



Direct/Explicit Instruction and Mathematics

What Is Direct/Explicit Instruction?

Direct instruction is a teacher-centered instructional approach that is most effective for teaching basic or isolated skills (Kroesbergen & Van Luit, 2003). It can be a scripted program that is very systematic with a step-by-step format requiring student mastery at each step. It is generally fast-paced instruction and often used with a small group of students. Students respond to instruction and receive immediate feedback. Direct instruction also includes continuous modeling by teachers, followed by more limited teacher involvement and then fading teacher involvement as students begin to master the material (Maccini & Gagnon, 2000).

With direct instruction, teachers follow a sequence of events, generally stating the objective, reviewing skills necessary for new information, presenting new information, questioning students, providing group instruction and independent practice, assessing performance, and giving more practice (Swanson, 2001). Swanson identified 12 criteria associated with direct instruction. When any four of these indicators are present, direct instruction is occurring.

1. Breaking down a task into small steps
2. Administering probes
3. Administering feedback repeatedly
4. Providing a pictorial or diagram presentation
5. Allowing independent practice and individually paced instruction
6. Breaking the instruction down into simpler phases
7. Instructing in a small group
8. Teacher modeling a skill
9. Providing set materials at a rapid pace
10. Providing individual child instruction
11. Teacher asking questions
12. Teacher presenting the new (novel) materials (Swanson, 2001, p. 4).

Direct Instruction, Strategy Instruction, and Learning Strategies: What's the Difference?

Direct instruction is teacher centered and focused on helping students learn basic skills and information. Strategy instruction is student centered and teaches students how to learn information and then retrieve that information when it is needed. Learning strategies are taught during strategy instruction as ways of organizing information so that it can be retrieved. All three could and should be found in the same lesson because they complement one another, and strategy instruction and direct instruction are very similar.

What Does Direct/Explicit Instruction Look Like for Mathematics?

Teachers provide instruction in a step-by-step manner. For example, when teaching the addition of decimals, teachers begin with a review of adding integers numbers (e.g., the importance of lining up the one's column and then lining up each column to the left). Next, they review the meaning of the decimal point. They demonstrate how the decimals must be lined up and model problems that require the addition of decimals several times, perhaps talking their way through each problem. Each problem has a set of steps that may be scripted.

Sample	
<ul style="list-style-type: none">• We will add $12.1 + 3.3$• First, write the 12.1• Next, write the 3.3. Remember to line up the decimal!• Now, bring your decimal point straight down into your answer.• Next, add your numbers. 1 plus 3 equals 4, and the 4 is placed on the right side of the decimal. The 2 plus 3 equals 5 and the 5 is placed on the left side of the decimal.• Finally, there is no number to add to the 1, so imagine a zero in front of the 3, and add 1 plus zero. Your answer should be 15.4.	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">$\begin{array}{r} 12.1 \\ + 3.3 \\ \hline . \end{array}$</div> <div style="border: 1px solid black; padding: 5px;">$\begin{array}{r} 12.1 \\ + 3.3 \\ \hline 15.4 \end{array}$</div>

Teachers model several problems like this, which they apply to practical situations, such as adding money. They then allow students to practice a variety of addition problems, some involving skills the students have already mastered and some using this new skill. When the students achieve mastery, determined through continuous progress monitoring, teachers move to the next skill but continue, through practice, to reinforce earlier skills.

How Is Direct/Explicit Instruction Implemented?

Teachers may develop their own direct instruction lessons by breaking the desired concept into smaller tasks and then developing scripted, fast-moving sessions. They must regularly check for understanding and provide immediate feedback. Most instructional computer programs use direct instruction, presenting a lesson and then providing immediate feedback and remediation when the students make an error. Mathematics programs that use direct instruction also offer teachers scripted mathematics lessons, manipulatives, activities, and short assessments that are easy for teachers or students to grade. Many mathematics textbooks use a direct instruction approach to teaching mathematics.

According to researchers and the results of several meta-analyses (Ellis, 1993; Karp & Voltz, 2000; Swanson, 2001), using a combination of direct instruction and strategy instruction has a greater positive effect than either method alone. Teachers should consider ways to use both direct instruction and strategy instruction in each lesson to gain the maximum benefit from each approach. Teaching basic skills to students through direct instruction and then

teaching them strategies to store and retrieve the information will ensure a successful educational experience for all students. However, for students with disabilities and students who are at risk, these approaches are crucial for the retention of new skills.

References

- Ellis, E. S. (1993). Integrative strategy instruction: A potential model for teaching content area subjects to adolescents with learning disabilities. *Journal of Learning Disabilities, 26*, 358–383.
- Karp, K. S., & Voltz, D. L. (2000). Weaving mathematical instructional strategies into inclusive settings. *Intervention in School and Clinic, 35*, 206–215.
- Kroesbergen, E. H., & Van Luit, J. E. H. (2003). Mathematical interventions for children with special educational needs. *Remedial and Special Education, 24*, 97–114.
- Maccini, P., & Gagnon, J. C. (2000). Best practices for teaching mathematics to secondary students with special needs. *Focus on Exceptional Children, 32*, 1–22.
- Swanson, H. L. (2001). Searching for the best model for instructing students with learning disabilities. *Focus on Exceptional Children, 34*, 1–15.

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The Access Center is a cooperative agreement (H326K020003) funded by the U.S. Department of Education, Office of Special Education Programs, awarded to the American Institutes for Research
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U.S. Office of Special Education Programs

This report was produced under U.S. Department of Education Grant # H326K020003 with the American Institutes for Research. Jane Hauser served as the project officer. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.



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