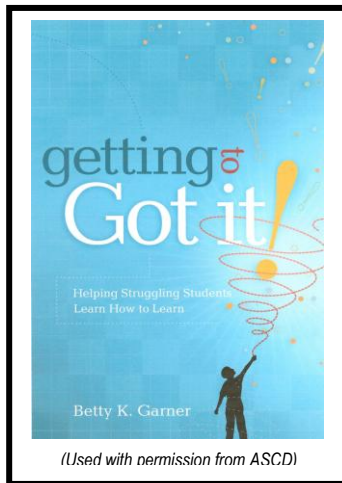


## Getting to “Got It!” – Helping Struggling Students Learn How to Learn

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It's one of the great mysteries of teaching: **Why do some students “get it” and some don't?** In this book, Dr. Garner focuses on *why* students struggle and what teachers can do to help them become self-directed learners. Difficulty reading, remembering, paying attention, following directions, or behaving appropriately are not the *reasons* students fail but *symptoms* of the true problem: underdeveloped cognitive structures—the mental processes necessary to connect new information with prior knowledge; organize information into patterns and relationships; formulate rules that make information processing automatic, fast, and predictable; and abstract generalizable principles that allow them to transfer and apply learning.

**Study Guide Questions for each chapter are available at [www.ASCD.org](http://www.ASCD.org)**

### **Cognitive Structures -- Overview**

**Cognitive structures are the basic mental processes used to make sense of information.** Cognitive structures can also be called cognitive tools, mental structures, patterns of thought, or “ways of thinking.” Cognitive structures are interconnected psychological systems that equip us to learn how to learn; to effectively gather, organize, and evaluate information; to “figure out how to figure out” as independent learners.

**Cognitive structures are developed through reflective awareness and visualization.** Cognitive structures develop **metability** – the dynamic of learning, creating, and changing.

*Cognitive structures are so basic that we take them granted and assume everyone has them. It is hard for those who have cognitive structures to comprehend what it is like not to have them. People who have poorly developed cognitive structures are difficult to work with because they do not see relationships or notice the obvious. They are also unaware that they do not have the cognitive structures.*

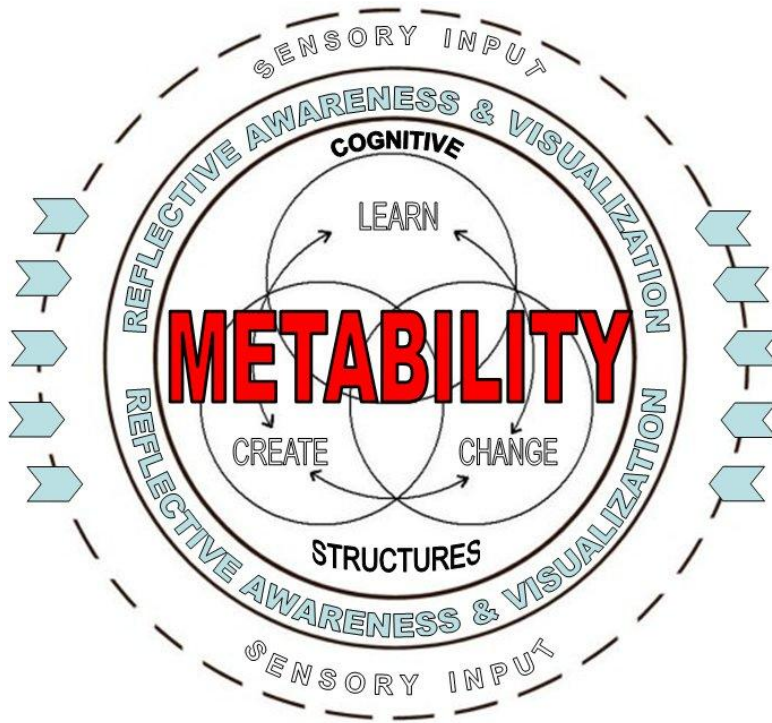
### **Two Things to Remember about Cognitive Structures**

**1. It is never too late to develop cognitive structures.** From infancy through old age, everyone who has the neurological capacity to communicate can develop cognitive structures.

**2. Cognitive structures have to be developed by each individual for him/her self.** Cognitive structures cannot be directly taught to someone. However parents and teachers can provide learning opportunities and mediation that stimulate the reflective awareness and visualization that develop cognitive structures.

### **Main Idea Of Seminar**

**Learning is created by the learner. Our job as facilitators is to equip students by helping them develop effective cognitive structures to make sense of information on their own and develop their metability.**



## How We Make Meaning

- Senses gather data – input from outside to inside
- Reflective awareness and visualization transform data into mental representation.
- Cognitive structures process information for meaning and equip us to **learn how to learn** by developing METABILITY.
- METABILITY is the dynamic process of learning, creating, changing.

## How Cognitive Structures Process Information

1. **Make connections with prior knowledge and experience**, to bridge from the known to the unknown. The kinds of connections are unique to each individual.
2. **Compare and analyze information to find patterns and relationships** and to organize data for access and application. Patterns are made up of repeated motifs or units.  
Relationships are logical and natural associations between any two or more things.  
All learning is based on relationships of parts to each other and parts to the whole. Organizing data makes it accessible and usable.
3. **Identify rules that speed up thinking by making the processing predictable, fast and automatic.** Noticing repeated patterns to formulate rules is more effective than memorizing textbook rules.
4. **Abstract (pull out) general principles that apply to many different situations.** This makes it possible to transfer and apply learning to contexts other than the one in which it was learned.

**Make connections**



**Find patterns & relationships**



**Identify predictable rules**



**Abstract general principles to transfer and apply information**

## Getting to “Got It!”

**Chapter 1: Sensory input** – The mind can only process information that is gathered through the senses. Take the time to suspend judgment and input as much data as possible – e.g., do “see/notice” activity before explaining; have students spell word before trying to sound it out; have students read all parts of a problem and use plan to identify elements, operations, and question being asked.

**Reflective Awareness:** conscious perception. *Conscious* = mindfully attentive of oneself as a thinking, feeling person. *Perception* = mentally taking hold or grasping something, assigning meaning to it.

DOTS -- Fold a paper in half ; Place 7 dots, randomly placed on top half of paper. Person receiving paper makes design/picture using dots as anchor points of the drawing (**be creative! – don’t just connect the dots**). Analyze your thinking from when you first looked at the dots – what happened in your head as you processed the information and did activity. **Write list of your thinking step by step (at least 10 things).**

**Visualization:** the ability to mentally represent and manipulate information, ideas, feelings, and sensory experiences. Essential for comprehension, planning, behavior control, computations, motivation, goal-setting, etc.

- ❖ Close your eyes and picture **what happens in your mind when you are trying to solve a problem** or make sense of something unfamiliar. (reflect for a couple minutes) **draw or write description.**

**Cognitive structures:** mental tools (3 categories – comparative, symbolic, logical) needed to process information to make sense and to develop **metability** – the dynamic process of learning, creating, and changing.

**Chapter 2 Recognition:** ability to identify a match or fit between two or more pieces of information.

- ❖ Mental “ticklers”- string of letters and/or numbers – see how your mind decodes to make meaning –  
Tehrpnjrenbahmpnnsr      $e^x \cos^2 x + e^x \sin^2 x = e$

**Chaper 3 Memorization:** ability to store and recall (access) information. **Memory tools:**

<ul style="list-style-type: none"> <li>• Acrostics</li> <li>• Application</li> <li>• Cartooning</li> <li>• Chunking</li> <li>• Classification</li> <li>• Context – time &amp; space</li> <li>• Dance</li> <li>• Designs</li> <li>• Emotions</li> </ul>	<ul style="list-style-type: none"> <li>• Graphics</li> <li>• Hand movements</li> <li>• Integration of content</li> <li>• Kind &amp; quality of data</li> <li>• Mnemonics</li> <li>• Multi-sensory input</li> <li>• Music</li> <li>• Patterns</li> <li>• Reflection</li> </ul>	<ul style="list-style-type: none"> <li>• Relevance</li> <li>• Repetition</li> <li>• Rhyme</li> <li>• Rhythm</li> <li>• Sequencing</li> <li>• Signals</li> <li>• Tactile – hand-on</li> <li>• Values &amp; beliefs</li> <li>• Visualization</li> </ul>
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- ❖ Factors that affect memorization (and all the other cognitive structures): sensory input, quality of information, level of understanding, prior knowledge and experience, values, beliefs, feelings, repetition, application.

**Chapter 4 Conservation of Constancy:** **ability to understand how some attributes of a thing can change while others stay same.** This cognitive structure is so fundamental for learning that we find it difficult to believe that students cannot “see” the obvious. Although many students come to us without conservation of constancy, we have to accept them where they are.

- ❖ Each person identify conservation activity for -- amount, length, volume, weight, number, area
- ❖ Each person identify a concept in each content area and how conservation of constancy is embedded and/or needed -- **Mathematics, Social Studies, Science, Music, Art, Physical Education, Religion/Philosophy, Language Arts (Reading, Writing, Spelling, Grammar, Literature)etc.**

**Chapter 5 Classification** – ability to identify, compare, and order information or data to create meaning based on relationships of parts to each other and parts to the whole. To classify, students need to apply criteria for belonging or not belonging to a group or set.

- ❖ Working in teams, go on a “classification system hunt” – see who can find the most examples of classification uses from school and everyday life.

- ❖ Help students create scoring guide for self-assessment using criteria to classify (compare and analyze) responses or work according to standard, purpose, rank order, degree of accuracy, level of precision, etc.

**Chapter 6 Spatial Orientation** – identifies and compares where objects and places are in relationship to each other and to oneself. To understand space, students need to be aware of 1) **boundaries** that differentiate one object from another; 2) **relationships** between and among objects; 3) **difference** between **material & mental** images; 4) spatial **types & characteristics**.

- ❖ Imagine a 6 x 6 x 6 cm opaque cube. What is the maximum number of sides (surface planes) that can be seen by one person from any point in space?
- ❖ Identify **location** (placement or position); **direction** (orientation toward a point of reference); **distance** (intervals of separation); **perspective** (point of view) for each object, shape, symbol, character, context, signs of operation, etc.

**Chapter 7 Temporal Orientation** – compares events in relationship to when they occur, essential for planning, organizing, communicating, record-keeping, understanding literature, science, history, math, arts, music, PE. etc.  
Key elements: measurement, movement, sequence

- ❖ Ask students to write what they understand about time or what time means to them. Bring the responses for discussion and analysis. Just because we explained to our students how to use a planner or schedule time doesn't mean they have developed temporal orientation.
- ❖ If students have difficulties with following step by step directions or putting things in order of sequence, stop and review telling time.

**Chapter 8 Metaphorical Thinking** – makes sense of info using figurative language; inferential, creative, equips students to generate fresh insights and understanding through unusual connections; includes other literary devices like simile, analogy, personification.

- ❖ Give an example of how you used a metaphor to explain a new concept to your students. Give an example of how your students used metaphors to express what they understood from a lesson.
- ❖ Go on “metaphor hunt” to find metaphors used in thinking, talking, literature, science, economics, media (news reports, magazines, newspapers, movies, songs, TV shows, etc.)

**Chapter 9 Spiritual Dimensions of Learning** – personal values, beliefs, emotions, assumptions, biases that motivate and influence learning, actions, decisions, and thought patterns. We are teaching the “whole person” – body, soul, and spirit. We teach **WHO** we are. Students listen more with their hearts than with their heads.

- ❖ Write down the two or three things you say to yourself most often. Discuss and analyze how these reveal your personal values, beliefs, and feelings.
- ❖ Experiment --take quiet time each morning to “nourish your spirit”—see how it affects your day.
- ❖ Encourage students to document how many positive comments you make in a day; & how many they make.
- ❖ Keep a “gratitude journal” to encourage positive thinking.

## 10 GUIDING QUESTIONS

1. What sense do you make of this?
2. What good questions can you think of?
3. What part do you know for sure? What part do you understand?
4. What do you notice?
5. What kind of pattern do you notice?
6. What do you wish was easier?
7. Why?
8. What did you understand the question to be?
9. If you were going to explain this to someone in your own words?
10. If you did know, what would you say? (Use this when students shrug their shoulders or respond “I don’t know” to a question.)

### Statements That Encourage Responses

- Tell me in your own words what you understand.
- Tell me more.
- Help me understand.
- **You did it! You enjoy figuring things out!** Avoid evaluative praise (phrases like, “I’m proud of you.”) which tends to transfer locus of control and focus to external motivation.
  - Tell me what you see in your mind in connection with this.

### What happens when you ask students: “What do you notice?”

- 1) They focus attention and gather more sensory data.
- 2) They become reflectively aware of what their senses are telling them.
- 3) Their curiosity is aroused and they become “investigators.”
- 4) They discern details (usually more than what you notice), and determine relevance.
- 5) They make connections with prior knowledge and experience.
- 6) They are set free from guessing what the teacher wants them to say.
- 7) You empower them to trust themselves and their capabilities.
- 8) They respond to your endorsement of their abilities.
- 9) They are freed from fear of making mistakes, because there is no “one” right answer.
- 10) You encourage originality, creativity, and emotional involvement.
- 11) Instead of you trying to “motivate,” you access their natural curiosity.
- 12) They are doing the work – you become a facilitator of learning.

**THEY BECOME THEIR OWN TEACHERS.**

### What happens when you ask students: “What sense do you make of this?”

#### “What do you understand by what I just said?”

- 1) They reflect and visualize information gathered by the senses.
- 2) They process information using cognitive structures to
  - **compare bits of data** using recognition, memorization, conservation of constancy, classification, temporal and spatial orientation, and metaphorical thinking.
  - **represent data symbolically** using their own words and thoughts to mentally manipulate the information with language, images, sounds, and/or movement.
  - **identify logical relationships** using analysis, synthesis, evaluation; cause-effect, inductive, deductive, and analogical reasoning to understand and generate new meaning.

**LARGE GROUP ASSESSMENT of BASIC COGNITIVE STRUCTURES****PROTOCOL**

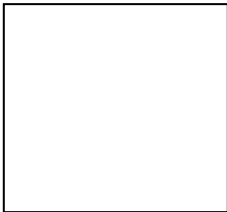
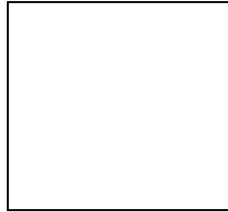
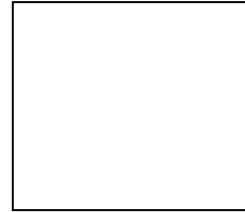
Student Name: \_\_\_\_\_ Date: \_\_\_\_\_

School: \_\_\_\_\_ Grade: \_\_\_\_\_ Teacher : \_\_\_\_\_

**Please circle one answer:**

1. Which piece of clay has more or do they have the same amount?      Ball      Pancake      Same

2. Which jar has more water or are they the same amount of water?      Right side up      Upside down      Same

3. Which is longer the one on the top or the  
one on the bottom, or are they the same length?      Top      Bottom      Same4. Draw a glass of water  
standing **straight up**  
half full.5. Draw a glass of water  
tipped to the **right**  
half full.6. Draw a glass of water  
tipped to the **left**  
half full.

7. Write a couple sentences about this room \_\_\_\_\_

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8. What do you wish was easier in school? \_\_\_\_\_

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9. Draw a floor plan of your house. (On back of paper or on another sheet of paper)

10. Draw a self portrait. (On back of paper or on another sheet of paper)

## Model Lesson Plan

**PURPOSE: Teacher designs content and learning objectives.**

### 1. Students Experience and Explore: *sensory input*

Provide concrete materials for students to touch, see, hear, smell, taste, interact with  
Instead of telling the students what something is like, provide experiences so that they can tell teacher and each other what they notice.

Encourage students to **notice things** and share their curiosity and observations.

Students need to “see with their eyes”—the physical characteristics of objects.

Students also need to “see with their minds”—the connections and unusual things they notice and have questions about. *[How the teacher relates to the students and interacts with them affects how engaged the students will be in the activity]*

### 2. Students Share: *beginning cognitive processing*

Provide time for students to describe and discuss with each other and with the class what they noticed and wondered about.

Encourage the asking of questions *[How the teacher reacts to questions and models being a curious learner determines whether or not the students ask questions.]*

### 3. Teacher Introduces New Materials and Concepts: *expanded processing*

Provide connections between student experience and feedback and new information being presented. Pace content and skills so that students can enjoy the challenge of new learning and the satisfaction of understanding.

Encourage cognitive, physical, and emotional engagement. Present material in multiple ways to meet needs of individual students. *[Teacher competence, enthusiasm, relationship with students, organization and ability to make information relevant directly affects students' willingness to learn new material.]*

### 4. Students Give Evidence of Learning: *output through synthesis and genesis*

Provide time, coaching and materials for students to demonstrate their understanding of the new concepts. *[Teacher willingness to build on the students' strengths and “let students do the work” greatly enhances students' learning.]*

**Encourage continued questioning** and learning through research projects (group and individual) related to the new information.

**Encourage application** of new information to life through relevant action to influence change (write letters, fax, call, send e-mail, research internet, interviews, etc.)

**Encourage creative ways to demonstrate understanding:**

In writing: written report, journal, letters, editorials.

Orally: verbal report, role playing, drama, newscast format, power point.

Graphically: video, drawing, posters, painting, construction of models.

By teaching information to someone else or making up an assessment.

### 5. Students and Teachers Reflect: *evaluation of learning experience*

Provide opportunity to reflectively respond to question: “What sense did I make of this?”  
Encourage students to help develop scoring guides to evaluate effectiveness of learning.

*[How teachers and students collaborate to evaluate learning determines personal investment in continued learning.]*

What could we do differently to improve this learning experience?

Develop plan of action--what will students do as a result of this learning.

How will they continue to use it in everyday life and other subject areas?

# How to Do Reflective Research

## 1. Ask a question or identify an issue of concern. For example,

“What happens when.....”

“ I’ve always wondered about....”

“What can I do differently to stimulate engagement in.....”

“How can I....”

## 2. Collect data relevant to the question or issue. Here are some ways to collect data.

- Observe the situation and take notes -- it is important to have written documentation
- Interview the persons involved – these can be formal or informal
- Keep anecdotal records – brief stories that describe an incident or interaction.
- Examine official records – report cards, health records, school records, etc.
- Use surveys or questionnaires – ask students, parents, teachers for their information and/or opinions about the issue or question.
- Take pictures – photos and/or videos that document evidence
- Have students draw pictures, diagrams, mind-maps of their perceptions of the issue
- Write journal reflections – this is very valuable because it encourages teachers to reflect and analyze as they are doing the project. Insights generated are very helpful in designing the action plan and stimulating new questions.
- Audio tape conversations – informal conversations and/or interviews can be transcribed and analyzed for patterns and subtle meanings.
- Analyze student work – important source of data that reflects effectiveness of teaching-learning interaction.
- Encourage students to write reflections about the issue to provide different perspectives.

## 3. Analyze data that has been collected to identify themes and patterns that emerge.

**Reflect** -- Think about what you have observed, heard, read, written, documented.

Ask yourself -- What does this all mean to me? What sense do I make of this?

Notice anomalies – What stands out as unusual indicators that challenge my assumptions or expectations

Reflect on the original question in light of the data collected.

**Look for patterns and relationships among the data** – organize, compare, classify.

Notice how some information is related to other information using criteria that suggest themselves – these will vary according to the question and kind of data collected. Some examples of criteria: time frames (when and how often something happened), subject matter, participants, situations, level of emotional or cognitive engagement, kind of interactions, kind of results, etc. etc.

Identify themes that begin to emerge in relationship to bigger issues; e.g., How learning is constructed by the learner, teacher leadership, teacher-student (interpersonal) relationships, how organization and planning affect student learning, dynamics of change, how personal biases and assumptions influence practice.

**Formulate preliminary interpretations** – evaluate in terms of the original questions; be sure interpretations are based on data; verify interpretations with participants.

**Explore what others have said** about the issue or themes that are emerging – read current literature or other teachers’ research.

**Share findings and interpretations with colleagues.** This dialogue provides feedback and differing perspectives that help clarify and verify findings and interpretations.

4. **Design, and implement an action plan based on findings. Be Specific about**  
**Goals** – what do you want to accomplish, change, focus on, try to understand better;  
**Activities** – what kinds of things will you do to accomplish goals;  
**Data collection and analysis** during implementation -- what kinds of data that will be collected and used to evaluate effectiveness of the plan.
5. **Evaluate implementation of action plan by collecting and analyzing data.** The evaluation leads to the next questions that emerge from the project. These questions form the stimulus for the next level or cycle of reflective research.

**Note: *Doing reflective research provides on-going, self-directed professional development, and continued cognitive development for teachers.***

***Doing reflective research with students, (which is based on Model Lesson Plan) helps them develop more effective cognitive structures for on-going, self-directed learning.***

Teachers who have participated in this kind of self-directed, on-going learning have discovered new purpose and energy in their work.

An elementary teacher stated, "I finally found a way to get answers to my puzzling questions, but I was surprised to find that doing this research just kept bringing up more questions."

A middle school teacher said that he thought he was doing a good job before he started this kind of research, but when he watched video tapes of his teaching and showed them to his students, they helped him see how he could do things differently to facilitate learning.

Many teachers reported that using this approach helped them focus on the real meaning of teaching and learning. Mini-teacher research is a tool that equips teachers to systematically examine their practice and benefit from their own learning experiences.

## Student Reflective Research

This process can also be used with students to encourage self-directed learning in every content area. Here is a simple way to summarize the steps of mini-research projects.

1. **What do I want/need to know?**  
(identify question, issue, or problem).
2. **How will I find out?**  
(collect data related to issue, set time line for collecting it).
3. **What did I find?**  
(analyze data by organizing, comparing, classifying, discussing).
4. **What am I going to do differently based on what I found?** (design and implement plan of action)
5. **What did I learn from what I did?**  
(evaluate implementation of plan, generate new questions).

## Square Search Assessment – Practice Sheet

*Use dots to draw a square exact size as model square on left. Every dot is used one time. Point to the four corners before drawing the square. Do not use ruler. Do not turn paper.*

