CALdigest

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Integrated Content and Language Instruction

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Integrated content and language instruction has entered its third decade and by many accounts is flourishing in both foreign language and second language instructional settings (Crandall, 1987; Krashen, 1982; Mohan, 1986; Mohan, Leung, & Davison, 2001; Snow, 2005; Stoller, 2004). Broadly defined, it is task-based instruction and assessment of knowledge, skills, and academic language within a content area. The academic language includes the concepts, key vocabulary, grammar, and discourse necessary to accomplish content-area tasks.

In preK-12 educational settings in the United States, integrated content and language instruction is an approach to schooling used with bilingual and second language learners, a sector of the population that has been underserved by the educational system (Nieto, 2005; Thomas & Collier, 2002). It offers a way into mainstream classrooms and a promise of success for these learners. The challenge for teachers is to design and deliver lessons that make content comprehensible and that facilitate language acquisition. While this is no small order, we know from research and experience that it is possible to integrate language and content instruction successfully, and that when teachers do so, they have a positive impact on student learning.

Through integrated content and language instruction, second language learners develop the ability to generate thoughtful spoken and written discourse about concepts in a content area, and they develop proficiency in understanding and producing the types of texts specific to that area. Students also develop the ability to carry out other content-related tasks, such as lab experiments, creative mathematical calculations, and historical inquiry. They solve problems, evaluate solutions, and collaborate effectively with one another in these activities through the use of appropriate academic language.

The purpose of this digest is to introduce four key principles of practice found in classrooms in which content and language instruction effectively converge:

1. Clear content and language outcomes are planned for each lesson.
2. Learners are provided with goal-directed opportunities to interact with each other and with the teacher to jointly reflect on and build specific content knowledge and skills.
3. Teachers provide learners with tasks that promote the development of reading, writing, listening, and speaking skills within the content areas.
4. Outcomes are reviewed, consolidated, and assessed during lessons.

Historically, the convergence of content and language instruction stems from the theoretical position that communicative competence (Hymes, 1971) in a second language is facilitated by using the language as a medium for learning content rather than by studying it as a separate and distinct subject area. In an integrated approach, the emphasis on content and language will vary at different times within a lesson and across program models (Shohamy & Inbar, 2006). However, the consistent goal of this instructional approach is to assist second language learners to develop fluency and accuracy in all four language modalities in the context of content-relevant tasks and in the service of building mastery of a body of content knowledge (Gibbons, 2002). Teachers can help ensure that their learners gain proficiency in language skills and master content knowledge by incorporating into their classroom instruction the four principles of practice listed above. The remainder of this digest is devoted to an illustration of these principles.

Planning Clear Content and Language Outcomes for a Lesson

To prepare clear content and language outcomes, teachers draw on a variety of resources that include standards of knowledge and skills in a content area, language proficiency standards, prior student performance assessments, and available course materials.

For example, a mathematics teacher would prepare an integrated content and language lesson by first examining the mathematics standards to determine the concept and skill to be learned, and then selecting course content, tasks, and materials appropriate to the students as determined by assessments of student performance. For instance, in planning to teach the concept of quadratic equations, a teacher might construct the following possible outcome statements: Students will be able to solve quadratic equations, discuss different methods of solving the same quadratic equations, and write a summary of each method. *Solve*, *discuss*, and *write* are the descriptive verbs that determine whether a particular outcome addresses the knowledge and skill of a content area or specific language functions. *Solving* a quadratic equation describes a content outcome, whereas *discussing* and *writing* about the methods used to solve a quadratic equation describe language outcomes related to the content.

Focusing strictly on the verbs in lesson objectives risks oversimplifying the complex process of attending to both content skills and language functions. The verbs, however, provide a sound starting point for integrating language and content in instructional planning. When teachers consciously attempt to sort the descriptive verbs used in standards documents and course materials into separately identified language

and content outcomes, there are at least two key benefits. First, the teachers clarify for themselves the separate content and language foci of the lesson, which can improve their delivery of the instruction. Second, if these foci are both explicitly presented and subsequently reviewed within each lesson, students become aware of the separate content and language goals, which may help them direct and monitor their own learning.

Figure 1 presents a partial list of verbs a teacher might consider in lesson planning. Each column of verbs is directly related to either mathematics outcomes or language outcomes.

Verbs that describe mathematics outcomes	Verbs that describe language outcomes
Solve	Discuss
Compute	Write
Rank	Tell
Identify	Listen
Graph	Explain
Measure	Read

Figure 1. Verbs that describe content and language outcomes

Content and language outcomes for second language learners at different language proficiency levels will generally need to differ according to the students' proficiency. Consequently, it will be important to modify tasks and define student grouping configurations in ways that support the growth of all learners.

Providing Opportunities for Effective Interaction

Effective interaction gives students multiple opportunities for the goal-directed negotiation of meaning. This is required for effective support of integrated content and language learning for two reasons. First, as they interact and create meaning, students map new content knowledge onto prior content knowledge. They do this through spoken and written discourse. Second, students notice the language used, they retrieve needed language from memory, and they generate new configurations of language through spoken and written discourse with each other and with their teacher. (See Robinson & Ellis, 2008, for a full discussion.)

Research has shown that content-based tasks that involve students in noticing, retrieving, and generating language are effective in facilitating second language acquisition (Long, 1996, 2007). For example, information-gap tasks (Pica, 2005) involve pairs of students in negotiating the meaning of content-area texts and materials (e.g., problems from mathematics, questions from science, issues in social science). In information-gap tasks, two students work together to interpret and understand a text. However, each student receives a version of the text that differs in some key points from the version given to the other. The students must communicate the information they have and resolve the differences to achieve a final, accurate, joint version of the text. Figure 2 presents an example from a biology lesson. The words that differ between the two versions are in bold here, but would not be in bold in the versions given to students.

Reviewing the Source of Genetic Variation

Read your paragraphs to each other line by line. Identify the differences between your texts. Discuss reasons for using one word and not another. Don't show each other your paragraphs. Once you've discussed them, work together to write one final version of the paragraph.

Student A

Mitosis is a type of cell division necessary for **sexual** reproduction. It is limited to the reproductive cells in the testes, namely the sperm cells, and the reproductive cells **on** the ovaries, namely the eggs. Meiosis produces **four** reproductive cells, or gametes. These cells contain half the number (**diploid)** of chromosomes of the mother cell, and the chromosomes are not identical. There are two phases of cell division, meiosis I and meiosis II. Before meiosis begins, each pair of chromosomes replicates while the cell is **in** its resting phase (**prophase).** During meiosis I, each set of replicated chromosomes lines up with its **homologous** pair. The homologous pairs of chromosomes can break and exchange segments during the crossing over process, a source of genetic variation. The homologous pairs of chromosomes separate. The cell then splits into two daughter cells, each containing one pair of the homologous chromosomes. **Cytokinesis** is the resting period before meiosis II begins.

Student B

Meiosis is a type of cell division necessary for **asexual** reproduction. It is limited to the reproductive cells in the testes, namely the sperm cells, and the reproductive cells **in** the ovaries, namely the eggs. Meiosis produces **two** reproductive cells, or gametes. These cells contain half the number (**haploid)** of chromosomes of the mother cell, and the chromosomes are not identical. There are two phases of cell division, meiosis I and meiosis II. Before meiosis begins, each pair of chromosomes replicates while the cell is **on** its resting phase (**interphase).** During meiosis I, each set of replicated chromosomes lines up with its **heterozygous** pair. The homologous pairs of chromosomes can break and exchange segments during the crossing over process, a source of genetic variation. The homologous pairs of chromosomes separate. The cell then splits into two daughter cells, each containing one pair of the homologous chromosomes. **Interkinesis** is the resting period before meiosis II begins.

Joint Copy

Meiosis is a type of cell division necessary for **sexual** reproduction. It is limited to the reproductive cells in the testes, namely the sperm cells, and the reproductive cells **in** the ovaries, namely the eggs. Meiosis produces **four** reproductive cells, or gametes. These cells contain half the number (**haploid)** of chromosomes of the mother cell, and the chromosomes are not identical. There are two phases of cell division, meiosis I and meiosis II. Before meiosis begins, each pair of chromosomes replicates while the cell is **in** its resting phase (**interphase).** During meiosis I, each set of replicated chromosomes lines up with its **homologous** pair. The homologous pairs of chromosomes can break and exchange segments during the crossing over process, a source of genetic variation. The homologous pairs of chromosomes separate. The cell then splits into two daughter cells, each containing one pair of the homologous chromosomes. **Interkinesis** is the resting period before meiosis II begins.

Figure 2. Information-gap task

In this example, as two second language learners discuss whether *meiosis* or *mitosis* is necessary for *asexual* or *sexual* reproduction, they begin to notice differences that may not have been salient prior to the discussion, retrieve prior knowledge about this topic, discuss the truth or falsity of the written text, and do all this as they generate utterances in their second language. They also explore the use of the prepositions *in* and *on*. Moreover, there are opportunities to repeat, repair, and request clarification of language while they focus on meaning and reach consensus. This sort of intense, goal-directed interaction has its antecedents in second language instruction and research (Pica, Kang, & Sauro, 2006).

Another type of task that provides similar opportunities for second language learners to interact with content-area knowledge and with each other is a *dictogloss* (Wajnryb, 1990) task. In a dictogloss, students listen to a short talk by a content-area specialist, first for the main idea, then a second time for details. Next, students reconstruct the talk individually. Finally, they discuss their version with a partner or small group and decide on the best version. These are shared with the whole class for a peer-editing session. What students can't peer-edit, the teacher quickly teaches.

In constructing task materials for both information-gap and dictogloss tasks, teachers draw on textbooks and seminal works or primary sources from their field of study so that students learn to grapple with a range of discourse styles. Through these processes, teachers and students begin to develop sensitivity for the textual demands of a variety of texts within a content area. (See Schleppegrell, Achugar, & Oteiza, 2004, for one way of developing this in a history course.)

Promoting the Development and Integration of Reading, Writing, Listening, and Speaking

To address the practice of integrating reading, writing, listening, and speaking, teachers must identify and work with students on two sets of discourse skills—one specific to a subject area, the other general to many areas. Some examples of discourse that are content-area specific are algebraic problems, geometry proofs, experimental studies, newspaper items, poetry, history, community surveys, and interviews. Those that are generic include summary, comparison, and outline. Teachers then provide opportunities for students to improve all four skills—reading, writing, listening, and speaking—across a variety of text types, including some specific to their subject area and others that are generic. Text-based tasks can be integrated into cooperative learning jigsaws (Aronson, Blaney, Stephin, Sikes, & Snapp, 1978), where students become experts on topics through texts that they read or listen to, take notes on, and teach to peers. Writing workshops, book study sections, student presentations, and student panels have been part of language arts classes and are encouraged in science, math, social studies, art, and music. Other approaches such as writing across the curriculum and reflective journaling have included math and science for some time and are also useful for writing development. When learners discuss their journal entries with other learners and edit and check each other's written work, more opportunities come into play for oral academic language development as well.

Additionally, important concepts and content-rich vocabulary need to be learned in context through tasks that provide elaborated relevant examples and visual support (Nation, 2004). By highlighting and emphasizing new vocabulary, teachers can make new content comprehensible. Through the use of graphic organizers, students can understand text structure and organize important content-area knowledge for sharing with others and for further study (Echevarria, Short, & Powers, 2006).

Reviewing, Consolidating, and Assessing Progress

Effective integration of content and language instruction occurs when there is a focus on assessing student outcomes. Instructional practice includes the review and consolidation of what has been accomplished in a lesson by comparing planned outcomes with actual ones. Such an evaluation of progress is best accomplished through multiple pathways in which both informal and formal assessments are conducted (Gottlieb, 2006; Shohamy & Inbar, 2006; Valdez-Pierce, 2003) and in which both teachers and students take responsibility for the review and evaluation. States and local school districts administer formal, standards-based, summative assessments for accountability purposes and to track student progress. More frequent—and arguably more informative for instruction—is the formative assessment that takes place in the classroom on an ongoing basis. Formative assessments include review activities combined with portfolios of performance-based products (e.g., project work, writing samples, video clips of role plays and interviews, Web pages, multimedia presentations, surveys) and teacher-made tests, essay assignments, and quizzes. When student outcomes are assessed through performance-based tasks, there is opportunity for rich, in-depth evaluation of individual and interactive student learning.

In evaluating student work, teachers develop checklists and rubrics for assessment, sometimes in collaboration with students. Rubrics can be generic within a content area or across subjects, or they can be specific to a particular task. The same or similar rubrics may be used for both summative and formative assessment. In addition, when assessment of language and content is integrated into instruction on an ongoing basis through performance-based tasks, the spoken and written discourse produced by students is often aligned to the essential questions of a content area or to identified important themes. As a consequence, instruction is shaped by meaningful questions for student-generated inquiry, study, discussion, and presentation, and learning comes full circle. Introducing performance tasks with essential questions and rubrics makes desired learning and criteria for success transparent to the students (see Wiggins & McTighe, 2005).

The incorporation of review and evaluation within instruction can also focus on promoting students' ongoing assessment of their own work. For example, there may be explicit instruction in learning strategies that encourages students to become aware of and monitor their own learning through activities such as predicting, visualizing, identifying main ideas, and raising critical questions about content (see Chamot & O'Malley, 1994). The goal of strategy instruction is to help students become self-regulated learners and to incorporate student self- and peer assessments into the learning process, along with teacher assessments of student language and content knowledge.

Conclusion

Integrated content and language instruction is a commitment to teach and assess the knowledge, skills, and language of a content area. The approach highlights the responsibility of *all* teachers within a school to intentionally support a dual focus on content and language because it is critical for the success of second language students. This digest has outlined four principles of instructional practice that foster integrated content and language instruction: (1) identification of content and language outcomes; (2) goal-directed interaction among learners, teachers, and others; (3) integration of reading, writing, listening, and speaking; and (4) ongoing review, consolidation, and assessment of outcomes.

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