THE CRUCIAL ROLE OF COGNITIVE DEMAND AND CONTEXT IN LEARNING

Students for whom English is a second language (ESL) face challenges in understanding the content of subjects taught in mainstream classrooms. Once they have learned enough English to engage in conversations, the challenge for these students is to use English in speaking, listening, reading, and writing in different content areas. For example, discussing books, listening to a lecture, reading a chapter, writing an essay, or solving a problem are all tasks which use English in specialized ways. The process of learning language for academic use takes time and effort.

There are important ways in which the process of learning the language of history, literature, science, and math can be made comprehensible to second language students. This Bulletin examines two crucial areas - cognitive demand and context - in helping second language students comprehend academic language.

COGNITIVE DEMAND

The reservoir of knowledge and experience that an ESL student brings to learning the content needs to be mediated through using the language in increasingly complex ways. The degree to which an ESL student can comprehend and use language in cognitively demanding ways depends on a gradual exposure to the demand called for in a task. In terms of Bloom’s taxonomy, for example, a student cannot use language to analyze, synthesize, or evaluate a concept without first knowing it, putting it in his/her own words, and applying it in other situations.

For example, for a high school student for whom English is a second language to be able to identify and analyze how the complex elements of plot (i.e., setting, major events, problems, conflicts, resolutions) affects the overall quality of a work in English language arts, it is necessary for that student to understand and recognize those elements, and recount events, ideas, and important details from material read, heard, or viewed. Similarly, in biology, for that same student to explain how the human body protects itself against disease, it is necessary to know how to identify and to describe how body systems work together. In math, using inductive and deductive reasoning to explore and determine the properties of and relationships among geometric figures presupposes the ability to describe, model, and classify two dimensional shapes and three dimensional figures. Finally, in social studies, evaluating the effectiveness of the Constitution as a vehicle for change is predicated on examining and explaining how civil rights, liberties, and responsibilities are established by the Constitution.

To put it in another way, in order for teachers to
engage students at higher levels of thinking, it is necessary to ensure that the student(s) can understand the concepts and use language in both oral and written forms.

**CONTEXT EMBEDDING**
Comprehension of language can be greatly enhanced through the use of appropriate surrounding visual information to support the language. Language in itself is contextually reduced; as a result, for ESL students it is necessary to create additional context through visual means. In using oral language, this may mean use of gestures, role playing, and demonstrations; in using written language, this may mean use of audiovisual aids, mapping, and graphic organizers.

For example, in English language arts, pictures accompanying stories and use of story grammar templates can assist students in comprehending basic plot and story details; in biology, layered colored transparencies can enhance comprehension of the body system; in math, physical objects and two dimensional drawings can help explain geometric figures and relationships; and in social studies, a semantic web of the Constitution and its different components can aid in comprehending the relationship of the executive, legislative, and judicial powers of government to one another.

In other words, supporting language in visual or graphic contexts enhances basic comprehension and helps to bridge the transfer to more complex uses of thinking and language use.

**SUGGESTIONS FOR INSTRUCTION**
1. **Provide instruction with a careful consideration of the cognitive load and use organizers, and other visual cues to clarify content delivery.** Although it is important to maintain the objectives of content instruction at a grade-appropriate level with regard to information and cognitive processing of that information, it may be necessary to modify the delivery in cognitively sequenced ways ranging from the simple to the more difficult. This may, as well, necessitate personalizing the lessons to meet students' needs. For example, designing a semantic web may help in clarifying the characters, setting, major events, problems, conflicts, and resolutions; creating or having students create an outline depicting the major functions of the human body may assist in remembering them for biology; using replicas of three dimensional figures as manipulatives may help to explain the properties and relationships of geometrical figures in math; and in social studies a Venn diagram may serve to illustrate the individual and collectively shared responsibilities of the separate branches of government.

2. **Employ a variety of practices to elicit greater comprehension of content and participation in learning.** The following practices should be used in all subjects to promote comprehension:
   - **Graphic organizers:** outlines, charts, equations, calendars, flow charts, graphs, diagrams, maps, tables, and timelines.
   - **Learning Resources:** Realia (use or replica of authentic items), manipulatives, slides, filmstrips, and overhead visuals.
   - **Focus materials:** Wall charts, large models, slides, filmstrips, and overhead visuals.
   - **Speech adaptations:** Repetitions, gestures, slowed speech, small units of expression, and more expression.
   - **Group Processing:** Partner explanations, cooperative learning, group work, peer tutoring, cross-age tutoring, and jigsaw.

3. **Check frequently for comprehension.** Students for whom English is a second language can often appear to understand content, when in fact comprehension is minimal or even nonexistent. Posing short answer and yes/no questions, giving multiple choice items, eliciting writing responses to questions individually and in small groups - these are some of the ways in which comprehension can be monitored to determine the degree to which and the feasibility of deconstructing content to become more contextually accessible and cognitively comprehensible.

**Sources:**

Maine Learning Results. (1997) ME Dept. of Education.