COGNITIVE/ACADEMIC ISSUES

Tutorial: Advance Organizers

WHAT IS AN ADVANCE ORGANIZER?

There are two main types of advance organizer. First, an advance organizer can be an introduction to a new topic, with the goals of giving students an overview, connecting new information to what the students already know, and illustrating the organization of the new concept or information to be processed and learned. Second, an advance organizer can be a task planner designed to orient the learner to a task by providing organizational cues, like a sequence of steps to complete the task or a list of components of the task, or by showing what a product (i.e., the learning outcome) should look like (e.g., what a well organized story or description looks like).

Therefore, advance organizers can be as simple as a teacher's background discussion before introducing a new concept or a list of tasks to be done by the learner; alternatively, they can be as complex as a detailed flow diagram that pictures many components of a multi-component task and their organization. Advance organization can be provided by words (spoken or written), diagrams and charts, photographs, or actual models of finished products. Advance organizers are cognitive strategies that help to make complex concepts or tasks clear, and also to relate known information to new or unknown information. They may be designed to facilitate orientation to new information, sequential organization through a task, elaboration of a concept, thematic or dramatic organization of narrative discourse, or other forms of cognitive organization. Advance organizers not only facilitate understanding of new information and completion of complex tasks, they also improve learning and memory at the levels of encoding new information, storing it, and subsequently retrieving it. **(See Tutorials on Memory and Retrieval)**

Advance organization may simply be provided by means of clear teacher instructions; however, they are often presented as visual or *graphic* organizers. Examples of *graphic* advance organizers for adults are the diagrams that accompany products that require some assembly. Even intelligent adults are unlikely to be able to assemble novel products from their parts in the absence of a clear sequence of pictures that explicitly present the steps needed to accomplish the assembly. These diagrams are graphic (i.e., pictured) advance organizers.

Maps are also examples of graphic advance organizers. A map graphically represents places in a specific geographic region and their relationships. Without a map, it would be impossible to find ones way around unfamiliar territory. Similarly, graphic organizers used in schools are "cognitive maps" designed to guide students through conceptual territory that is unfamiliar to them. A cognitive map is a visual road map that illustrates some of the connections among concepts. For example, a visual "map" illustrating the components of a story and their sequence may help elementary school students to read or listen to stories more attentively and also to write stories that are more complete and better organized. (See below for features of a story organizer.)

Often these cognitive organizers are referred to as **"semantic maps"** or "concept maps". The analogy with real maps helps to clarify the common sense usefulness of these academic maps – if you don't know the territory, you need a map. A less useful term that is also used in some schools for graphic organizers is "web". This term is less useful because it does not indicate the purpose of the organizer, as the word "map" does, and because the word "web" is often associated with confusion and complexity, not clarity, simplicity, and organization.

So a "map" in this broad sense of the term is an advance external visual organizer that can help with an organizationally complex task. For preschoolers, an organizer map can be as simple as a set of photographs, presented top-down, representing the daily schedule at home or at school. A preschool "map" is also represented by places that dictate specific activities and by containers that indicate where objects

go. The art corner is for art activities, the water table is for water play, the dress-up area is for pretend play, the snack table is for snack, cubbies are for my personal things, and so on. Thus more abstract ideas like activities, sequences of activities, and categories of objects are "mapped" by physical spaces and containers in the preschool room. When these places are kept distinct, the preschooler is much more likely to behave in an organized manner.

By first grade, the places and photographs that are useful for preschoolers may be replaced by graphic organizers on paper. For example, a student who does not know how to tell or write an organized story will benefit from a chart – a set of boxes and connecting lines – that dictates what information to include and in what order.(See below for details.) Or if the teacher wants the students to produce increasingly elaborated descriptions of objects, a chart that has a separate box for each category of attribute (e.g., functions, physical attributes, composition, etc.) will help the student produce well elaborated and organized descriptions. (See below for details.)

As the child ages into adolescence, graphic organizers shift to more structured planning tools such as written outlines, checklists, and day planners, with an emphasis on sequencing of events by time. These external organizers become essential in maintaining the organizational flow of day-to-day events. Most students will continue to rely on some sort of external organizer (e.g., day planner) as a compensatory tool for the remainder of their lives.

Clear orientation to a learning task or instructional activity is known to be one of the most critically important instructional procedures for students with learning problems, almost as important as the amount of practice or number of learning trials. This is true for all students, but particularly those with organizational impairment. Advance organizers have repeatedly been shown to facilitate learning and academic performance.

WHY ARE ADVANCE ORGANIZERS IMPORTANT FOR MANY STUDENTS AFTER TBI?

Organizing schemes, like the organization of a story, plans for a complex task, and other mental models, are processed and implemented by the frontal lobes of the brain. The frontal lobes are particularly vulnerable in traumatic brain injury, and thus, damage to frontal lobes accounts for much of the disorganized thinking and behavior of students with brain injury. Students with brain injury often have organizational problems that are more severe than meet the eye. Their recovery of preinjury knowledge may result in the appearance of reasonable organizational skills. However, when faced with tasks that are novel or assignments that require significant organizing, they may have great difficulty.

Children who have been injured at a young age may have mastered very few of these organizing schemes, in part because they had acquired relatively few before the injury and in part because they need many more learning trials than other children to learn new organizing schemes. In addition, adults often give these children less rather than more exposure to the organizing schemes. Because of the disability, they may simply have fewer opportunities to experience the events in the world, and thus have less opportunity to form effective organizing schemes. Students who are older at the time of injury have had greater opportunity to master a wide variety of organizational schemes, but may lose these schemes – or lose access to them – due to the brain injury.

WHAT ARE THE MAIN THEMES IN ORGANIZATIONAL SUPPORT USING ADVANCE ORGANIZERS?

Understanding the problem

As always, the first task for teachers and parents is to correctly understand the problem. Symptoms of organizational impairment can easily be misidentified as lack of knowledge, an attention problem, memory problem, or behavior problem. For example, if a student stops working on an assignment because of organizational problems, teachers might attribute this behavior to defiance, lack of interest, or lack of

knowledge when in fact none of these issues is involved. Or perhaps the problem is a result of a combination of factors. Therefore, efforts to sort out the relative contributions of these potential contributors to the perceived problem may be required. The problem-solving component of this web site may be helpful in sorting out the issues.

When organizational impairment is found to be a contributor to the student's difficulties with tasks at home or school, its role must be recognized and relevant intervention and support strategies designed and implemented.

Environmental Supports/Teacher Strategies

In one sense, all advance organizers could be considered a teaching strategy and in this sense fall under the heading of environmental supports. That is, an advance organizer can be considered a procedure used by teachers to orient a student to the content of a lesson, to ensure consideration of known information before processing new information, and to illustrate for the student the structure or organization of the to-be-presented information or to-be-completed task.

From this perspective, all of the graphic organizers and related considerations listed below could be considered to be included in this section on teacher strategies.

Facilitating Organization in Students

Please see the Tutorial on Cognitive Intervention for some cautionary comments on traditional attempts to "train" cognitive processes like organization (e.g., sequencing, categorizing, associating) and memory with decontextualized cognitive exercises. Simply practicing remembering random information or sequencing or categorizing varied types of information has been used for decades by therapists and special educators with the hope of producing generalizable improvements in cognitive processes. Unfortunately, research in rehabilitation and special education has shown that cognitive exercises of this sort have little to no functional, generalizable impact on cognitive functioning in academic or other real-world contexts.

In contrast, graphic organizers are context-sensitive procedures designed to help students become progressively more organized as they attack organizationally complex tasks in school or at home. In this case the goal is not simply to help the student complete the task (which is the case with organizers used as environmental compensations), but rather to improve the student's independent organizational functioning. Graphic organizers are initially used as external supports for task completion. However, as the student gains competence and begins to internalize the organizer, it may be systematically withdrawn so that the organizer becomes a component of the student's mental organization.

As with all supports, the goal is to have the organizational support – the "map" – available for as long as it is needed, but then gradually reduce dependence on physical supports as the student internalizes the organizational structure and it becomes a habit. Systematic reduction in supports is necessary to avoid "learned helplessness". However, some students will need to rely on the external organizer indefinitely.

What follows are some examples of graphic organizers commonly used in schools.

Activity Maps

Time Line Graphic Organizer: For preschoolers, a time line (e.g., the schedule for the day) can be represented by a top-down sequence of photographs representing their activities for the day and the order of these activities. By kindergarten and beyond, the sequence can become left-right and printed words should be combined with the photographs or drawn pictures/symbols as the children start to decode printed words. Parents will need to use these same organizers at home to help their child remain organized through a series of home tasks (e.g., getting up, getting dressed, eating breakfast, packing the book bag, getting ready for the bus) both during school and non-school days. For older students with significant organization and/or memory problems, these time line organizers continue to be used, with the student encouraged to preplan aspects of their day-to-day activities.

More Complex Task Analysis and Planner: For more complex activities at a higher level, the following graphic organizer can be used: At the top of the page, include a box for specific task/activity directions (e.g., the goal, time limits, needed information, collaborators). Then comes a checklist for materials that will be needed. Following that is a checklist outlining the steps in the plan, with a possible time frame for each step. Then follows a section for ongoing review. Finally there is a section for final review: Is the task complete? Was it done correctly? Was it submitted on time? What task strategies worked especially well? What did not work?

Concept Maps/Semantic Maps

Narrative/Story Graphic Organizer: Students with organizational impairment tend to write or tell stories that are short, incomplete, and poorly organized. They also have difficulty remembering stories that they hear or read because they do not focus in an organized way on the salient information. The components of a simple story – or episode or a larger story (narrative structure or "story grammar") – can be graphically represented by a sequence of boxes and connecting lines. The chart might have a box at the top for title, under which would be placed three boxes next to each other for characters, place, and time – that is, the basic setting of the story and its main characters. These boxes would then be connected by a line to a large box immediately below representing the event that gets the action started, the initiating event. That box leads to the next box below, representing the main characters' psychological responses to that event (i.e., they were frightened or concerned and therefore had to do something, which becomes the action of the episode). Below that would be a box for the characters' plan – what they chose to do to deal with the issue or problem; then the unfolding action; and finally the resolution or end of the story. With this simple and organized "map" as a guide, students with organizational difficulty in the middle grades and higher can write well elaborated and well organized stories, which would be impossible without the map. Younger students or those with significant organizational impairment may need simplified versions of this organizer.

Concept Analysis/Elaboration Graphic Organizer: Students with organizational impairment often fail to elaborate their descriptions (and their underlying concepts) of objects and activities, or in other cases, elaborate in a disorganized manner with associations that are at best tangential. The components of a well elaborated description or analysis of an object can be graphically represented by a set of boxes radiating out from a central box like spokes from an axle. In the center box goes the name of the object (e.g., horse). A box positioned at 12:00 (i.e., directly above) contains the category of the object (e.g., a horse is an animal). A box at 1:30 contains words for the actions of the object – if it is something that acts (e.g., a horse runs, gallops, jumps, kicks, neighs). A box at 3:00 contains words for the uses of the object (e.g., a horse is used for racing, pulling, riding, showing). A box at 5:00 contains words for the main attributes of the object (e.g., a horse is big, strong, fast, wild or tame). A box at 7:00 contains words for the parts of the object (e.g., a horse has a mane, tail, four legs with hooves). A box at 8:30 contains words for the main locations where the object can be found (e.g., a horse might be found in a barn or stable, at a race track, on a field). And a box at 10:30 contains words for the possibly idiosyncratic associations that the student may make with the object (e.g., when I think of horses, I think of my uncle Herb or the time I fell or ...).

Similarities and Differences Graphic Organizer: Students with organizational impairment often fail to connect concepts in a logical and organized manner. Overlapping circles (i.e., a Venn diagram) can be used to facilitate similarities/differences exercises. For example, one circle might include characteristics of dogs and another of cats. The overlap between the two circles would include characteristics they have in common (i.e., their similarities, like four legs, animals, household pets). The parts of the circles that do not overlap can then contain the characteristics of each animal that are not in common (e.g. bark would go under dog, meow under cat)

Essays: Topics and Sub-topics Graphic Organizer: Students with organizational impairment tend to write essays that are short and disorganized. The components of a well organized essay can be represented graphically as follows: At the top of the paper goes the title or general topic of the essay. That is followed by a top-down sequence of large boxes representing the main sub-topics. Within each sub-topic box can go smaller boxes listing sub-sub-topics, possibly including the information for each sub-sub-topic. There should be arrows connecting these boxes, representing the connections or segue sentences. The final box would be labeled conclusion or summary.

Character Analysis Graphic Organizer: Students with organizational impairment tend to analyze characters in ways that are poorly elaborated. The components of a well organized character analysis can be represented graphically as follows: In the center of the page goes the name of the character. In a box above this circle could go information in response to the question, "What does the character do?" In a box to the right of the circle could go information in response to the question, "What does the character say or think?" In a box below this circle could go information in response to the question, "How do others feel about this character?" In a box to the left of the circle could go information in response to the question, "How does the character change?"

Problem-Solving Graphic Organizer: Students with organizational impairment tend to be impulsive and possibly rigid problem solvers, failing to consider and evaluate a variety of possible solutions to a problem. The components of well organized problem solving can be represented graphically as follows: On the top of the page is a statement of the problem. What follows is a series of boxes. At the top of each box is a possible solution to the problem. Within each of these boxes are two sub-boxes labeled "+" and "-" or "advantages" and "disadvantages". There should be at least three or four of these boxes, indicating a need to brainstorm about possible solutions and their relative advantages and disadvantages before leaping to a solution. At the bottom of the page is a box for Best Solution. Finally there is a section for final review: Is the solution a good one? What did I learn about my problem-solving abilities? What could I do differently next time?

http://www.cast.org/publications/ncac/ncac_go.html - presents a variety of graphic organizers for a variety of organizational tasks.

Principles for constructing Graphic Advance Organizers:
There are many books and other commercial products that offer graphic organizers for a variety of activities or thought processes. And there is software that enables users to construct their own graphic organizers. Many of these materials are useful. However, they should be used with some important principles in mind.

The organization of the organizer must match the organization of that which is to be organized: Many organizers found in books are pleasing to the eye, but fail to capture the organization of their content. For example, there are many story organizers that are circular despite the fact that narrative organization is rarely circular but rather linear. Therefore, the graphic organizer should be linear (see above), not circular. The same logical thinking should be applied to all organizers.

The organizer should be as simple as possible: Many commercially available graphic organizers are more complex than they need to be. Individuals who are organizationally impaired may be further confused by organizers that are too complex. The graphic organizer should be as simple as possible, with only as much visual detail as is necessary to communicate the organization of the concept or task.

The organizer should be as concrete as necessary: As indicated above, preschoolers often benefit from photograph routines. Their young minds are too concrete to process abstract symbols and they do not yet read words. In addition, teachers should not assume that just because a student can read, it is OK to provide nothing but written instructions. Even the best educated adults benefit from a series of pictures when "Some Assembly Is Required" to assemble a product. Thus, elementary school students still benefit from picture organizers even if they can read adequately. Similarly, disorganized adolescents who are readers may nevertheless still benefit from photograph organizers for complex tasks. The added concreteness of the photographs can greatly facilitate orientation to the tasks.

Principles for Teaching the Use of Graphic Organizers:
There are basic principles that should be followed in teaching with graphic organizers.

Connecting Organizers in Instruction: Several organizers might be used together in teaching a complex lesson with organizers building upon each other in a logical fashion. For example, in elementary school, a concept, like pets, might be chosen for a week's reading and writing lessons. On Monday, the concept

analysis graphic organizer might be used to elaborate descriptions of two or three animals. On Tuesday, the similarities and differences graphic organizer might be used to analyze similarities and differences. On Wednesday, the problem solving graphic organizer might be used to elaborate possible solutions to a hypothetical problem involving the pets. On Thursday the narrative/story graphic organizer might be used to generate material for an interesting story about the pets using all of the information in the graphic organizers from Monday through Wednesday. And on Friday, the story can be written in prose form, with practice reading it as part of the exercise.

Providing Extensive Practice: Students with brain injury require considerable amounts of practice with specific graphic organizers to gain facility with them. Ideally the same graphic organizers will be used over the course of several years within a school building. For some students, extensive practice with a specific type of organizer will lead to internalization of the organizer as an internal mental organizational scheme.

Systematically Reducing External Support: As with all supports, graphic organizers should be slowly faded as the students gain automaticity in using them and internalize the organizational system as part of their own thinking. It is not uncommon, however, that a previously learned organizational strategy will need to be reintroduced when the student is faced with a more complex academic task.

EVIDENCE SUPPORTING THE USE OF ADVANCE (INCLUDING GRAPHIC) ORGANIZERS

This summary of evidence is written for teachers and others who may be required to support their intervention practices with evidence from the research literature or who may simply be curious about the state of the evidence. This summary was written in early 2008. Evidence continues to accumulate.

Graphic organizers are not only relevant to the needs of many students with TBI, they are also supported by a large body of educational research with both disability and nondisability populations. Nesbit and Adesope (2006) estimated that more than 500 articles have been published in peer-review journals, most since 1997, with substantial reference to educational applications of graphic organizers.

In their meta-analysis of 55 experimental studies (with 5,818 participants and 67 standardized mean difference effect sizes), Nesbit and Adesope concluded that there is a generally positive effect of graphic organizers (i.e., knowledge and concept maps) in facilitating knowledge comprehension and retention, with effect sizes varying from small to large depending on how the organizers were used and on the type of comparison treatment. The students who were studied ranged from grade 4 to post-secondary education. Most of the studies were of regular education students (including post-secondary professional education). However, Nesbit and Adesope also summarized data suggesting that low ability students experienced greater benefit than high ability students, suggesting a relatively stronger positive effect for students with cognitive disability. The respected report of the National Reading Panel (2000) identified 11 experimental studies that met stringent methodological criteria and supported the use of graphic organizers to facilitate reading comprehension and memory for text. Bulgren and Schumaker (2006) described 19 studies of advance organizers, all with adolescent participants. Five of the studies used only participants with learning disabilities; the remaining 14 used participants with learning disabilities, low academic achievement, and normal achievement. Seventeen of the studies used group designs; the remaining two used single-subject experiments. All of the organizers used in the studies had been developed at the Kansas University Center for Research on Learning. The 19 studies reported uniformly positive results, interpreted both statistically and clinically, leading the authors to conclude that advance organizers, including graphic organizers, can substantially improve the learning of adolescent students with learning disabilities, low achieving students, and average achieving students.

Because of the organizational needs of many students with TBI, advance (including graphic) organizers appear to be an evidence-based intervention well designed to meet their needs. However, little research is available that documents the effectiveness of advance organizers with this specific population. Graphic organizers were used in combination with other cognitive and behavioral interventions in nine successful single-subject experiments with students with TBI reported by Feeney and Ylvisaker (1995, 2003, 2006, 2008). The graphic organizers were in most cases actual photographic representations of complex tasks.

The participants in the studies were students with TBI and associated frontal lobe involvement, ranging in age from six years to late adolescence. In each case, negative behaviors decreased in frequency and intensity while the amount of school work completed increased in response to the multi-component intervention.

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Written by Mark Ylvisaker, Ph.D. with the assistance of Mary Hibbard, Ph.D. and Timothy Feeney, Ph.D.