The complementarity of quantitative and qualitative methods: evaluating educational activities using mixed methods

HY So[1] *, MHPE, FHKAM (Anaesthesiology), **Stanley SC Wong**[2], MD, FHKAM (Anaesthesiology), **Abraham KC Wai**[3], MD, FHKAM (Emergency Medicine), **Albert KM Chan**[4], MHPE, FHKAM (Anaesthesiology), **Benny CP Cheng**[5], FHKAM (Anaesthesiology)

[1] *Educationist, Hong Kong Academy of Medicine, Hong Kong SAR, China*
[2] *Chairman, Scientific Committee, Hong Kong College of Anaesthesiologists, Hong Kong SAR, China*
[3] *Chairman, Research Subcommittee, The Jockey Club Institute for Medical Education and Development, Hong Kong Academy of Medicine, Hong Kong SAR, China*
[4] *Chairman, Board of Education, Hong Kong College of Anaesthesiologists, Hong Kong SAR, China*
[5] *Honorary Director, The Jockey Club Institute for Medical Education and Development, Hong Kong Academy of Medicine, Hong Kong SAR, China*

* Corresponding author: sohingyu@fellow.hkam.hk

This article was published on 10 Dec 2025 at www.hkmj.org.

Hong Kong Med J 2025;31:Epub
https://doi.org/10.12809/hkmj245176

In a recent position paper,[1] the Hong Kong Academy of Medicine (HKAM) recommended that both HKAM and its Colleges establish mechanisms to evaluate faculty development programmes using both quantitative and qualitative methods. This recommendation underscores the importance of mixed methods approaches in evaluating educational activities within postgraduate medical education (PGME). This editorial builds on our study of the impact of the conjoint workplace-based assessment (WBA) workshop, published in this issue of the *Hong Kong Medical Journal*,[2] to illustrate the effective application of mixed methods approaches.

Mixed methods combine quantitative and qualitative approaches to provide a comprehensive evaluation.[3] In healthcare, experimental research utilising quantitative methods is more familiar; these methods are equally relevant in medical education. Quantitative studies rely on measurable data and statistical analyses to assess the effectiveness of interventions in numerical terms, such as the number of trainees achieving a specific competency level or improvements in assessment scores. This approach addresses questions such as 'How effective was the workshop in enhancing feedback skills among trainers?' or 'What proportion of trainees demonstrated improved competency after implementing WBA?' Quantitative methods are particularly valuable for investigating cause-and-effect relationships.[4]

For descriptive questions about ongoing events or explanatory questions about how or why something occurred, qualitative studies are often the most suitable approach.[4] These studies enhance understanding by exploring experiences, behaviours, and attitudes, providing insights that cannot be captured through numerical data alone. This approach is particularly valuable for examining complex interventions where contextual factors exert substantial influence. In such situations, adoption of the CMO model (Context + Mechanism = Outcome) can be highly effective.[5] Qualitative methods (eg, interviews, focus groups, and observations) enable the exploration of participants' perspectives—what they value in an educational intervention, the challenges they encounter, and areas requiring improvement. For example, within the context of the conjoint WBA workshop, qualitative research can reveal how trainers and trainees perceive WBA and feedback, their emotional responses, the barriers they face in effectively integrating WBA into daily practice, and the factors that facilitate learning during the workshop.[2] Despite the subjective nature of qualitative research, quality criteria have been established to ensure its rigour.[6]

Quantitative and qualitative studies address distinct research purposes and questions. They also differ in aspects such as ontology, sampling methods, and analysis, as summarised in the Table.[7,8] Mixed methods studies combine the strengths of both approaches, compensating for the limitations of each. Quantitative data reveal patterns, whereas qualitative insights provide essential context and depth, enabling a more comprehensive understanding. This combination is particularly important in PGME, where reliance on quantitative measures alone risks neglecting key nuances of learner experiences, while qualitative approaches may lack generalisability. By integrating both methods, evaluations become more robust and better suited to inform faculty development, curriculum enhancement, and improvements to the clinical learning environment.

TABLE. Differences between quantitative and qualitative methods*

	Quantitative method	Qualitative method
Nature of reality (ontology)	Measures unbiased facts (objective)	Understands social and cultural meaning (subjective)
Perspective on knowledge (epistemology)	Assumes a single correct answer or truth	Accepts multiple perspectives or truths
Focus	Emphasises numbers and variables	Focuses on meaning; uses various types of non-numerical data such as words, observations, and images
Values and validity	Reliability is prioritised; neutral	Authenticity is prioritised; values are openly considered
Relationship between theory and data	Theory and data are considered separate	Theory and data are interconnected
Reasoning approach	Deductive	Inductive
Researcher involvement	Researcher remains objective and distant	Researcher is directly involved
Research setting	Results remain consistent across settings	Results are influenced by specific context
Sample size and method	Large sample, selected randomly	Small sample, selected purposefully
Analysis	Statistical analysis	Non-statistical methods, such as theme and pattern identification

* Modified from references 7 and 8

Four basic designs for mixed methods studies are commonly used[9]:

1. Exploratory sequential design: Qualitative research is conducted first to explore a topic, guiding a subsequent quantitative study, often for instrument development.
2. Explanatory sequential design: Quantitative data are collected first, followed by qualitative research to explain or provide context to the results.
3. Triangulation or convergent design: Qualitative and quantitative data are simultaneously collected to compare and contrast findings.
4. Longitudinal transformation: Data are collected at multiple points, typically from different populations and using various methods; analysis and integration occur throughout the project.

In the evaluation of the conjoint WBA workshop, both triangulation and explanatory approaches were utilised.[2] Quantitative outcomes demonstrated the success of the intervention. Qualitative findings not only supported these results but also explained why specific outcomes were achieved, guiding future refinements.

However, many clinicians are unfamiliar with qualitative research methods, which limits their ability to fully engage with mixed methods evaluations. To address this limitation, the HKAM position paper also recommended that training in qualitative evaluation methods be provided to Fellows responsible for quality assurance.[1] The Research Subcommittee of the Jockey Club Institute for Medical Education and Development has collaborated with the Scientific Committee of the Hong Kong College of Anaesthesiologists to develop a research course that includes both quantitative and qualitative methods. This course is now in progress and may subsequently be offered to other Colleges, thereby enhancing capacity for quality assurance across specialties.

As PGME increasingly shifts towards competency-based approaches, evaluations must evolve to reflect these changes. Mixed methods offer a practical means of achieving this evolution, providing a comprehensive understanding of learner progress and the contextual factors influencing outcomes.

The integration of mixed methods into educational evaluations aligns with HKAM's vision of a continuous, evidence-based improvement cycle in PGME. By uncovering both the 'what' and the 'why' behind educational outcomes, educators become better equipped to make informed decisions that enhance the learning experience and ultimately improve the quality of care delivered by future specialists.

Author contributions

All authors have contributed equally to the concept, development, and critical revision of the manuscript. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

HY So and AKM Chan are co-authors of the article by So et al (Reference 2), published in the same issue. Other authors have declared no conflicts of interest.

Funding/support

This editorial received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

1. So HY, Li PK, Lai PB, et al. Hong Kong Academy of Medicine position paper on postgraduate medical education 2023. Hong Kong Med J 2023;29:448-52.
2. So HY, Wong EW, Chan AK, et al. Improving efficiency and effectiveness of workplace-based assessment workshop in postgraduate medical education using a conjoint design. Hong Kong Med J 2025 Dec 9. Epub ahead of print.
3. Maudsley G. Mixing it but not mixed up: mixed methods research in medical education (a critical narrative review). Med Teach 2011;33:e92-104.
4. Eisenhart M. Qualitative science in experimental time. Int J Qual Stud Educ 2006;19:697-707.
5. Berwick DM. The science of improvement. JAMA 2008;299:1182-4.
6. Frambach JM, van der Vleuten CP, Durning SJ. AM last page. Quality criteria in qualitative and quantitative research. Acad Med 2013;88:552.
7. Mehrad A, Zangeneh MH. Comparison between qualitative and quantitative research approaches: social sciences. Int J Res Educ Stud 2019;5:1-7.
8. Braun V, Clarke V. Successful Qualitative Research: A Practical Guide for Beginners. Los Angeles: Sage; 2013.
9. Schifferdecker KE, Reed VA. Using mixed methods research in medical education: basic guidelines for researchers. Med Educ 2009;43:637-44.

