

Tools to measure the learning environment in medical education: A systematic review of validity evidence

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Background

The learning environment (LE) encompasses the physical, social, and psychological context in which trainees are immersed and is thought to play a significant role in professional¹ and moral² development. While most agree supportive LEs are essential for effective medical education, it has been challenging to determine how exactly to assess LE quality.

Importance of topic

The LCME states that medical schools "should regularly evaluate the LE."³ Yet in the absence of a standard LE metric, schools have struggled to determine how to comply with this standard. The ACGME recently implemented a clinical LE review program to address the LE during residency training. Thus, it is an apt time to review the literature for tools used to assess the LE, and more importantly, to determine the strength of validity evidence for the interpretation of scores from those tools.

Methods

This review aims to summarize results from studies that have measured the LE and address the following research questions: (1) What tools have been developed to measure the LE in medical education? (2) What types of constructs do the tools assess? (3) What is the strength of validity evidence⁴ (content, response process, internal structure, relationship to other variables, consequence) for the interpretation of scores from those tools?

We will use ERIC, PsychINFO, and MEDLINE to conduct a search for all articles using the terms *learning, educational, physical, social, and psychological paired with environment*. For all extracted articles we will review the references lists for additional relevant articles and if

needed, add related search terms. Studies will be limited to those that have assessed the LE by medical students and residents (US and internationally) published in English. Two of the authors will independently identify inclusion based on the abstract and an article will be included if at least one of the authors identified it as such. While the exact data to be extracted has yet to be determined, articles will certainly be coded for respondent type, LE tool name, and themes/constructs of tool or items measured. We will evaluate study quality based on the MERSQI⁵ criteria for design, sample, and validity, adding response process, internal structure, and consequences validity evidence.

Importance of review

To date, there has been not been a systematic review of tools used to assess the LE. Since this review will explore validity evidence for the interpretation of scores, it will inform medical educators of the strengths and limitations of existing LE tools. Thus, the field will be able to make evidence-based decisions on the right tool(s) to assess the LE or determine if a new tool needs to be developed by researchers.

Feasibility

The PI has protected time for research so she will be able to devote 15% FTE towards this project. The other authors have all committed to spend 2.5% so the collected team will have 20% FTE devoted to this review. Additionally, we have a clinical librarian liaison available to help with literature searches. As such, we believe the entire review can be completed in 24 months.

References

1. Cooke M, Irby DM, O'Brien BC. *Educating Physicians: A Call for Reform of Medical School and Residency*. 2010: Stanford, CA; Jossey-Bass. p 6-26.
2. Hafferty, FW. Beyond curriculum reform: confronting medicine's hidden curriculum. *Acad Med*. 1998; 73(4):403-7.
3. Liaison Committee on Medical Education. Accreditation Standards. (www.lcme.org/functionslist.htm). Accessed August 2, 2012.
4. American Educational Research Association. (1999). Standards for educational and psychological testing. Washington, DC: American Psychological Association. pp 25-36.
5. Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. *JAMA*. 2007; 298:1002-9.

Abbreviated CVs (2 page limit)

Jorie M. Colbert-Getz, PhD

Education and Training

<u>Year</u>	<u>Degree</u>	<u>Institution</u>	<u>Discipline</u>
2003	Bachelors of Science	Illinois State University	Psychology
2005	Masters of Science	Illinois State University	Psychology
2008	Doctor of Philosophy	University of Utah	Educational Psychology

Personal Experience

<u>Date</u>	<u>Position/Institution</u>
2006 – 2009	Research Associate, Academic Affairs Utah System of Higher Education
2009 – Present	Director, Office of Assessment and Evaluation Johns Hopkins University School of Medicine
2012-Present	Adjunct Professor, Department of Education Johns Hopkins University
2012-Present	Assistant Professor, Bayview Internal Medicine (<i>pending</i>) Johns Hopkins University School of Medicine

Teaching Experience

<u>Date</u>	<u>Course/Institution</u>	<u>Role(s)</u>
2004	<i>Statistics for the Social Sciences</i> Illinois State University	Instructor of Record
2007	<i>Health Statistics</i> University of Utah	Instructor of Record
2012	<i>Ensuring Learning through Assessment and Feedback</i> Johns Hopkins University	Co-Developer and Co-Instructor

Selected Peer Reviewed Publications

1. Aboumatar H, Thompson D, Wu A, Dawson P, **Colbert* JM**, Marsteller J. Development and evaluation of a three day patient safety curriculum to advance knowledge, self-efficacy, and system thinking among medical students, *BMJ Quality & Safety*. 2012; 21(5): 416-422.
2. Dudas RA, **Colbert J M**, Goldstein S, Barone MA. Validity of faculty and resident global assessment of medical students' clinical knowledge during their pediatric clerkship. *Acad Peds*. 2012; 12: 138-141.
3. Neufeld K, Alvanzo A, King VL, Feldman L, Hsu J, Rastergar DA, **Colbert JM**. & MacKinnon D. A collaborative approach to teaching medical students how to screen, intervene and treat substance use disorders. *Sub Abuse*, in press.

4. **Colbert-Getz, JM**, Fleishman C, Jung J, Shilkofski N. The Impact of gender and anxiety on self-assessment and actual performance of a high-stakes clinical skills examination, *Acad Med*, in press.
5. Shochet R, **Colbert-Getz JM**, Levine R, Wright S. Gauging events that impact students' perceptions of the medical school learning environment. *Acad Med*, in press.

Selected Workshops/Seminars

Date(s)	Course Title, Location, and Role
2009	<i>Returning rigor to clerkship grading: Designing a standard setting workshop at your institution</i> Association of American Medical Colleges Annual Meeting, Boston, MA Co-Presenter
2012	<i>Program and course evaluation for medical education</i> Medical Education Partnership Initiative Grant Makerere University, Kampala, Uganda Developer and Co-Presenter

Selected Peer review presentations- Talks and Posters

Dudas R, **Colbert JM**, Goldstein S, Barone MA. (2010, May). Faculty and resident assessment of medical students' clinical knowledge during the pediatric clerkship. Pediatric Academic Society Annual Meeting, Vancouver, BC, Canada.

Thomas PA, **Colbert JM**. (2010, May). Self-awareness of cultural competency in internal medicine residents. Society of General Internal Medicine, Phoenix, AZ.

Chou B, **Colbert JM**, Hueppchen N. (2011, March). The impact of obstetrics and gynecology clerkship change on student performance, teaching, and student/teacher satisfaction. APGO and Council of Resident Education in Obstetrics and Gynecology Annual Meeting, Orlando, FL.

Colbert JM, Shochet RB, Levine RB, Wright SM. (2011, August). Events that influence medical students' perceptions of the learning environment. An International Association for Medical Education Annual Conference, Vienna, Austria.

Chen CCG, Green IC, Chou B, Lawson SM, Firoozmand A, **Colbert-Getz JM**, Satin, AS. (2012, March). Warm-up with laparoscopic simulator improves resident laparoscopic performance in the operating room: A randomized trial. APGO and Council of Resident Education in Obstetrics and Gynecology Annual Meeting, Orlando, FL.

Sheth S, Chou B, **Colbert-Getz JM**, Heuppchen N. (2012, March). Feedback passports: A tool for an improved journey through the obstetrics & gynecology clerkship. APGO and Council of Resident Education in Obstetrics and Gynecology Annual Meeting, Orlando, FL.

Experience conducting a review/synthesis

The principle investigator had completed course work, including a research report on meta-analysis (*Predicting Graduate School Success: An Investigation of Criterion-Related Validity for GRE General Scores, GRE Subject Scores, and UGPA*). She has also taught undergraduate and graduate students on validity evidence in addition to delivering faculty development workshops on the topic.

Robert Shochet, MD

Education and Training

<u>Year</u>	<u>Degree</u>	<u>Institution</u>	<u>Discipline</u>
1979	Bachelor of Arts	Brandeis University	Biology
1983	Doctor of Medicine	University of Maryland	Medicine
1983-86	n/a-Residency	St. Vincent Hospital	Internal Medicine
1986-87	n/a-Fellowship	Mass. General Hospital	Consultation Psychiatry

Personal Experience

<u>Date</u>	<u>Position/Institution</u>
1988- 1990	Private practice, Internal Medicine- Baltimore, MD Educator, part-time- Communication Skills Training for Med. Residents University of Maryland School of Medicine
1990 – 1993	Faculty Physician, Internal Medicine Residency Program Greater Baltimore Medicine Center, Baltimore, MD
1993- 1998	Associate Director, Johns Hopkins University/Sinai Hospital Residency Training Program in Internal Medicine
1993- 2005	Faculty Physician and Director of Psychosocial Medicine Training JHU/Sinai Residency Training Program in Internal Medicine
1994- 2002	Chairman, Continuing Medical Education Committee, Sinai Hospital
2005- present	Director, Colleges Advisory Program for Medical Students Assistant Professor of Medicine Johns Hopkins University School of Medicine

Teaching Experience

<u>Date</u>	<u>Course/Institution</u>	<u>Role(s)</u>
1988-90	Communication Skills in Healthcare University of Maryland School of Medicine	Teacher for Medical Residents
1993-2005	Psychosocial/Behavior Medicine JHU/Sinai Residency Training Program in Internal Medicine	Director, Teacher
2005-	<i>Clinical Foundations of Medicine</i> Johns Hopkins University School of Medicine	Director, Developer and Co-Instructor
2005-2010	Communication Skills for Physicians Train the Trainer Initiative, Mayo Clinic, Jacksonville, FL	Trainer, Consultant

Selected Peer Reviewed Publications

1. Ashar B, Levine R, Magaziner J, **Shochet R**, Wright S. An association between paying physician teachers for their efforts and an improved educational experience for learners. *J Gen Intern Med.* 2007; 22 (10): 1393-7.

2. Stewart RW, Barker AR, **Shochet RB**, Wright SM. The new and improved learning community at Johns Hopkins University School of Medicine resembles that at Hogwarts School of Witchcraft and Wizardry. *Med Teach.* 2007 (4): 353-7.
3. Levine R, Cayea D, **Shochet RB**, Wright SW. The mid-clerkship crisis: Lessons in advising a medical student with career indecision. *Acad Med* 2010; 85: 654-659.
4. Murinson B, Klick B, Haythornthwaite J, **Shochet RB**, Levine RB, Wright SM. Formative experiences of emerging physicians: gauging the impact of events that occur in medical school. *Acad Med.*2010; 85(8):1331-7.
5. **Shochet, RB**, Cayea D, Levine R, Wright, SW. Using medical student case presentations to help faculty learn to be better advisors- editorial. *Acad Med* 2010; 85: 578-579.
6. Bicket M, Misra S, Wright SW, **Shochet RB**. Medical student engagement and leadership within a new learning community. *BMC Medical Education* 2010; 10:20 (26 February 2010).
7. Levine RB, **Shochet RB**, Cayea D, Ashar BH, Stewart RW, Wright SM. Measuring medical students' sense of community and satisfaction with a structured advising program. *Int J Med Ed.* 2011; 2: 125-32.
8. **Shochet RB**. Learning Communities: A New Twist to Medical Education. *Maryland Medicine* 2012; 13(1): 13-14.
9. **Shochet RB**, Colbert-Getz J, Levine RB, Wright SM. Gauging events that impact students' perceptions of the medical school learning environment. *Acad Med* 2012. *Accepted for publication, 7/23/2012.*

Selected Workshops/Seminars

<u>Dates</u>	<u>Course Title, Location, and Role</u>
2001-03	Course Director and Host, American Academy on Communication in Healthcare Annual Research and Teaching Forum- Baltimore- March, 2002 and October, 2003.
2007, 2010	Course Director and Host, Annual Conference, Learning Communities Institute Johns Hopkins University School of Medicine- November, 2007 & 2010, Baltimore MD.

Selected Peer review presentations- Talks and Posters

Misra S, Bicket M, Wright S, and **Shochet, R**. Medical Student Engagement and Leadership with a new Learning Community: Perspectives from Student Leaders. Poster, *Society General Internal Medicine Annual Meetings, Miami Beach FL, 5/2009.*

Nichols D, **Shochet R**, Drake T. Transforming Medical Education for the 21st Century: The Johns Hopkins University School of Medicine Initiative. Nichols D, **Shochet R**, Drake T. AAMC Group on Business Affairs and Institutional Planning Meeting, Philadelphia, PA, 4/27/2011.

R Shochet, J Colbert, R Levine, S Wright. Events that influence medical students' perceptions of the learning environment, Oral Abstract Presentation, American Academy on Communication in Healthcare Annual Research Meeting, Northwestern University School of Medicine, Chicago, IL. 10/17/2011.

R Shochet, S Wright. Learning Communities: A Way to Support Humanism in Medical School? Gold Humanism Honor Society Biennial Conference, Dallas, TX, 10/2010.

Experience conducting a review/synthesis

The second author recently completed a year-long research award to study the medical school LE at the Johns Hopkins University School of Medicine, where he reviewed the body of literature on LE so is familiar with the types of articles that we need to review.

Scott M. Wright, MD

Education and Training

Year	Degree	Institution	Discipline
1988	DEC	Vanier College	Health Sciences
1992	MD	McGill University	Medicine
1995	n/a- Residency	Montreal General Hospital	Medicine
1997	n/a-Fellowship	Johns Hopkins University	Medicine

Personal Experience

Date	Position/Institution
1997 - 2002	Assistant Professor of Medicine, JHUSOM
1999 - 2002	Associate Editor, <i>Journal of General Internal Medicine</i>
2002 - 2008	Associate Professor of Medicine, JHUSOM.
2008 - Present	Professor of Medicine, JHUSOM.
2009 - Present	Director, Miller-Coulson Academy of Clinical Excellence, JHUSOM.
2011 - Present	Chief, Division of General internal Medicine, JHBMC.

Teaching Experience

Date	Course/Institution	Role(s)
1997-2005	Teaching Skills Workshop, Faculty Development Program (FDP)	Core Faculty
1998-present	Evidence-Based Medicine	Course Director
1998-2005	Mentor for Facilitators-in-Training Teaching Skills Workshop, FDP	Core Faculty

Selected Peer Reviewed Publications

1. Beasley BW, Wright SM, Cofrancesco J, Babbott SF, Thomas PA, Bass EB. Promotion criteria for clinician-educators in the United States and Canada: a survey of promotion committee chairpersons. *JAMA*. 1997; 278: 723-8.
2. Wright SM, Kern DE, Kolodner KB, Howard DM, Brancati FL. Attributes of excellent attending-physician role models. *N Eng J Med*. 1998; 339: 1986-93.
3. Yao DC, Wright SM. National Survey of Internal Medicine Residency Program Directors Regarding Problem Residents. *JAMA*. 2000; 284: 1099-1104.
4. Wright SM, Beasley BW. Motivating factors for academic physicians within Departments of medicine. *Mayo Clinic Proceedings*. 2004; 79: 1145-1150.
5. Reed D, Kern DE, Levine R, Wright SM. Costs and funding for medical education research. *Journal of the American Medical Association*. 2005; 294:1052-57.
6. Wright SM, Levine RB, Beasley B, Haidet P, Gress TW, Caccamese S, Brady D, Marwaha A, Kern DE. Personal growth and its correlates during residency training. *Medical Education*. 2006; 40: 737-745.
7. Reed D, Cook D, Beckman T, Levine R, Kern D, Wright SM. Association between funding and quality of published medical education research. *JAMA*. 2007; 298:1002-1009.
8. Kravet S, Shore A, Miller R, Green G, Wright SM. Healthcare utilization and the proportion of primary care physicians. *American J of Medicine*. 2007; 121: 142-148.
9. Christmas C, Kravet S, Durso C, Wright SM. Defining clinical excellence in academic medicine: A qualitative study of the master clinicians. *Mayo Clinic Proceedings*. 2008; 83: 989-994.

10. Durso C, Christmas C, Kravet S, Wright SM. Implications of academic medicine's failure to recognize clinical excellence. *Clin Med and Research*. 2009; 7: 127-133.
11. Wright SM, Christmas C, Burkhart K, Kravet S, Durso C. Creating an Academy of Clinical Excellence at Johns Hopkins Bayview Medical Center: A 3-Year Experience. *Acad Med*. 2010; 85:1833-9.
12. Page K, Castillo-Page L, Wright SM. The challenging task of diversifying the faculty in academic medicine. Accepted for publication in an upcoming issue of *Acad Med*.
13. Kravet S, Christmas C, Durso C, Parson G, Burkhart K, Wright SM,. The intersection between clinical excellence and role modeling in medicine. Accepted for publication in an upcoming issue of *J Grad Med Ed*.
14. Stewart R, Wolfe L, Flynn G, Carrese J, Wright SM. Success in Grateful Patient Philanthropy: Insights from Experienced Physicians. Accepted for publication in an upcoming issue of *Am J Med*.
15. Wright SM, Gozu A, Burkhart K, Bhogal H, Hirsch G. Clinicians' perceptions about how they are valued by the academic medical center. Accepted for publication in an upcoming issue of *Am J Med*.

Selected Workshops/Seminars

<u>Dates</u>	<u>Course Title, Location</u>
October 2003	"Guiding residents along the path toward personal growth." Workshop at the Association of Program Directors in Internal Medicine annual national meeting in Washington, DC.
May 2004	"The facilitation of personal growth in medical learners." Workshop at the Society of General Internal Medicine's Annual National Meeting in Chicago, IL.
May 2004	"Making it count twice: How to get curricular work published." Workshop at the Society of General Internal Medicine's Annual National Meeting in Chicago, IL.
May 2005	"Leadership Skills for Internists." Workshop at the Society of General Internal Medicine's Annual National Meeting in New Orleans, LA.
November 2007	"Conducting Research within a Learning Community" Workshop for the American Association of Medical College's (AAMC) Learning Community Group, Baltimore, MD.
April 2008	"Enhancing career development one pair at a time: How to start and sustain a mentoring program at your institution", Workshop at the Society of General Internal Medicine's Annual National Meeting in Pittsburgh, PA.

Experience conducting a review/synthesis

The third author has published review articles, and written book chapters that have reviewed clinical content. He was a primary mentor to the investigator who has developed the MERSQI (Dr. Reed) and he been asked to serve as a peer-reviewer for many reviews that have used this tool. Because his career has focused on medical education research, his general insights on the subject matter and the review should help the team in process and outcome.