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Hands-on with physical experiments for teaching Design of Experiments

Design of Experiments (DOE) is powerful but rarely intuitive. What is wrong with poking around in design space? Why not vary one factor at a time? The mathematics answers clearly, but the classroom often doesn't.

Physical experiments —where participants can see, touch, and interact with a real system —bring DOE concepts to life. They make abstract ideas like screening, response surface optimization, and measurement variability concrete in ways simulations cannot. But teaching with them requires experience and calm: real systems have their own lives and don't only do what we want them to.

In this 90-minute active session, participants work in small groups at stations built around different physical experiments, each illustrating some aspect of DOE: screening designs, response surface methodology, measurement systems analysis, or mixture/sensory experimentation. Rather than rotating through all stations, each participant engages deeply with one or two, guided by structured exercises. A reporter at each station captures observations on a prepared checklist, and a plenary discussion closes the session.

The goal is twofold. First, participants experience firsthand running a physical DOE exercise feels like —the engagement, the learning, and the challenge of real systems pushing back. Second, the session builds a shared resource: a standardized booklet of physical experiment systems for DOE teaching, tagged by topic, time, and suitability, hosted as a living document on the ENBIS website.

Whether you teach DOE in universities or in industry, this session will equip you with practical tools and inspiration to make your teaching more effective —and more fun!

Special/ Invited session

Teaching, exercises and assignments

Classification

Both methodology and application

Keywords

DOE, teaching

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