



Statistics as a science of techniques for inquiry and problem-solving

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One conception of statistics is as a mathematical science, where mathematical modeling allows insight into the internal logic of statistical inference. In industrial statistics, quality engineering and operations management, statistics is evolving into an altogether different science, which aims to build knowledge about the use of statistical techniques in their functional context. In this view, statistics is seen more as an engineering than as mathematical science. In the presentation we will briefly explore this notion of statistics using the concepts of Herbert Simon's theory of the *Sciences of the Artificial*. Then we will present Six Sigma's DMAIC as a very influential model for the application of statistical techniques for studying and solving operational problems in business and industry. The DMAIC model is a methodological structure that breaks down the process of problem solving into a logical sequence of tasks, that are associated to statistical and other techniques. The acronym summarizes the main stages: Define, Measure, Analyze, Improve and Control. Not only does this structure facilitate the teaching and application of statistical techniques, it also acknowledges the importance of sequential study design, where the design of a statistical investigation builds on and is guided by the results of previous studies. The essential claim statistical methodologies such as DMAIC make, goes much beyond the mathematical proof of their correctness and logical consistency. Rather, such methodologies claim effectiveness, a claim that incorporates not only mathematical correctness, but also relevance to the research questions of its intended users, and applicableness in its intended context.

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