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Methodology Matters

# Mixed methods: Expanding research methodologies in pharmacy education

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## Abstract

Mixed methods research combines quantitative and qualitative research to address a research question. Researchers engaging in mixed methods can establish a more complete understanding of an issue, triangulate findings, develop a complementary picture, identify trends, and validate results. Using mixed methods research may provide a more accurate and comprehensive reflection of educational experiences and outcomes across the span of pharmacy, including admissions, experiential education, and faculty development. Expanding our research toolkit to include multiple approaches for collecting, analyzing, and applying quantitative and qualitative data are likely to strengthen educational research in pharmacy education and broaden our impact across the health professions. After reviewing this article, the reader should be able to define mixed methods research, provide recommendations for its use, identify applications for pharmacy education, and describe the implications and limitations of the mixed methods approach.

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## Our Situation, issue, or problem

A growing body of literature in health care and education point to the challenges of providing students with opportunities to develop critical workplace skills (e.g., adaptability, collaboration, communication, and initiative).<sup>1–3</sup> In many cases, these skills are best taught and assessed in the context of experiential education; however, researchers interested in examining student development during experiential education are faced with a number of challenges, including small sample sizes (e.g.,  $n < 30$ ) and

complex construct measurement. As an example, my research team was recently tasked with developing a new experiential education program and evaluating its impact on the professional identity development of students.

In higher education, identity development is articulated by a number of distinct theories and can include complex constructs that are not easily reduced to a single metric or survey item such as developing competence, moving through autonomy toward interdependence, developing mature interpersonal relationships, and developing purpose.<sup>4</sup> Further, some experiential education theories articulate the role of reflection as a key element of creating knowledge.<sup>5</sup> While quantitative data may be useful in this situation, quantitative data alone will not provide the depth and richness of data (e.g., reflection) necessary to fully understand student development. Along the same lines,

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qualitative data may not be amenable to systematic comparisons or hypothesis testing (e.g., limited by smaller sample sizes and analyzed qualitatively) and may fail to generate the type of statistical feedback desired by experiential educators to inform practice moving forward. For these reasons, we needed the distinct advantages of quantitative and qualitative methods and chose to employ both approaches to conduct a mixed methods study.

### Methodological literature review

In general, mixed methods research can be defined as the combination of both quantitative and qualitative research efforts to address one research question (Table 1).<sup>6–8</sup> The combination of these two approaches can answer a specific research question more comprehensively, increase the tools available to conduct a research study, and broaden the scope of research possible.<sup>7,9</sup> Through integration of quantitative and qualitative research, investigators are able to maximize the strengths and minimize the weaknesses of each individual approach.<sup>6,7</sup> The sequence and dominance of quantitative and qualitative efforts may vary among mixed method approaches; however, the integration of the mixed methods results, even if they initially appear to disagree, can strengthen the overall research design to overcome the respective limitations of the individual quantitative and qualitative designs.<sup>6,10</sup>

To better understand mixed methods design, it might be helpful to review quantitative and qualitative research in more detail. Quantitative research utilizes numerical data to explain a particular phenomenon, such as performance, attitudes, or

engagement.<sup>11,12</sup> It originates from positivism, which is the idea that a single reality or truth can be discovered through the objective study of numeric data and variables. A wide range of sources can be utilized to collect numeric data including surveys, structured interviews, observations, performance indicators and assessments, institutional information, and national databases.<sup>13</sup> In some cases, these data may be collected as qualitative data (e.g., interviews) and reduced to numeric quantities for the purposes of analysis. Quantitative data are analyzed using statistical methods that describe variables (i.e., descriptive statistics) and draw inferences of a sample to the population at large (i.e., inferential statistics).<sup>11–13</sup>

Quantitative methods use two main research design approaches: experimental design and non-experimental design.<sup>11</sup> Experimental design involves the random assignment of participants to either the experimental group or the control group to test a hypothesis under controlled conditions.<sup>11</sup> Quasi-experimental designs are utilized when random assignment is not feasible but continue to test a hypothesis under controlled conditions.<sup>11</sup> In contrast, non-experimental design (e.g., observational study) does not involve the manipulation of study variables nor is the setting controlled. In pharmacy education, research designs vary widely and include the quantitative research traditions of epidemiologic, correlational, and psychometric studies in addition to randomized control. Statistical methods for analyzing quantitative data can range in complexity from simple correlations to multilevel modeling.<sup>13</sup>

Although health care researchers have traditionally employed quantitative methods, qualitative approaches have

Table 1  
Comparison of research approaches

	Quantitative research	Qualitative research	Mixed methods research
Purpose	Determine relationships and describe variables; test hypotheses	Understand a specific population or phenomenon	Examine a question from a quantitative and qualitative perspective
Data characteristics	Numeric or reduced to numeric quantities for purposes of analysis	Text, pictures, video, audio, or other multimedia	Both quantitative and qualitative data types
Common data sources	Surveys, records, learning assessments (e.g. tests), measurements	Observations, interviews, focus groups, documents	Uses a mix of qualitative and quantitative data sources
Data analysis	Statistical and numerical analyses (descriptive and inferential statistics)	Coding and document analysis	Triangulation; integrating data analysis methods
Quality criteria	Validity, reliability, objectivity	Credibility, dependability, conformability, transferability.	Some combination of quantitative and qualitative criteria
Common applications	Description; generalization	Theme identification; theory development; case analysis	Triangulation, complementarity, development initiation, expansion
Limitations	Reduced power for small sample sizes; difficult to measure complex constructs; lack of deep, rich description	Lack of statistical power and generalizability; time intensive; potentially misunderstood by audience due to lack of training	Lack of resources; requires skills in both approaches; publication word limitations hindering thorough method and results descriptions

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