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ABSTRACT

In theory, effective thinking is a trait that is valued by schools at all levels; however, it is a skill that is very rarely taught. Teaching thinking skills explicitly and embedding them into a literacy curriculum can help students become more effective critical and creative thinkers. This article defines thinking skills, describes how they should be taught using the elements of effective skills instruction, and describes 18 specific critical and creative thinking skills that can be used across the curriculum at any level. (Contains 10 references and a figure that outlines 10 critical thinking and 8 creative thinking skills.) (Author/RS)

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## Using Thinking Skills to Enhance Learning.

by Andrew P. Johnson

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**ABSTRACT**

In theory, effective thinking is a trait that is valued by schools at all levels; however, it is a skill that is very rarely taught. Teaching thinking skills explicitly and embedding them into a literacy curriculum can help students become more effective critical and creative thinkers. This article defines thinking skills, describes how they should be taught using the elements of effective skills instruction, and describes 18 specific critical and creative thinking skills that can be used across the curriculum at any level

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## Using Thinking Skills to Enhance learning

This article is to (a) define thinking skills; (b) describe how they should be taught; and (c) demonstrate how they can be embedded in any reading or literacy curriculum.

### Defining Thinking Skills

A thinking skill is any cognitive process broken down into a set of explicit steps which are then used to guide thinking (Johnson, 2000b). For example, making inferences or inferring is a cognitive process that is included in many state standards. Inferring is a thinking process that helps one integrate observed clues with background knowledge in order to make an informed guess or prediction. To teach students to how make inferences, this process needs to first be broken it into the following steps: (a) identify the question or point of inference, (b) identify what is known or observed, (c) identify related knowledge that is relevant, and (d) make a reasoned guess based on b and c.

There are three terms that are related to thinking skills but are actually quite different: high level thinking, complex thinking, critical thinking. Each of these is described below.

#### ***High Level Thinking***

High level thinking is a cognitive operation that places high demands on the processing taking place in short term memory. In looking at Bloom's Taxonomy, these are the kinds of thinking process that take place at the top: evaluation, synthesis, and analysis. However, students do not benefit from being exposed to high level thinking tasks unless there is explicit instruction first. Students who are already fairly adept at high level thinking might be able to do this easily while other students will probably become frustrated. Unfortunately, this is what often happens under the guise of developing high level thinking: Teachers simply present high level tasks. In these situations there is no actual teaching, very little learning, and a great deal of student frustration.

Thinking skills instruction, on the other hand, makes learning this cognitive process fairly simple by making it a thinking skill. If you want students to be able to compare and contrast, you must first break this cognitive process into the following steps: (a) Look at the whole, (b) find the similarities, (c) find the differences, and (d) describe. Then, teach it using explicit instruction. With instruction, high level thinking becomes relatively easy. This is the major premise of thinking skills instruction: You make complicated things easy by breaking them into parts and teaching them explicitly.

#### ***Complex Thinking***

Complex thinking is a cognitive processes that involves many steps or parts. The difference between high level thinking and complex thinking sometimes is very slight. The best example of complex thinking is the thinking process that takes place when planning a lesson for a classroom. Here one has to (a) define the information or skill to be taught, (b) organize the knowledge or break the skill into manageable parts, (c) decide how to convey this knowledge or teach the skill to students at a level they can understand and in a manner that will keep them focused, (d) create active involvement (e) consider a variety of learning modes, (f) attend to individual differences, (g) manage student behaviors, and (h) design an activity to reinforce the skill or concept. These processes, of course, vary with the teacher and the situation.

In undergraduate teacher methods courses, students often struggle when they are first asked to design lessons. Indeed, it is not reasonable to expect them to know how to engage in the

kinds of complex thinking needed to adequately design learning experiences without providing them explicit instruction. Thus, lesson plan design should be broken into a few well-defined steps and taught explicitly (Johnson, 2000a). In this way, it becomes a thinking skill and thus, allows students to master this type of complex thinking more quickly and with less frustration.

### ***Critical Thinking***

Critical thinking is a type of thinking that converges on a single thought or entity. Here one must organize, analyze, or evaluate information, all of which could become a thinking skill if they were broken into parts and taught explicitly. The opposite of critical thinking is creative thinking. This is thinking that diverges from a single point or entity. Here one must generate, synthesize, find alternatives, adapt, substitute, or elaborate. Each of these operations could also become thinking skills if they were broken into parts and taught explicitly. It is only by teaching thinking skills that we help students to become better critical and creative thinkers.

### **Thinking Skills and Thinking Frames**

Examples of ten critical thinking skills and eight creative thinking skills and their corresponding thinking frames can be seen in Figure 1. A thinking frame is a concrete representation of a particular cognitive process broken down into specific steps and used to support the thought process (Perkins, 1986). These are used to initially guide students' thinking as they are learning a thinking skill. Thinking frames can be effectively constructed in poster form and placed in the classroom for teaching and easy review.

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Figure 1 about here

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### **Teaching Thinking Skills**

Thinking skills will be of little use if they are not taught in a manner in which students can understand and learn to use them. Effective skills instruction of any kind incorporates four components: identification of the procedural components, direct instruction and modeling, guided practice, and independent practice (Johnson, 1999; Pressley, Harris, & Marks, 1992). Each of these are described below.

1. *Identification of the Procedural Components.* First, students are introduced to the skill and the specific steps involved are identified. When teaching a thinking skill, this is where students are introduced to the thinking frame used to guide students' thinking during the other steps.

2. *Direct Instruction and Modeling.* Next, the teacher gives explicit instruction as to how the skill might be used and models it by thinking out loud while going through each step. This element, which is used to provide students with an overview, should be relatively brief.

3. *Guided Practice.* Guided practice is sometimes referred to as scaffolded instruction (Johnson & Graves, 1997; Rosenshine & Meister, 1992). The goal is to provide the support necessary for students to use the skill independently. Here, the teacher takes the whole class through each step of the skill several times.

4. *Independent Practice.* The teacher designs an activity so students can practice the skill independently. This may include homework. If the first three components have been taught effectively, students should be able to complete this with 95% -100% success ratio (Brophy, 1986). Independent practice is not meant to be challenging. It is meant to practice those skills already covered in class.

***Regular Practice, Review, and Integration.***

Like any skill, students need to revisit and review it even after it becomes part of their cognitive repertoire. Regular practice allows for efficiency and automaticity. Depending on age and ability, it might take as few as one lesson or as many as ten lessons for students to learn a new thinking skill and be able to use it independently. Also, the new thinking skill should be integrated through the curriculum wherever possible. This allows the teacher to provide regular practice, enhance all curriculum areas, raise the level of thinking, augment learning, and create a more interesting and student-centered learning environment.

Depending on the level of the students, teachers should identify four to ten thinking skills to incorporate into their classroom each year. It is most effective to focus on one skill at a time and use it in a variety of situations and settings. It is appropriate to spend anywhere from two weeks to a month on a single skill. Continue to review and use past thinking skills throughout the year.

**The Final Word**

Effective thinking is a trait valued in theory by schools at all levels; however, it is something which is rarely given a great deal of attention in practice (Gardner, 1991). Research indicates that while levels of basic skills have remained consistent or shown a slight increase, students are not acquiring effective thinking strategies (Mullis & Jenkins, 1990). If students are to learn higher and more complex ways of thinking, it makes sense that thinking skills instruction be examined as a potential tool to use in enhancing the curriculum. In other words, if we want students to be proficient thinkers, we must teach them how. This article contains just some of the many examples of how thinking skills might be embedded into a reading curriculum or used with any story to enhance thinking.

### References

- Brophy, J. (1986). Teacher influences on student achievement. *American psychologist*, 41, 1069-1077.
- Gunning, T. (1996). *Creating literacy instruction for all children* (3<sup>rd</sup> ed.). Needham heights, MA: Allyn and Bacon.
- Johnson, A. (2000a). It's time for Madeline Hunter to go. *Action in Teacher Education*, 22, 72-78.
- Johnson, A. (2000b). *Up and out: Using creative and critical thinking skills to enhance learning*. Needham Heights, MA: Allyn and Bacon.
- Johnson, A. (1999). Effective lesson planning for effective skills instruction. *Journal of Reading Education*, 24, 15-19.
- Johnson, A. & Graves, M. (1997). Scaffolding: A tool for enhancing the reading experience of all students. *Texas Journal of Reading*, 3, 23-30.
- Mullis, I.V. & Jenkins, L.B. (1990). *The reading report card. 1971-1988: Trends from the nation's report card*. Princetone, NJ: National Assessment of Educational Progress, Educational Testing Service.
- Perkins. D.N. (1986). Thinking frames. *Educational Leadership*, 42, 4-10.
- Pressley, M., Harris, K.R., & Marks, M.B. (1992). But good strategy users are constructivists! *Educational Psychology Review*, 4, 3-31.
- Rosenshine, R., & Meister, C. (1992). The use of scaffolds for teaching higher-level cognitive strategies. *Educational Leadership*, 49, 26-33.

*Figure 1. Critical and creative thinking skills.*

### **Critical Thinking Skills**

Critical or convergent thinking has to do with organizing, analyzing, evaluating, or describing what is already there. This type of thinking generally leads the thinker toward a specific conclusion. Critical thinking compliments creative thinking. Ten critical thinking skills are outlined here.

<p>1. Inferring: The student will go beyond the available information to identify what may reasonably be true. <u>Thinking Frame</u> A. Identify what is known. B. Identify similar situations. C. Make a reasonable guess based on A and B.</p> <p>2. Compare: Given two or more items, students will find their similarities. <u>Thinking Frame</u> 1. Look at all items. 2. Brainstorm attributes of each. 3. Conclude and describe.</p> <p>3. Compare and Contrast: Given two or more items, the student will find their similarities and differences. <u>Thinking Frame</u> A. Look at all items. B. Find the similarities. C. Find the differences. D. Conclude and describe.</p> <p>4. Analyze: Students will break an item or event down into its component parts. <u>Thinking Frame</u> A. Look at the item or event. B. Find important parts. C. Describe each part.</p> <p>5. Supporting a Statement: Students will use appropriate reasons, detail, or examples to support a statement or conclusion. <u>Thinking Frame</u> A. Make a statement or claim. B. Gather information to support the statement. C. Organize the information. D. Describe the original statement in terms of the new information.</p>	<p>6. Decision-Making: Students will examine the options and alternatives in order to decide on a course of action. <u>Thinking Frame</u> A. Identify the problem or decision. B. Generate options. C. Evaluate costs and rewards of options. D. Make a choice based on the above.</p> <p>7. Ordering: Given a criterion, students will arrange events, concepts, or items in sequential order based on that criterion. <u>Thinking Frame</u> A. Look at or define a criterion. B. Look at the whole. C. Arrange items within the whole according to the criteria. D. Describe the whole in terms of the new order.</p> <p>8. Evaluation/Critique: The student will make a formal evaluation based on a set of criteria. <u>Thinking Frame</u> A. Look at or define a criterion. B. Look at the subject. C. Compare the subject to the criteria. D. Describe the subject relative to the criteria.</p> <p>9. Creating Groups: Students will impose order on a field by identifying and grouping common themes or patterns. <u>Thinking Frame</u> A. Look at the whole. B. Identify reoccurring items, themes, or patterns. C. Arrange into groups. D. Describe the whole in terms of groups</p> <p>10. Investigation: The student will find information to answer a question. <u>Thinking Frame</u> A. Ask question. B. Collect data. C. Organize data. D. Answer question.</p>
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## Creative Thinking Skills

Creative or divergent thinking has to do with generating ideas, integrating ideas, or seeing things in new ways. Creative thinking compliments critical thinking. Eight creative thinking skills are outlined here.

<p>1. Fluency: (brainstorming) The student will create the greatest number of ideas without regard to evaluation. <u>Thinking Frame</u> A. Look at the idea. B. Add as many ideas as quickly as you can.</p> <p>2. Flexibility: The student will create a variety of different approaches. <u>Thinking Frame</u> A. Look at the original. B. Find other ways for it to be used, solved, or applied.</p> <p>3. Elaboration: The student will embellish it with an original idea. <u>Thinking Frame</u> A. Look at the idea. B. Add things to it to make it better or more interesting.</p> <p>4. Originality: The student will produce ideas that are unusual or unique. <u>Thinking Frame</u> A. Find it an idea or problem. B. Think of solutions or applications that nobody else has thought of before.</p>	<p>5. Creative Problem Solving (CPS): Give a problem, student will generate solutions. <u>Thinking Frame</u> A. Look at the problem. B. Brainstorm solutions. C. Pick one solution. D. Elaborate, embellish, and refine.</p> <p>6. Integrate: The student will connect or combine two or more things to form a new whole. <u>Thinking Frame</u> A. Look at both wholes. B. Select interesting or important parts. C. Combine to describe a new whole.</p> <p>7. Web and Brainstorm: The student will create a web to generate ideas relative to a given topic. <u>Thinking Frame</u> A. Look at the original ideas. B. Find 2-5 sub-ideas. C. Brainstorm on each subheading. D. Describe.</p> <p>8. Generate Relationships: The student will find related items or events. <u>Thinking Frame</u> A. Look at the item or event. B. Generate attributes. C. Find items or events with similar or related attributes. D. Describe the relationship.</p>
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