Rich Tasks

Open-ended tasks involve students in connecting their learning to the real world.

Phillip Moulds

In our classrooms, we teach much more than just topics. Our approach to the content has considerable weight in how well we teach. Moreover, an individual teacher's design and implementation of a particular subject—be it addition, poetry, or geology—is likely to be quite different from the approaches of other teachers. For example, focusing on the events that led the United States to enter World War II is fundamentally different from teaching the same content through the question, Should U.S. President Truman have authorized the bombing of Nagasaki and Hiroshima? (Perkins, 2002).

As teachers strive to engage students in the learning process, make the content meaningful, and foster connections among ideas and disciplines, they continually make important decisions. How can teachers best provide students with effective learning experiences?

Designing *rich tasks*—purposeful activities that connect to the world beyond the classroom—offers one way to reconceptualize the curriculum and teach more effectively. By linking real tasks with traditional curriculum topics, teachers can approach topics in context, build student understanding, and make connections within and across topics and disciplines.

What Is a Rich Task?

Education standards and curriculum guidelines throughout the world are challenging teachers to make school-

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Year 12 students at Brisbane Grammar School in Brisbane, Australia, analyze water samples in the laboratory (top) and in the field (bottom).

based learning relate to the world beyond the classroom (Costa & Kallick, 2000; Marzano et al., 1997; Queensland Studies Authority, 2001). In Australia, the Queensland Studies Authority syllabus for preschool through year 12 (2001) emphasizes learning key concepts in real-world contexts, and Education Queensland (2001) recommends the use of rich tasks to invigorate such learning, defining a rich task as a

> culminating performance or demonstration or product that is purposeful and models a life role. It presents substantive, real problems to solve and engages learners in forms of pragmatic social action that have real value in the world. The problems require identification, analysis, and resolution and require students to analyze, theorize, and engage intellectually with the world. In this way, tasks connect to the world outside the classroom. (p. 5)

Education Queensland specifies that rich tasks should be *transdisciplinary,* drawing on practices and skills across the disciplines while retaining the integrity of the separate disciplines. Rich tasks, however, can also be *disciplinary,* making connections among concepts and processes within one discipline.

Criteria for Rich Tasks

We can use three criteria, similar to those proposed by Perkins (1992), to judge the value of a rich task: focus on the discipline or disciplines, abundant connections to a real-world context, and accessibility to students.

Focus on learning a discipline. Teachers have long made use of themes to teach geography, science, history, and mathematics. A theme can make a topic more accessible to students, but it does not necessarily use the approaches of specific disciplines. For example, a teacher may choose the theme of earthquakes for use in a year 7 classroom. The unit might involve locating earthquakes on a map with a coordinate grid, collecting data on earthquakes, and reading accounts of earthquakes. Students may cover a lot of content but not explore central ideas from one or more disciplinary areas.

Rich tasks move an important step beyond thematic units by focusing on the core ideas of the discipline, including subject-specific knowledge and its accompanying thinking processes. For example, as part of a transdisciplinary rich task, students might investigate how seismologists determine the epicenter of an earthquake.

Rich tasks invite an open-ended exploration of a topic, involve learning the language of a particular discipline, and demand complex reasoning processes.

Connections to a real-world context. The Queensland Studies Authority's pilot syllabus for chemistry (2001) defines a *context* as "a group of related situations, phenomena, technological applications, and social issues likely to be encountered by students" (p. 10), such as drugs, medicine, soil chemistry, fuels, and photography. Placing subjects in context helps make the curriculum more relevant (Fensham, 1994; Marzano, 1992; Perkins, 2002), and rich tasks are necessarily embedded in meaningful contexts. Beyond understanding context, however, rich tasks require students to apply their knowledge to real-world situations. In the study of earthquakes, for example, students might formulate risk assessments for constructing certain kinds of buildings in a particular place.

Accessibility to students. The power of rich tasks lies in their ability to actively engage students in the completion of a meaningful product. The connection to real-world problems motivates students and makes the material more accessible. To ensure accessibility, teachers need to

- Present the rich task and learning experiences leading up to it in a clear, logical sequence.
- Model precise communication, flexible thinking, and complex reasoning processes for understanding important concepts.
- Align classroom learning with the assessment task by providing students with opportunities throughout the unit to develop the thinking processes required to engage in the final task.
- Incorporate reflective activities that encourage students to question their understanding and thinking throughout the unit.
- Develop assessment procedures that emphasize students' understanding of important concepts and demonstration of complex thinking processes.

Enriching the Humanities

The topic of World War I appears in most junior high school courses. Typically, students look at pictures from textbooks, watch video presentations, and answer comprehension questions about the historical events. One different approach is to ask students to consider a specific question, such as Should Australian soldiers have been under the command of the British forces in World War I?

By moving away from the disconnected activities of the traditional unit to the more coherent problem-based approach, students become motivated to explore historical events and primary

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documents so that they can develop the knowledge and skills necessary to respond thoughtfully to the question posed.

This rich task offers students the opportunity to address ideas that are both central to the humanities and of personal interest to students, such as authority, independence, fairness, courage, and identity. Students make meaningful connections between concepts while developing their ability to reflect and communicate with clarity and precision.

The Brisbane River Project

In a unit on solubility and acid/base chemistry in a senior chemistry course, students investigated the water quality of the Brisbane River. Students needed to analyze data from a number of sampling sites along the river, compare and contrast their findings with government standards of water quality for recreational use of the river, and make recommendations for improving the river's water quality.

By using the task of assessing the water quality of the Brisbane River as a focus for the unit, students moved beyond the acquisition of discrete facts and processes to gain a dynamic understanding of the role that solubility and acid/base chemistry plays in the world's environment. For example, rather than just making solubility product calculations for predicting precipitates, students developed an understanding of the importance of the formation of precipitates at particular ion concentrations and noted the significance of this relationship to test sensitivity. This understanding demonstrated students' appreciation of the testing procedures and the ways in which the presence and the amount of different substances within a water sample may affect the data collected.

Before engaging in the Brisbane River task, students needed to develop the knowledge and complex reasoning processes necessary for completing the task successfully. They first studied the variation in solubility of a number of substances over a wide temperature range, analyzed tables and graphs and learning concepts central to understanding solubility, and practiced the process of classification as they developed operational definitions for acids and bases.

For rich tasks to be successful, the preliminary learning experiences that students complete must connect directly to the culminating task. The preliminary learning experiences of the Brisbane River project included experimental activities that developed students' understanding of solubility, acid/base chemistry, and the scientific process. For example, students experimented using two different procedures to determine the chloride concentrations of water samples that did not come from the Brisbane River. The samples that students tested showed a wide range of chloride concentrations, preparing students to determine the presence of chloride ions in the Brisbane River water samples. Students considered which procedure was more suitable for measuring concentrations of chloride ions in the Brisbane River and then justified their conclusions.

For the culminating product of the unit, students wrote reports that drew on their readings, evaluated data from their water samples, discussed the implications of their findings, and argued for specific ways to improve the water quality of the Brisbane River. The reports began by presenting the river's current state, including its geography

and industrial, agricultural, and recreational uses.

Students then presented maps, descriptions, data, and observations from each sampling, including tables and graphs that identified trends and comparisons among sites. The reports discussed the testing procedures and their accuracy, analyzed and interpreted the data collected at each site, and identified patterns related to local land and river use. Referring to standards for the recreational use of water bodies, students assessed the current water quality of the Brisbane River and made carefully argued recommendations for improving the river's water quality. They subsequently forwarded their recommendations to a number of government agencies and professional organizations for their consideration.

The power of rich tasks lies in their ability to actively engage students in the completion of a meaningful product.

Assessing a Rich Task

Traditional assessments of chemistry units about solubility and acid/base chemistry are typically pen-and-paper tests administered at the completion of the unit. The work within the unit progresses from one aspect of the topic to another, with the test sampling student performance in these different areas. Without a clear vision of what students should be able to do with their understanding apart from answer the test questions, teachers often fail to impart a sense of connection between the concepts or a realization of how their learning activities apply to the real world. Both formative and summative assessment suffer, focusing only on students' knowledge of discrete facts and ability to perform certain calculations rather than on an understanding of central solubility, acid/base ideas, and the multifaceted nature of chemistry as a discipline. Traditional assessments show what students can do and remember, but they do not reveal whether students can understand and apply the core concepts in a meaningful context.

Throughout the course of the Brisbane River unit, classroom learning experiences enabled students to complete the task successfully, thereby aligning the planned, enacted, and assessed curriculum. To evaluate student work on this rich task, the rubrics assessed and provided feedback on student performance. Students' responses in their Brisbane River reports demonstrated that students had gained a deep understanding of solubility and acid/base chemistry, the processes of science, and science's connections to the real world. Students presented sophisticated arguments that made use of the evidence that they had gathered and of their new understandings of chemistry to recommend ways to improve the water quality of the Brisbane River.

Teaching in Depth

Rich tasks are consistent with current calls for reforms in school-based education and for greater emphasis on higher-order thinking, deeper understanding of core concepts, and better communication skills. Rich tasks also corroborate the research conducted by Anderson and colleagues (1994) showing the value of "less is more": teaching fewer concepts in greater depth rather than teaching more content.

Simply incorporating a topic into a theme or context does not constitute a rich task; instead, rich tasks invite an open-ended exploration of a topic, involve learning the language of a particular discipline, and demand complex reasoning processes. Through the use of rich tasks, teachers and students can develop deep understandings of the world. ■

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