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BEME GUIDE

A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME Guide No. 40

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ABSTRACT

Background: This review, which focused on faculty development initiatives designed to improve teaching effectiveness, synthesized findings related to intervention types, study characteristics, individual and organizational outcomes, key features, and community building.

Methods: This review included 111 studies (between 2002 and 2012) that met the review criteria.

Findings: Overall satisfaction with faculty development programs was high. Participants reported increased confidence, enthusiasm, and awareness of effective educational practices. Gains in knowledge and skills, and self-reported changes in teaching behaviors, were frequently noted. Observed behavior changes included enhanced teaching practices, new educational initiatives, new leadership positions, and increased academic output. Organizational changes were infrequently explored. Key features included evidence-informed educational design, relevant content, experiential learning, feedback and reflection, educational projects, intentional community building, longitudinal program design, and institutional support.

Conclusion: This review holds implications for practice and research. Moving forward, we should build on current success, broaden the focus beyond individual teaching effectiveness, develop programs that extend over time, promote workplace learning, foster community development, and secure institutional support. We should also embed studies in a theoretical framework, conduct more qualitative and mixed methods studies, assess behavioral and organizational change, evaluate transfer to practice, analyse key features, and explore the role of faculty development within the larger organizational context.

Introduction

Faculty development programming in medicine has increased significantly in the last decade. In response to new educational trends in teaching and assessment, most medical schools and educational organizations now offer a variety of programs and activities to help faculty members improve their skills as teachers and educators (Steinert 2014).

Faculty development, or staff development as it is often called, refers to all activities health professionals pursue to improve their knowledge, skills and behaviors as teachers and educators, leaders and managers, and researchers and scholars, in both individual and group settings (Steinert 2014). In addition, although faculty development has traditionally taken place through formal programs or activities offered by medical schools or other educational organizations and institutions (Bland et al. 1990; Steinert et al. 2006), it has recently been suggested that faculty members develop educational expertise through informal learning opportunities in authentic environments (Webster-Wright

Practice points

- The field of faculty development has grown substantially in the last 10 years.
- Formal, structured activities in group settings (e.g. longitudinal programs and workshops) seem to be the most commonly offered faculty development interventions.
- Longitudinal programs tend to yield outcomes that go beyond teaching effectiveness (to include educational leadership and scholarship) and appear to be more sustainable.
- Key features of faculty development include evidence-informed design principles, relevant content, experiential learning and opportunities for practice and application, opportunities for feedback and reflection, educational projects, intentional community building, longitudinal program design, and institutional support.
- Faculty development interventions have the ability to build communities of practice among program participants and in the workplace.

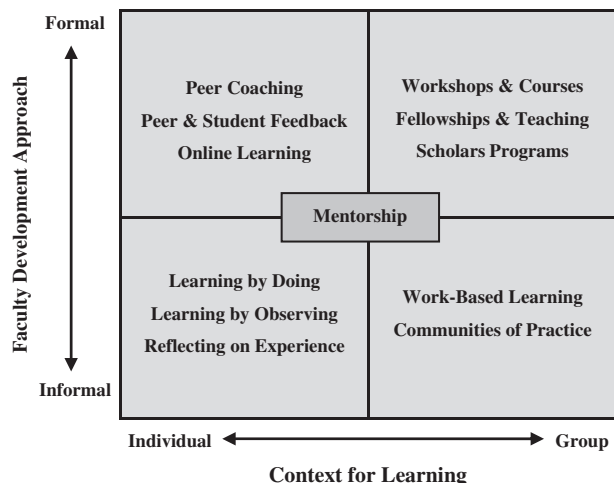


Figure 1. Approaches to faculty development. This figure was originally prepared for a chapter on “Becoming a Better Teacher: From Intuition to Intent.” Re-printed with permission by the American College of Physicians © 2010.

2009). As Figure 1 illustrates (Steinert 2010), faculty members can develop expertise through experience, observation, and reflection; they can also improve their skills as teachers and educators through peer coaching, learner feedback, online learning, and workplace learning, often by being a member of a community of practice. Thus, faculty development programs can differ in format (e.g. from one-time workshops to longitudinal programs) and purpose (e.g. from focusing on teaching beliefs and skills to educational leadership and scholarship), in both individual and group settings, using a variety of educational strategies. Mentors can also help faculty members enhance their teaching effectiveness.

In 2006, we conducted a review of faculty development activities designed to enhance teaching effectiveness (Steinert et al. 2006). That review, which summarized articles from 1980 to 2002, reported the following outcomes: high satisfaction with faculty development programs; positive changes in attitudes toward faculty development and teaching; self-reported gains in knowledge and skills of educational principles and teaching; self-reported changes in teaching behavior, with some observed changes in teaching performance; and few changes in organizational practice (e.g. establishment of collegial networks) or student learning. Key features of effective faculty development were also identified, including: the use of experiential learning; the provision of feedback; effective peer and colleague relationships; well-designed interventions following principles of teaching and learning; and a diversity of educational methods within single interventions. Recommendations for research in the field were also proposed.

Since 2006, several reviews of faculty development designed to enhance teaching effectiveness have been published in higher education (e.g. Stes et al. 2010; Amundsen & Wilson 2012), dentistry (Hendricson et al. 2007), family medicine (Sorinola & Thistlethwaite 2013), and medical education (Leslie et al. 2013). For example, Stes et al. (2010) conducted a systematic review of instructional development in higher education to investigate the differential impact of initiatives with varied duration, formats, and participant groups. These authors reviewed 37 articles reporting on 36 different initiatives of teachers in higher education, published between 1977 and 2007, and concluded that interventions over time have more positive outcomes at the level of participant behavior than one-time events. They

also suggested that alternative or hybrid formats (e.g. peer coaching or formal courses plus coaching and project work) yielded more positive results than more traditional approaches such as workshops.

More recently, Amundsen and Wilson (2012) conducted a conceptual review of the literature on faculty development in higher education published between 1995 and 2008. Rather than organizing their review by type of activity, they clustered different initiatives according to their purpose or focus (e.g. acquisition or enhancement of observable teaching skills and techniques; mastery of a particular teaching method; changes in teachers’ conceptions of teaching and learning through support for individual reflection). Moreover, these authors, interested in the design of educational development practices, concluded that future reviews should focus on how faculty development can support learning about teaching in the broader context in which individuals work and teach, as little is known about how learning about teaching in the workplace can enhance practice.

Leslie et al. (2013) reviewed the faculty development literature within medical education. These authors focused on 22 high quality studies with strong designs, reporting on 21 different interventions, 95% of which were published between 2001 and 2010. Most studies were described as a series of workshops or longitudinal programs ranging from 10 days to two years, and the authors postulated that faculty development initiatives are moving away from single, one-time workshops to more prolonged exposure. They also recommended that future research focus on the educational process of faculty development (including workplace learning) and the interplay of contextual factors (including communities of practice) that may influence faculty development outcomes.

We decided to update our 2006 review for several reasons. Firstly, we believed that a 10-year update would allow us to describe the evolution of faculty development in the last decade. Secondly, we wanted to identify emerging trends and articulate a practice and research agenda to help advance the field. Thirdly, despite significant growth, there has been no comprehensive systematic review of faculty development focused on teaching improvement in medicine since our 2006 publication. The review by Sorinola and Thistlethwaite (2013) focused solely on Family Medicine, whereas Leslie et al. (2013) only included 22 out of 160 studies published between 2001 and 2010. Lastly, we wanted to explore a gap identified by previous reviews; that is, we wanted to contribute towards a better understanding of how faculty development can enhance the building of sustainable communities of practice.

Making a plea to examine the rich context in which faculty development—and teaching and learning—occur, O’Sullivan and Irby (2011) proposed a model for research on faculty development that is grounded in social systems and focuses on two communities of practice: the faculty development community and the workplace community. As highlighted in other reviews, these researchers suggested that instead of maintaining an exclusive focus on individual faculty members, we should focus on the context (or environment) in which faculty members work. In this model (outlined in Figure 2), the faculty development community includes the participants involved in faculty development, the programs (i.e. curricula) offered, the facilitators of faculty development initiatives, and the context in which faculty

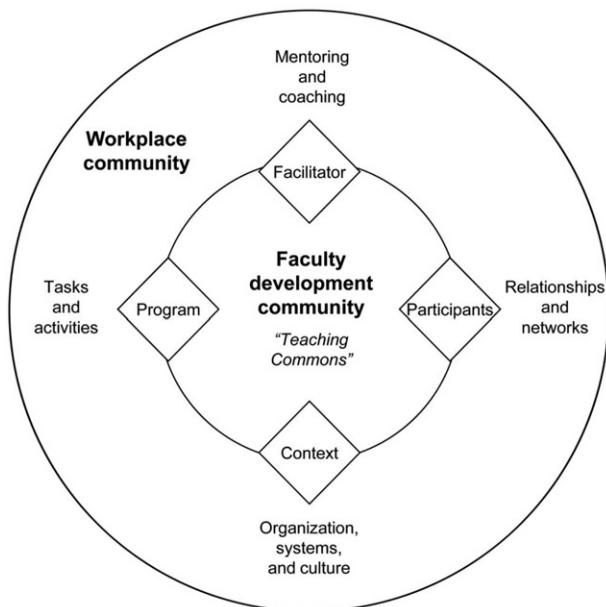


Figure 2. Expanded model of faculty development. This model for faculty development research suggests that faculty development is embedded in two communities of practice (the faculty development community and the workplace community). Reprinted with permission from O'Sullivan PS, Irby DM. 2011. Reframing research on faculty development. *Acad Med.* 86:421–428.

development is organized (e.g. classroom or clinic). Each component is also associated with teaching in the workplace, as participants involved in faculty development collaborate with other teachers or staff members, have relationships and networks in the workplace, fulfill tasks and activities within the educational program, have mentors and coaches in the work setting, and work in an organizational context characterized by a culture that either supports or inhibits educational change (O'Sullivan & Irby 2011). In describing this model, the authors argued that faculty development research should focus on process and outcomes, including relationships within the program and the workplace.

Although the definition of faculty development encompasses the multiple roles of faculty members as outlined above, this review focused on faculty development initiatives (including both formal and informal approaches in individual and group settings) designed to improve teaching effectiveness; we also explored the types of interventions offered, study characteristics, individual and organizational outcomes, key design features, and effects on community building, both in the faculty development program and in the workplace. More specifically, this review addressed the following research questions:

1. What types of faculty development interventions (e.g. workshops; longitudinal programs) have been offered in the last 10 years?
2. What characterizes the studies that have been conducted (e.g. overarching conceptual framework; study design; data collection methods and sources; and levels of outcome measured)?
3. What are the outcomes of faculty development programs in terms of individual changes in knowledge and attitudes, self-reported and observed behaviors, and the organization at large?
4. What are the key features of effective faculty development programs?

5. What is the impact of faculty development on building a faculty development community and a community of practice in the workplace?

Review methodology

Review group

As in 2006, an international Topic Review Group (TRG) of individuals representing six countries was constituted. Three criteria were used to invite individuals for TRG participation: international diversity; practical experience in faculty development and medical education; and expertise in educational research methodology. To accommodate the size and scope of this review, six individuals joined the team of six reviewers who had participated in the earlier review.

The pilot process

A three-phase pilot process was undertaken to prepare for this systematic review.

Phase I

Four articles (chosen by the lead reviewer) were sent to the six reviewers who had participated in the 2006 review to determine the scope of the review, refine the review question, and assess the applicability of the original BEME FACDEV Coding Sheet (Steinert et al. 2006). We also wanted to capture new lenses through which to consider study findings, including the notion of workplace learning and communities of practice (Steinert 2010; O'Sullivan & Irby 2011).

Following this step, we identified areas of the original BEME FACDEV Coding Sheet that required adaptation (i.e. questions related to the stated intervention, target population, instructional methods, evaluation methods, and "impact" of the intervention, distinguishing between self-reported and observed behavioral changes). We also incorporated several questions that emerged from O'Sullivan and Irby's model (2011).

Phase II

Six articles were sent to all 12 reviewers, using the modified BEME FACDEV Coding Sheet (which now included questions related to communities of practice and work-based learning). Via an international conference call, the TRG members reviewed coding challenges (with a particular focus on Kirkpatrick and Kirkpatrick's classification of educational outcomes) and further revised the Coding Sheet.

Phase III

Based on feedback received during phase II, additional changes were made to the Coding Sheet and two articles were sent to all reviewers, to ensure inter-rater agreement and consistency. The final Coding Sheet (see Appendix I, available online as Supplementary Material) was subsequently accepted, and a timeline for individual and group coding was determined.

Guiding conceptual frameworks

As stated above, we added a number of questions to the Coding Sheet to incorporate the conceptual framework proposed by O'Sullivan and Irby (2011). To classify and

analyze outcomes, we used an adaptation of Kirkpatrick and Kirkpatrick's model (2006) for evaluating training programs which describes four levels of outcome: learners' *reaction* (to the educational experience); *learning* (changes in attitudes, knowledge and skills); *behavior* (changes in practice and the application of learning to practice); and *results* (changes at the level of the learner and the organization).

Inclusion/exclusion criteria

To facilitate comparison, we adopted the criteria used in our 2006 review to select the articles.

Faculty development focus

Within our focus on faculty development interventions designed to improve teaching effectiveness, all types of activities (including formal and informal approaches), of whatever duration, were included. Faculty development activities focusing on specific clinical content (e.g. addiction medicine; geriatric medicine) were included if they also addressed methods of teaching and learning.

Target population

Faculty development activities for both basic science and clinical faculty in all areas of medicine were selected. Interventions designed solely to improve teaching effectiveness of residents-in-training or other health care professionals (e.g. nursing) were excluded.

Study design

We included all study designs across the positivist (empirical observation and measurement), interpretist (construction of understanding), and participatory (action research) paradigms (Creswell 2003; Freeth et al. 2005). However, we excluded studies that only reported participant satisfaction; while participant satisfaction is important, we wished to explore evidence of learning and change.

Year of publication

All articles assessing faculty development interventions from 2002 to 2012 were included in the search.

Language and geography

Though we did not exclude any articles on the basis of language or geography, our database search mostly returned English-language results. Two articles, in Hebrew and in Spanish, did not meet the inclusion criteria.

Search strategy and sources of papers

We significantly revised the database search (included in Appendix II, available online as Supplementary Material) from the previous review to increase relevant findings. We searched Medline, EMBASE, CINAHL, and ERIC, using the following key words: faculty development; staff development; in-service training; medical faculty; physicians; teaching; and professional development. This search covered the period of February 2002 to February 2012, to provide a 10-year update.

Only original research articles and reviews were retrieved. Editorials and essays were excluded. Additionally, we conducted manual searches of the following journals: *Academic Medicine*; *Medical Education*; *Medical Teacher*; *Teaching and Learning in Medicine*; and *Advances in Health Sciences Education*. We also hand-searched Proceedings of the Ottawa Conferences on Medical Education, reference lists of all review articles, and experts' recommendations.

Selection methods and judgment of methodological quality

The literature search resulted in a total of 871 abstracts. As outlined in Figure 3 (available online as Supplementary Material), we employed a two-step process in the selection of studies eligible for review. Initially, each abstract was evaluated by the lead reviewer (YS) and two members of the review group (BMB and LN), to ascertain whether the article related to faculty development and teaching improvement. This resulted in 215 articles, all of which were pulled for further appraisal. Two members (YS and BMB) then applied the selection criteria to these articles, resulting in 121 articles for further review. A subsequent hand search (of all reference lists and the lead reviewer's own files) yielded an additional nine articles that had not appeared in the electronic search, yielding a total of 130 articles. We then re-read the abstracts and sent 121 articles to the team for review. Ten additional articles were removed during the review process due to lack of data, resulting in 111 articles for this systematic review.

Data extraction, analysis and synthesis

Data extraction involved the completion of an abstract sheet for each study. The Coding Sheet was based on the 2006 prototype and included the following data:

- Context of the intervention
- Description of the intervention and its outcomes
- Evaluation methods, including study design, data collection methods, and data sources
- Study quality and strength of findings
- Relationship between faculty development, work-based learning, and communities of practice
- Avenues for further research
- New insights and implications for faculty development.

Members of the TRG worked in pairs to review and code each article. Results were entered into a central EXCEL spreadsheet and verified for completion and accuracy. The EXCEL summary was then returned to both reviewers to resolve coding differences. When necessary, the lead reviewer (YS) assisted in resolving differences; she also read all of the articles and coding sheets to ensure uniformity in approach.

Review of findings

This review is based on 111 articles focused on faculty development interventions designed to improve teaching effectiveness in medical education. (Tables 1 A–E, available

Table 1. Comparison of 2006 and 2016 review: intervention types, study designs and outcomes.

	2006 (n = 53)	2016 (n = 111)
Intervention type*		
Workshop	43% (23)	29% (32)
Short course	11% (6)	14% (16)
Seminar series	19% (10)	9% (10)
Longitudinal program	10% (5)	36% (40)
Other	17% (9)	13% (14)
Study design		
Single group	85% (45)	75% (83)
Observational	0	1% (1)
Non-equivalent control group	4% (2)	14% (16)
Randomized control trial	11% (6)	4% (4)
Qualitative	0	6% (7)
Mixed methods	21% (11)	23% (25)
Level of outcomes		
Level 1 – Reaction (<i>Satisfaction</i>)	74% (39)	50% (56)
Level 2A – Learning (<i>Attitudes</i>)	36% (19)	46% (51)
Level 2B – Learning (<i>Knowledge & Skills</i>)	58% (31)	54% (60)
Level 3A – Behaviour (<i>Self-Reported Changes</i>)	25% (13)	65% (72)
Level 3B – Behaviour (<i>Observed Changes</i>)	47% (25)	35% (39)
Level 4A – Results (<i>Organizational Practices</i>)	13% (7)	23% (26)
Level 4B – Results (<i>Change in Learners</i>)	6% (3)	5% (5)

*Please note that one intervention was coded as two intervention types: a short course and seminar series.

online as Supplementary Material, summarize these articles). Consistent with the research questions outlined above, this section will be organized into five parts:

- Description of the interventions
- Study characteristics
- Summary of outcomes by intervention type
- Key features of faculty development programs
- Effects on community building.

Description of the interventions

Setting

Of the 111 interventions, 79 took place in the United States (71%); other countries included Canada ($n=8$; 7%), the UK ($n=6$; 5%), Turkey ($n=3$; 3%), Russia ($n=2$; 2%), Sweden ($n=2$; 2%), and Australia, Denmark, Germany, India, Israel, Italy, Iran, Nepal, Pakistan, Singapore, and Switzerland (one each). Only one intervention (Burdick et al. 2010) described an international program that took place in the US and 19 other countries in South America, Africa and South Asia. As in 2006, the majority of studies came from the US, with several studies from Canada and the UK. In addition, most activities were delivered in a university, hospital, or community setting.

Professional discipline

The majority of faculty development interventions targeted practicing clinicians. The disciplines that were identified most frequently included Internal Medicine, Family Medicine, and Pediatrics. Other specialties included Anesthesiology, Emergency Medicine, Gastroenterology, Geriatrics, Psychiatry and Surgery. Thirty-three faculty development interventions (30%) reported the inclusion of multiple specialties, and 16 (14%) identified other health professions such as Nursing, Dentistry, Public Health, Social Work, and Speech Therapy. Seventeen interventions (15%) were designed for both clinical and basic sciences. Participant numbers ranged from six to 543, with a mean attendance of 66 and a median attendance of 46. Participation was primarily on a volunteer basis (62%); participation was mandatory in 11% of the interventions, and 27% did not specify the nature of participation.

Focus of the intervention

The faculty development interventions in this review focused on the improvement of teaching performance (in the classroom and the clinical setting), teaching conceptions and learning approaches, the acquisition of specific teaching skills (e.g. interactive lecturing and small group facilitation; giving feedback), learner assessment, instructional design and curriculum development, educational leadership, and educational scholarship. A number of interventions (16%) linked educational improvement to specific content areas (e.g. alcoholism and other substance abuse disorders; geriatric medicine; palliative care; primary care genetics), and a few identified an explicit goal of creating institutional, regional or national networks focused on education.

Intervention type

As in 2006, we utilized the authors' descriptions to describe the interventions. The majority of programs were longitudinal interventions ($n=40$; 36%) and workshops of varying duration ($n=32$; 29%). The longitudinal interventions were further described as fellowships ($n=8$; 7%), scholars programs ($n=13$; 12%), and longitudinal programs ($n=19$; 16%). Fifteen programs were described as short courses (14%), nine as a seminar series (8%), and one as both a short course and a seminar series. Fourteen programs (13%) were identified as "other;" these included peer observations and coaching, self-study audiotapes and CD-ROMS, web-based training modules, and Objective Structured Teaching Encounters (OSTE's). As illustrated in Table 1, and in comparison to 2006, longitudinal programs demonstrated the greatest increase (from 10% to 36%); a slight decrease in seminar series (previously 19%) and workshops (previously 43%) was observed.

Instructional methods

All reports described a wide range of instructional methods that included small-group discussions and interactive exercises, experiential learning (during the intervention or in the workplace), structured opportunities for reflection, didactic lectures, role-plays and simulations, films, and videotape reviews of performance. Over a third of the programs included

project-based learning; others integrated independent and online learning as well as peer observation and coaching.

Duration

The duration of faculty development interventions ranged from 30 minutes to four years. Workshops were primarily one-time interventions, ranging in duration from one hour to six days, with a median of three hours. Short courses ranged from two days to one month, with a median of four days, with some courses being offered over a four to six-month time period. Seminar series ranged from one hour (offered 10 times over one year) to four hours (offered 12 times over three months), with a median of eight hours. Longitudinal interventions lasted from five weeks to four years, with a median of 18 months.

Study characteristics

Study goal and theoretical/conceptual framework

The majority of studies stated their objectives explicitly ($n = 87$, 78%); a majority ($n = 83$, 75%) also cited the relevant literature. Thirty-six studies (32%) explicitly placed their work within a conceptual framework, drawing primarily upon principles of adult learning, experiential and collaborative learning, and reflective practice. Several studies also referred to the conceptual frameworks underlying the Stanford Faculty Development Program (Stratos et al. 2006), the One-Minute Preceptor (Salerno et al. 2002) and Kirkpatrick and Kirkpatrick's model for evaluating training programs (2006). However, even when explicitly mentioned, the conceptual frameworks were primarily mentioned at the outset of the study, to inform program design or content; they were rarely re-visited in the discussion or interpretation of outcomes. This is comparable to the 2006 review.

Study design

The majority of studies were quasi-experimental and used single-group designs ($n = 83$, 75%), of which 39 (35%) included pre-post-test measures and 44 (40%) relied on post-tests only. Fifty-one percent of the studies using post-tests ($n = 42$) included a delayed post-test, and many single group designs collected data from multiple cohorts. Sixteen studies (14%) used a non-equivalent control group, with 14 of these (88%) using pre-post testing and 2 (12%) using post-tests only. Four studies (4%) were randomized control studies, and one study used a prospective observational design. Seven studies (6%) used a qualitative methodology, with a primary focus on interpretive description, and 25 (23%) reported a mixed-methods approach. As indicated in Table 1, in 2006, the majority of studies were quasi-experimental in design; there were no purely qualitative studies (although 21% had incorporated a qualitative method or analysis), and no mixed-methods approaches were reported.

Data collection methods

Questionnaires were the most popular data collection method. Sixty-two studies (56%) used a questionnaire only. Thirty-six (32%) combined questionnaires with another method (i.e. observation, interview, focus group, CV analysis). The majority of questionnaires were designed for a particular study or program evaluation and were not validated. Approximately 10 studies used a pre-validated

questionnaire and another 10 provided psychometric properties for a newly designed questionnaire. The use of questionnaires was similar to the 2006 review, in which 55% of the interventions used a questionnaire only and 38% used a questionnaire and another method. In the current review, fourteen studies (13%) included direct observation, a lower proportion than the 30% reported in 2006; seventeen studies (15%) used interviews.

Data sources

One hundred and four studies (94%) relied on data from program participants to assess changes in teaching behaviors. Thirty studies (27%) included students and residents to assess these changes, 16 (14%) used program coordinators or faculty developers, two (2%) used colleagues or peers, and 11 (10%) used other data sources such as external evaluation teams, external or blinded observers, and standardized students. As in 2006, the majority of programs relied on self-reported ratings of teaching; the use of third-party observers increased in this review.

Level of outcome assessed

Fifty six studies (50%) assessed *reaction*, which included participants' satisfaction and perceptions of the program's usefulness and acceptability. Seventy four studies (67%) assessed *learning*, which included attitudinal changes ($n = 51$; 46%) and gains in knowledge or skills ($n = 60$; 54%). Ninety studies (81%) assessed changes in *behavior*. Seventy-two studies examined self-reported changes (65%) and 39 reported observed changes (35%). Twenty-nine studies (26%) assessed *results*; 26 studies (23%) reported changes in organizational practice and 5 (5%) assessed changes in student or resident learning (e.g. Stratos et al. 2006; Shields et al. 2007; Murphy et al. 2008; Ogden et al. 2008; Mazotti et al. 2010). As highlighted in Table 1, in 2006, the percentage of studies assessing reaction (74%) and learning (77%) was higher; the percentage of studies examining behavior (72%) and results at the organizational level (19%) were slightly lower than in this review.

Study quality and strength of findings

Study quality was rated on a five-point scale (1 = low; 5 = high). With a range of scores from 1 (one study) to 4.5 (four studies), the mean study quality was 3 (as in 2006). Identified strengths included the use of pre-post-tests, large sample sizes, multiple sources of information, appropriate data analysis, and an educationally strong intervention. Weaknesses included limited evaluation data, an over-reliance on self-report data, few control or comparison groups, small participant numbers, and low response rates.

Strength of findings was also based on a five-point scale (1 = no clear conclusions can be drawn, not significant; 3 = conclusions can probably be based on the results; 5 = results are unequivocal). The mean rating for strength of findings was 3 (only slightly higher than 2.88 in 2006).

Summary of outcomes by intervention type

Workshops

Thirty-two interventions (summarized in Table 1A, available online as Supplementary Material) were described as

workshops (Peters et al. 2002; Ferguson et al. 2003; Gelula & Yudkowsky 2003; Green et al. 2003; Salerno et al. 2003; Stone et al. 2003; Yolsal et al. 2003; Roberts & Devries 2004; Wong et al. 2004; Bandiera et al. 2005; Bardella et al. 2005; Steinert et al. 2005; Wamsley et al. 2005; Berbano et al. 2006; Eckstrom et al. 2006; Bulik & Shokar 2007; Baral et al. 2007; Baroffio et al. 2007; Kumagai et al. 2007; Shields et al. 2007; Ottolini et al. 2007; Alford et al. 2008; Bylund et al. 2008; Notzer & Abramovitz 2008; Pandya & Ghosh 2008; Steinert et al. 2008; Aronson et al. 2009; Laberge et al. 2009; Round et al. 2009; Walsh et al. 2009; Myhre & Lockyer 2010; Zaidi et al. 2010).

Level 1—Reaction

Many workshop components were found to be of value: the interchange with colleagues and peers; the methodologies used (e.g. small group discussions; role plays and simulations); the presentation of frameworks for teaching and learning; and the creation of safe learning environments.

Level 2a—Learning

Most workshops led to self-reported changes in attitudes and perceptions towards teaching and learning. This included increased comfort and confidence in teaching (both in general and with respect to specific teaching strategies), altered awareness and teaching beliefs, and increased interest in teaching and in faculty development.

Level 2b—Learning

Many participants reported gains in knowledge and skills related to educational processes and teaching methods, with an emphasis on giving feedback, goal setting, and the promotion of reflection.

Level 3a—Behavior

Examples of self-reported changes in teaching practices included improved teaching effectiveness, better communication with learners, and enhanced feedback processes. Participants also reported changes in specific teaching methods (e.g. interactive teaching), use of learning principles, and development of appropriate goals and objectives.

Level 3b—Behavior

Only a few workshops reported the transfer of learning to the workplace as observed by a third party. In one study, teachers reported a change in their teaching behaviors following the intervention, but residents did not (Eckstrom et al. 2006); in another (Notzer & Abramovitz 2008), student ratings of teacher effectiveness and availability improved. Green et al. (2003) observed that integrating teaching skills with clinical content (e.g. primary care genetics) facilitated behavior change.

Level 4a and 4b—Results

Wider organizational changes attributable to the educational program were infrequently noted. However, a few studies reported changes in local and national networks. In one study (Laberge et al., 2009), all teams reported changes at the institutional level (e.g. increased awareness of student

needs, formalized collaborations) following the intervention. Improvement in learners' performance was observed in only one study (Shields et al. 2007).

Short courses

Fifteen interventions (summarized in Table 1B, available online as Supplementary Material) were short courses (Armstrong et al. 2003; Brown & Wall 2003; Dennick 2003; Bahar-Ozvaris et al. 2004; Godfrey et al. 2004; Holmboe et al. 2004; Houston et al. 2004; Sullivan et al. 2005; Amin et al. 2006; Armstrong & Barsion 2006; Manwell et al. 2006; Hatem et al. 2007; Malling et al. 2007; Sarikaya et al. 2010; Ebrahimi & Kojuri 2012); one study (Stratos et al. 2006) was entered as both a short course and seminar series.

Level 1—Reaction

Participants indicated a high level of satisfaction with short courses. In one study (Amin et al. 2006), participants indicated their preference for experiential learning and small group work, noting that it promoted group bonding and sharing of ideas.

Level 2a—Learning

Self-reported changes in attitudes included greater enthusiasm and motivation as educators, increased confidence, and enhanced awareness of the value of a learner-centered approach to teaching.

Level 2b—Learning

Participants indicated self-reported gains in knowledge of instructional principles (e.g. setting of objectives) and teaching skills (e.g. decreased use of lectures; increased interactivity).

Level 3a—Behavior

Self-reported behavior changes included the use of new teaching methods, increased committee work and grant applications, and renewed professional and career development (Armstrong et al. 2003). In one study (Sullivan et al. 2005), participants reported changes in practice that included defining explicit learning objectives, encouraging learners to reflect on emotional experiences, giving feedback, and conducting teaching exercises that allowed learners to practice new skills. Another study (Godfrey et al. 2004) reported improvements in negotiating learners' needs and planning and managing learning activities.

Level 3b—Behavior

Several studies reported observed behavior changes. For example, Brown and Wall (2003) found that participants were evaluated more positively according to senior house officers; Manwell et al. (2006) observed changes in the assessment of patients with alcohol use disorders; Ebrahimi and Kojuri (2012) reported that learners observed significant improvements in participants' teaching abilities. Another study reported career advancement among participants (Armstrong & Barsion 2006).

Level 4a and 4b—Results

One study (Houston et al. 2004) reported institutional benefits, including protected time for team building, new networking opportunities, and increased access to resources; another noted changes in institutional leadership (Stratos et al. 2006).

Seminar series

Nine interventions (summarized in Table 1C, available online as Supplementary Material) were described as seminar series (Salerno et al. 2002; Barratt & Moyer 2004; Wong & Agisheva 2004; Wong & Agisheva 2007; Pinheiro & Heflin 2008; Podrazik et al. 2008; Johansson et al. 2009; Mazotti et al. 2010; Johansson et al. 2012); one study (Stratos et al. 2006) was entered as both a short course and a seminar series.

Level 1—Reaction

Most participants rated seminar series as highly useful. In two studies (Stratos et al. 2006; Johansson et al. 2009), participants indicated that the learning climate, control of the sessions, and clear goals contributed to high levels of satisfaction; in another study (Johansson et al. 2012), participants valued the use of role-plays for training.

Level 2a—Learning

Self-reported changes in attitudes and perceptions included enhanced self-efficacy and confidence in teaching.

Level 2b—Learning

Self-reported changes in knowledge and skills were found in five studies; these included the ability to promote an effective learning climate, provide constructive feedback, and engage in self-directed learning.

Level 3a—Behavior

Most studies indicated self-reported behavior changes, with a particular focus on improved feedback and evaluation processes. One study (Johansson et al. 2012) indicated greater self-reported changes among groups who had participated in role-plays.

Level 3b—Behavior

Relatively few seminar series reported observed behavioral changes. In one study (Salerno et al. 2002), positive changes in feedback behaviors were observed; in another (Mazotti et al. 2010), ratings of geriatrics teaching by residents indicated positive changes.

Level 4a and 4b—Results

Changes in organizational practice (e.g. establishing new programs, influencing policy at local and state levels) were reported in one study (Stratos et al. 2006). Another study (Mazotti et al. 2010) reported changes in learners' skills in geriatric medicine.

Longitudinal programs

Forty interventions (summarized in Table 1D, available online as Supplementary Material) were described as

longitudinal programs. Eight were coded as *longitudinal fellowships* (Pinheiro et al. 2002; Marcus et al. 2005; Searle et al. 2006; Wilkerson et al. 2006; Beck et al. 2008; Lown et al. 2009; Burdick et al. 2010; Steinert 2010); 13 as *scholars programs* (Steinert et al. 2003; Simpson et al. 2004; Wilson & Greenberg 2004; Levine et al. 2005; Rosenbaum et al. 2005; Frohna et al. 2006; Muller & Irby 2006; Simpson et al. 2006; Steinert & McLeod 2006; Fidler et al. 2007; Srinivasan et al. 2007; Moses et al. 2009; Neufeld et al. 2011); and 19 as *longitudinal programs* (Morzinski & Fisher 2002; Lye et al. 2003; Morzinski & Simpson 2003; Cole et al. 2004; Gjerde et al. 2004; Eleazer et al. 2005; Knight et al. 2005; Pololi & Frankel 2005; Rust et al. 2006; Wilkes et al. 2006; Herrmann et al. 2007; Knight et al. 2007; Windish et al. 2007; Gjerde et al. 2008; Gozu et al. 2008; Light & Calkins 2008; Williams et al. 2008; Branch et al. 2009; Sehgal et al. 2011).

Level 1—Reaction

Participants reported high levels of satisfaction and enjoyment with longitudinal programs, highlighting the value of the content, the instructional methods, and the relationships among attendees. They also appreciated the opportunity to try new methods and test novel ideas in a safe environment.

Level 2a—Learning

Participants reported feeling more confident in their approach to educational problems and better prepared to teach. In one study (Steinert 2010), participants reported a sense of personal and professional renewal as they reconnected with the rewards of teaching and their own core values; in another (Burdick et al. 2010), participants indicated significant pre-post gains in the importance ratings of all curriculum topics (e.g. international medical education; change theory and management; personal and professional development), re-affirming their appreciation of each.

Level 2b—Learning

Self-reported changes in knowledge of educational theory and techniques as well as teaching skills (including a more structured approach to teaching and learning) were frequently reported. In one study (Cole et al. 2004), pre-post change scores were significantly higher for participants compared to non-participants on measures of enhanced teaching effectiveness (e.g. assessing learning needs, giving feedback), professional effectiveness beyond teaching (e.g. time management), and self-directed learning.

Level 3a—Behavior

Self-reported behavior changes included improved teaching performance (e.g. small group teaching; clinical assessment; provision of feedback), development of new educational curricula and programs (e.g. on substance abuse), and greater involvement in local settings. In one study (Williams et al. 2008), participants reported increased recognition and support for teaching and greater committee involvement as a result of their new "expertise". In another study (Lye et al. 2003), several participants reported the receipt of teaching awards following their involvement in a longitudinal program on clinical teaching. An increased sense of community

and enhanced networking were noted in many of the longitudinal interventions.

Level 3b—Behavior

Observed changes included new educational courses and practices (e.g. increased geriatrics teaching), new leadership positions, increased academic output (including peer-reviewed presentations and publications), and career advancement (e.g. Morzinski & Simpson 2003; Frohna et al. 2006; Simpson et al. 2006; Steinert & McLeod 2006; Wilkerson et al. 2006). Retention in academia was also noted by several studies.

Level 4a and 4b—Results

Several studies reported changes in organizational practices related to network expansion and development, enhanced cross-departmental collaboration, and curricular changes (e.g. new rotations in geriatrics).

Other activities

Other activities (summarized in Table 1E, available online as Supplementary Material) included peer observation (Regan-Smith et al. 2007; O'Keefe et al. 2009; Pattison et al. 2012), peer coaching (Sekerka & Chao 2003), pedagogical consultation (Lochner & Gijssels 2011), a four-step cognitive training method (Murphy et al. 2008), the use of audiotapes (Willett 2006), CD-ROMs (Ogden et al. 2008; Ozuah et al. 2010) and a web-based module and OSCE (Alevi et al. 2010), an Objective Structured Teaching Encounter (Julian et al. 2012), faculty evaluations (Maker et al. 2004, 2006), and a two-day conference (Quirk et al. 2005).

Level 1—Reaction

Participants reported high levels of satisfaction with the diverse approaches offered. They particularly valued the experiential learning that these activities allowed, expressing appreciation of the use of OSTEs (Objective Structured Teaching Encounters) and the individual attention offered (e.g. in peer observations and consultations).

Level 2a—Learning

In the four studies that assessed change at this level, participants reported increases in teaching confidence and comfort, awareness of effective educational practices, and appreciation of institutional support.

Level 2b—Learning

Only three studies assessed gains in knowledge and skill. One documented self-reported gains in knowledge related to evaluations of student performance (Ogden et al. 2008); the other two indicated self-reported changes in lecturing (Lochner & Gijssels 2011) and teaching skills (Julian et al. 2012).

Level 3a—Behavior

Self-reported behavior changes included improved teaching behaviors (e.g. learning climate; control of teaching session), feedback skills (e.g. focusing on specific behaviors and giving negative feedback), reflection on teaching, and educational planning (e.g. lesson plans and

coordination of teaching programs). One study noted personal learning and change among peer coaches (Sekerka & Chao 2003).

Level 3b—Behavior

Observed changes were reported in nine (64%) interventions and included: improvements in clinical teaching behaviors and practices (e.g. provision of feedback; stimulation of critical thinking); clerkship evaluations; use of the One-Minute Preceptor; and lecturing skills. In two studies (Maker et al. 2004, 2006) utilizing faculty evaluations to enhance teaching effectiveness, residents observed significant changes in faculty members' educational practices; the authors also noted that faculty evaluations had the highest impact on teachers who had the lowest scores, and, in fact, several faculty members were relieved of their teaching responsibilities as a result of poor evaluations. Another study (Julian et al. 2012) did not observe changes in evaluations of faculty members after using an OSTE to improve teaching skills, despite self-perceived changes in behavior.

Level 4a and 4b—Results

No studies reported changes in organizational practices. However, two studies assessed changes in learners. In one study focused on student evaluations, no changes in student grades were observed (Ogden et al. 2008); in another, students trained by teachers in the intervention group received a higher global rating score on procedural skills than students taught by teachers who were not trained (Murphy et al. 2008).

Key features of faculty development programs

In 2006, we highlighted a number of key features that contributed to program effectiveness. These included: the use of experiential learning; the provision of feedback; effective peer and colleague relationships; well-designed interventions following principles of teaching and learning; and a diversity of educational methods within single interventions. In this review, we once again observed a number of key features, which emerged across the 111 interventions:

- *Evidence-informed educational design*, which included the integration of theoretical or conceptual frameworks, adherence to principles of teaching and learning, and the use of multiple instructional methods to achieve diverse objectives.
- *Relevant content*, which was applicable to participants' clinical and educational responsibilities.
- *Experiential learning and opportunities for practice and application*, both within the intervention and the workplace.
- *Opportunities for feedback and reflection*, which allowed participants to reflect on their teaching and learning practices, values, and beliefs.
- *Educational projects*, which were most common in programs that extended over time and allowed participants to apply their learning in the workplace.
- *Intentional community building*, both during and after the faculty development intervention, which included the provision of a safe and supportive learning environment, explicit encouragement of collaboration and networking,

and facilitation of effective peer and colleague relationships.

- *Longitudinal program design*, which appeared to be associated with other design features such as opportunities for practice and application, feedback and reflection, and relationship building and networking.
- *Institutional support*, which was demonstrated through financial support of participants and programs as well as release time for faculty members.

The key features identified in 2006 were once again observed. However, the relevance of content and the incorporation of reflection with feedback were more frequently highlighted in this review. The value of peers as role models and the importance of collaboration with colleagues, observed in 2006, were identified in this review as part of a larger vision related to community building and the sustainability of change; the use of projects to address professional needs and reinforce educational principles was more prominently featured in most longitudinal programs.

Community building

O'Sullivan and Irby (2011) suggested looking at two communities of practice: one that might be built among program participants and one that might be nurtured in the workplace.

In response to the question of whether the faculty development intervention contributed to *building a faculty development community*, reviewers observed that almost 34% of the studies appeared to contribute to this goal. For example, the building of trust and relationships among participants was noted in several studies, as was the development of informal learning networks and increased collaboration after the intervention, all of which were linked to a greater sense of motivation and enthusiasm. Several authors reported that relationships developed during the faculty development program facilitated learning and helped to reduce the sense of isolation and stress of working in large medical centers (e.g. O'Keefe et al. 2009). In one study (Simpson et al. 2004), more than 20% of the scholars cited the development of a network with participants, which led to the development of a special interest group on faculty development as the most important program outcome. Notably, 65% of the longitudinal interventions ($n = 26$) and 50% of the seminar series, which extended over time ($n = 5$) reported the building of a faculty development community.

In examining whether the intervention contributed to building a *community of practice in the workplace*, reviewers noted that almost 25% aimed to do this (e.g. Armstrong et al. 2003; Searle et al. 2006; Beck et al. 2008). Interestingly, the notion of building a community of practice in the workplace was noted in 45% of the longitudinal interventions ($n = 18$) and 30% of the seminar series ($n = 3$). In one study, researchers reported the development of a funded proposal on interprofessional education (e.g. Pinheiro et al. 2002); in another, new relationships with like-minded colleagues in the workplace were reported (Steinert & McLeod 2006); in a third study, the intervention appeared to foster a critical mass of empowered faculty members with enhanced educational leadership abilities (Wilkerson et al. 2006). One study reported that feeling "connected" with a larger community of educators was instrumental in enhancing

personal and professional growth (Lown et al. 2009), whereas another reported that scholars developed networks at various levels (e.g. with senior colleagues or peers), depending on their needs (Roberts & Devries 2004). Many interventions (close to 48%) led to enhanced teaching and educational activities in the workplace. These included: new undergraduate and postgraduate courses and curricula; educational innovations; enhanced teaching practices; and a plethora of new faculty development activities in participants' settings. Enhanced coaching and mentoring in the workplace was infrequently observed and remains an important area for further investigation. Lastly, only a few interventions reported on enhanced organizational processes or cultural changes (e.g. new policies and practices, greater attention to educational excellence and scholarship, increased institutional resources).

O'Sullivan and Irby (2011) also highlighted the need to more carefully examine who delivers faculty development programs. Less than 30% of the interventions reported any information about program facilitators. Of these, 60% stated the number of involved facilitators and 40% described facilitators' educational background, clinical specialty, or years of experience. However, no particular portrait of faculty developers emerged in this review, highlighting another area for further study. Although most authors would acknowledge the importance of the individuals delivering the diverse programs, very little is known about this group.

Discussion

This review, which focused on faculty development interventions designed to improve teaching effectiveness in medicine since 2002, included 111 articles published over a 10-year period, a sharp increase from the 53 studies (over a 22-year period), which we reviewed in 2006. The field has grown substantially, and we observed a number of changes in the nature of faculty development interventions, study characteristics, outcomes, and key features. We also had the opportunity to explore workplace learning and the building of communities of practice, and to identify several implications for future practice and research.

Faculty development interventions

The majority of interventions targeted practicing clinicians and focused on: teaching conceptions and learning approaches, the acquisition of specific teaching skills, the improvement of teaching performance and learner assessment, instructional design and curriculum development, and educational leadership and scholarship. Several interventions linked teaching improvement with the development of clinical expertise (e.g. in geriatric medicine, primary care genetics), an approach that may hold promise for the future. Few interventions focused on assessment, despite its critical role in student learning (McLachlan 2006; Wormald et al. 2009) and competency-based medical education (Holmboe et al. 2011).

Interestingly, the majority of interventions emphasized skill acquisition, often ignoring faculty members' motivations for teaching, values, and professional identities. Given our growing understanding of the role that identity plays in clinicians' desire to teach (O'Sullivan & Irby 2014a; Steinert

& Macdonald 2015), it may be time to re-conceptualize faculty development as an opportunity for renewal and reflection on personal and professional growth rather than an occasion for skill enhancement alone. As O'Keefe et al. (2009) observed, such an approach may also help to reduce professional isolation or attrition.

This review also indicated that faculty development designed to enhance teaching effectiveness focuses primarily on the development of individual teachers in groups, even though organizational development is a key element in supporting the institution's educational mission. Moving forward, an emphasis on organizational change and capacity building would be worthwhile. For example, faculty development can promote a culture of change by helping to develop institutional policies that support and reward excellence, recognize innovation and scholarship, and enable career advancement (Steinert 2013). It would be timely to capitalize on the benefits of faculty development in producing organizational change and remember that the institution (as well as the individual faculty member) can be the "client" (Jolly 2014).

The range of faculty development interventions outlined in Figure 1 guided this review. Based on this portrayal of faculty development, it appears that the majority of interventions in this review fell within the upper right quadrant, namely formal approaches that occur primarily in group settings (e.g. workshops of varying duration, longitudinal programs, short courses and seminar series). Given the re-conceptualization of faculty development that is occurring in the literature (Webster-Wright 2009; Steinert 2014), it would be important to design and evaluate faculty development activities in the other quadrants. For example, several studies have recently observed how faculty members learn in the workplace (Cook 2009; Steinert 2012) and that health professionals become adept at what they do by the "nature of their responsibilities" and "learning on the job" (Steinert 2010). Although informal learning is often taken for granted, it incorporates role modeling, reflection and learning from peers (Mann 2014), key ingredients to effective faculty development. Although a few studies in this review offered peer consultations and observation (Regan-Smith et al. 2007; O'Keefe et al. 2009), it would be worthwhile to incorporate more informal approaches into the design and delivery of faculty development and to render workplace learning as visible as possible so that we can recognize it as a legitimate form of professional development.

This review also demonstrated a notable growth in longitudinal interventions and the potential impact of faculty development programs that extend over time. In several instances, longitudinal programs resulted in outcomes that went beyond teaching effectiveness, including the creation of networks and collaborations that arise when groups meet over time (Armstrong & Barsion 2006; Simpson et al. 2006). Seminars and programs that extended over time also led to more involvement in educational activities following the activity, implying enhanced sustainability. Investing in longitudinal interventions, and exploring how their outcomes can be sustained over time, is warranted.

Study characteristics

The majority of studies relied on a positivist or post-positivist paradigm, were quasi-experimental in nature, and used

single-group designs; only a small number of studies used a qualitative methodology or mixed-methods approach. Despite an increase in the use of qualitative methodologies since 2006, the need to conduct such studies remains, as these methodologies would allow us to analyze the process of change, conduct "clarification" studies (Cook et al. 2008), and capture faculty members' stories of "why" and "how" faculty development works (Drescher et al. 2004; O'Sullivan & Irby 2014b). Researchers should also consider alternative methodologies, including educational design research (Collins et al. 2004), network analysis (Moses et al. 2009; Jippes et al. 2013), and success cases (Brinkerhoff & Dressler 2003). Other qualitative research traditions, such as narrative inquiry, ethnography and interpretive phenomenology, could also provide a more in-depth understanding of teacher development and the contexts in which this process unfolds.

Questionnaires, often lacking in tested psychometric properties, continued to be the most popular method of data collection, and program participants were the most common data source. Moving forward, we should consider greater use of behavioral or performance-based measures of change (e.g. OSTEs) as well as alternative data sources to ascertain as many different stakeholder perspectives as possible. It would also be important to collect data over time, to better understand the long-term retention (and possible decay) of outcomes. Although a number of studies included delayed post-test evaluations, it was difficult to ascertain the durability of change and determine what type of support would be needed to maintain gains.

In analyzing levels of outcome assessed (Kirkpatrick & Kirkpatrick 2006), the majority of studies noted changes at level 2 (learning) and 3 (behavior). In comparison to 2006, fewer studies included outcomes at the level of reaction (which may well be a positive development) and at the level of observed behavior changes (which may be disappointing). Moreover, only five studies explored learner performance as an outcome of faculty development. Although learner evaluations of faculty members' educational competencies are invaluable, they should be augmented by a careful assessment of change in learner performance.

Outcomes

Although many of the studies continued to employ weak designs, the literature in the last 10 years highlighted positive changes in teachers' attitudes, knowledge, skills and educational practices following participation in a faculty development activity. The impact on the organization (i.e. the learners and the systems in which our teachers work) remains relatively unexplored. Nonetheless, we can offer some general observations about the outcomes of faculty development programs reported to date:

High satisfaction with faculty development programs

Overall satisfaction with faculty development programs was high. Moreover, although participation was mostly voluntary, teachers consistently found the programs helpful, enjoyable and relevant to their personal objectives. The methods used, especially those with an experiential and skill-based focus, which may enhance transfer of learning to the workplace, continued to be valued.

Changes in attitudes towards teaching and faculty development

Participants continued to report a positive change in attitudes towards teaching *and* faculty development as a result of their involvement in these programs. In addition, they frequently reported increased confidence, enthusiasm, and awareness of effective educational practices.

Gains in knowledge and skills

Participants frequently reported increased knowledge of educational principles, specific teaching strategies, and approaches to teaching and learning. They also described gains in skills, with a particular focus on instructional design and effective feedback.

Changes in behavior

Self-reported changes in teaching behavior, such as improved feedback or teaching effectiveness, remained the most common outcome and were reported in most interventions. Observed changes that extended beyond teaching in the classroom or clinical setting included the design and delivery of new educational initiatives, new educational responsibilities or leadership positions, increased academic output and productivity, and career advancement. These observed changes were less frequently noted in 2006, where the major outcome was teaching performance.

Changes in organizational practice and student learning

Changes in organizational systems, as well as changes in student (or resident) behavior, continued to be underexplored. Less than a third of the studies reported changes in organizational practices, and only 5% of studies assessed changes in learner behavior. However, in those studies that did examine organizational practice, participants reported the establishment of new or improved networks of colleagues. The latter outcome was most frequently observed in longitudinal programs and seminar series, faculty development interventions that allowed for repeated contact with a group of colleagues over time.

Key features of effective faculty development

As in 2006, a number of key features emerged in this review. They included: evidence-informed educational design (which encompassed the integration of theoretical or conceptual frameworks, adherence to principles of teaching and learning, and the use of multiple instructional methods to achieve diverse objectives); relevant content; experiential learning and opportunities for practice and application; opportunities for feedback and reflection; educational projects; intentional community building; longitudinal program design; and institutional support. The relevance of content to the participants' work was more frequently highlighted in this review, as were the incorporation of reflection with feedback and the use of educational projects to address professional needs. Longitudinal programming also emerged as a new key feature; indeed, the extension of programs over time appeared to be associated with broader and more sustained changes.

Community building

Applying O'Sullivan and Irby's model (2011) to this review was particularly helpful as we observed that faculty development interventions can enhance the building of a faculty development community, especially in the context of longitudinal programs that ensure repeated contact over time and ongoing collaboration with colleagues. Supportive relationships with colleagues, noted in over 30% of the studies, appeared to enable the accomplishment of shared goals and individual success. This finding was not reported in 2006. O'Sullivan and Irby (2011) also highlighted the role of faculty developers in their model; based on this review, we believe it would be important to explore who faculty developers are and what the potential impact of faculty development on them might be. It has been said that "to teach is to learn twice." Interestingly, few studies to date (O'Sullivan & Irby 2014a) have examined the unique blend of skills and attributes required of faculty developers.

We also noted that more work is needed to realize the possible impact of faculty development on building a sense of community in the workplace. As noted in the introduction, faculty development participants collaborate with other teachers or staff members, have relationships and networks in the workplace, fulfill tasks and activities within the educational program, have mentors and coaches in the work setting, and work in an organizational context characterized by a culture that either supports or inhibits educational change (O'Sullivan & Irby 2011). It is time to better understand what occurs in the workplace and whether faculty development can influence the building of a community of practice in the academic setting. Moreover, although this review demonstrated that many of the faculty development interventions had a positive effect on involvement in teaching activities in the workplace, the concept of transfer of training requires further investigation. De Rijdt et al. (2013) reviewed the literature to investigate which variables most impact transfer of learning from faculty development to educational practice, highlighting learners' motivations and experiences, instructional strategies, training time, and learning climate. Variables within the work environment, including opportunities to perform and create networks both within and outside the training program, also play a role (van den Bossche & Segers 2013). Exploring the transfer of these "lessons learned" to faculty development would now be worthwhile.

Implications for practice

Based on the review findings, we suggest the following priorities for consideration:

- *Building on our successes to date*
The literature describes successful programs with recognizable, replicable elements. To the extent possible, and being mindful of the importance of context, we should adopt a systematic approach to program development and implementation, building on available evidence and incorporating key features highlighted in this review. We should also strive to enhance the integration of theory with practice, highlighting relevance and application.
- *Broadening our focus beyond individual teaching effectiveness*

Given the complexity of faculty members' roles, broadening the focus of faculty development programs designed to enhance teaching effectiveness is needed. This could include an emphasis on curriculum design, educational leadership, or scholarship (an outcome which was observed in longitudinal interventions), as well as a focus on faculty members' identities as teachers (including their values, motivations and beliefs). A greater focus on the organization at large, be it an emphasis on promoting the recognition of educational excellence or leadership development, would also be beneficial.

- *Developing programs that extend over time*
This review indicated the multiple benefits of faculty development programs that extend over time, allowing for cumulative learning, practice and feedback. As noted earlier, the benefits of longitudinal approaches to faculty development include changes that go beyond improved teaching performance and include enhanced self-awareness, new leadership roles and responsibilities, and increased academic output and productivity. Longitudinal interventions also have the potential to foster social networks and a sense of community, an outcome that might be particularly important as collaboration and teamwork have emerged as critical components of clinical and educational practice.
- *Moving from workshops to the workplace*
The current literature demonstrates a continuing over-reliance on formal, structured approaches such as workshops, short courses and seminars. Such approaches are expected and reflect the growth of the field to incorporate more systematic planning and program design. However, on their own, structured approaches may be insufficient. Whereas structured interventions appear to have the stated advantage of ease of scheduling, building a community of interested educators, and increasing motivation, other methods that take advantage of experiential learning in the workplace, which include guided reflection, peer coaching and mentorship, should be considered. We should also identify ways to recognize and promote learning in the workplace.
- *Fostering communities of practice*
Closely related to workplace learning is the notion of communities of practice. Faculty members often learn about teaching—and many other competencies—by participating in the activities of a community. The results of this review have suggested that belonging to a community can enhance a sense of membership, promote transfer of training, and foster the attainment of individual goals. These outcomes can also lead to culture change, benefiting the institution at large, as collective learning allows community members to build new knowledge and understanding, acquire new skills and expertise, and improve practice.
- *Securing institutional support*
The findings of this review highlighted the role of institutional support. In 2006, we noted the importance of organizational context. This remains important, as does the “matching” of programs to context. However, institutional support, as evident through financial support or release time, is emerging as a critical component of success; so is the establishment of an organizational culture

that supports and rewards continuous quality improvement in all spheres of faculty members' responsibilities.

Implications for research

Based on the review findings, we suggest the following approaches to enhancing research in faculty development. Many of these recommendations mirror those made in 2006.

- *Embedding research studies in a theoretical or conceptual framework*
Moving forward, we should embed research studies more explicitly in a theoretical or conceptual framework and utilize theory in the interpretation of our results (Davidoff et al. 2015). It would also be beneficial to incorporate theoretical and conceptual approaches that go beyond the individual learner and help us to understand how collective learning occurs in communities.
- *Conducting more qualitative and mixed methods studies*
Despite an increase in the use of qualitative methodologies since 2006, we still need to better understand “why” and “how” change occurs in faculty development. Qualitative studies, using a range of methodologies, as well as mixed methods approaches, can help us to better understand the process of change, both as a result of the intervention and within the individual and the organization. This avenue for further study was highlighted in 2006 and remains important. Qualitative studies might also help us to understand how faculty development can enhance the building of communities of practice—and how communities of practice can help to promote the development of faculty members.
- *Using multiple methods and data sources to assess behavioral and organizational outcomes*
There is a need for more studies to report on changes observed by third parties, both in simulated environments as well as in actual practice. Several studies in this review utilized OSTE's for assessing change in behavior; employing such performance-based measures of change is invaluable. Using multiple methods and data sources would also enable triangulation of data. Additionally, measures of change in the system (e.g. the creation of new or improved networks) are needed to demonstrate the full potential of faculty development.
- *Assessing change and transfer to practice over time*
Although a number of studies included delayed post-tests, we still know very little about the “durability” of change. Focusing on patterns of change over time would enhance our understanding of the impact of faculty development on individuals and organizations and help to identify which interventions are associated with sustained change. Longitudinal follow-up might also shed light on the development of faculty members throughout their careers. Faculty development is not an activity that we “do” to others; it is a process that occurs over time in authentic settings.
- *Analysing key features of faculty development*
Faculty development interventions occur in a complex environment in which many unforeseen and unpredictable variables play a role (Steinert et al. 2006). Based on this review, we need to conduct more studies which investigate interactions between different features. Few

studies in this review (e.g. Ogden et al. 2008; Johansson et al. 2012; Julian et al. 2012) compared and contrasted different faculty development approaches and methods to enable an analysis of which features of faculty development contribute to changes in teacher performance. Such analyses would be critical in advancing the field.

- *Exploring the role of faculty development within the larger organizational context in which it unfolds*

As we observed, more work is needed to observe the potential impact of faculty development on the organization at large. Such studies will help us to better understand the key elements of workplace learning that foster professional development and the role that communities of practice can play. This line of investigation will also require more complex research designs, such as social network analysis or ethnography, given the complexity of faculty members' roles and contexts.

Strengths and limitations of the review

A major strength of this review included the international representation and expertise of the TRG that provided an invaluable perspective on faculty development and outcomes research. The use of a structured Coding Sheet was an additional strength, especially as it provided a coherent structure to the review process and allowed the inclusion of new questions we wished to explore. The time spent adapting and piloting the form, and discussing difficulties and differences, also helped to contribute to the review's rigor. A third strength concerned the comprehensive nature (111 studies) of this 10-year up-date in which we built on previous reviews by addressing the impact of faculty development on building a faculty development community and a community of practice in the workplace.

This review also had a number of limitations. The review process was time-limited, as it reflected a 10-year update of the literature from February 2002 until 2012. Further, almost all of the reviewed studies were found in the English language, with a greater number in the North American literature. As others have noted (Koppel et al. 2001; Freeth et al. 2002), this may reflect a publication bias that prevents a fuller picture of faculty development from an international perspective. Negative results are also rarely reported, reflecting another possible publication bias. As in other reviews, inter-rater interpretation and agreement on the Coding Sheet was a challenge throughout the review process, despite the rigorous process we undertook to achieve consensus. Moreover, while we sought to maintain critical reflexivity as individuals and a research team (Freeth et al. 2002), and we were as vigilant as possible about data coding and quality control, personal biases and misinterpretations of reported data may have led to some errors in the final summary of the studies that we reviewed. Lastly, the nature of the articles reviewed presented several challenges. Descriptions of study designs were often limited. As well, authors frequently omitted response rates, statistical methods used, or basic background information critical to understanding the context of the intervention (e.g. discipline, duration). In addition, an inconsistent use of terminology (e.g., to describe program types) often led to conflicting interpretations of the same information.

Conclusion

The aim of the BEME (Best Evidence Medical Education) Collaboration is to encourage teachers to think more deliberately about the actions they take as teachers and to utilize evidence where it is relevant and available to inform their decisions (Harden et al. 1999). The goal of this 10-year update was to assess how the evidence on faculty development, addressing research questions related to types of interventions, study characteristics, outcomes, features, and effects on community building, has advanced since 2002. The breadth of faculty development programs described in the literature continues to grow at a rapid rate. Moving forward, implications for practice include building on our successes to date, broadening our focus beyond individual teaching effectiveness, developing programs that extend over time, moving from workshops to the workplace, fostering communities of practice, and securing institutional support. Implications for research include embedding research studies in a theoretical or conceptual framework, conducting more qualitative and mixed methods studies, using multiple methods and data sources to assess behavioral and organizational outcomes, assessing change and transfer to practice over time, analysing key features of faculty development, and exploring the role of faculty development within the larger organizational context in which it unfolds. Faculty members are our most important resource; investing in their growth and development is essential in promoting innovation and excellence at all levels of the educational continuum.

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