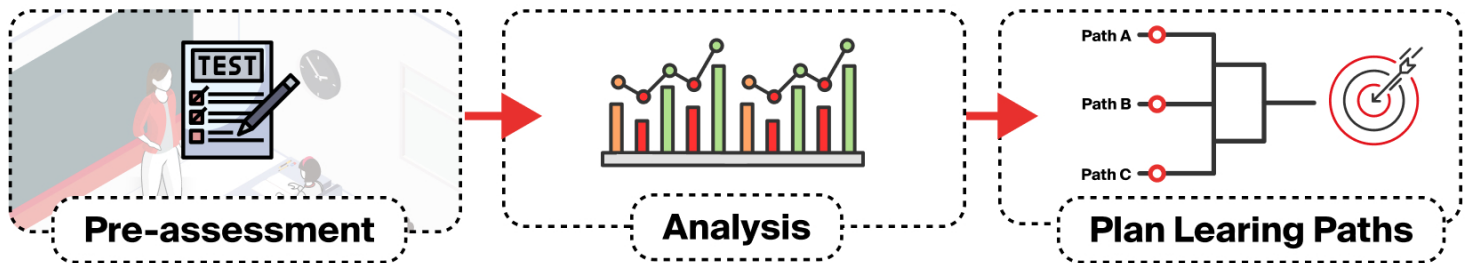
Part 1

In practice, adaptive teaching might look very different depending on the context, but there are some generalizable strategies that can help with its enactment. In this section and the next section we will look at some of those strategies.



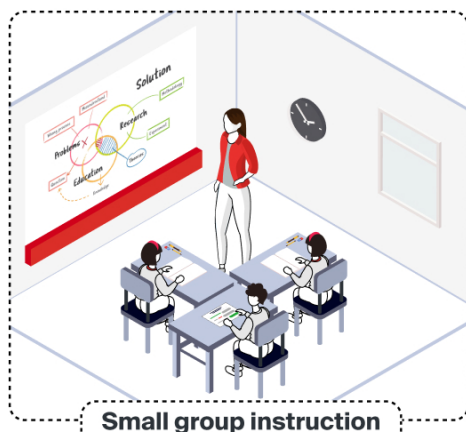
1 Pre-Assessment and adaptive Lesson Planning

Before starting a unit, the teacher conducts a pre-assessment to identify students' prior knowledge and misconceptions. Using this data, they create differentiated learning paths tailored to varying readiness levels, ensuring all students can progress effectively.



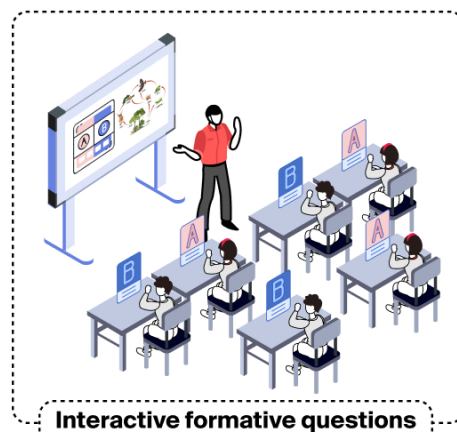
2 Targeted Small Group Instruction

While students work, the teacher identifies a group struggling and organizes a mini-workshop to address the issue. Meanwhile, others continue with current or enrichment tasks.



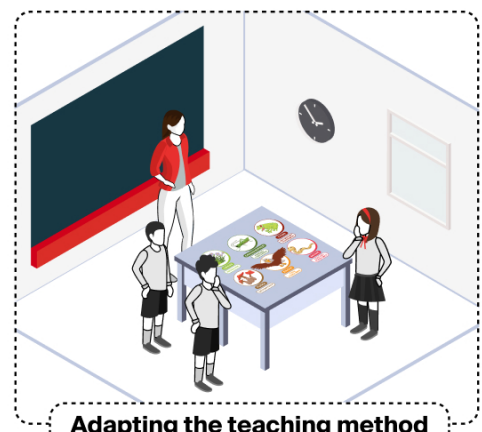
3 In-Class Formative Assessment

During a lesson, the teacher uses digital polls and quizzes to quickly assess understanding. Immediate data highlights misconceptions, allowing the teacher to address them promptly and adjust instruction as needed.



4 Adapting teaching Method based on Feedback

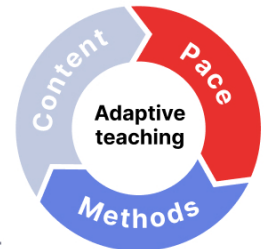
In response to identified confusion, the teacher pauses the lesson and revisits the concept using a different teaching method. The new method engages students and helps clarify misunderstandings effectively.



Adaptive Teaching in Action

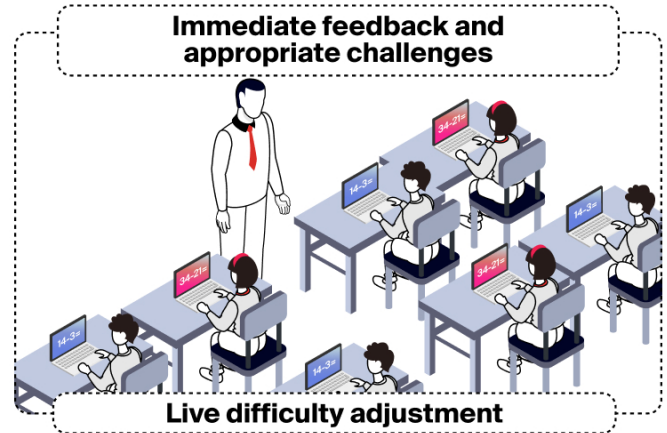
Part 2

In this section we will look at some more examples and strategies how to put adaptive teaching in action. By dynamically adjusting instructional methods, content, and pace, teachers can better ensure that all students achieve their potential, regardless of their starting point.



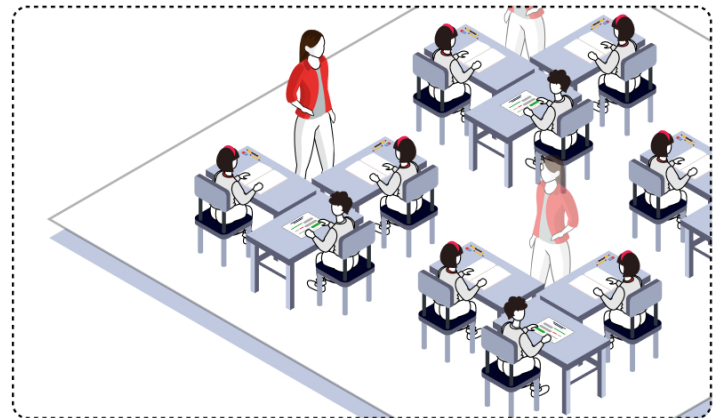
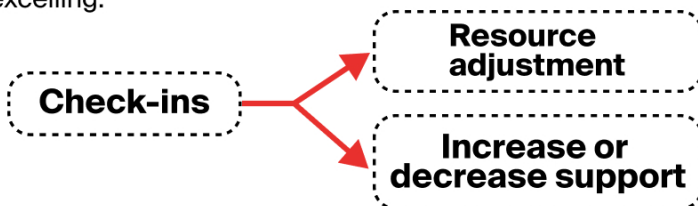
1 Use of Technology to Enhance Adaptive Teaching

Incorporate adaptive learning software that adjusts problem difficulty in real-time based on student performance. This approach allows students to progress at their own pace, receive immediate feedback, and engage with challenges tailored to their individual learning needs.



2 Ongoing Monitoring and Adjustment

Continuously monitor group progress and conduct regular check-ins to identify needs and provide tailored support. Adjust resources or offer targeted assistance, such as worked examples, to effectively support students who are either struggling or excelling.



3 Reflective Practice and Feedback Loops

Regularly evaluate the effectiveness of adaptive teaching strategies by analyzing student growth data and feedback from students and parents. Reflect on what worked and what didn't, and use these insights to plan future lessons. Encourage students to also reflect themselves on their learning experiences and let them suggest improvements, incorporating their perspectives into the next planning cycle.



Analyse student growth data and feedback



Reflection



Encourage students reflection