EFFECTIEF LES GEVEN

“To see what is in front of one's nose needs a constant struggle.” (Orwell, 1946)
1. De wetenschappelijke basis over leren & instructie
2. Een aantal fundamentele didactische principes
3. Uitdagingen voor ons onderwijs
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE

Een gigantisch experiment
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE
PROJECT FOLLOW THROUGH

200,000 students spread over 178 schools in ‘low-income communities’ (1968 - 1976), with a budget of $500 million at the time (3.7 billion according to inflation calculator).  

22 didactic models were tested, categorized into:

- a **cognitive-conceptual category** emphasizing problem-solving skills;
- an **affective-cognitive category** emphasizing positive attitudes to learning and “learning to learn” skills;
- a **basic skills category** emphasizing fundamental skills in reading, maths, spelling and language.

### Follow Through Program Sponsors

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Sponsor 2: Far West Laboratory</td>
</tr>
<tr>
<td>5.2</td>
<td>Sponsor 3: University of Arizona</td>
</tr>
<tr>
<td>5.3</td>
<td>Sponsor 5: Bank Street College</td>
</tr>
<tr>
<td>5.4</td>
<td>Sponsor 7: University of Oregon</td>
</tr>
<tr>
<td>5.5</td>
<td>Sponsor 8: University of Kansas</td>
</tr>
<tr>
<td>5.6</td>
<td>Sponsor 9: High/Scope Educational Research</td>
</tr>
<tr>
<td></td>
<td>Foundation</td>
</tr>
<tr>
<td>5.7</td>
<td>Sponsor 10: University of Florida</td>
</tr>
<tr>
<td>5.8</td>
<td>Sponsor 11: Educational Development Center</td>
</tr>
<tr>
<td>5.9</td>
<td>Sponsor 12: University of Pittsburgh</td>
</tr>
<tr>
<td>5.10</td>
<td>Sponsor 14: Southwest Educational Development</td>
</tr>
<tr>
<td></td>
<td>Laboratory</td>
</tr>
</tbody>
</table>

The Model

The EDC Open Education approach seeks to stimulate learning by providing children with a great variety of materials and experience within a supportive emotional environment. The sponsor believes children learn at individual rates and in individual ways, and teachers should adapt approaches to encourage individual progress and responsibility in learning.

The sponsor believes that there is no uniform way to teach reading, writing, or arithmetic skills, and no uniform timetable for all children to follow. Children are not compared with other children and do not receive standardized tests. Consequently, EDC classrooms and teachers vary greatly. Teachers often divide classrooms into interest areas where children may work part of all day. Traditional subjects important in the open classroom may be combined with these interest groups. The teacher may work with the entire class, small groups, or individuals. Parents sometimes serve as classroom aides and assist in curriculum planning. In sum, the EDC Model is more a philosophy than a technique.

The Direct Instruction Model

The Direct Instruction Model is a behaviorally oriented educational program. It utilizes a tightly controlled instructional methodology and highly structured teaching materials. Its aim is to accelerate the learning of disadvantaged children in reading, language, and arithmetic. Although the instruction is programmed, the emphasis is placed on the children's learning intelligent behavior rather than specific pieces of information by rote memorization. The Direct Instruction approach uses a fast moving series of programmed questions and answers. Teachers present specified questions to elicit a verbal child response. Proper responses are reinforced and wrong answer corrected according to specified procedures. These questions, answers, and correction procedures are contained in the Direct Instructional System in Arithmetic and Reading (Distar) materials published by Science Research Associates (SRA). Noncore subjects are generally introduced after mastery of basic skills.
Getest op …
- basiskennis- en vaardigheden (woordenschat, spelling, rekenen …)
- Hogere orde cognitieve vaardigheden (begrijpend lezen, problem solving)
- Affectieve outcomes (samenwerking, zelfwaarde en verantwoordelijkheidszin)
The basic problem we face is that the most popular models in education today (those based on open classrooms, Piagetian ideas, language experience, and individualized instruction) failed in Follow Through. As a result there are many forces in the educational establishment seeking to hide the fact that Direct Instruction, developed by a guy who doesn’t even have a doctorate or a degree in education, actually did the job. To keep those promoting popular approaches from hiding very important outcomes to save their own preconceptions will take formidable help from persons like yourself. We hope it is not too late.

According to former Commissioner of Education, Ernest Boyer, “Since only one of the sponsors (Direct Instruction) was found to produce positive results more consistently than any of the others, it would be inappropriate and irresponsible to disseminate information on all the models…”
6 + 0 = 6
7 + 4 = 11
9 + B = 14
Lesson 126

**Task 1: Rote Counting**

**Counting in the Teens**

**Group Activity**

a. Listen. You're going to start with eight and count (pause) forward.

b. Counting forward from eight. Get it going. Raise your hand. When eight is firm, drop your hand.

9, 10, 11, 12, 13. Stop. Good counting forward.

| Correct | If the children stop counting before reaching 13, say: I didn't say stop. Let's try it again.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repeat a and b.</td>
</tr>
</tbody>
</table>

**Individual Test**

Call on several children for a and b.

**Task 2: Figuring Out Facts**

**Completing Statements**

**Group Activity**

a. Write these problems on the board.

\[
\begin{array}{c|c}
6 + 0 = & \\
6 + 3 = & \\
6 + 5 = & \\
\end{array}
\]

You're going to figure out the answers to some problems.

b. Point to each \(\square\) under m. Some of my numerals are missing. Point to each \(\square\) under the smiling face. All your numerals are missing. Let's figure out the missing numerals.
• Directe Instructie (Engelmann & Becker, 2001) is een systeemmethode voor onderwijs die voorziet in het curriculum, didactische aanpak, monitoring van de resultaten maar ook training van de leraar.

• Het kenmerkt zich o.a. door zorgvuldig geplande en gescripte lessen, met leerstof in behapbare delen, om foutloos te communiceren en misconcepties te vermijden
  - Leerlingen krijgen les in groepen met vergelijkbaar.
  - De aandacht van de leerlingen is gevestigd op de leraar.
  - Actieve deelnemen aan de les (zowel in groep als individueel).
  - Antwoorden geïnitieerd door leraar.
  - Snelle feedback and verbetering.
  - Fluks tempo in de lessen.

• Ook nu nog in gebruik en steevast effectief (Stockard et al, 2018) maar niet vrij van kritiek.
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE

Een gigantisch experiment
Lerareneffectiviteitsonderzoek

As a result, they have described for us a kind of invisible, ghost-like person who, in fact, may not exist. She has been found to be cooperative, sympathetic, poised. She is well-groomed, healthy, imaginative, and cooperative. She gets along with her co-workers and her principal and she gets her reports in on time. As one of my friends said, 'she has the same characteristics we expect from a good bar girl.'
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE

LERARENEFFECTIVITEITSSTUDIES

1

START SCHOOLJAAR

INSTRUCTIE

EINDE SCHOOLJAAR

17 Principles of Effective Instruction

- Begin a lesson with a short review of previous learning.
- Present new material in small steps with student practice after each step.
- Limit the amount of material students receive at one time.
- Give clear and detailed instructions and explanations.
- Ask a large number of questions and check for understanding.
- Provide a high level of active practice for all students.
- Guide students as they begin to practice.
- Think aloud and model steps.
- Provide models of worked-out problems.
- Ask students to explain what they have learned.
- Check the responses of all students.
- Provide systematic feedback and corrections.
- Use more time to provide explanations.
- Provide many examples.
- Reteach material when necessary.
- Prepare students for independent practice.
- Monitor students when they begin independent practice.
De wetenschappelijke basis over leren & instructie

Percentage Passing 7th-Grade Math Test

- Low-achieving 4th graders: 42%
- High-achieving 4th graders: 90%

Effective teachers: three years in a row

1 DE WETENSCAPPELIJKE BASIS OVER LEREN & INSTRUCTIE

Een gigantisch experiment
Lerareneffectiviteitsonderzoek
Cognitieve en onderwijspsychologie
Inexpensive techniques to improve education: Applying cognitive psychology to enhance educational practice

Henry L. Roediger III*, Mary A. Pyc
Washington University, St. Louis, MO, United States

Improving Students’ Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology

John Dunlosky¹, Katherine A. Rawson¹, Elizabeth J. Marsh², Mitchell J. Nathan³, and Daniel T. Willingham⁴

¹Department of Psychology, Kent State University; ²Department of Psychology and Neuroscience, Duke University;
³Department of Educational Psychology, Department of Curriculum & Instruction, and Department of Psychology,
University of Wisconsin–Madison; and ⁴Department of Psychology, University of Virginia
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE
EXPERIMENTEEL ONDERZOEK IN COGNITIEVE- EN ONDERWIJSPSYCHOLOGIE

DISTRIBUTED PRACTICE

LEERMOENT
10 minuten oefenen

LEERMOENT
10 minuten oefenen

LEERMOENT
10 minuten oefenen

TEST
ONMIDDELUK

TEST
1 WEEK

MASSED PRACTICE

LEERMOENT
30 minuten oefenen

TEST
ONMIDDELUK

TEST
1 WEEK

Spicing effect: Het spreiden van oefenmomenten in de tijd heeft een positief effect op het langetermijngeheugen in vergelijking met even lang oefenen op één moment.

Vergeetcurve

Onthouden:
- 100%
- 90%
- 80%
- 70%
- 60%

Dagen:
- 1
- 2
- 3
- 4
- 5
- 6
- 7
<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing effect</td>
<td>Testing enhances learning, particularly when the tests are aligned with important content.</td>
</tr>
<tr>
<td>Spacing effect</td>
<td>Spaced schedules of studying and testing produce better long-term retention than a single study session or test.</td>
</tr>
<tr>
<td>Exam expectations</td>
<td>Students benefit more from repeated testing when they expect a final exam.</td>
</tr>
<tr>
<td>Generation effect</td>
<td>Learning is enhanced when learners produce answers compared to having them recognize answers.</td>
</tr>
<tr>
<td>Organization effects</td>
<td>Outlining, integrating, and synthesizing information produces better learning than rereading materials or other more passive strategies.</td>
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<tr>
<td>Coherence effect</td>
<td>Materials and multimedia should explicitly link related ideas and minimize distracting irrelevant material.</td>
</tr>
<tr>
<td>Stories and example cases</td>
<td>Stories and example cases tend to be remembered better than didactic facts and abstract principles.</td>
</tr>
<tr>
<td>Multiple examples</td>
<td>An understanding of an abstract concept improves with multiple and varied examples.</td>
</tr>
<tr>
<td>Feedback effects</td>
<td>Students benefit from feedback on their performance in a learning task, but the timing of the feedback depends on the task.</td>
</tr>
<tr>
<td>Desirable difficulties</td>
<td>Challenges make learning and retrieval effortful and thereby have positive effects on long-term retention.</td>
</tr>
<tr>
<td>Manageable cognitive load</td>
<td>The information presented to the learner should not overload working memory.</td>
</tr>
<tr>
<td>Imperfect metacognition</td>
<td>Students rarely have an accurate knowledge of their cognition, so their ability to calibrate their comprehension, learning, and memory should not be trusted.</td>
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<tr>
<td>Discovery learning</td>
<td>Most students have trouble discovering important principles on their own, without careful guidance, scaffolding, or materials with well-crafted affordances.</td>
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<td>Most students need training in how to self-regulate their learning and other cognitive processes.</td>
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### 17 Principles of Effective Instruction

Begin a lesson with a short review of previous learning.
- Present new material in small steps with student practice after each step.
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- Reteach material when necessary.
- Prepare students for independent practice.
- Monitor students when they begin independent practice.

---

**COGNITIEVE EN ONDERWIJSPSYCHOLOGIE**

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<thead>
<tr>
<th>Cognitive effects</th>
<th>Ideas that need to be associated should be presented contiguous in space and time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptual-motor grounding</td>
<td>Concepts benefit from being grounded in perceptual motor experiences, particularly at early stages of learning.</td>
</tr>
<tr>
<td>Dual code and multimedia effects</td>
<td>Materials presented in verbal, visual, and multimedia form richer representations than a single medium.</td>
</tr>
<tr>
<td>Tiring effect</td>
<td>Testing enhances learning, particularly when the tests are aligned with important content.</td>
</tr>
<tr>
<td>Spacing effect</td>
<td>Spaced schedules of studying and testing produce better long-term retention than a single crudy session or test.</td>
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<tr>
<td>Exam expectations</td>
<td>Students benefit more from repeated testing when they expect a final exam.</td>
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<td>Students benefit from feedback on their performance in a learning task, but the timing of the feedback depends on the task.</td>
</tr>
<tr>
<td>Negative suggestion effects</td>
<td>Learning wrong information can be reduced when feedback is immediate.</td>
</tr>
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</tr>
<tr>
<td>Manageable cognitive load</td>
<td>The information presented to the learner should not overload working memory.</td>
</tr>
<tr>
<td>Segmentation principle</td>
<td>A complex lesson should be broken down into manageable subparts.</td>
</tr>
<tr>
<td>Explanation effects</td>
<td>Students benefit more from constructing deep coherent explanations (mental models) of the material than rereading shallow isolated facts.</td>
</tr>
<tr>
<td>Deep questions</td>
<td>Students benefit more from asking and answering deep questions that elicit explanations (e.g., why, why not, how, what if?) than shallow questions (e.g., who, what, when, where).</td>
</tr>
<tr>
<td>Cognitive disequilibrium</td>
<td>Deep reasoning and learning is stimulated by problems that create cognitive disequilibrium, such as obstacles to goals, contradictions, conflict, and anomalies.</td>
</tr>
<tr>
<td>Cognitive flexibility</td>
<td>Cognitive flexibility improves with multiple viewpoints that link facts, skills, procedures, and deep conceptual principles.</td>
</tr>
<tr>
<td>Goldilocks principle</td>
<td>Assignments should not be too hard or too easy, but at the right level of difficulty for the student's level of skill or prior knowledge.</td>
</tr>
<tr>
<td>Imperfect metacognition</td>
<td>Students rarely have an accurate knowledge of their cognition, so their ability to calibrate their comprehension, learning, and memory should not be trusted.</td>
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<tr>
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<td>Most students need training in how to self-regulate their learning and other cognitive processes.</td>
</tr>
<tr>
<td>Anchored learning</td>
<td>Learning is deeper and students are more motivated when the materials and skills are anchored in real-world problems that matter to the learner.</td>
</tr>
</tbody>
</table>
DE WETENSCHAPPELIJKE BASIS OVER LEREN & INSTRUCTIE

CONVERGEREND BEWIJS
01. Great teachers understand the content they are teaching and how it is learnt.

02. Great teachers create a supportive environment for learning.

03. Great teachers manage the classroom to maximise opportunity to learn.

04. Great teachers present content, activities and interactions that activate their students’ thinking.
BOUWSTENEN VOOR EFFECTIEF LEREN

De rol van voorkennis en het curriculum
De kracht van het voorbeeld
Betrokkenheid door leren, oefening en feedback
Sturen van zelfstandig leren
VABHKSVOTRVBOVSOA
VRTABVVBSOAHOVOKS
VRT ABVV BSO AHOVOKS

Omgevingsprikkels

Werkgeheugen

Langetermijngeheugen
Omgevingsprikkels

Werkgeheugen

Langetermijngeheugen
Omgevingsprikkels

Werkgeheugen

Langetermijngeheugen
BOUWSTENEN VOOR EFFECTIEF LEREN

DE ROL VAN VOORKENNIS

M11 - VIERHOEKEN IN DE RUIMTE
alle begrippen die we nodig hebben

M12 - VIERHOEKEN TEKENEN
Tekenen op papier en in Geogebra

M13 - KUBUS EN BALK ONTVOUWEN
Een training voor je ruimtelijke inzicht

M14 - VIERHOEKEN IN DE RUIMTE
Geen fouten meer tegen de omzettingen

Wat je al kunt
- vierhoeken herkennen in ruimtefiguren
- hoeken meten
- rekenen met hoeken
- het bepalen van de som van de hoeken van een driehoek

Wat je leert in deze module
- verschillende vierhoeken definiëren zoals: trapezium, parallelogram, ruit, rechthoek en vierkant
- rekenen met hoeken in een vierhoek
- vierhoeken schetsen en tekenen
- omtrek en oppervlakte van vierhoeken berekenen
- herkennen van de eigenschappen bij de soorten vierhoeken

In de kijker
Je werkt op 1 mm of 1 graad nauwkeurig.

Wiskundetaal
- een trapezium
- een gelijkbenig trapezium
- een rechthoekig trapezium
- de benen van een gelijkbenig trapezium
- een parallelogram
- een ruit
- een rechthoek
- een vierkant
- de diagonalen in een vierhoek

Waarna we kunnen inzoomen op...

M15 - RECHT-HOEK EN BALK
M16 - VIERKANT EN KUBUS
M17 - TRAPEZIUM-RIJT

The Cold War

Context

At the end of World War II, the world was split into two factions: The Western Bloc—a group of countries under capitalist rule, comprised of the United States and its allies, some of whom would later become NATO, and the Eastern Bloc—led by the USSR (known as the Soviet Union) and communist countries, some of whom would later sign the Warsaw Pact. An imaginary Iron Curtain divided east and west.

These two factions would spend the next 40 years engaged in a stand-off—both the United States and the USSR had developed nuclear weapons—and knew that attacking the other would lead to M.A.D. (Mutually Assured Destruction). There were incidents of brinkmanship and proxy wars fought in Korea and Vietnam, as the USA became increasingly concerned about a domino effect as neighbouring countries would fall to communist rule.

With the fall of the Berlin Wall in 1989 and the collapse of the USSR in 1991, the Cold War came to an end, as the world sought a more harmonious approach to co-existence.

Key Concepts

Significant People

- John F. Kennedy 35th President of the USA
- Dwight Eisenhower 34th President of the USA
- Joseph Stalin Communist leader/dictator of the USSR after WWII
- Nikita Khrushchev Stalin’s successor as leader of communist USSR
- Winston Churchill Prime Minister of the UK 1940-45 and 1951-1955
- Fidel Castro Led the communist revolution in Cuba
- Harry S. Truman 33rd President of the USA
- Ho Chi Minh Communist leader of the Viet Minh in Vietnam

USA, NATO & its Allies

Neutral/Non-aligned

USSR & its Allies

Vocabulary

- Capitalism: An economic system based on private ownership
- Communism: A political system based on community ownership
- Democracy: A political system where people vote for their representatives
- Totalitarianism: A political system where one person holds complete power
- Government: A group of people responsible for running a country
- Rebellion: Fighting against someone who is in power
- Guerrilla Warfare: A method of fighting using ambushes, raids, and surprise
- Nuclear Weapons: A weapon of mass destruction powered by a nuclear reaction
- Soviet Union: A communist country comprised of Eastern European republics
- Missile: A weapon that is projected/lived at a target
- Blockade: Sealing off a place to prevent movement of goods or people
- Brinkmanship: Pushing a situation to the brink of disaster to achieve an advantage
- Domino Theory: A theory that one country fell to communism, others would follow
- Iron Curtain: The imaginary line dividing free and communist countries in Europe
- Satellite Nations: Nations under the control of the Soviet Union
- Detente: Lessening of military and diplomatic tensions between countries
- M.A.D.: Mutually Assured Destruction
- NATO: North Atlantic Treaty Organisation
- Warsaw Pact: A defence pact between the USSR and neighbouring countries
- Allies: Countries that are committed to military cooperation and defence
Frans: iemand leuke intro voor de Futur Simple?

12 reacties

Ik start met het thema roken in 38, het ontbrak mij alleen aan een leuke instap. Iemand een idee?

Ho! ik ga de CCO en de CDI aan een derde jaar geven (technische wetenschappen) en ik was een week maar een eenvoudig introductie aan hen! In het
## Kindergarten
- Overview of Topics ........................................... 2
- Language Arts .................................................. 3
- World History and Geography ............................ 12
- American History and Geography ....................... 13
- Visual Arts ...................................................... 15
- Music ............................................................ 16
- Mathematics .................................................... 18
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- Language Arts .................................................. 25
- World History and Geography ............................ 35
- American History and Geography ....................... 37
- Visual Arts ...................................................... 39
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## Grade 2
- Overview of Topics ........................................... 50
- Language Arts .................................................. 51
- World History and Geography ............................ 61
- American History and Geography ....................... 63
- Visual Arts ...................................................... 66
- Music ............................................................ 68
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Core Knowledge Sequence

Content and Skill Guidelines for Grades K–8

https://www.coreknowledge.org/curriculum/
BOUWSTENEN VOOR EFFECTIEF LEREN
DE ROL VAN HET CURRICULUM

History and Geography: Kindergarten

Teachers: In kindergarten, children often study aspects of the world around them; the family, the school, the community, etc. The following guidelines are meant to broaden and complement that focus. The goal of studying selected topics in World History in Kindergarten is to foster curiosity and the beginning of understanding about the larger world outside the child’s locality, and about varied civilizations and ways of life. This can be done through a variety of means: story, drama, art, music, discussion, and more.

The study of geography embraces many topics throughout the Core Knowledge Sequence, including topics in history and science. Geographic knowledge includes a spatial sense of the world, an awareness of the physical processes that shape life, a sense of the interactions between humans and their environment, an understanding of the relations between place and culture, and an awareness of the characteristics of specific regions and cultures.

WORLD HISTORY AND GEOGRAPHY

I. Geography: Spatial Sense (working with maps, globes, and other geographic tools)

Have students regularly locate themselves on maps and globes in relation to places they are studying. Children should make and use a simple map of a locality (such as classroom, home, school grounds, “treasure hunt”).

- Maps and globes: what they represent, how we use them
- Rivers, lakes, and mountains: what they are and how they are represented on maps and globes
- Locate the Atlantic and Pacific Oceans.
- Locate the North and South Poles.

II. An Overview of the Seven Continents

Teachers: Help children gain a beginning geographic vocabulary and a basic sense of how we organize and talk about the world by giving names to some of the biggest pieces of land. Introduce children to the seven continents through a variety of methods and media (tracking, coloring, relief maps, etc.), and associate the continents with familiar wildlife, landmarks, etc. (for example, penguins in Antarctica; the Eiffel Tower in Europe). Throughout the school year, reinforce names and locations of continents when potential connections arise in other disciplines (for example, connect Grimm’s fairy tales to Europe; voyage of Pilgrims to Europe and North America; story of “Momotaro—Peach Boy” to Asia (Japan); study of Native Americans to North America).

- Identify and locate the seven continents on a map and globe:
  - Asia
  - Europe
  - Africa
  - North America
2
BOUWSTENEN VOOR EFFECTIEF LEREN

De rol van voorkennis en het curriculum
Het gebruiken van voorbeelden
Bieden van zorgvuldig gekozen oefenkansen
Betrokkenheid door leren en feedback
BOUWSTENEN VOOR EFFECTIEF LEREN
DE KRACHT VAN HET VOORBEELD

GEDACHTEGANG VAN DE LERAAR

UITLEG DOOR DE LERAAR

UITGEWERKT VOORBEELD
To solve an equation of the form $ax + b = c$

To solve an equation of the form $ax + b = c$, it is necessary to use both the Addition and Multiplication Properties to simplify the equation to one of the form $variable = constant$.

**HOW TO 1**
Solve: $\frac{x}{4} - 1 = 3$

- The goal is to simplify the equation to one of the form $variable = constant$.
- Add the opposite of the constant term $-1$ to each side of the equation. Then simplify (Addition Properties).

\[
\begin{align*}
\frac{x}{4} - 1 + 1 &= 3 + 1 \\
\frac{x}{4} &= 4 \\
x &= 16
\end{align*}
\]

The solution is 16.

**EXAMPLE 1**
Solve: $3x + 7 = 2$

**Solution**

\[
\begin{align*}
3x + 7 &= 2 \\
3x + 7 - 7 &= 2 - 7 \\
3x &= -5 \\
\frac{3x}{3} &= \frac{-5}{3} \\
x &= \frac{-5}{3}
\end{align*}
\]

The solution is $\frac{-5}{3}$.

**YOU TRY IT 1**
Solve: $5x + 8 = 6$

**Your solution**

- Subtract 7 from each side.
- Divide each side by 3.
What instruction is best for whom? (Expertise reversal effect)

- **Novice**
  - Fully guided instruction and worked examples to help students acquire relevant schema.
  - Mix of guided instruction and problem-solving with faded worked examples and completion tasks to provide practice at accessing schema.
  - Minimally guided problem-solving with occasional corrective feedback to promote fluency and mastery.

- **Intermediate**

- **Advanced**

**Performance**
- Novices: 6
- Experts: 4

**Mental effort**
- Novices: 2
- Experts: 6

**Diagram with integrated text**

**Diagram only**

BOUWSTENEN VOOR EFFECTIEF LEEREN

De rol van voorkennis en het curriculum
De kracht van het voorbeeld
Betrokkenheid door leren, oefening en feedback
Sturen van zelfstandig leren
BOUWSTENEN VOOR EFFECTIEF LEREN
BETROKKENHEID DOOR LERNEN, OEFENING EN FEEDBACK

EXPERIMENT 1

Half blaadje instuderen (7 min. lezen)

5 min.

Half blaadje instuderen (7 min. lezen)

5 min.

EINDTEST

2 dagen

EINDTEST

1 week

Half blaadje instuderen (7 min. lezen)

EINDTEST

2 dagen

EINDTEST

1 week

Oefentest (7 min. free recall)

EINDTEST

EINDTEST

EINDTEST

EINDTEST

EINDTEST

EINDTEST

EINDTEST
BOUWSTENEN VOOR EFFECTIEF LEREN

BETROKKENHEID DOOR LEREN, OEFENING EN FEEDBACK

![Chart showing retention over time with different methods: Reread and Retrieve.](chart.png)
**Testing effect:** het maken van een oefentest (trachten iets te herinneren) heeft een positief effect op het lange termijngeheugen (meer dan bijv. herlezen).

(Carpenter, 2012; Dunlosky et al, 2013; Karpicke et al, 2014; Roediger & Karpicke, 2017)
Table 1  Evidence on the effectiveness of generative learning strategies in different age groups

<table>
<thead>
<tr>
<th>Concept mapping</th>
<th>University students</th>
<th>Secondary-school students</th>
<th>Fourth/fifth-grade students</th>
<th>Below fourth-grade students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Mixed</td>
<td>Mixed</td>
</tr>
<tr>
<td>Predicting</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Favorable</td>
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<tr>
<td>Questioning</td>
<td>Favorable</td>
<td>Mixed</td>
<td>Favorable</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>Testing</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Favorable</td>
</tr>
<tr>
<td>Drawing</td>
<td>Favorable</td>
<td>Favorable</td>
<td>Unfavorable</td>
<td>Unfavorable</td>
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</tbody>
</table>

Think about the question

Pair with your partner

Share your ideas with others

Does pre-testing promote better retention than post-testing?

Alice Latimier\textsuperscript{1,2}, Arnaud Riegert\textsuperscript{3}, Hugo Peyre\textsuperscript{1,4,5}, Son Thierry Ly\textsuperscript{3}, Roberto Casati\textsuperscript{2} and Franck Ramus\textsuperscript{1}

Compared with other learning strategies, retrieval practice seems to promote superior long-term retention. This has been found mostly in conditions where learners take tests after being exposed to learning content. However, a pre-testing effect has also been demonstrated, with promising results. This raises the question, for a given amount of time dedicated to retrieval practice, whether learners should be tested before or after an initial exposure to learning content. Our experiment directly compares the benefits of post-testing and pre-testing relative to an extended reading condition, on a retention test 7 days later. We replicated both post-testing ($d = 0.74$) and pre-testing effects ($d = 0.35$), with significantly better retention in the former condition. Post-testing also promoted knowledge transfer to previously untested questions, whereas pre-testing did not. Our results thus suggest that it may be more fruitful to test students after than before exposure to learning content.

WHOLE-CLASS-FEEDBACK

Who impressed me?

Medieval Literature BASELINE

Key timeline content: LEARN THIS!

470-800
Fall of Rome / Charlemagne
The period in which the idea of "England" was formed, and a new language began to emerge. 

800-1066
Anglo-Saxon Period
The period in which English was written, influenced by Latin and Old English. 

1066-1300
Early Middle English Period
A period of great change during which the language of the Old English phase was replaced by the language of modern English. 

1300-1500
Late Middle English Period
A period of great change during which the language of the Middle English phase was replaced by the language of modern English. 

1500-1800
Early Modern English Period
A period of great change during which the language of the Modern English phase was developed. 

SPELLINGS
1. Common
2. Sentences
3. Metaphor
4. Alliteration
5. Poetry
6. Geoffrey Chaucer
7. Active

Common punctuation and grammar errors:
- Students writing numbers as digits, not words
- A sentence is ALWAYS two separate words
- Possessive apostrophe: the king's treasure
- Capital letters for proper nouns (such as languages, time periods and places)
- Battle of Hastings, Beowulf, English, French, Romans, Latin, Old English, Anglo-Saxon

Analysis structure: WHAT, HOW, WHY

WHAT
- The writer was talking about a dragon that was angry.
- The writer was talking about all the people being scared.

HOW
- Interesting structure.
- Technical devices.
- Structure: one of the ways of answering the question.

WHY
- The writer wants to do what.
- The writer tries to convince us.

- What exactly does the writer want us to know.
- Change our minds.
- Change our behavior.

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"Het moet harder werken zijn voor de leerling dan voor de leraar"

"Als leerlingen de feedback niet gebruiken om het de volgende keer beter te doen doen, dan was het gewoon tijdverlies"

Dylan Wiliam
BOUWSTENEN VOOR EFFECTIEF LEREN

De rol van voorkennis en het curriculum
De kracht van het voorbeeld
Betrokkenheid door leren en feedback
Sturen van zelfstandig leren
BOUWSTENEN VOOR EFFECTIEF LEREN (OP AFSTAND)

STUREN VAN ZELFSTANDIG LEREN

- Laat steeds verklaren waarom het voorbeeld is van een bepaald begrip. Je weet als leerder dan pas zeker dat je leerlingen de bepalende kenmerken begrijpen, om dat ze niet alleen maar de concrete voorbeelden leren.
- Kies in de mate van het mogelijke voorbeelden uit verschillende vakken en interessesgebieden. Zo sproeit je de vorken van zo veel mogelijk leerlingen aan.
- Benoem samen ook tegenvoorbeelden, verschillen en gelijkenissen met andere concepten.

VOORBEELDEN UIT HUN LEFWERELD: JA EN NEEN!
Probeer de hobby’s, achtergronden, bezorgdomeinden, interesses van je leerlingen te achterhalen, zodat je het luister, toekomstsebeelden en andere interesses van je leerlingen kunt verwerken in je les. Leerlingen voelen ze dat onderwerp op hun wereld niet zo ver van elkaar staan als ze soms vermoeden. Maar bij voorbaat ook niet steken in de leefwereld van de leerlingen, die kennen ze immers al. Onderwerp kan net de laagvuur van het kind openhouden en hun blik vermaken. Breng je leerlingen naar werelden die ze nog niet kennen!

Wat onderzoek ons vertelt
Als voorbeelden deel uitmaken van de instructie, is het leereffect groter dan wanneer het leren plaatsvindt louter via het oplossen van oefeningen (zelfs met goede begeleiding). Dit heeft het *worked example effect* en is volgens John Sweller, de bedenker van de cognitieve-belastingtheorie, het meest gekend en onderzocht effect van de theorie. “We benaderen dat het worked example effect alleen maar gelijk voor voorbeelden waarbij nieuwe principes of theorie vooraf werden gepresenteerd, en dus niet voor voorbeelden die gebruikt worden om van daaruit nieuwe principes te ontcijferen. Het effect treedt dus op als je eerst uitleg wilt over het begrip ‘erosie’ betekent, en daarbij verschillende voorbeelden laat zien en bespreekt.
Stel dat leerlingen een nieuw soort oefeningen moeten leren oplossen. Wanneer ze met een volledig oefeningen voorgescholden zouden krijgen die ze bovendien zelfstandig moesten oplossen, dan zouden ze gedwongen

CORNELL-METHODE

ONDERWERP VAN DE LES

KERNWOORDEN KERNVRAAGEN
Hierop wil ik meer kunnen vertellen...

BEGRIPPEN

- Noteer naast elk kernwoord de belangrijke punten.
- Gebruik korte kernachtige zinnen.
- Maak tekeningen / schema’s en schrijf hier de belangrijke info bij.

VRAGEN

- Laat voldoende ruimte tussen de tekeningen of zinnen (overzicht).

NAMEN

- Gebruik opsommingen indien mogelijk.
- Bewaar de structuur van de les.

DATUMS

- Deze samenvatting studeren? Dek het rec terdeel af en probeer je zo veel mogelijk te herinneren. Check nadien je antwoorden en vul aan.

SAMENVATTING

ExCEL EXPERTISECENTRUM VOOR EFFECTIEF LEREN @THOMAS MORE

STUREN VAN ZELFSTANDIG LEREN
BOUWSTENEN VOOR EFFECTIEF LEREN (OP AFSTAND)

STUREN VAN ZELFSTANDIG LEREN

1. Activating Prior Knowledge
2. Explicit strategy instruction
3. Modelling of learned strategy
4. Memorisation of strategy
5. Guided practice
6. Independent practice
7. Structured reflection

ExCELI
EXPERTISECENTRUM VOOR EFFECTIEF LEREN @THOMAS MORE

Muijs et al, 2018
UITDAGINGEN VOOR ONS ONDERWIJS

Generieke vaardigheden als doel of als middel?
De publieke perceptie van kennis
Constructivisme beschouwen als didactiek
Concepten binnen didactiek die vloeken met wetenschap én praktijk
UITDAGINGEN VOOR ONS ONDERWIJS
GENERIEKE VAARDIGHEDEN ALS DOEL OF ALS MIDDEL?

EXPERIMENTAL EVIDENCE SHOWS THAT AN EXPERT DOES NOT THINK AS WELL OUTSIDE HER AREA OF EXPERTISE, EVEN IN A CLOSELY RELATED DOMAIN. SHE IS STILL BETTER THAN A NOVICE, BUT HER SKILLS DO NOT TRANSFER COMPLETELY.

Domain-Specific Knowledge and Why Teaching Generic Skills Does Not Work

André Tricot • John Sweller
UITDAGINGEN VOOR ONS ONDERWIJS
DE PUBLIEKE PERCEPTIE VAN KENNIS

DE KNOPEL
EN HOE ZE WORDEN DOC

Achter de concrete voorstellen die nu ter tafel liggen zit een overweg
veel denk- en studiewerk, discussie en overleg. Maar er moeten de
knopen worden doorgehakt. Zodra daarover consensus bestaat valt
het de onderwezens. Een overzicht van de doorgehaakte knopen.

VIJF BELANGRIJKE KEUZES
In de nieuwe eindtermen kiest men resoluut
voor vijf belangrijke principes.
1. Minder specialisatie en meer brede basisvoor-
mening.
2. Minder accent op kennis en het cognitieve,
meer op waarden, het affectieve en de persoon-
lijkheidsvorming.
3. Minder theorie en nuiver intellectualisme,
meer praktijk, toepassing en aandacht voor het
levenslicht.
4. Minder denken in aparte vakken, meer vaak-
overschrijvend werken en coördinatie tussen
de verschillende vakken.
5. Minder melden op geheugen, onmiddellijk
resultaat en de korte termijn, meer aandacht
voor wat behoort op lange termijn.

hun eigen invloedboek het zeldzame onderwijs moeten
aanschaffen. Er moeten voortdurend bringen
worden geschild.

In het basisonderwijs sprekt men zelfs niet
meer over vakken. Er blijven slechts vijf leerge-
bieden over.

In het secundair behoudt men vaak maar
het overleg en de aandacht voor de samenhang
zullen, als het goed zij, bij decreet worden
vastgelegd.

Staatssecretaris: ‘We zullen de leerdoelen in het
secundair onderwijs niet meteen van hun melk
brengen en stuursloos maken. We hebben nu
eenmaal een sterk vakkenonderwijs. De be-
veiligd, de classificatie, de begrijding, de
prognostie, de beva-
ing… het streutelt al-
leen aan en vakken.”
UITDAGINGEN VOOR ONS ONDERWIJS

CONSTRUCTIVISME ALS LEERTHEORIE VERWARREN MET INSTRUCTIETHEORIE
Just because they’re engaged, it doesn’t mean they’re learning

**Figure 1**
Two Dimensions of Active Learning: Cognitive Activity and Behavioral Activity

<table>
<thead>
<tr>
<th>Cognitive Activity</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral activity</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
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</tr>
</tbody>
</table>
Leerstijlen van Kolb

- Doener
- Bezinner
- Beslisser
- Denker

Inhoudelijk sterke lerarenopleiding- en professionalisering

“To see what is in front of one's nose needs a constant struggle.” (Orwell, 1946)
“Explicit instruction is a group of research-supported instructional behaviors used to design and deliver instruction that provides needed supports for successful learning

- through **clarity of language and purpose**, and reduction of cognitive load.
- It promotes **active student engagement**
- by requiring **frequent and varied responses**
- followed by appropriate affirmative and corrective feedback, and
- **Assists long-term retention through use of purposeful practice strategies**”.

Directe Instructie, directe instructie, expliciete instructie