

Quant, Qual and Mixed Nuts

Engineering Education Research (EER), like research in many fields, can be categorized as qualitative, quantitative, or mixed methods. Creswell and Creswell (2018) have written extensively on research design, and these categories of research, and we strongly recommend reading their book on the subject.

As engineers, we are very familiar with quantitative research. Generally, engineering research is based on the statistical analysis of experimental results, and those results are typically in the form of continuous data. This is not always the case for quantitative research in EER. Studies may be observational and data may be continuous, ordinal, or categorical. Also, the concept of “validity” is somewhat different in EER than typical engineering lab experiments. However, fundamentally, in quantitative research we are trying to answer a research question using a statistical study.

Qualitative

Qualitative research uses words, pictures, or other information to investigate the world. This information is analyzed, but often not through numbers or statistics. For example, we might analyze the changes to accreditation requirements over time and how that has impacted engineering curricula across Canada. Or we could do a set of extensive interviews with France Cordova and analyze her career path in the context of changing attitudes toward women in STEM professions. Some of this work may include considering the frequency of a theme in an interview transcript, or the number of courses that fall into the “design” category in a curriculum, but fundamentally, qualitative research is analyzing the meaning of qualitative information.

Quantitative

Quantitative studies may include some qualitative work. For example, you might analyze the performance of students before and after a change in teaching method, and then hold some focus groups with students to hear how they think the change impacted their learning. Some people consider this to be essentially a quantitative study, and others would call this “mixed methods”. Similarly, many qualitative studies involve some statistical analysis (Saldaña is a good reference on this), but it may be in service to the qualitative analysis.

Mixed Methods

Mixed methods fully approaches the research using a mix of quantitative and qualitative methods. There has been much written about mixed methods and I would encourage you to do some reading on it before you decide that this is the way you want to set up a study. John Creswell, in particular, has written extensively on mixed methods, and his writing on this subject would be a good place to start. Bottom line: the decision about whether to choose qual, quant, or mixed should be aligned with your research questions and theoretical paradigm in your study design.

Creswell, J.W., and Creswell, J.D. (2017) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 5th Ed, Sage Publications.

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