Foreword

In November 2007, the Inaugural Conference of the International Mind, Brain and Education Society (IMBES) was held in Fort Worth, Texas. Its purpose was to foster collaboration between practitioners and researchers in the neurosciences, cognitive sciences, and similar fields. Interestingly, and unlike past practice, educators were also included in this group. Each of us knows “default educators,” members of any given profession who believe, because they completed their own professional program, that they can teach in their field. There is no doubt that some are able to do so—a few are remarkably talented—yet many are not. In Online Science Learning: Best Practices and Technologies, we hear from two scientists who made the deliberate decision, years ago, to embrace professional education praxis.

The praxis of Downing and Holtz is matter-of-fact, yet thorough, much like the authors themselves. These are researchers and educators who read widely, think globally, and act locally. They use the tenets presented here in each of their courses, whether online or on-site in format, and whether learners are adult or traditional-aged. In fact, Kevin Downing’s emphasis on experiential learning in science made him instrumental in establishing their current online program, and Jennifer Holtz’s previous work with resident physicians informed her current practice philosophy.

Their lack of credence with more ephemeral aspects of education and learning theory is palpable, yet they clearly identify valuable features from behaviorism, cognitivism, and constructivism, typically those based on reproducible research. These they merge with neurological advances in learning to posit neuro-cognitive instrumentalism, a learning theory that emphasizes hypothetico-predictive behaviors that current evidence supports as naturally occurring. Their work is well grounded in both contemporary and classic education and learning literature, yet it requires us to think differently, more inventively, about ideas that we believe we understand.

Although the titular focus is online science learning, the model presented is also applicable to on-site courses that incorporate—or could incorporate—computer-based learning activities. Furthermore, as Downing and Holtz address in Chapter III, the tenets developed here likely
have application to secondary, as well as tertiary, education applications that could improve
the state of science education for all learners, regardless of the method of instruction.

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