

Redefining Quality in Medical Education Research: A Consumer's View

GAIL M. SULLIVAN, MD, MPH
 DEBORAH SIMPSON, PhD
 DAVID A. COOK, MD, MHPE
 NICOLE M. DELORIO, MD
 KATHRYN ANDOLSEK, MD, MPH
 LAWRENCE OPAS, MD
 INGRID PHILIBERT, PhD, MBA
 LALENA M. YARRIS, MD, MCR

Abstract

Background Despite an explosion of medical education research and publications, it is not known how medical educator consumers decide what to read or apply in their practice.

Objective To determine how consumers of medical education research define quality and value.

Methods *Journal of Graduate Medical Education* editors performed a literature search to identify articles on medical education research quality published between 2000 and 2013, surveyed medical educators for their criteria for judging quality, and led a consensus-building workshop at a 2013 Association of American Medical Colleges meeting to further explore how users defined quality in education research. The workshop used standard consensus-building techniques to reach concept saturation. Attendees then voted for the 3 concepts they valued most in medical education research.

Results The 110 survey responses generated a list of 37 overlapping features in 10 categories considered important aspects of quality. The literature search yielded 27 articles, including quality indexes, systematic and narrative reviews, and commentaries. Thirty-two participants, 12 facilitators, and 1 expert observer attended the workshop. Participants endorsed the following features of education research as being most valuable: (1) provocative, novel, or challenged established thinking; (2) adhered to sound research principles; (3) relevant to practice, role, or needs; (4) feasible, practical application in real-world settings; and (5) connection to a conceptual framework.

Conclusions Medical educators placed high value on rigorous methods and conceptual frameworks, consistent with published quality indexes. They also valued innovative or provocative work, feasibility, and applicability to their setting. End-user opinions of quality may illuminate how educators translate knowledge into practice.

Gail M. Sullivan, MD, MPH, is Professor of Medicine and Geriatric Medicine Fellowship Program Director, University of Connecticut School of Medicine; **Deborah Simpson, PhD**, is Director, Medical Education Programs, Aurora Health Care, and Professor of Family and Community Medicine (Clinical Adjunct), Medical College of Wisconsin and University of Wisconsin School of Medicine & Public Health; **David A. Cook, MD, MHPE**, is Associate Director, Mayo Clinic Online Learning, and Professor of Medicine and Medical Education, Mayo Clinic College of Medicine; **Nicole M. Delorio, MD**, is Associate Professor of Emergency Medicine and Director of Student Affairs, Oregon Health and Science University; **Kathryn Andolsek, MD, MPH**, is Professor of Community and Family Medicine, Duke University School of Medicine; **Lawrence Opas, MD**, is Professor of Clinical Pediatrics and Designated Institutional Official, University of Southern California/Los Angeles County and University of Southern California Medical Center; **Ingrid Philibert, PhD, MBA**, is Senior Vice President, Department of Field Activities, Accreditation Council for Graduate Medical Education; and **Lalena M. Yarris, MD, MCR**, is Associate Professor and Emergency Medicine Residency Program Director, Oregon Health and Science University.

This proceeding was derived from a workshop session of the 2013 AAMC GEA Workshop, "Defining Quality in Medical Education Research: a Consensus-building Discussion," Philadelphia, PA, November 5, 2013.

The authors would like to acknowledge the contributions of the participants and facilitators of the consensus-building workshop on November 5, 2013 (listed alphabetically):

Participants (in addition to the authors): Dorene Balmer, RD, PhD; Beth Bierer, PhD; Rebecca Blanchard, PhD; Elizabeth Bradley, PhD; Susan Cavanaugh, MS,

Editor's Note: The online version of this article contains a list of medical education articles from literature review, survey of medical educators, and workshop description in AAMC brochure, and facilitator script.

Introduction

The number of submissions, published articles, and journals focusing on medical education research has

MPH; Tara Cunningham, EdD; Jeffrey Devries, MD, MPH; Lisette Dunham, MSPH; Alice Fornari, EdD, RD; Michele Haight; Janice Hanson, PhD, EdS; Richard Hawkins, MD; Elizabeth Kadiur; Philip J. Kroth, MD, MS; Marieke Kruldering, PhD; Lyuba Kunopasek, MD; Lauren Maggio; George Mejicano, MD, MS; Robin Ovitsh; Barbara Pettit, MD; William Pluta, MEd; Martin Pusic, MD; Michael Ryan, MD; Nathaniel Slater; Louisa Stark, PhD; Nancy Stewart, DO; David C. Thomas, MD; Anna Volerman, MD; David Wilks, MD; and David Yens, PhD.

Facilitators (in addition to the authors): Anthony R. Artino Jr, PhD; Kevin Eva, PhD; Barbara Joyce, PhD; Amy Miller Juve, EdD, MEd; and Steven Rougas, MD.

Corresponding author: Gail M. Sullivan, MD, MPH, University of Connecticut, 253 Farmington Avenue, Farmington, CT 06030-5215, 860.679.3863, gsullivan@nsoi.uchc.edu

DOI: <http://dx.doi.org/10.4300/JGME-D-14-00339.1>

exploded in the past decade. This increase has made the process of selecting articles for publication more difficult for reviewers and editors who aim to disseminate high-quality studies that have the greatest potential to affect educational practice. A growing number of studies and editorials have cited a lack of methodologic rigor while exhorting medical education researchers to improve study quality.^{1–8}

The frameworks used to define quality work typically reflect the perspectives of those who actively engage in medical education research—the producers.^{1–5,8,9} Although some people who identify primarily as researchers also teach and some who identify primarily as educators also perform medical education research, many key end users of education research are “clinician educators,” such as program directors and clerkship directors.

Indexes used to rate the quality of medical education research have not emphasized the consumer perspective as part of the instrument development process.^{9–13} Given their multiple responsibilities, clinician educators have a limited amount of time to read outside their clinical specialty.^{14,15} A better understanding of the end user’s perspective would help researchers design and present studies that are more likely to be read and implemented by the end user. Relevant questions to ascertain the end users’ perspectives include the following: Do medical educators routinely read articles in education-focused journals? Which articles are most valued and most likely to be applied in practice? How do educators define overall quality in medical education research?

Methods

To obtain educator stakeholders’ perspectives on medical education research quality and value, *Journal of Graduate Medical Education* (JGME) editors performed (1) a background literature review, (2) a national survey of clinician educators, and (3) a consensus-building workshop at the November 2013 Association of American Medical Colleges (AAMC) annual meeting.

Literature Review

To provide background material for workshop planning, a JGME editor (G.M.S.) performed a comprehensive literature search for articles relevant to the definition of medical education quality. Using PubMed, Google Scholar, and ERIC, the editor searched for articles published between January 1, 2000, and October 10, 2013, and combinations of the following terms: medical education research quality, quality of medical education research, educational research, medical education research, and quality in research in medical education. The editor further searched for publications by the first authors of articles identified by the aforementioned searches to identify additional relevant

work within the time period and asked JGME editors to recommend relevant publications. Twenty-seven relevant articles were identified: 4 introduced quality indexes; 8 were systematic reviews of the quality of existing research; and 15 were narrative reviews, commentaries, or editorials evaluating the state of medical education research (see online supplemental material for a list of articles).

Survey of Educators

The JGME editors also sought stakeholder perspectives via a survey to inform the design of the consensus workshop. Three editors (G.M.S., L.M.Y., I.P.) developed a questionnaire that asked whether particular medical education journals were read and at what frequency, preferred journal formats, specific articles that changed their teaching, and how respondents judged quality of education articles. The survey comprised 3 specific (defined-response option) and 3 open-ended questions. The JGME editorial board reviewed these questions for clarity and content (see online supplemental material for survey). We used SurveyMonkey to implement the survey and disseminated the survey link through JGME’s Twitter account and in ACMGE weekly e-mails to all US residency program directors and designated institutional officials for graduate medical education for 6 weeks (September 9 through October 20, 2013). We analyzed the responses to open-ended questions regarding quality to generate a list of concepts that informed the workshop planning.

Consensus-Building Workshop

We held a 90-minute consensus-building workshop titled “Defining Quality in Medical Education Research: A Consensus-Building Discussion” at the 2013 AAMC meeting. The workshop used a format that allowed discussion of 2 separate questions—one addressing how participants define quality in medical education research (the subject of the present article) and the other seeking to identify the barriers faced when conducting research¹⁵ (see online supplemental material for AAMC brochure program description). In addition to routine listing on the AAMC website and in conference materials, the workshop was promoted through ACGME weekly e-mails and Tweets from JGME editors.

The consensus-building workshop began with a 15-minute large group presentation to define the questions and intended goals of the session, brief the audience on the consensus-building process, and provide focused background information drawn from the literature review and survey results to facilitate participants’ ability to engage in the process. Participants were then randomly divided into 4 groups for 25-minute facilitated discussions to answer the workshop questions.

TABLE 1 FEATURES OF QUALITY OF EDUCATION RESEARCH FROM SURVEY ^a	
Research question	Well defined Important, interesting Relevant Novel
Conceptual framework	Present
Study design	Appropriate to question Comparison or control group Prospective
Methods	Overall quality Easy to follow, clear Adaptable to my institution Clear rationale More than 1 institution Number of participants
Outcomes	Measurable Measures of impact Use of multiple tools to draw conclusions Quality of testing materials—validity and reliability Student satisfaction
Analysis	Appropriate Appropriate statistics Sufficient power
Results	Generalizable to my institution Applicable to other settings Applicable to the real world Easily understood Relevant to teaching Meaningful Credible Results align with principles of general education
Discussion	Clear statement of limitations Biases are included
Conclusions	Supported Reasonable
Other	Reputation of authors and institutions Peer review Writing clarity

^a Summary of responses from an open-ended survey question.

Three facilitators participated in each group, each with specific roles: questioner, hand scribe, or session timer and observer. A content expert (D.A.C.) traveled among groups and observed responses in order to identify recurring themes. The facilitators began each of their groups by prompting participants to brainstorm individually and write down their responses to the following prompt: “Please take a minute to think about what you value in education research papers. What makes you want to read the paper? What causes you to want to finish the paper? What factors determine whether you will apply the results of this paper to your teaching practice?”

Facilitators then led the group in generating a list of quality features, which were recorded on poster paper and assessed for consensus regarding each concept. Quiet

participants were drawn out, dissenting opinions were sought and explored, and the lead facilitator continued to probe until saturation was reached (see online supplemental material for facilitator script). This produced a nonprioritized list of quality aspects. Using sticky tabs, each group member then voted on the top 3 concepts that defined high-quality medical education research; these votes were tabulated by the facilitators.

After this activity, the content expert provided a brief summary of observations, and participants were invited to correct or comment further on these observations.

The transcribed workshop notes were circulated to facilitators for amplification and correction. Facilitators sorted and condensed the full list of concepts by similar items into an ordered summary list of concepts to describe high-quality medical education research articles.

Results

The online survey generated responses from 110 educators and researchers. The total number of survey recipients is unknown but the number is likely greater than the 10 000 program directors and designated institutional officials who receive the ACGME weekly e-mail. Of the 110 respondents, 83 (75%) read medical education journals at least monthly, and only 8 (7%) rarely or never read medical education journals. Respondents indicated that the journals they “read or skim regularly” include *JGME* (88 [85%]), *Academic Medicine* (71 [65%]), and *Medical Education* (25 [24%]). The most preferred format for accessing medical education articles was paper followed by online journal, with journal apps, video or audio podcasts, blogs, and Twitter less preferred. TABLE 1 lists the quality features provided in open-ended answers by survey responders.

Thirty-two participants, 12 facilitators, and 1 content expert participated in the 4 groups (TABLE 2). Consensus was reached for most of the proposed quality concepts. The highest-ranked item focused on the innovative or provocative nature of the research findings to attract participants’ attention. Participants indicated that they were drawn to read an article when the findings challenged established thinking, were novel, and/or expanded their educational lens. The second most valued item was meeting established principles of high-quality medical education research with a clear question that is investigated using an appropriate study design and analyses. Next in importance was the study’s relevance to the participants’ own educational roles and responsibilities: the ability to use study information determined whether a study was fully read. However, these features had little to no bearing if the participant could not access the article (eg, online via Google Scholar) or if the

TABLE 2 CHARACTERISTICS OF WORKSHOP PARTICIPANTS

	Participants, No. (%), n = 32	
Sex		
Women	20	63
Men	12	37
Degree ^a		
MD/DO	15	47
EdD/PhD	10	31
MEd/MS/EdS	6	19
Other	5	16
Academic Rank ^b		
Professor	8	25
Associate professor	9	28
Assistant professor	6	19
Instructor	2	6
None reported	3	9
Region		
West	9	28
Midwest	6	19
South	7	22
Northeast	10	31

^a10 participants reported 2 advanced (beyond bachelor's) degrees, 6 participants did not report an advanced degree, and 1 participant was a medical student.

^bAcademic rank was not reported for 5 participants; 1 participant reported 2 academic ranks.

article lacked clear writing and visuals that succinctly encapsulated the study.

Although educators valued high-quality methods, they also placed trust in traditional external quality sources, such as status of journal, author, and institution. For these participants, work by a well-known author or acceptance by a prestigious journal may be used as a proxy measure in deeming whether the article is of high-quality design and importance. Workshop participants also valued study outcomes that had a connection to or impact on patient outcomes. Although participants recognized that obtaining patient-related outcomes is often difficult, they expressed concern at the plethora of publications that looked solely at trainee “happiness.” See TABLE 3 for full list of quality indicators.

Discussion

A survey and a consensus-building workshop that targeted medical education end users identified features

of high-quality medical education research that overlapped with usual indexes of quality—methodologic rigor, clear writing and research question, theoretical underpinnings—but also introduced concepts that are less emphasized: provocative and novel work, relevance to personal goals and roles, and immediate online accessibility. Workshop participants often perceived the latter features as more important than “traditional” criteria of high-quality research.

Participants valued meaningful study outcomes, including those related to patient outcomes. Although an outcomes research approach is a highly rated factor in most quality indexes,^{1,9,10} it has also been much debated in prior publications.^{16–18} In addition, educators expressed that they were looking for value: how much impact they might expect for their investment of effort, time, and money. Intervention studies that do not include adequate information to assess feasibility and education outcomes may have little impact.¹⁹

Some of the generated responses may reflect the reality of working as a medical educator in the current hectic, fast-paced environment, whereas others may relate to generational changes in preferred information access. A less rigorous study that can be found quickly, is immediately relevant to an educator's needs, and is feasible to implement may be more valued than a methodologically higher-quality article that takes more time to find, read, interpret, and apply. Workshop participants stressed a desire for articles to meet their own needs; participants agreed that they would be unlikely to read an article that does not meet this criterion.

Several of the concepts highlighted by educators in the survey and workshop echo concepts presented in older articles. In a 1999 publication, Harden et al²⁰ proposed a multidimensional model to define features needed for evidence assessment: quality, utility, extent, strength, target, and setting (QUESTS). In the perfect study, all dimensions will be of high quality. This rarely occurs, which underscores the “tensions with regard to the evidence in medical education: quality vs. relevance”²⁰—tensions that appear evident to today's educators as well.

This article presents a hypothesis-generating study yielding results to frame additional work. This initial work has several limitations. The survey was not tested, and respondents may have interpreted the questions differently from what was intended by the authors. The survey was brief, and answers were not prioritized or explored in more depth. The number and backgrounds of participants in the survey group are unknown, introducing the potential for sample bias: those most involved or interested in education research are more likely to have responded. Although the participants in the consensus-building workshop were

TABLE 3 FEATURES OF QUALITY FROM AAMC CONSENSUS-BUILDING WORKSHOP ^a	
Highest-rated features of quality, in order	
Provocative	Provocative, challenges or “flips” established thinking, “cross-cutting,” expands medical educator “lens,” novel
Methodologically sound	Adherence to good principles of research methods, including design, statistical rigor, methodology appropriate to question, analysis, pilot if appropriate
Relevant	Relevant to my practice, my role, my challenges, my population, or my needs
Practical	Real world, practical application, practical, doable, feasible
Conceptually grounded	Connection to conceptual framework, theoretical underpinning
Linked to patient care	Connection to or impact on patient outcomes
Visually clear	Good figures, visuals
Well-organized	Clear, organized writing that includes statement of the problem
Accessible	Accessible, such as online, Google Scholar
Placed in context	Situates work in context of literature and gives future implications and next steps
Other features noted by participants	
Reflective of participants’ voice	For qualitative research—able to hear the participants’ voice, the story
From a reputable source	Reputation of author, institution Reputation of journal
Influential in meaningful ways	Meaningful outcomes, not just resident “happiness” Longitudinal outcomes
Sustainable	Sustainability of benefit to learners; what is the half-life of the intervention
Ethical	Study is ethical
Transparent	Access to actual research data in order to see all of the data
Applicable	Access to actual tools used or studied in the project in order to be able to apply immediately
Brief	Short, concise, digestible
Methodologically innovative	Innovative methods section

^a Workshop participants each voted for their top 3 features; facilitators subsequently grouped similar items. Group consensus was reached for the highest-rated aspects of quality.

diverse, the total number was small, and their responses may not generalize to other consumers of medical educational literature. Finally, the questions asked by the different facilitators in probing for consensus and dissent

may have influenced participant answers in unknown ways. Although consensus among the 4 subgroups was high and was reached for most items, additional time may be needed to fully explore all aspects of consumer-defined quality.

TABLE 4 QUICK QUALITY QUESTIONS (Q ³)—FOR CONSUMER-ORIENTED MEDICAL EDUCATION RESEARCH		
Area	Question	Yes
Title, Introduction	Is the study novel or does it challenge current practice?	
Methods	Are the methods both rigorous and understandable by most clinician-educators?	
	Do the methods include complete, accurate feasibility information? (costs, time, materials)	
	Are all tools or instruments provided so that readers could use the results immediately?	
Results	Are the findings innovative or do they challenge established beliefs?	
	Is there immediate, real world application of the results?	
Writing	Is the article concise and clearly written?	
Visuals	Are the visuals (figures, tables) and overall visual presentation clear?	
Access	Is the article searchable and readily accessible online, such as via Google Scholar?	

Although we hesitate to conclude that the results of a single AAMC consensus workshop and survey should guide author and editor decisions, these concepts could be integrated into current quality standards. End users' perceptions of quality could be considered in planning and writing research studies, establishing article review criteria, and making editorial decisions. In an increasingly resource-constrained environment, educators may value what can be borrowed quickly, tweaked locally, and implemented easily. TABLE 4 distills these consumer-oriented aspects of quality into questions that may be helpful as an additional perspective for some articles, for some journals. Although consumer reactions regarding quality may, in future work, prove to be useful in promoting knowledge translation, these reactions should be used in conjunction with, not replace, expert consensus and tested constructs for quality assessment.

Conclusion

Medical educators endorse many of the usual criteria for high-quality medical education research, such as rigorous methods, clear writing and research questions, and use of theoretical frameworks. However, in deciding what articles to read and interventions to implement, they also consider other factors: novelty or challenging established beliefs, relevance of the article to their immediate needs and situation, real world applications and feasibility, and accessibility.

References

- 1 Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. *JAMA*. 2007;298(9):1002–1009.
- 2 McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. A critical review of simulation-based medical education research: 2003–2009. *Med Educ*. 2010;44(1):50–63.
- 3 Cook DA, Beckman TJ, Bordage G. Quality of reporting of experimental studies in medical education: a systematic review. *Med Educ*. 2007;41(8):737–745.
- 4 Cook DA, Levinson AJ, Garside S. Method and reporting quality in health professions education research: a systematic review. *Med Educ*. 2011;45(3):227–238.
- 5 Reed DA, Beckman TJ, Wright SM. An assessment of the methodologic quality of medical education research studies published in The American Journal of Surgery. *Am J Surg*. 2009;198(3):442–444.
- 6 Chen FM, Bauchner H, Burstin H. A call for outcomes research in medical education. *Acad Med*. 2004;79(10):955–960.
- 7 Lurie SJ. Raising the passing grade for studies of medical education. *JAMA*. 2003;290(9):1210–1212.
- 8 Cook DA, Bowen JL, Gerrity MS, Kalet AL, Kogan JR, Spickard A, et al. Proposed standards for medical education submissions to the Journal of General Internal Medicine. *J Gen Intern Med*. 2008;23(7):908–913.
- 9 Reed DA, Beckman TJ, Wright SM, Levine RB, Kern DE, Cook DA. Predictive validity evidence for medical education research study quality instrument scores: quality of submissions to JGIM's Medical Education Special Issue. *J Gen Intern Med*. 2008;23(7):903–907.
- 10 Harden RM, Grant J, Buckley G, Hart IR. Best evidence medical education. *Adv Health Sci Educ Theory Pract*. 2000;5(1):71–90.
- 11 Côté L, Turgeon J. Appraising qualitative research articles in medicine and medical education. *Med Teach*. 2005;27(1):71–75.
- 12 Bordage G. Reasons reviewers reject and accept manuscripts: the strengths and weaknesses in medical education reports. *Acad Med*. 2001;76(9):889–896.
- 13 Glassick CE. Boyer's expanded definitions of scholarship, the standards for assessing scholarship, and the elusiveness of the scholarship of teaching. *Acad Med*. 2000;75(9):877–880.
- 14 DeAngelis CD. Professors not professing. *JAMA*. 2004;292(9):1060–1061.
- 15 Yarris LM, Miller Juve A, Artino AR Jr, Sullivan GM, Rougas S, Joyce B, et al. Expertise, time, money, mentoring, and reward: systemic barriers that limit education researcher productivity (proceedings from AAMC GEA workshop). *J Grad Med Educ*. 2014;6(3):430–436.
- 16 Littlewood S, Ypinazar V, Margolis SA, Scherpbier A, Spencer J, Dornan T. Early practical experience and the social responsiveness of clinical education: systematic review. *BMJ*. 2005;331(7513):387–391.
- 17 Prystowsky JB, Bordage G. An outcomes research perspective on medical education: the predominance of trainee assessment and satisfaction. *Med Educ*. 2001;35(4):331–336.
- 18 Cook DA, West CP. Perspective: reconsidering the focus on "outcomes research" in medical education: a cautionary note. *Acad Med*. 2013;88(2):162–167.
- 19 Zendejas B, Wang AT, Brydges R, Hamstra SJ, Cook DA. Cost: the missing outcome in simulation-based medical education research: a systematic review. *Surgery*. 2013;153(2):160–176.
- 20 Harden RM, Grant J, Buckley G, Hart IR. BEME guide no. 1: best evidence medical education. *Med Teach*. 1999;21(6):553–562.