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Facilitating Integration across the Geology Program: Applying "Weaving the Curriculum" to Petrology and Structural Geology Courses

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2008 Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM

Paper No. 275-9

Presentation Time: 4:00 PM-4:15 PM

Facilitating Integration across the Geology Program: Applying "Weaving the Curriculum" to Petrology and Structural Geology Courses

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Students often encounter difficulty with advanced material in upper-level geology courses (crystallography, stress and strain, mineral reactions). We identified several trends that arise at the beginning of upper-level courses including difficulty in connecting introductory course material to deeper content, integrating skills and knowledge from supporting courses (physics, chemistry, calculus), and integrating material between upper-level courses (Structure, Petrology). From students' perspective, the curriculum appears as a series of discrete courses versus an integrated informational tapestry. Redesigning upper-level courses, we intentionally incorporate relevant material from introductory geoscience courses into upper-level courses, such that students are re-exposed to fundamental concepts they need to master as more advanced concepts are taught. Far from simply being "review", the students are also asked questions that their current knowledge base cannot readily answer.

Bowen's Reaction Series provides an excellent example of our method. Although students are exposed to this concept in our introductory course, in the upper-level petrology course the concept is brought out and deconstructed at greater depth as an in-class group exercise. Gaps in their knowledge become apparent and are promptly addressed. This aids students in connecting prior knowledge with newer concepts and builds student confidence in their capacity to master new material. A simplified discussion of the olivine-pyroxene transition follows. Later, as the students study phase diagrams, the olivine-pyroxene transition is brought back and explored on a deeper level. Students also learn basic folds in the introductory course, which are reviewed in Structure. When students are asked to name recumbent folds, they see their vocabulary of fold classification is simplistic, leading into a fuller discussion of fold geometry. In both examples, fundamental concepts are continually revisited at higher levels of complexity. Students well-equipped with foundational knowledge and an awareness of its limits are better able to connect new terms and concepts to prior knowledge.

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[General Information for this Meeting](#)

Session No. 275

[Teaching Petrology and Structural Geology in the 21st Century](#)

George R. Brown Convention Center: 332BE

1:30 PM-5:30 PM, Tuesday, 7 October 2008

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