

# **Instructional Scaffolding**

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## **Instructional Scaffolding: A Teaching Strategy**

Scaffolds are temporary structures that physically support workers while they complete jobs that would otherwise be impossible. Scaffolds provide workers with both a place to work and the means to reach work areas that they could not access on their own (Herber and Herber, 1993, p. 138). Instructional scaffolding is a teaching strategy that was cleverly named for the practical resemblance it bears to the physical scaffolds used on construction sites. The strategy consists of teaching new skills by engaging students collaboratively in tasks that would be too difficult for them to complete on their own. The instructor initially provides extensive instructional support, or scaffolding, to continually assist the students in building their understanding of new content and process. Once the students internalize the content and/or process, they assume full responsibility for controlling the progress of a given task. The temporary scaffolding provided by the instructor is removed to reveal the impressive permanent structure of student understanding (Herber and Herber, 1993, pp. 138-139).

Instructional scaffolding involves two major steps. The first step is development of instructional plans to lead the students from what they already know to a deep understanding of new material (Turnbull, Turnbull, Shank and Leal, 1999, pp. 641-642). Scaffolding plans must be written carefully, such that each new skill or bit of information that the students learn serves as a logical next step, based upon what they already know or are able to do. The instructor must prepare both to continuously assess student learning and to connect new information to the students' prior knowledge. The second major step of instructional scaffolding is execution of the plans, wherein the instructor provides support to the students at every step of the learning process (Turnbull et. al.,

1999, pp. 641-642). At the beginning of the process, the instructor models the task in its entirety. Having observed their instructor's model, the students begin guided practice by performing parts of the task independently. The instructor assists his or her students with their early practice and continuously assesses their learning. As the students gain experience with and understanding of new information or tasks, the instructor increases the complexity of guided practice activities and gradually reduces his or her support. By the end of a well-executed scaffolding plan, the students perform the entire task with little or no support from their instructor (Turnbull et. al., 1999, pp. 641-642).

There are actually five different instructional scaffolding techniques: modeling of desired behaviors, offering explanations, inviting student participation, verifying and clarifying student understandings, and inviting students to contribute clues (Hogan and Pressley, 1997, pp. 17-36). These techniques may either be integrated or used individually, depending on the material being taught. The instructor's goal in employing scaffolding techniques is offering just enough assistance to guide the students toward independence and self-regulation.

Modeling is generally the first step in instructional scaffolding. It is defined as "teaching behavior that shows how one should feel, think or act within a given situation" (Hogan and Pressley, 1997, p. 20). There are three types of modeling: think-aloud modeling, talk-aloud modeling and performance modeling. Think-aloud modeling is verbalization of the thought process used to solve a particular problem. For example, an instructor might verbalize his or her strategies for finding the main idea of a paragraph. By contrast, talk-aloud modeling is a demonstration of task completion accompanied by verbalization of the thought process or problem solving strategy that brought the modeler

to her conclusion. For example, an instructor might verbally describe her strategies as she demonstrates the written solution to a word problem. Finally, performance modeling is simply demonstration of the task to be completed. For example, an instructor might model sustained silent reading by reading a book and either moving her lips, smiling at a funny part of the story, running her finger along the lines of text as she reads, etc. Performance modeling does not involve any verbal explanation (Hogan and Pressley, 1997, p. 20).

In addition to modeling, it is extremely important for the instructor to offer explanations, which should be “ explicit statements adjusted to fit the learners’ emerging understandings about what is being learned (declarative or propositional knowledge), why and when it is used (conditional or situational knowledge), and how it is used (procedural knowledge)” (Hogan and Pressley, 1997, p. 17). At the beginning of instruction, explanations are thorough and may be repeated. As the learners gain experience, explanations consist of only hints or key words, which prompt the learners to recall important information. Eventually, explanations are removed altogether (Hogan and Pressley, 1997, p. 17). For example, an instructor might begin a unit on dividing fractions with a thorough explanation of compound fractions, reciprocals and inverse operations. The instructor might have to rephrase or repeat this thorough explanation several times during guided practice. As the students gain experience, their instructor might limit her explanations to single words like “reciprocal” and “operation” to prompt the students when they occasionally forget the next step in the process.

Particularly in the early stages of scaffolding, an instructor must invite student participation in the task at hand. This practice engages the student in learning and

provides her with ownership of the learning experience (Hogan and Pressley, 1997, p. 18). For example, a teacher might write the decimal point on the chalkboard and then ask a student to identify the next step in converting a fraction to a decimal. The student might be invited to participate verbally or she might be asked to come to the chalkboard and contribute her ideas or strategies in writing. Rather than asking a student for direct participation, an instructor might scaffold learning by asking students to contribute clues or ideas (Hogan and Pressley, 1997, p. 27). When students contribute their ideas about a topic or skill, the instructor can add her own ideas to guide the discussion. If the students' understandings are incorrect or only partially correct, the teacher can correct them and tailor her explanations based upon whatever the students have brought to the discussion (Hogan and Pressley, 1997, pp. 27-28).

As the students gain experience with new material, it is important for the instructor to continuously assess their understanding and offer feedback. "Verifying and clarifying student understanding" is essentially offering affirmative feedback to reasonable understandings, or corrective feedback to unreasonable understandings (Hogan and Pressley, 1997, pp. 18-19). For example, an instructor might affirm a student's understanding of inverse operations as opposites. She might then clarify the understanding of a student who has identified addition and multiplication as inverse operations.

Scaffolding techniques are used in conjunction with scaffolding instructional materials. These materials fit into one of the following categories: reception scaffolds, transformation scaffolds or production scaffolds (*A Scaffolding Strategy*, n.d., main page). Reception scaffolds help learners to effectively gather information from available

sources. They keep the learner's attention focused on important information, and they prompt the learner to organize and record what he or she sees. For example, a web-like graphic organizer called a concept map might be provided to students who are learning about the metric system (*A Scaffolding Strategy*, n.d., "Reception Scaffolds" page). The concept map prompts the students with focus questions, and provides them with a framework for organizing their answers. Whereas reception scaffolds help the student to identify structure already present in a given source, transformation scaffolds help the student to impose structure on information (*A Scaffolding Strategy*, n.d., "Transformation Scaffolds" page). For example, a child who is studying the metric system might be asked to classify metric units of length, mass and volume in different columns on a chart. The transformation scaffold is the blank chart, which prompts the student to categorize information logically. Finally, production scaffolds are tools that prompt the student to convey what they've learned in an effective way. For example, an instructor might prepare an outline or template to help her students organize their book reports (*A Scaffolding Strategy*, n.d., "Production Scaffolds" page). The three different kinds of scaffolds may either be integrated or used individually to support student learning.

With the right techniques and materials, an instructor can provide the temporary support that children need to grow intellectually. This instructional scaffolding allows children to reach levels of understanding and task mastery that would have been unattainable without it. Just as scaffolds help workers to complete difficult jobs, instructional scaffolding helps children to build solid understandings of challenging academic topics.

## **Usefulness of Instructional Scaffolding: Research and Theory**

Research shows that humans “come to formal education with a range of prior knowledge, skills, beliefs, and concepts that significantly influence” both how they view the world and how they “remember, reason, solve problems, and acquire new knowledge” (Bransford, Brown and Cocking, 2000, p. 10). Modern theories about how people learn new content and process are based on the idea that they “construct new knowledge based on what they already know and believe” (Bransford et al, 2000, p. 10). Instructional scaffolding is a teaching strategy that depends heavily on the idea that children come to any educational setting with a great deal of pre-existing knowledge. Some of this knowledge is naïve or incorrect, but it is the process of building on what a student already knows that makes scaffolding an effective instructional technique (Byrnes, 2001, pp. 34-36).

A great deal of the research and theory supporting instructional scaffolding as a teaching strategy comes from Lev Vygotsky’s work. As part of his social constructivist theory, Vygotsky introduced the notions of social interaction learning and the cognitive zone of proximal development. He rejected the Piagetian idea that children independently construct their understandings of the world. Rather, Vygotsky theorized, children’s learning must be guided and supported by adult modeling and corrective feedback (Byrnes, 2001, pp. 34-35).

Vygotsky describes two types of cognitive entities: concepts and functions. According to his theory, young children comprehend primarily spontaneous concepts, or pseudoconcepts. They might understand the name of a concept, but the criteria that they understand to define it are concrete and context specific (Byrnes, 2001, p. 34). For

example, a young child might identify the correct label for the concept of “dog,” but his defining criteria of “brown with white spots” are specific to his environment and experience. Older children, Vygotsky theorized, are capable of understanding scientific or “true” concepts, which include both a correct label and generalized defining criteria. Like the young child, an older child understands the concept of “dog.” However, the older child understands generalized, context-independent defining criteria like “has four paws and sharp canine teeth; pants to keep cool” (Byrnes, 2001, p. 34). In order to learn concepts, Vygotsky theorized that both young children and older children utilize five main cognitive functions: language, thinking, perception, attention and memory. He proposed that the integration of several or all of these cognitive functions in problem solving makes a learner successful, as compared to the unsuccessful learners who utilize only one or two cognitive functions in problem solving (Byrnes, 2001, p. 35).

Vygotsky believed that the primary goal of instruction is to lead children from their naïve understandings of spontaneous concepts to mature understandings of true concepts, through social interaction with both adults and other children (Byrnes, 2001, pp. 35-36). Unlike true constructivists, he insisted that social agents, such as adult tutors or more skilled peers, are absolutely essential to a child’s cognitive maturation (*Vygotsky and Social Cognition*, n.d., “Discussion,” part 9.). He theorized that a child’s thinking would forever remain on the level of spontaneous concepts without the influence of social agents (Byrnes, 2001, p. 36).

According to Vygotsky, academic tasks fall into one of three categories: those that the student can perform independently, those that the student cannot perform even with help from others, and those that the student can perform with help from others



(Dodge, n.d., “Scaffolding,” para. 1-3). A child is in the ideal cognitive state for learning when he is working on skills in the last category. Vygotsky called this state the zone of proximal development, or ZPD. In the zone of proximal development, the child is ready to grow cognitively (Dodge, n.d., “Scaffolding,” para. 1-3).

During cognitive growth, Vygotsky recognized that children master intellectual skills progressively. He noted that children who are just learning a skill make many mistakes and rely a great deal on assistance and feedback from their teachers (Byrnes, 2001, p. 37). Through practice and corrective adult feedback, children progress to higher and higher levels of understanding until they reach the expert level, at which point they can perform the skill or task independently. As the children progress, Vygotsky states that adult tutors must act as scaffolds: they must provide just enough guidance to allow the children to advance independently (Byrnes, 2001, p. 37).

Vygotsky identifies four phases of instructional scaffolding (Byrnes, 2001, p. 37). The first phase is modeling, with verbal commentary. The second phase is student imitation of the skill they’ve seen modeled by their instructor, including the commentary. During this phase, the instructor must constantly assess student understandings and offer frequent assistance and feedback. The third phase is the period when the instructor begins to remove her scaffolding. She offers progressively less assistance and feedback to her students as they begin to master new content and/or process. In phase four, the students have achieved an expert level of mastery. They can perform the new task without any help from their instructor (Byrnes, 2001, p. 37).

Vygotsky’s four phases of instructional scaffolding are somewhat idealized in theoretical texts, and are not as easily executed as the literature might suggest at first

glance. In order for the technique to be effective, Vygotsky suggests three important characteristics (Byrnes, 2001, p. 37). First, the teacher must be careful not to offer too much assistance for too long, at the risk of making students overly dependent rather than independent. Following the early stages of modeling, he suggests that teachers should start a problem and have the students finish it, or perhaps give hints when a student gets off track. The instructor should not, however, perform the task in its entirety for any student after the initial modeling phase is completed. Vygotsky's second characteristic of effective scaffolding is that the level of instruction should always be within the zone of proximal development and, therefore, challenging to the students (Byrnes, 2001, p. 37). Material presented at or below the child's level of mastery will bore her, while material presented well beyond the child's level of mastery will cause her to become frustrated and disengaged. In either case, no growth can occur. Lastly, Vygotsky believed that it is critically important for instructors to repeatedly confront their students with scientific concepts in order to prevent them from falling back on their naïve ideas of spontaneous concepts. As children are often reluctant to abandon their long held misconceptions, it is absolutely essential for instructors to adopt this form of repetition (Byrnes, p. 37).

When executed correctly, theory suggests that instructional scaffolding leads to a number of desirable educational outcomes. First, scaffolding children's learning allows them to reach levels of mastery that might be impossible for them to achieve without it. In line with Vygotsky's theory, the scaffolding provided by an instructor can elevate a child's understanding of a concept from the naïve level to the scientific level, whereas the child might never have progressed beyond a naïve understanding without adult intervention (Byrnes, 2001, pp. 34-37). In line with modern theory, effective scaffolding

should help students to achieve an expert level of understanding of a subject, characterized by organized and conditionalized knowledge of content, fluent retrieval and positive transfer (Bransford et al, 2000, pp. 31-48). Another desirable outcome of scaffolding student learning is the development of the students as independent learners (*Vygotsky and Social Cognition*, n.d., “How Vygotsky Impacts Learning”). Providing students with scaffolds such as graphic organizers, outline templates, note taking guides and strategies for remembering helps them not only with the task at hand, but also later on in their educational careers. The goal of any educator, in any subject, is to help students develop skills that will make them self-directed, self-regulated learners. Instructional scaffolding is the type of teaching strategy that contributes to this development. Finally, scaffolding student learning should result in elimination of problems such as disengagement and boredom (Byrnes, 2001, p. 37). If a teacher adjusts the level of instruction to meet her students in their zones of proximal development, she should find that the students are focused and able to stay on task.

Cognition theory provides a great deal of support for instructional scaffolding as a teaching strategy. Vygotsky makes frequent reference to scaffolding in his social constructivist theory, as do modern cognitive psychologists who have continued his work. It is well accepted among modern cognitive psychologists that children interpret and remember new content and process by building upon what they already know. According to Vygotsky’s social constructivist theory, children progressively develop mature understandings of various concepts with proper assistance from adults. These two fundamental ideas are the basis for the emergence of instructional scaffolding as a teaching strategy. Research and theory suggest that the educational outcomes of

scaffolding can be quite positive, particularly when the instructor is well prepared and aware of the theoretical basis for the technique.

## **Instructional Scaffolding: Advantages and Disadvantages**

Instructional scaffolding should be an extremely effective technique in practice, provided that it is executed effectively. Indeed, the more that I have learned about the technique, the more I am inclined to rename it “good teaching.” It simply makes sense to first show another person how to do something, help her as she is just learning to perform the task herself, and then send her off on her own once she’s learned to perform the task independently. Whether a more experienced tutor is teaching a child long division or training a new worker at a factory, instructional scaffolding should work.

Scaffolding is a particularly effective method to use with children in failing schools. Having suffered the pain and embarrassment of both past failures and a variety of personal problems, many of these children lack the confidence to apply themselves in school. They suffer severe anxiety in testing situations and typically claim that they do not understand before they even try a challenging problem.

Although it might not be consistent with a grade level standard, failing students have a zone of proximal development. There are things that they can do on their own, there are things that they cannot do even with the teacher’s help, and there are things that they cannot do on their own but can do with help. I have been told to meet failing children where they are. That is somewhat of an intangible idea, but now that I have learned Vygotsky’s specific criteria for the zone of proximal development, I have been quite successful in meeting children where they can do things with help from me.

Scaffolding is helpful to failing children both in terms of their cognitive development and in terms of self-efficacy and self-esteem. I model a skill, provide help and hints, and gradually fade from the scene. However, I have noticed that Vygotsky was

absolutely right in warning teachers against scaffolding pitfalls. First, I try to make sure that I keep instruction within the zone of proximal development. I do not worry about boring students who have already mastered a skill, but I try very hard not to go too fast or too far for students who are just learning. I figure that as long as I do not “lose” anyone, the more advanced students can use the practice and reinforcement. This leads to the fact that I absolutely rely on repetition. Unless we practice a given skill, the children either forget the skill or mix it up with another. I do everything I can to keep them from aligning their decimal points when they multiply, or from finding a common denominator when they divide fractions. I make reminder charts, I repeat my exact words on a skill to the point that they mimic me in chorus, and I often do silly things or make funny faces to plant a concept in their memories. I am also careful not to do too much for my students, which would only change them from disengaged to overly dependent learners. When they have trouble, I might model a similar problem or give them a key word. They see the model or process the word, remember how to do the problem, and do it themselves. Their confidence soars. I often say to the children, “you don’t even need my help; you are doing it all by yourself.”

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