

## What can we learn from Direct Instruction and Seigfried Engelmann?

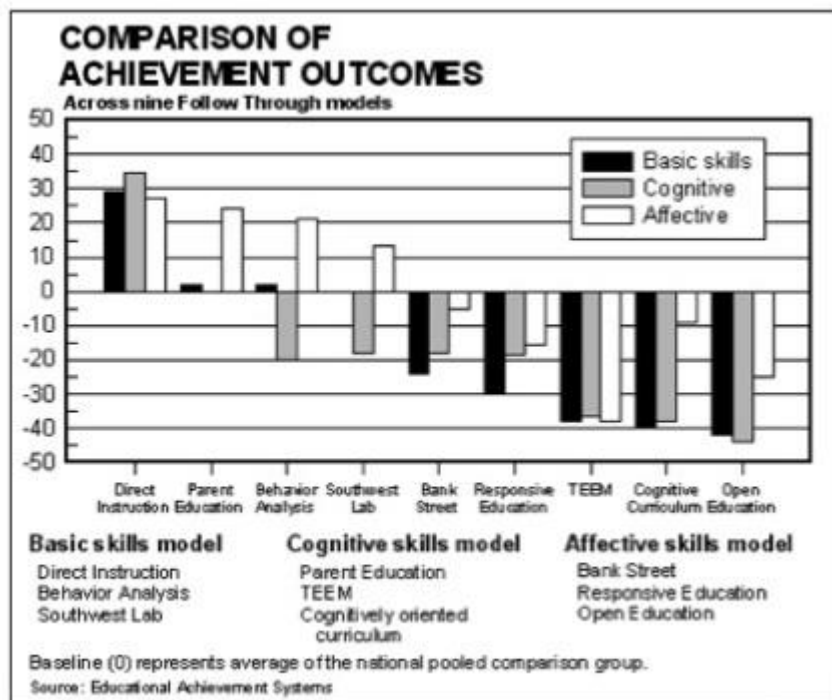
**Combining precise example sequences, high-pace questioning, continuous instant feedback, extended practice drills, and rapid corrections of misconceptions, direct instruction is one of the most effective teaching methods.**

***Citing an individual study to prove that Direct Instruction isn't effective is like citing a rainstorm to prove that the Sahara isn't a desert.***

There is a vast range of empirical, scientific and statistical evidence that shows Direct Instruction works.

Project Follow Through was the largest controlled comparative study of pedagogical techniques in history: from 1967 – 1995, over 700,000 children in 170 disadvantaged communities across the United States participated in this \$1 billion study to discover the best practices for teaching disadvantaged students. This was the result:

*'Eighteen school districts, some rural, some urban, applied Direct Instruction (DI). When the testing was over, students in DI classrooms had placed first in reading, first in maths, first in spelling, and first in language. No other model came close. Many of the others underperformed the control groups. DI even defeated the developmental and affective models on their own turf: DI students also placed first in self-esteem. Apparently children who mastered reading, writing, and maths felt better about themselves than those who did not.'*



The Washington Times

In 1996, a meta-analysis of 35 empirical studies published from 1972-1996 showed an effect size of 0.87. An effect size of greater than 0.4 is considered effective, and above 0.75 extremely rare. Large-scale studies from 1997-2003, such as the Baltimore Curriculum Project, show that Direct Instruction can help schools that are

in the lowest twenty percent steadily improve their academic achievement until they are performing well above average.

In 2009, *Visible Learning* synthesised over 800 statistical analyses on the effects of teaching techniques on student achievement. For Direct Instruction, across 304 studies including over 42,000 children, the effect size was [0.82](#), significantly greater than any other curriculum that Hattie studied, and greater than almost any other technique apart from feedback.

All the evidence shows that Direct Instruction works. So the puzzle is this: why haven't more people heard of Siegfried Engelmann, its pioneering educationalist? And what insights could we learn from him about effective instruction? I've tried to distil four of his core insights and summarise five of the key components of Direct Instruction here.

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### **Insight 1. Pupils learn concepts from examples**

Specific series of examples lead pupils to understand concepts. Explanation must demonstrate a range of positive examples of a concept, the limits of the concept by negative examples, and minimally different examples to show pupils how to distinguish between what is and what is not categorised as the concept. (For instance, 'the eagle is a thunderbolt' is a metaphor; but 'the eagle is like a thunderbolt' is minimally different: it is not a metaphor, it is a simile). A whole series of examples must demonstrate the range of variation and the clear boundaries.

### **Insight 2. Pupils have only learned a concept when they can master new examples**

Pupils master a concept by making up a rule to apply to new examples to categorise them as either positive or negative examples of the concept. So teachers must test pupils with examples, different from those presented to demonstrate the concept, to check whether mastery has occurred.

### **Insight 3. Pupils require far more practice than we think for mastery**

Engelmann says that 'the amount of practice required is five times what teachers expect' (1992 p17): 'pupils use it or lose it; activities must require kids to use all the important skills and concepts they've been taught'. Integrating previously learned knowledge and skills in continuous review is essential. The research on the essential importance of practice is corroborated by, amongst others, [Carol Dweck](#), [Matthew Syed](#), [Daniel Coyle](#), [Doug Lemov](#) and [Daniel Willingham](#).

### **Insight 4. Curriculum design is the difference between failure and success**

Engelmann's own words are the best way to get to the core of this insight:

'The field of education still hasn't learned that poorly designed curricula generate poor performance in both teacher and students'.

'Instructional sequences have the capacity to make students smart or not...

The curriculum will largely determine the extent to which students are smart.’

‘The curriculum is the difference between failure and success (1992 p7).

‘When the curriculum fails, the teaching will fail’. (1992 p7)

‘If the teaching is not effective, the most direct implication is that the curricular sequences are not well designed’ (1992 p179)

‘The curriculum is the central focus of effective reform, because teachers don’t teach without content, and the content comes from the curriculum’. (1992 p176)

‘Effective reform must start with the understanding that the curriculum is the central focus and the central business of schools. Effective curricula are the sine qua non of the system that is capable of delivering a quality education to all kids’. (1992 p179)

Engelmann’s insight that ‘**the cause of educational failure is the curriculum**’ locates the responsibility right at the centre of schools’ locus of control.

So, based on these insights, what are the main components of the tried-and-tested direct instruction method?

I have cited Hattie’s summary [here](#), and Nadler neatly sums up Engelmann’s approach: ‘sequences of instruction form the kernel of his curricula: skills communicated with logical precision in discrete chunks; careful measurement of mastery; rapid correction of mistakes; and incessant review to integrate old skills with new’. I break down Direct Instruction into five applications:

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### **Precise example sequences**

Carefully specified sequences of examples, non-examples and minimally different examples are systematically presented and unambiguously communicated to pupils. Pupils are then tested on whether they have mastered the concept through new, different examples.

### **High-pace questioning**

Active responding as a group and individually is cued by the teacher at a high pace of up to 10 learner responses per minute. A fast pace of short explanations plus a series of questions is better than slow-paced, long explanations. Engelmann says: ‘if the teacher talks too much, the pupils will have difficulty identifying what’s important’.

### **Continuous instant feedback**

Continuous checking for understanding is embedded so that the teacher gets instant feedback on who understands what and the pupils get instant feedback on whether they’ve mastered what they’re learning.

**Extended practice drills**

In a typical lesson, only 15% of content is new; the rest is either review of content introduced in the preceding lessons or slight expansions that build on what was taught earlier. Lessons build from modelled, through guided, to independent practice. When introducing a new concept, the teacher models the same type of problems the students will be solving; the pupils then apply the same steps to a different but similar problem; the pupils then use the concept in varying contexts and with other skills.

**Rapid corrections of misconceptions**

Planned correction procedures are implemented to prevent errors from becoming learned habits. All errors are corrected as soon as they occur. Teachers make immediate judgments about why errors occur and focus on those aspects when providing corrective feedback.

Just as the evidence is crystal-clear that the Sahara is a desert, it's rock-solid that Direct Instruction is effective. So next time you hear someone in education dismissing teacher-led instruction, knowledge transmission, or practice drills, remind them of the astonishing success of Siegfried Engelmann.