Scaffolding as a Teaching Strategy

Rachel R. Van Der Stuyf

Adolescent Learning and Development

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I. **Scaffolding as a Teaching Strategy – Definition and Description**

Scaffolding instruction as a teaching strategy originates from Lev Vygotsky’s sociocultural theory and his concept of the *zone of proximal development* (ZPD). “The zone of proximal development is the distance between what children can do by themselves and the next learning that they can be helped to achieve with competent assistance” (Raymond, 2000, p. 176). The scaffolding teaching strategy provides individualized support based on the learner’s ZPD (Chang, Sung, & Chen, 2002). In scaffolding instruction a more knowledgeable other provides scaffolds or supports to facilitate the learner’s development. The scaffolds facilitate a student’s ability to build on prior knowledge and internalize new information. The activities provided in scaffolding instruction are just beyond the level of what the learner can do alone (Olson & Pratt, 2000). The more capable other provides the scaffolds so that the learner can accomplish (with assistance) the tasks that he or she could otherwise not complete, thus helping the learner through the ZPD (Bransford, Brown, & Cocking, 2000).

Vygotsky defined scaffolding instruction as the “role of teachers and others in supporting the learner’s development and providing support structures to get to that next stage or level” (Raymond, 2000, p. 176). An important aspect of scaffolding instruction is that the scaffolds are temporary. As the learner’s abilities increase the scaffolding provided by the more knowledgeable other is progressively withdrawn. Finally the learner is able to complete the task or master the concepts independently (Chang, Sung, & Chen, 2002, p. 7). Therefore the goal of the educator when using the scaffolding teaching strategy is for the student to become an independent and self-regulating learner and problem solver (Hartman, 2002). As the learner’s knowledge and learning competency increases, the educator gradually reduces the supports provided (Ellis, Larkin, Worthington, n.d.). According to Vygotsky the external scaffolds
provided by the educator can be removed because the learner has developed “…more sophisticated cognitive systems, related to fields of learning such as mathematics or language, the system of knowledge itself becomes part of the scaffold or social support for the new learning” (Raymond, 2000, p. 176).

Caregivers help young children learn how to link old information or familiar situations with new knowledge through verbal and nonverbal communication and modeling behaviors. Observational research on early childhood learning shows that parents and other caregivers facilitate learning by providing scaffolds. The scaffolds provided are activities and tasks that:

- Motivate or enlist the child’s interest related to the task
- Simplify the task to make it more manageable and achievable for a child
- Provide some direction in order to help the child focus on achieving the goal
- Clearly indicate differences between the child’s work and the standard or desired solution
- Reduce frustration and risk
- Model and clearly define the expectations of the activity to be performed (Bransford, Brown, and Cocking, 2000).

The activities listed above are also detailed in the Executive Summary of the Research Synthesis on Effective Teaching Principles and the Design of Quality Tools for Educators, which refers to these as “…Rogoff’s six characteristics of scaffolded instruction” (Ellis, Larkin, Worthington, Principle 5 section, para. 2).

In the educational setting, scaffolds may include models, cues, prompts, hints, partial solutions, think-aloud modeling and direct instruction (Hartman, 2002). In Teaching Children and Adolescents with Special Needs the authors provided an example of a procedural facilitator (hint, cue-card, partially completed example). When trying to teach the math skill of rounding, a
teacher may list, “...the steps of rounding hundreds beginning with the first step of ‘1. Look at the number in the ten’s position’, (this) provides hints to the students” (Olson and Platt, 2000, p.180). This cue prompts the students to complete the next step of the task. Educators may also use questions as scaffolds to help students solve a problem or complete a task. Teachers may increase the level of questioning or specificity until the student is able to provide a correct response. This type of scaffold is reflected in the following excerpt, “…if you receive no response or an incorrect response after asking the question, “How do we change lady to ladies?” you should proceed with a more intrusive verbal prompt: “What is the rule?” to remind the student that there is a rule. If necessary, continue with “What do we do when a word ends in y to make it plural?” to give the student a part of the rule” (Olson and Platt, 2000, p.186). As the student develops his or her ability with applying the rule, the number and intrusive nature of the questions would be decreased until the student can do the task without prompting.

Following the use of teacher provided scaffolds, the educator may then have the students engage in cooperative learning. In this type of environment students help students in small group settings but still have some teacher assistance. This can serve as a step in the process of decreasing the scaffolds provided by the educator and needed by students (Hartman, 2002).

Teachers have also used scaffolding to engage students in research work and learning. In this context, scaffolding facilitates organization of and focus for students’ research (McKenzie, 1999). The structure and clearly defined expectations are the most important component of scaffolding in this context. The teachers provide clarity and support but the students construct the final result through their research. In a chapter on scaffolding, Scaffolding for Success, Jamie McKenzie provides a visual image analogy of how scaffolding works, “The workers cleaning the face of the Washington Monument do not confuse the scaffolding with the
monument itself. The scaffolding is secondary. The building is primary.” (McKenzie, 1999, Matters of Definition section, para. 6). He goes on to describe eight characteristics of scaffolding. The first six describe aspects of scaffolding instruction. The last two refer to outcomes resulting from scaffolding and are therefore presented in a later section of this paper. According to McKenzie scaffolding:

1. Provides clear direction and reduces students’ confusion – Educators anticipate problems that students might encounter and then develop step by step instructions, which explain what a student must do to meet expectations.

2. Clarifies purpose – Scaffolding helps students understand why they are doing the work and why it is important.

3. Keeps students on task – By providing structure, the scaffolded lesson or research project, provides pathways for the learners. The student can make decisions about which path to choose or what things to explore along the path but they cannot wander off of the path, which is the designated task.

4. Clarifies expectations and incorporates assessment and feedback – Expectations are clear from the beginning of the activity since examples of exemplary work, rubrics, and standards of excellence are shown to the students.

5. Points students to worthy sources – Educators provide sources to reduce confusion, frustration, and time. The students may then decide which of these sources to use.

6. Reduces uncertainty, surprise, and disappointment – Educators test their lessons to determine possible problem areas and then refine the lesson to eliminate difficulties so that learning is maximized (McKenzie, 1999).
Scaffolded instruction is also employed in problem based learning environments.

“Problem-based learning (PBL) is an educational approach that challenges students to "learn to learn".” (Ngeow and Yoon, 2001, p. 1). In this type of classroom the teacher must assess the activities that the students can perform independently and what they must learn to complete the task. The teacher then, “…designs activities which offer just enough of a scaffold for students to overcome this gap in knowledge and skills.” (Ngeow and Yoon, 2001, p. 2). The authors also describe several of same scaffolding activities or characteristics that were presented by Bransford, Brown and Cocking and McKenzie thus illustrating scaffolding’s applicability to various educational settings.

II. Scaffolding – Related Theory, Theorists, and Research

Scaffolding instruction as a teaching strategy originates from Lev Vygotsky’s sociocultural theory and his concept of the zone of proximal development (ZPD). Lev Vygotsky was a Soviet psychologist whose works were suppressed after his death in the 1930s and were not discovered by the West until the late 1950s (“Lev Vygotsky’s archive,” n.d.). His sociocultural theory proposes that social interaction plays a fundamental role in the development of cognition. (“Social Development Theory,” n.d.). Vygotsky “…theorized that learning occurs through participation in social or culturally embedded experiences.” (Raymond, 2000, p. 176). In Vygotsky’s view, the learner does not learn in isolation. Instead learning is strongly influenced by social interactions, which take place in meaningful contexts. Children’s social interaction with more knowledgeable or capable others and their environment significantly impacts their ways of thinking and interpreting situations. A child develops his or her intellect through internalizing concepts based his or her own interpretation of an activity that occurs in a social
setting. The communication that occurs in this setting with more knowledgeable or capable others (parents, teachers, peers, others) helps the child construct an understanding of the concept (Bransford, Brown, & Cocking, 2000). The communication helps the child develop inner or egocentric speech. The inner speech is abbreviated speech for oneself that eventually directs personal cognitive activities. Inner speech is developed as the adult initially models a cognitive process and communicates the steps as in “think-aloud” modeling. “…Over time and through repeated experiences, the child begins to internalize, and assumes responsibility for the dialogical actions, (i.e. it becomes a “private speech” spoken aloud by the child to direct personal cognitive activity).” (Ellis, Larking, Worthington, n.d., Principle 5 Research section, para.3). In subsequent similar activities the amount and or type of modeling and guidance provided by the more knowledgeable other will be reduced until the child is able to complete the activity without these supports or scaffolds, the child’s inner speech would now be directing the child’s activities. (“Four Stage Model,” n.d. and Jaramillo, 1996).

The second foundation for scaffolding instruction is Vygotsky’s concept of the zone of proximal development (ZPD). The ZPD “…is that area between what a learner can do independently (mastery level) and what can be accomplished with the assistance of a competent adult or peer (instructional level)” (Ellis, Larkin, Worthington, n.d. Principle 5, Research section, para.1). Vygotsky believed that any child could be taught any subject effectively using scaffolding techniques by applying the scaffolds at the ZPD. “Teachers activate this zone when they teach students concepts that are just above their current skills and knowledge level, which motivates them to excel beyond their current skills level” (Jaramillo, 1996, p. 138). Students are guided and supported through learning activities that serve as interactive bridges to get them to the next level. Thus the learner develops or constructs new understandings by elaborating on
their prior knowledge through the support provided by more capable others (Raymond, 2000). Studies have actually shown that in the absence of guided learning experiences and social interaction, learning and development are hindered (Bransford, Brown, and Cocking, 2000).

Modern research continues to find that scaffolding is an effective teaching strategy. Two recent studies regarding the use of inscriptions for teaching scientific inquiry and experimentation (external representations – graphs, tables, etc.) found that the use of external representations, representational scaffolds, can serve as an effective strategy for teaching these scientific skills. In one study the instructional goal was to teach fourth graders valid experimentation skills. During the first part of the study a teacher-specified table of variables was the scaffold provided. Students had to select the appropriate variable related to their experiment. The results of this part of the study led to the conclusion that the “… use of the pre-developed table representation may have helped students abstract the overall structure of the experiment and thus aided their understanding of the design…” (Toth, Results and Discussion section, para. 1). The teacher designed table helped focus the learners’ thinking on only those items that were important for the task. Additionally through the use of the table it became obvious to the students if they had omitted an important variable from their experiment. This helped the students learn what things must be considered when designing an experiment (Toth, n.d.).

In the second study, “… the effects of two different external representations (evidence mapping vs. prose writing)…” were evaluated in research with ninth grade students (Toth, n.d., Representational scaffolding while coordinating data with theories section, para. 1). Students used either a software tool or prose writing to record their thinking during a problem-based-learning activity in which they had to find a solution to a scientific challenge. The software tool
provided epistemological categories linked with unique shapes. The students that used the software had to categorize the information they were evaluating by selecting the appropriate shape and entering the information into the shape. The students in the prose writing group just documented their thinking by writing. One finding of the study was that the students who used the software tool correctly categorized more of the information as hypothesis and data than those students in the prose writing groups. The correct categorization of information was attributed to “…the effect of the mapping representation that scaffolded students’ categorization efforts” (Toth, n.d., Results and Discussion section, para. 1). Eva Toth concluded from the research that the use of “…teacher-developed table representations was found to scaffold students’ progress of inquiry by making the variables of an experiment salient and by perceptually constraining the students’ attention to abstract the characteristics of correct experimentation” (Toth, n.d. Conclusion and Educational Significance section, para. 1). She also concluded that the evidence mapping, which used the software tool that scaffolded students’ thinking and categorization efforts, was a “…successful instructional methodology to teach how to categorize and label scientific information and to teach students how to evaluate hypotheses based on empirical data.” (Toth, n.d., Conclusions and Educational Significance section, para. 2). The study also found that the use of explicit rubrics supported the scaffolding effect.

Kuo-En Chang, Yao-Ting Sung, and Ine-Dai Chen conducted a study to test the learning effects of three concept-mapping methods on students’ text comprehension and summarization abilities and “…to determine how students can most effectively learn from concept mapping” (Chang, Chen, & Sung, 2002, p. 8). For the study three concept-mapping methods were designed “…with varying degrees of scaffolding support, namely, map construction by correction (with constant and highest degree of scaffolding), by scaffold fading (with gradually
removed scaffolding), and by generation (with the least scaffolding)” (Chang, Chen, & Sung, 2002, p. 19). The 7 week study was conducted with 126 fifth grade students that were randomly assigned to 4 groups, one for each concept mapping method and a control group. Both pre- and post- text comprehension and summarization tests were administered to evaluate the students’ abilities. Each group received the same reading materials and training on concept mapping. The map correction group was given a partially revised expert generated concept map that included some incorrect information. The students had to read the provided materials before correcting the errors in the map. The instruction for the scaffold-fading group consisted of the following: “…(a) read an expert concept map, (b) fill in the blanks of the expert concept map (with whole structure), (c) complete the partial expert concept map (with partial structure), (d) construct the concept map using the given concepts and relation links, and (e) determine the key concepts and relation links from the text to construct the concept map” (Chang, Chen, & Sung, 2002, p.10). Only the reading materials were provided to the students in the map generation group.

The study results showed that the map-correction group performed better on the text comprehension and text summarization posttests than did the scaffold-fading or other groups. It also found that the scaffold-fading group performed much better than the map-generation and control groups on the text summarization posttest but showed no significant difference on the text comprehension posttest (Chang, Chen, & Sung, 2002). The authors explain that the students in the map-correction group performed better because the map-correction scaffolding provided a content framework for and a reminder of the content in the text. The authors go on to explain that the finding regarding the scaffold fading group was not consistent with the findings of “…Day and Cordon (1993) and Kao (1996) that the scaffolding instruction method had better direct and transferring effects than general teaching methods…”(Chang, Chen, & Sung, 2002, p.
They cite two factors that may have affected the outcome of their study and generated the inconsistent findings. First, they state that, “… the operations performed after the scaffolding was removed may still have been too difficult for elementary school students” and secondly there “…may have been the lack of sufficient time for training” (Chang, Chen, & Sung, 2002, p. 20).

They conclude that the scaffolds provided by the map-correct method (framework and partial information) seem “…to be a more suitable way for conducting concept mapping for elementary students” (Chang, Chen, & Sung, 2002, p. 19) than the other methods, scaffold-fading or map generation. However any form of concept mapping (scaffolding) “…may serve as a useful graphic strategy for improving text learning” (Chang, Chen, & Sung, 2002, p. 21).

Scaffolding instruction guides the learner to independent and self-regulated competence of skills. This occurs when the learner’s inner speech occurs on an automatic, unconscious level (Ellis, Larkin, Worthington, n.d.). In addition to improving learners’ cognitive abilities, scaffolding instruction in the context of classroom learning and student research:

1. Delivers efficiency – Since the work is structured, focused, and glitches have been reduced or eliminated prior to initiation, time on task is increased and efficiency in completing the activity is increased.

2. Creates momentum – Through the structure provided by scaffolding, students spend less time searching and more time on learning and discovering, resulting in quicker learning (McKenzie, 1999).

### III. Advantages and Disadvantages of Scaffolding

One of the primary benefits of scaffolding instruction is that it engages the learner. The learner does not passively listen to information presented instead through teacher prompting the learner
builds on prior knowledge and forms new knowledge. In working with students who have low self-esteem and learning disabilities, it provides an opportunity to give positive feedback to the students by saying things like “…look what you have just figured out!” This gives them more of a can do versus a “this is too hard” attitude. This leads into another advantage of scaffolding in that if done properly, scaffolding instruction motivates the student so that they want to learn. Another benefit of this type of instruction is that it can minimize the level of frustration of the learner. This is extremely important with many special needs students, who can become frustrated very easily then shut down and refuse to participate in further learning during that particular setting.

Scaffold instruction is individualized so it can benefit each learner. However, this is also the biggest disadvantage for the teacher since developing the supports and scaffolded lessons to meet the needs of each individual would be extremely time-consuming. Implementation of individualized scaffolds in a classroom with a large number of students would be challenging. Another disadvantage is that unless properly trained, a teacher may not properly implement scaffolding instruction and therefore not see the full effect. Scaffolding also requires that the teacher give up some of the control and allow the students to make errors. This may be difficult for teachers to do. Finally the teachers’ manuals and curriculum guides that I have been exposed to do not include examples of scaffolds or outlines of scaffolding methods that would be appropriate for the specific lesson content. Although there are some drawbacks to the use of scaffolding as a teaching strategy the positive impact it can have on students’ learning and development is far more important.
References:


Four-Stage Model of ZPD. (No date). North Central Regional Educational Laboratory. Retrieved October 12, 2002 from http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1zpda.htm


