Abstract: With the advent of computer-based instructional technologies, the use of hybrid/flipped classroom structures and fully online course offerings are rapidly expanding in higher education. Though the use of these types of classroom structures often meet resistance from instructors, the theoretical frameworks of cognitive load theory and the cognitive theory of multimedia learning suggest these approaches, if implemented appropriately, will lead to improved student performance relative to traditional in-person courses that rely heavily on passive lectures. The implementation of hybrid/flipped classrooms in the undergraduate general chemistry and organic chemistry course sequences, and the implementation of a fully online preparatory chemistry course will be described. Research studies that aimed to measure student learning outcomes in courses incorporating significant online learning and the implications for classroom practitioners will also be presented.