

The Importance of Statistical Consulting and Research Projects in Academia

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ABSTRACT

Undergraduate, Master's and PhD students in applied statistics typically take basic courses including biostatistics and statistical methods, statistical software, experimental design, regression, categorical data analysis, and statistical theory, but it is not until they engage in statistical consulting and/or research that they need to synthesize this material. This may be due to the "stove-piping" or exclusive manner in which courses are taught, in which students and instructors focus only on the narrow material at hand. Further, students in other disciplines often take courses in statistical and research methods, yet often miss the big picture, or "forest for the trees."

This talk focuses on the ways in which statistical consulting and research projects can help master's students to traverse course boundaries and to achieve a greater understanding of the course material by helping them to juxtapose, compare, and notice any similarities in various statistical techniques. These activities can also reinforce the underlying statistical theory in practical settings.

Essential to the application of statistical techniques is powerful statistical software: we use SAS[®] and R software in consulting and research, and this is key focus of this talk. Numerous practical examples are provided from assessing drug synergy and relative potency, data-mining of "big data", mixed and hierarchical modeling, and optimal experimental design.

Key Words: decision-making; likelihood; modelling; statistical education.