Supplemental Table – Article Summaries and Authors Top Picks about Faculty Development for CBME Implementation

Article	Type	Brief Description	Author Top Picks
Kogan JR, Conforti LN, Yamazaki K, Iobst W, Holmboe ES. 2017. Commitment to Change and Challenges to Implementing Changes After Workplace-Based Assessment Rater Training. Acad Med 92:394-402.	Prospective cohort study	This study explored the commitments to change and the subsequent ability to implement these changes among faculty who completed a workplace-based assessment rater training. The most common commitments focused on changes in faculty members' own teaching e.g. increasing direct observation. In follow up, a higher initial motivation predicted change and most commonly cited barriers were lack of time/competing priorities. As difficulty increased, implementation became less likely. The authors describe several system-level barriers that undermine the ability to implement change.	
Kogan JR, Conforti LN, Bernabeo E, Iobst W, Holmboe E. 2015. How faculty members experience workplace-based assessment rater training: a qualitative study. Med Ed 49:692-708.	Prospective cohort study	This qualitative study explored the experiences of faculty with two rater training methods: performance dimension training and frame of reference training. The aim was to elucidate how such FD can be optimally designed. Rater training positively influenced faculty members' approach to direct observation and feedback, ability to use entrustment as the standard for assessment, and clinical skills. Barriers to implementation and change included: (i) a preference for holistic assessment over frameworks; (ii) challenges in defining competence; (iii) difficulty in changing one's approach to assessment, and (iv) concerns about institutional culture and buy-in.	
Schultz K, Griffiths J. 2016. Implementing Competency-Based	Evidence summary, expert opinion and	The authors use their local experience to outline a stepwise approach to implementing CBME. They identify overarching processes, costs, and	Author Top Pick: FD is part of a larger context of CBME

Medical Education in a Postgraduate Family Medicine Residency Training Program: A Stepwise Approach, Facilitating Factors, and Processes or Steps That Would Have Been Helpful. Acad Med. 91:685-689.	program description	facilitating factors. Key components include: • FD should be multimodal, e.g. small-group sessions, one-on-one sessions, online presentations. • FD should include providing feedback from residents to preceptors about performance in both preceptor and assessor roles.	implementation; this article nicely embeds FD within a stepwise approach.
Walsh A, Koppula S, Antao V, Bethune C, Cameron S, Cavett T, Clavet D, Dove M. 2018. Preparing teachers for competency-based medical education: Fundamental teaching activities. Med Teach. 40:80-85.	Evidence summary and expert opinion	The authors describe a set of Fundamental Teaching Activities (FTAs) that outline the day-to-day work of teachers. An iterative process was used to delineate discrete observable activities of teachers, each integrating knowledge, skills, and attitudes, and related to specific teaching tasks. FTAs are intended as a guide for teacher professional development, and authors have subdivided coaching into clinical coaching and competency coaching.	
Dewey CM, Jonker G, ten Cate O, Turner TL. 2017. Entrustable professional activities (EPAs) for teachers in medical education: Has the time come? Med Teach. 39:894-896.	Evidence summary and expert opinion	The authors suggest applying the EPA construct to the development of competence teaching among faculty members. Suggested FD activities include formal on-boarding orientation or boot-camp–type training, observed structured teaching exercises (OSTE), peer observation, and self-review of videotaped performances. Using periodic assessments can confirm educators' ongoing competence. Barriers include faculty time, monetary costs, and the lack of resources and tools for assessment and training.	Author Top Pick: The article suggests methods for improving the effectiveness of FD activities in the setting of CBME.
Nousiainen MT, Caverzagie KJ, Ferguson PC, Frank JR, ICBME Collaborators. 2017. Implementing	Evidence summary and expert opinion	The authors describe CBME implementation and cite FD as critical to ensuring CBME does not fail. Suggestions include financial incentives, online assessment	

competency-based medical education: What changes in curricular structure and processes are needed? Med Teach. 39:594-598.		systems, and programs sharing experiences with each other.	
Favreau MA, Tewksbury L, Lupi C, Cutrer WB, Jokela JA, Yarris LM, AAMC Core Entrustable Professional Activities for Entering Residency Faculty Development Concept Group. 2017. Constructing a Shared Mental Model for Faculty Development for the Core Entrustable Professional Activities for Entering Residency. Acad Med. 92:759-764.	Evidence summary and expert opinion	The authors describe a conceptual framework for entrustment that was developed to prepare teachers making entrustment decisions in undergraduate medical education. The model includes four dimensions for FD: (1) observation skills in authentic settings, (2) coaching and feedback skills, (3) self-assessment and reflection skills, and (4) peer guidance skills developed through a community of practice.	Author Top Pick: Entrustment decision making is a big stumbling block when EPAs are implemented.
Konopasek L, Norcini J, Krupat E. 2016. Focusing on the Formative: Building an Assessment System Aimed at Student Growth and Development. Acad Med. 91:1492-1497.	Evidence summary and expert opinion	The authors propose an infrastructure for a formative assessment system. It consists of four pillars: (1) FD, (2) learner development, (3) longitudinal academic advising and coaching, and (4) documentation of developing competence. Effective formative assessments require: a learning and feedback culture; a focus on relationship, assessment, and coaching; facilitating learner self–assessment; establishing a shared mental model for milestones; and setting a timeframe for achieving competence.	
Carraccio C, Englander R, Van Melle E, ten Cate O,	Evidence summary	The authors present a literature-based model of CBME in the form of a charter. The aim is to outline a path	

Lockyer J, Chan MK, Frank JR, Snell LS, ICBME Collaborators. 2016. Advancing Competency-Based Medical Education: A Charter for Clinician-Educators. Acad Med. 91:645-649.	and expert opinion	forward for widespread CBME implementation. Key charter components include: • Commitment to supervision that balances patient safety with the professional development of learners • Commitment to transparency with all stakeholders about the level of supervision needed • Commitment to the empowerment of learners • Commitment to the effectiveness and efficiency of assessment strategies and tools • Commitment to providing FD in teaching and assessing the competencies required of learners	
Gorlitz A, Ebert T, Bauer D, Grasl M, Hofer M, Lammerding-Koppel M, Fabry G; GMA Committee on Personal and Organizational Development in Teaching. 2015. Core Competencies for Medical Teachers — A Position Paper of the GMA Committee on Personal and Organizational Development in Teaching. GMS Zeitschrift Fur Medizinische Ausbildung. 32: Doc23.	Evidence summary and expert opinion	The authors outline a model for core teaching competencies that was designed for routine application in medical schools. The areas of competency within the model include: (1) educational action in medicine, (2) learner centeredness, (3) social and communicative competencies, (4) role-modelling and professionalism, (5) reflection and advancement of personal teaching practice, and (6) systems related to teaching and learning.	
Holmboe ES, Ward DS, Reznick RK, Katsufrakis PJ, Leslie KM, Patel VL, Ray DD, Nelson EA. 2011. Faculty	Evidence summary and expert opinion	The authors offer an expert opinion on the most appropriate focus areas for FD in the context of CBME. These include: (1) frame-of-reference training (should be a standard of practice), (2) feedback to faculty that	

development in assessment: the missing link in competency-based medical education. Acad Med. 86:460-467.		directly compares them with their peers (should be a standard of practice), (3) activities enabling a working knowledge of basic core psychometric concepts and use of validated assessment tools and methods, (4) development of a web-based suite of course work on assessment, and (5) having learners actively engaged in assessment systems.	
Dath D, Iobst W; ICBME Collaborators. 2010. The importance of faculty development in the transition to competency-based medical education. Med Teach 32:683-686.	Evidence summary and expert opinion	The authors describe the challenges of CBME implementation and cite FD as fundamental to its effectiveness. They encourage making FD activities easily accessible and multi-modal in design. FD should result in faculty understanding competencies, as well as assessment skills outside the medical expert domain. Recognition of educational work, innovation, or scholarship are suggested as FD incentives that may help with CBME adoption.	
Iobst WF, Sherbino J, ten Cate OT, Richardson DL, Dath D, Swing SR, Harris P, Mungroo R, Holmboe ES, Frank JR. 2010. Competency-based medical education in postgraduate medical education. Med Teach. 32:651-656.	Evidence summary and expert opinion	The authors provide expert opinion on CBME for the postgraduate setting. They suggest that effective FD creates a shared mental model about direct observation and that this will ultimately enhance assessment reliability and validity. Rater training ideally results in agreement on the essential elements of the competency to be observed, standardized criteria for rating that competency, and strategies to increase the frequency of observations.	
Harris P, Snell L, Talbot M, Harden RM. 2010. Competency-based medical education: implications for undergraduate	Evidence summary and expert opinion	The authors provide expert opinion on CBME implementation and suggest best practices for UGME, which include adequate examiner training as the *sine qua non* of reliable observational assessment. Change management strategies are identified as highly important.	

programs. Med Teach. 32:646-650.			
Kittredge D; Baldwin CD; Bar-on M; Trimm RF; Beach PS. 2009. One specialty's collaborative approach to competency-based curriculum development. Acad Med 84:1262-1268.	Evidence summary and expert opinion	The authors describe their experience of CBME implementation, citing FD as "one of the cornerstones of educational change." Suggested FD activities include self-directed online tutorials and user-friendly interactive workshops that enable personal contact.	
Fraser AB; Stodel EJ; Jee R; Dubois DA; Chaput AJ. 2016. Preparing anesthesiology faculty for competency-based medical education. Can J of Anesth. 63:1364-1373.	Critical review and program description	The authors outline the evidence supporting FD best practices and describe local FD experiences as part of a larger CBME implementation. Key messages: • FD is critical to the success of CBME programs. • Faculty need to know both the theory and rationale behind CBME. • Faculty must teach and assess beyond the medical expert role for competencies that they may not have been taught. • Resources should be shared among programs both locally and nationally. • FD prepares faculty for coach role. • Incentivize. • Longitudinal program. • Feedback to faculty on skills. • Consider making FD mandatory. • FD can be criterion for academic promotion. • Link FD to learner outcomes. • Employ change management strategies.	Author Top Pick: There are a number of practical lessons learned in CBME implementation, including lessons about FD.
Hawkins RE, Welcher CM, Holmboe ES, Kirk	Critical review	The authors review the challenges with CBME. They suggest providing FD incentives that link activities to	

LM, Norcini JJ, Simons KB, Skochelak SE. 2015. Implementation of competency-based medical education: are we addressing the concerns and challenges? Med Ed. 49:1086-1102.		clinical learning needs or administrative and regulatory requirements, as well as through academic award programs that recognize innovation and scholarship.	
Alevi D; Baiocco PJ; Chokhavatia S; Kotler DP; Poles M; Zabar S; Gillespie C; Ark T; Weinshel E. 2010. Teaching the competencies: using observed structured clinical examinations for faculty development. Am J of Gastro. 105:973-977.	Program description	The authors report on their use of an OSCE as a tool for FD to improve the effectiveness of feedback. To prepare for the OSCE, faculty completed a web-based training module and received written guidelines on giving feedback.	
Des Ordons AR, Gaudet J, Cheng A, Downar J. 2016. Towards skilled feedback on challenging conversations — a simulation-based faculty workshop. J Pain and Symptom Management. 52:e8-e9.	Conference abstract	The authors describe the implementation and evaluation of a simulation-based workshop on feedback provision. Confidence increased for most participants in all domains assessed.	