

Knowing and Learning in Mathematics and Science

A traditional certification program typically includes, early on, a general-purpose educational psychology course. While similarly placed in the FSU-Teach program, the Knowing and Learning course was developed as a significant alternative to such an all-inclusive, all-things-to-all-people course. Rather than pursue very general claims about knowing and learning across disciplines and ages and rather than being based on only one formal perspective (educational psychology), FSU-Teach’s Knowing and Learning course is intended to focus on knowing and learning in secondary mathematics and science as understood from a multidisciplinary perspective. The course stands on the premise that formal research on knowing and learning in mathematics and science has emerged, in itself, as a robust line of inquiry and design. This line of inquiry has tended to be situated relative to classroom practice and draw on significant insights from many fields of inquiry, including psychology, anthropology, critical literacy, sociology, biology, linguistics, neuroscience, philosophy, developmental theory, artificial intelligence, and the domains of mathematics, science, and computer science proper. Some now call this integration of domains a “learning science” perspective.

This course is not simply a general survey of theories of mathematical knowing and learning. Instead, the primary goal of Knowing and Learning is to provide students with the opportunity to identify theories and employ these theories to guide their own practice. FSU-Teach is committed to the idea that practice and theory build on each other. Any teaching practice is guided by some theory of how people learn. If students are not aware of this, they are likely to adopt teaching practices without considering the full implications of theory behind them. FSU-Teach wants its students to be thoughtful and reflective practitioners.

Course Objectives: Knowing and Learning

Students Will Be Able To:	Evidence (Student Products)
Articulate various standards for knowing science and mathematics and articulate the implications of these standards for assessment, especially standardized assessment	Meaningful contributions to class discussions Comments posted about analysis of readings Analysis of clinical interviews Written examinations
Describe how knowing and learning are structured and how what people know changes and develops	Meaningful contributions to class discussions Comments posted about analysis of readings Analysis of clinical interviews Written examinations
Describe various paradigms for evaluating science and mathematics understanding	Meaningful contributions to class discussions Comments posted about analysis of readings Written examinations
Describe the links between knowing and developing in learning theory and the content and evolution of scientific ideas	Meaningful contributions to class discussions Comments posted about analysis of readings Analysis of clinical interviews Written examinations
Complete three mini clinical	Report including transcription and analysis of

interviews with an expert/novice pairing on a topic	clinical interviews Rubric given to students before clinical interview to clarify what will be assessed
Express informed opinions on current issues and tensions in education, especially as they relate to mathematics and science instruction	Meaningful contributions to class discussions Comments posted about analysis of readings Analysis of clinical interviews Written examinations