Part III
Teaching Chemistry

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The eight chapters in this section relate to chemistry teacher education and chemistry teaching. In the category of chemistry teacher education, Sulaiman and Ismail investigated Malaysian pre-service chemistry teachers' mental models of science teaching and learning, and found these pre-service chemistry teachers practice mainly teacher-centered teaching and learning. Lu, Chen, Shen, and Li used video case instruction to enhance Chinese pre-service chemistry teachers' instructional design and implementing competency and found these teachers' instructional design and implementation in "electron configuration of the atom" increases after 3 months of implementation. Mamlok-Naaman, Blonder, and Hofstein introduce an Israeli chemistry teacher education program that consists of three steps: course lectures to enhance teachers' content knowledge, follow-up tutoring lessons that aim to elaborate students' understanding of content knowledge, and, the final step, the workshop coordinated by science teaching groups that addresses how to apply science knowledge into teaching contexts. This teacher education program approach can enhance chemistry teachers' content knowledge and pedagogical knowledge. Finally, Mohamed, Abdullah and Ismail investigated 78 Malaysian primary teachers about their perceptions about practical science activities implemented in primary schools. The practical science activities provided opportunities for students to engage in scientific investigations through hands-on activities and experimentation. They found teachers were concerned about the cost, safety, waste disposal, and teacher preparation in implementation of practical science activities. The authors suggest the microscience approach is feasible for implementing future practical science activities in primary schools.

The second part of this section focuses on chemistry teaching. Kyle, Bacon, Park, Griffin, Cummins, Hooks, Qian, and Fan examined several instructional approaches: hands-on demonstration, technology concentrated online learning tool,

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and process-oriented guided inquiry learning to connect chemistry and engineering to a group of engineering majors. Toward the end of their study, students perceived the usefulness of these instructions in building their understanding of the connections between chemistry and engineering. Teh and Yakob used a quasi-experimental design to investigate the effectiveness of a problem-based learning (PBL) technique to teach cell potential of electrochemistry to a group of 18-year-old college students. Findings indicated that PBL instruction enhanced students' understanding of cell potential. Grunwald introduces teaching catalysis by means of enzymes and microorganisms. This teaching example does not only reduce the time for teaching but also provides interdisciplinary element. Finally, Golemi presents a method for explaining the module "Metabolism of Organic Substances" in biochemistry through diagram drawing and explaining.