The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy). The Common Core State Standards in Mathematics provide ample opportunities for teachers to use multiple available ICTs (Information and Communication Technologies) to support mathematics teaching and learning. From the grade level content standards to the Standards for Mathematical Practice there is a need to provide examples about effective ways that technology can be integrated into mathematics classrooms.

Based on an available air-quality monitoring network, the data integration technologies will be applied to identify the scenarios of the possible emission source and the dynamic pollutant monitor result, so as to timely and effectively support diagnostic and prognostic decisions. Qualitative and mixed methods researchers have employed a variety of information and communication technology (ICT) tools, simulated or virtual environments, information systems, information devices and data analysis tools in this field. With the collection and representation of information in a range of ways, software tools have been created to manage and store these data. This data management enables more efficient searching ability of various types of digitized information. Various technologies have made the work of research more efficient. The results of the qualitative or mixed methods research may be integrated to reach the research target. Right now, a lot of software tools are available for the analysis to identify knowledge patterns and represent new meanings. The programs extend the capabilities of the researcher in terms of information coding and meaning-making. Machine-enhanced analytics has enabled the identification of aspects of interest such as correlations and anomalies from large datasets.

In this chapter, we will present the introduction of currently available Information and Communication Technologies (ICTs) and their application to create e-learning environment to prepare for the students’ future engineering education. Actually mathematical methods and techniques such as ordinary and partial differential equations, stochastic processes, calculus of variations, and nonlinear
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