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Virtual experiments and their use in teaching experimental design.

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Summary: The ability to design experiments in an appropriate and efficient way is an important skill, but students typically have little opportunity to get that experience. Most textbooks introduce standard general-purpose designs, and then proceed with the analysis of data already collected. In this paper we explore a tool for gaining design experience: computer-based virtual experiments. These are software environments which mimic a real situation of interest and invite the user to collect data to answer a research question. Two prototype environments are described. The first one is suitable for a course that deals with screening or response surface designs, the second one allows experimenting with block and row-column designs. They are parts of a collection we developed called ENV2EXP, and can be freely used over the web. We also describe our experience in using them in several courses over the last few years.

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