Learning a Second Language with Multimedia Materials

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According to the National Center for Education Statistics (U. S. Department of Education, 2004) the number of students in the U.S. who live in homes where the first language is not English has doubled over the last 20 years. For these language-minority students and their peers who are learning a second language, the goal is to develop several core competencies that allow them to develop and maintain social relationships and communicate ideas.

To support these students’ acquisition of a second language, researchers have identified two instructional approaches. First, proponents of the structural approach argue that drill and practice is the best way to learn grammar and vocabulary. With this approach, language is usually taught orally with an emphasis on the learner responding to spoken prompts. Second, the cognitive approach emphasizes how the learner interacts with language. An effort is made to make language acquisition a more active process. Instruction is based on activating prior knowledge and allowing the learner to build the cognitive skills required to understand, process, and interact with a language. Effective opportunities to learn a second language with the cognitive approach can be divided into three stages: a) comprehensible input, b) interaction, and c) comprehensible output (Plass and Jones, 2005). The research on this approach to learning in a digital multimedia environment is relatively small and often limited to studies that include college students; however, the insights from this work can be helpful for elementary and secondary educators.

This Research in Brief article is comprised of four sections: an overview of the stages for effective instruction using the cognitive approach to acquiring a second language, a section providing advice for choosing multimedia programs to support this approach, a list of resources cited in the article, and description of the research literature on this topic.
Overview of Using Multimedia to Support a Cognitive Approach to L2 Acquisition

**Input: Students need accessible materials**

In the first stage of the cognitive approach for second language acquisition, comprehensible input, the underlying assumption is that the learner needs help identifying the critical features in “the wealth of the linguistic and nonlinguistic information they receive” (Plass & Jones, 2005, p. 470). This means that the supports embedded in a multimedia instructional approach should guide what students notice in a word, sentence, passage, or image. This strategy can also be accomplished through immediate and focused teacher feedback. For example, when a teacher highlights portions of an assignment that require revisions, the student’s ability to evaluate and revise her work increases. These strategies help the learner understand task directions and focus on pertinent information to comprehend or revise.

Another strategy for increasing the accessibility of materials is using a multimedia glossary for problematic vocabulary. When students have access to images, sentences, and pronunciations for vocabulary terms, their comprehension of the content increases. For an example of a multimedia glossary, visit the Harcourt school [math glossary](#) or [science glossary](#). These glossaries can be searched alphabetically and by grade level. In a digital environment, a multimedia glossary can be made even more accessible by changing the font size or using text-to-speech software.

**Interaction: Students need scaffolding to process information**

The second stage of the cognitive approach includes “information links that provide simplification, elaboration, clarification, definitional support, or redundancy” (Plass & Jones, 2005, p. 469). Similar to highlighting important information, teachers can scaffold student comprehension of content-area facts, concepts, and generalizations and the links between them. When considering how students might interact with new content, it is important to ensure that new information be linked to previous learning.

Advance organizers and graphic organizers are effective ways to facilitate this task because they can provide an overview of a new topic and visually represent links between the concepts to be learned. Though there is limited research on using graphic organizers in a digital multimedia environment, they are effective ways for
students with special needs to comprehend text in print-based environments (Kim, Vaughn, Wanzek, & Wei, 2004). It is very likely that these supports are just as effective in digital form.

Students’ interactions with content can also be more effective when they have control over the mode of presentation. In a digital environment, for example, some students might prefer hearing text read aloud whereas others might prefer reading it on their own. If reading fluency in the target language is not the objective of a lesson, it is important to allow students to make these types of decisions. The teacher’s best judgment is required, however, when deciding what supports are appropriate for the learner.

**Output: Students need to be engaged in active learning**

Plass and Jones (2005) define the third stage, comprehensible output, as “the need for use of language in meaningful contexts to develop the learners’ communicative competency” (p. 475). Effective means to support students during this stage include support for self-correction. For example, in a digital environment, text-to-speech programs enable the user to hear what he has written and check if a sentence makes sense. Researchers have also investigated the benefits of students actively using second language vocabulary versus passively receiving information. The students in the former group were more engaged in the learning process and retained more information (Nikolova, 2002).

Research on second language acquisition for language minority students also indicates a need for teachers to focus on both students’ academic and affective learning (Plass & Jones, 2005). To do so, teachers need to be aware of the potential discontinuities between learning at home and learning at school. To address this disconnect between home and school, many teachers have found success bringing “sociocultural (and personal) elements into the classroom curriculum and instruction” by allowing students to select topics for writing assignments (Rueda, August, & Goldenberg, 2006, p. 329). The teacher can also create shared experiences for the entire class through virtual field trips or other cooperative activities through a digital multimedia environment. Researchers also stress the importance of teachers valuing their students’ first language. When teachers show this respect, students are more likely to have positive attitudes towards their language minority peers, creating a supportive environment that can benefit the learning of all students.
Choosing a Program

This Research in Brief article identifies several issues to consider when selecting a computer program for students acquiring a second language. First, when considering scaffolds and supports, learners should be able to link to multimedia glossaries or other supports (e.g., graphic organizers) that connect new information to background knowledge. Second, learner control is important. Programs should allow the learner to manage the path and pace of learning. If the student needs more background information for a concept or a definition of a key vocabulary word, the program should offer links to this information throughout the learning process. Finally, students should be given opportunities to actively engage with the second language (e.g., create multimedia glossaries) rather than passively receive information through drill and practice.

Research Support

**Input: Students need accessible materials**

Highlighting critical features is an effective way to scaffold students’ comprehension of text and acquire second language vocabulary. Research on using this strategy for students acquiring a second language in a digital multimedia environment is limited. Overall, these researchers conclude that a digital environment increases the flexibility of materials by allowing students to click on supports when they need them. For example, Laufer and Hill (2000) observed 72 college students learning a second language use a multimedia glossary embedded in a text they were reading. They found that underlining key vocabulary in the passage and providing links to a multimedia glossary had a positive effect on vocabulary acquisition, retention, and comprehension.

**Interaction: Students need scaffolding to process information**

Researchers contend that scaffolding students’ interactions with content increases learning. Yeh & Lehman (2001) conducted an experimental study on the effects of using an advanced organizer. The 150 participating college students were divided into three groups. In the first group, students used an advanced organizer and learned information via an imposed linear progression. Students in the second group also used the advanced organizer but were permitted to choose their own path through a digitally-based learning environment. For example, when confused about a social studies topic, they could follow links to additional information in the form of short
videos with accompanying text. These students could stop the videos at any point, click on a problematic vocabulary word, and receive help from a multimedia glossary. Thus, students had multiple entry points into the same content and could modify their own path of learning. The third group received no treatment. Findings revealed that students permitted to choose their own path through the environment comprehended the content better than did the students in the control group or those who followed an imposed linear progression. The researchers found that learner control of advanced organizers and content is key in a digital environment.

In another study, Plass, Chun, Mayer, and Leutner (2003) found that digital annotations of concepts (e.g., translations, visual representations, links to additional background knowledge) are more effective if students can select verbal and/or visual modes to receive this information. Their sample included 152 college students divided amongst four treatment groups: verbal annotations for vocabulary, visual annotations for vocabulary, both forms of annotations, or no annotations. The three groups that received annotations comprehended more text than students in the control group. Finally, Kim et al. (2004) reviewed twenty-one studies (1963-2001) on the use of graphic organizers for students with special needs. From their synthesis of these studies, they concluded that graphic organizers have a positive effect on reading comprehension for this population. They also caution that these studies have mixed results when it comes to students retaining information. It seems that graphic organizers are effective tools for immediate comprehension of text but not efficient tools for memorizing content. There is limited research in this area on the uses of graphic organizers in a digital multimedia environment and for students acquiring a second language, but it is very possible that the outcomes would be the same for these populations.

**Output: Students need to be engaged in active learning**

Researchers also note the importance of active learning. For example, Nikolova (2002) divided 62 college students leaning French into two groups. The first group learned vocabulary in a digital environment by clicking on a word that linked to images and definitions. The second group received the same vocabulary list but created the definitions themselves and chose images for each word. The latter group acquired more French vocabulary than their peers. Although this kind of active approach to learning a second language can require more time, the study did find that it facilitates deeper learning. In any case, the teacher will likely need to decide which concepts or vocabulary words warrant additional time.
The quality of interactions between non-native speakers and a school is also important. Xu (1999) did a general survey of several schools and found that many did not offer learning materials in language minority students' first language. Also, several cultural structures at school limited meaningful adult-child interactions, and curricula isolated skills learned in the classroom. However, for many of these students, the opposite was true at home. In this context, they frequently used their first language, and many of these students experienced more in-depth interactions with adults at home. At the very least, these findings point out the need for digital multimedia environments to include opportunities for students to use their first language when acquiring second language vocabulary and grammar.

Resources

**Multimedia Glossary - Mathematics**

Multimedia Glossary - Mathematics provides links to mathematics vocabulary, including animations that demonstrate these concepts. Concepts are organized alphabetically and by grade level.

**Multimedia Glossary - Science**

Similar to the link above, Multimedia Glossary - Science includes a glossary of science terms organized alphabetically and by grade level.

**Education Place**

Education Place includes several free printable copies of graphic organizers. Templates also available in Spanish.

**PowerUp WHAT WORKS ELA Instructional Strategy Guides**

The Instructional Strategy Guides incorporate multimedia tools to differentiate instruction to help struggling students learn foundational skills in English Language Arts.

**Inspiration**

The Inspiration website provides information on Inspiration and Kidspiration, the popular computer programs for creating graphic organizers.
Word2Word Language Dictionaries and Translators

Use online dictionaries in students' native languages to help build vocabulary and background knowledge. **Word2Word** is a syndication of multiple language dictionaries (not all are compatible with screen readers).

**References**


