

Interdisciplinary Instruction

by Laura L. Duerr

Middle school students are naturally curious about their expanding possibilities. This stage of their lives is a time of transition, of figuring out who they are and where they belong in the world. Many students also think that the world they look at through the classroom window is distant and unconnected to the world of chalkboards and pop quizzes they inhabit between the hours of eight and three.

Models of middle school education have often included teacher and community expectations developmentally inappropriate for young adolescents; in fact, middle school students were often treated more like smaller versions of high school students (Foster 2002). A newer model of the middle school seeks to explore many areas of recreational as well as academic and vocational interest (George et al. 1992). But what exploration opportunities, limited only to what the school can think of, fund, and staff, should be offered? Should the developmental needs of young adolescents determine the content of the curriculum? Should we be thinking about what students themselves want to learn? According to Howard Gardner:

Students want to master rules of their cultures and of its specific vocations and avocations. They want to use language precisely, not allusively: they want to draw pictures that are photographically realistic, not fanciful or abstract: and they expect a strict adherence to rules in dress, behavior, games, moral situations and other cultural activities, brooking little deviation. (Gardner 1989)

Balancing Traditional and Modern Pedagogy through Interdisciplinary Instruction

Effective schools balance depth with breadth and provide experiences that help young people become more sophisticated. That can be accomplished through a mix of traditional and modern ideas: teaching methods and methods that accommodate students' eagerness for individual

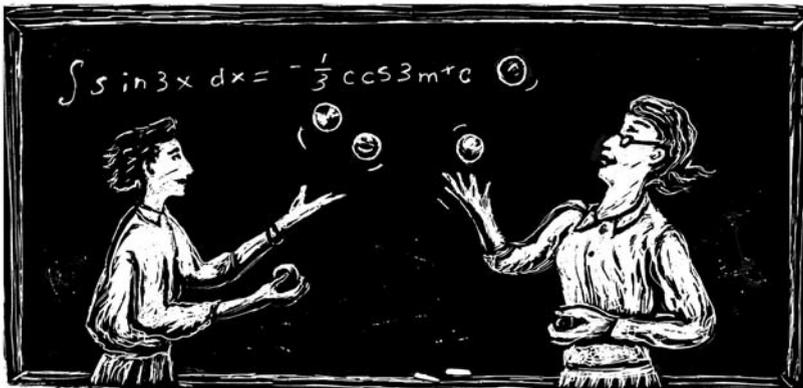
choices, for firsthand experiences, and for varied learning contexts (George et al. 1992).

Why interdisciplinary units? For one, most children are familiar with narrative texts: storybooks, chapter book series, magazines, and pop-up books. It is the transition to content texts that most often leads to the genuine difficulties children experience with reading. Teachers should not only help students learn how to read and comprehend texts but also understand what makes a text “easy” or more challenging. Through a variety of resources, teachers can ease the transition from narrative texts to content reading. In addition to using such resources, teachers must at all times model and use a vast repertoire to bolster students’ independent reading skills and comprehension tactics. Web sites, trade books, and nonfiction texts all activate students’ prior knowledge of a given subject.

The common dictionary definition of curriculum “as a set of courses or subjects offered by an institution” simply doesn’t go far enough (Tchudi and Mitchell 1999). Teaching students effectively requires coherence across subject areas rather than isolation (Tchudi and Mitchell 1999). Interdisciplinary Instruction (IDI) serves to integrate areas rather than isolate them. Not only do many educational authorities prescribe IDI for middle school use, but in addition “probably no single word has been more frequently cited in relationship to the middle school than has the word ‘interdisciplinary’” (Lounsbury 1992).

Why Textbooks Are Not Enough

Effective instruction in both science and English language arts (ELA) emphasizes the learner’s active construction of meaning (O’Brien 2005). This “minds-on, sense-making” approach to learning is violated by many science texts and basal readers, which emphasize isolated, de-contextualized skills, words, and facts (O’Brien 2005).



Nonetheless, textbooks have become the de facto curriculum in many U.S. schools (Thomas B. Fordham Institute 2004). A 2002 survey found that some 80 percent of elementary and high school teachers use textbooks in their classrooms, and nearly half of class time involves textbooks (Thomas B. Fordham Institute 2004). Another survey, sponsored by the National Education Association and the Association of American Publishers, revealed that those numbers probably understate teachers' and students' true dependence on textbooks: shadow studies tracking teachers' school days suggest that 80 to 90 percent of classroom and homework assignments are textbook driven or textbook centered (Thomas B. Fordham Institute 2004).

Although it is possible for textbooks to be creative and accurate, few textbooks treat subject matter with the breadth and depth necessary to develop ideas and concepts fully. They are often poorly organized, dull, inaccurate, biased, written at high levels of difficulty, and unappealing to students (Vacca and Vacca 2005). However, using quality textbooks with creative, "hands-on" science activities and a variety of relevant and high-quality trade books creates a more holistic means of teaching science and ELA in a motivational and meaningful context centered on student activity (O'Brien 2005). A nonfiction or fiction trade book can act as a magnifying lens that enlarges and enhances the reader's personal interactions with a subject (Vacca and Vacca 2005). Used in tandem, texts and trade books help learners think critically about content; they can transform blanded, dull material into rich, personalized perspectives on a given content-area topic.

Furthermore, the real value of literacy lies in its uses (Vacca and Vacca 2005). As meaningful contributors to society, readers and writers use and adapt strategies to meet the demands of a given task at hand. Learning with trade books involves exposure to many different genres, all potential sources of information for the active learner (Vacca and Vacca 2005). A fiction or nonfiction trade book can act as a "magnifying glass" that enlarges and enhances the reader's personal interactions with a subject (Vacca and Vacca 2005).

What Curriculum Should Mean

The word "curriculum" is by its own definition a noun: a thing. But that is a flat definition. Isn't the goal of educators everywhere to engage students in what they're learning? Why can't curriculum be transformed into a verb, something dynamic and ever changing, in which ideas, books, and concepts come alive? In the end, curriculum should be not a dusty, brittle list of goals and objectives but a flexible set of relationships and activities that evolve from a group of adults (teachers) and a larger number of young people (students) interacting with a set of resources (Tchudi and Mitchell 1999). When functioning correctly, these parts produce a community of language in which students steadily and coherently increase the range and

complexity of their language skills by reading, writing, and discussing their concerns (Tchudi and Mitchell 1999). In many ways, the content-area classroom is the perfect place for students to connect with books because it allows students to network and build webs of meaning about a topic through a variety of resources (Vacca and Vacca 2005). Through such experiences, students construct their own meanings by evaluating information, connecting ideas across sources, comparing and contrasting information, and reflecting on conclusions (Vacca and Vacca 2005).

Additionally, it has been repeatedly evidenced that students are more likely to remember personally meaningful material. And it's apparent that using modern literature in tandem with textbooks overcomes many of the limitations—comprehension, vocabulary, and application to real-world scenarios—that students face when reading. The best trade books provide depth, accurate information, varied reading levels, and motivation for learning (Vacca and Vacca 2005).

Integration and Connection of Subject Material

Integrating texts with trade books provides a refreshing perspective on a particular topic within a given subject area. A cross-curricular integrative stand makes material meaningful because it becomes connected. A science teacher's job is influencing students to think like scientists, and the best way for them to do that is learning to read, experiment, and write like scientists (Baker 1991, as referenced in Vacca and Vacca 2005). Showing students how to think like scientists encourages independent learning by teaching them strategies to manage texts. Students are able to bring their personal interests and talents into the classroom, and the material makes sense when students can interact with the content and create their own meanings. Students see the point of what they are learning, making it more likely that students will take an interest in the subject and experience success.

Benefits of Integration

The benefits of an integrated approach are considerable. Reading increases students' vocabulary and exposure to the language of a discipline. What does that mean? Students learn to think like scientists, historians, mathematicians, and writers. They learn to take an independent rather than a passive approach. Though texts tend to compile information, trade books present much the same material in more appealing ways. By going beyond the facts, literature sharpens understanding of topics within specific disciplines. Literature allows readers to live vicariously and expands students' perceptions and understandings of their world. Trade books can be catalysts for thoughtful analysis and critical thinking, skills in which most students need constant practice. Finally,

good reading experiences motivate students to seek further reading and learning experiences: the grail of education, continuous learning.

There are wonderful uses of literature for content classes. For example, a read-aloud can involve five minutes or twenty, daily or weekly, and it can be used to investigate, expand, or illustrate concepts. Additional integration can entail complementary readings, in which the whole class reads a specific book during a thematic unit or small circles use several books related to the unit. Sustained silent reading restricted to a subject area can introduce children to different genres: for example, restricting reading to science fiction can encourage scientific awareness. Post-reading, students respond with journals and writings designed to activate newly gained knowledge and encourage exploration.

I regard middle schoolers as the most inquisitive age group, constantly searching toward independence and self-discovery. Teacher-education programs require every candidate for middle-level schools to select two subject concentrations, and as an undergraduate I chose language arts and science. Nearly every adviser, teacher, and peer I've encountered has questioned, "Why those two? Why not combine science and math, or language arts and music?" It certainly is more traditional to associate the logical with the logical, the artistic with the artistic.

A good teacher needs a deep understanding of the material to be taught, but the great teacher, one who inspires a love of learning and a thirst for knowledge in students, must love the subject and reflect that passion to students. Middle-level language arts is important because so many modern teenagers use writing as a form of therapy and reading to escape the peer-pressured, angst-ridden world with which so many pre-adolescents and adolescents identify. If there were a way to marry science and language arts, would my colleagues' opinion change? Are the two subjects really that separate? With interdisciplinary instruction, students can become more involved in their learning and teachers can work toward eliminating discipline lines. Students can become independent, confident individuals who "learn how to learn" and develop lifelong learning skills (Manning and Bucher 2005).

The development of young adolescents prepares them for IDI. Their cognitive development allows them to see relationships among content areas and understand principles that cross curricular lines. Their psychosocial development gives them the ability to understand people and to look at situations from various viewpoints. Successful curriculum integration and IDI allow young adolescents to see wholeness rather than fragmentation. They can also confront questions and engage in experiences that are personally meaningful to them. (Manning and Bucher 2005)

In such ways can middle-level students benefit from interdisciplinary instruction. Reading literary and informational texts is an important component of all statewide proficiency assessments in reading and language arts (Vacca and Vacca 2005). In addition, most proficiency assessments outside reading are actually assessments of literacy (Vacca and Vacca 2005). Students must read and write effectively in order to meet those increasing demands, and the standards for science and language arts tend to incorporate personal ideas with learned knowledge to make information meaningful.

Weaknesses and Limitations of Interdisciplinary Instruction

What are the problems and pleasures of creating and implementing an interdisciplinary curriculum? Bintz et al. note, "One of the pleasures . . . [is that] looking forward is just as important as looking backward when it comes to teaching and learning" (2006). But it is difficult to see the forest for the trees. Interdisciplinary units (IDUs) are time-consuming to create and require teachers to know their students on a developmental as well as a needs-based level.

The future of interdisciplinary instruction is a thrilling concept: what's not to like about weaving a curriculum that works like real-life problem solving? Although integrating science, math, language arts, and social studies (and maybe even the arts and foreign language studies) may seem daunting, the overall result of a well-designed and purposeful interdisciplinary unit is rewarding. As one teacher notes:

This unit was an exciting opportunity for all of us. We had discussed interdisciplinary instruction before but were not sure how to overcome the scheduling difficulties. It was interesting to see something implemented that we have studied, but not experienced firsthand. (Bintz et al. 2006)

Many middle-level teachers have found that planning interdisciplinary units challenges their thinking skills as well as those of their students. That can be a hurdle before it is a pleasure (Cheney 2001). Obviously, interdisciplinary units cannot be delivered off the cuff. They require careful planning and review of grade-level standards, learner characteristics, and teacher objectives. Bintz et al. noted that the biggest problems include "scheduling students and dealing with time and space constraints" (2006). Planning an interdisciplinary unit also requires coordinating and collaborating with other grade-level faculty and subject-area specialists in the school. Just as a football coach does not enter a game without a plan, a teacher cannot enter a classroom unprepared.

As the most crucial point of development in an effective interdisciplinary plan, the planning stage is consequently the most difficult. Rushed planning may tempt teachers to focus on material already mastered by the students: “Too often an IDU just teaches better what shouldn’t be taught in the first place” (Lounsbury 1992).

Many teachers complain that it is difficult enough to “cover” their own subjects without struggling through long planning sessions with other teachers of various disciplines (Davidson and Worsham 1992). Only by stretching the imagination and harnessing one’s creativity can one trim the curriculum and tailor it to suit numerous interdisciplinary themes.

Creating a Successful Interdisciplinary Unit

It is important to note other teachers’ objectives and teaching methods, because overlap is common. It is also important for everyone collaborating on an interdisciplinary unit to understand what is expected and what is occurring in the other classrooms; that way, no individual class gets further ahead of or behind the other.

The ultimate goal of integrated instruction extends far beyond fusing two or more subjects: effective IDI also requires using cooperative learning and teaching. Needed opportunities for integrating instruction and improving learning for kids are created immediately by connecting students as learning groups and teachers as teaching teams.

Davidson and Worsham (1992) list eight steps of the thinking-skills approach that “can be applied at any educational level and in any and all content areas.”

1. Analyzing the curriculum objectives to determine categories and levels of thinking required for mastery.
2. Assessing the learners’ cognitive needs regarding curriculum objectives.
3. Developing a list of thinking skills to be taught or selecting skills from existing lists.
4. Developing a long-range plan for sequencing thinking-skills instruction.
5. Defining each skill.
6. Listing the steps involved in applying each skill.
7. Applying the skills to the curriculum.
8. Testing for skill mastery.

Conclusion

According to Harold Foster, “Writing is discovery” (2002); according to Francis Bacon, “Science is the labor and handicraft of the mind” (<http://www.thup.edubdsimanek/sciqoute.htm>).

Teachers must believe that excellent pedagogy helps students discover how their own minds work and test the limits of their creative and academic skills. Integrating science and English language arts not only is developmentally appropriate for middle-level students, but the standards meant to address skills also evidence ways to intertwine the two subject areas.

Interdisciplinary instruction can be meaningful, engaging, and educational for students who seek to internalize their learning experiences. Interdisciplinary instruction accentuates the best of both, or even multiple, worlds. It encourages critical thinking skills, the creativity of both teachers and students, and a fresh outlook on teaching methods. It is a worthwhile approach toward making learning more effective for all students, especially that group seemingly most likely to be lost in the sea of academia: adolescents.

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