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Exploring the Impact of Entrustable Professional Activities on Feedback Culture: A Qualitative Study of Anesthesiology Residents and Attendings

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Abstract

Purpose

Entrustable professional activities (EPAs) were introduced as a potential way to optimize workplace-based assessments. Yet, recent studies suggest that EPAs have not yet overcome all of the challenges to implementing meaningful feedback. The aim of this study was to explore the extent to which the introduction of EPAs via mobile app impacts feedback culture as experienced by anesthesiology residents and attending physicians.

Method

Using a constructivist grounded theory approach, the authors interviewed a purposive and theoretical sample of residents (n = 11) and attendings (n = 11) at the Institute of Anaesthesiology, University Hospital of Zurich, where EPAs had recently been implemented. Interviews took place between February and December 2021. Data collection and analysis were conducted iteratively. The authors used open, axial, and selective coding to gain knowledge and understanding on the interplay of EPAs and feedback culture.

Results

Participants reflected on a number of changes in their day-to-day experience of feedback culture with the implementation of EPAs. Three main mechanisms were instrumental in this process: lowering the feedback threshold, change in feedback focus, and gamification. Participants felt a lower threshold to feedback seeking and giving and that the frequency of feedback conversations increased and tended to be more focused on a specific topic and shorter, while feedback content tended to focus more on technical skills and more attention was given to average performances. Residents indicated that the app-based approach fostered a game-like motivation to “climb levels,” while attendings did not perceive a game-like experience.

Conclusions

EPAs may offer a solution to problems of infrequent occurrence of feedback and invite attention to average performances and technical competencies, but may come at the expense of feedback on nontechnical skills. This study suggests that feedback culture and feedback instruments have a mutually interacting influence on each other.

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Feedback can alter or reinforce behavior and is thus an essential part of professional development.^{1,2} The way feedback has been formalized and incorporated in postgraduate medical education (PGME) has seen many changes within the last decades. Whereas for a long time, feedback was mainly informal and provided at the supervisor's leisure, beginning in the 1980s, Ende laid the foundation for systematically integrating narrative feedback into the clinical workplace to guide trainees on their professional journeys.³ The importance of constructive and meaningful feedback was further amplified by the introduction of formative workplace-based assessments (WPBAs)⁴⁻⁷ and increased integration of the goal-oriented principles (e.g., physicians being able to meet patients' needs at the end of their training program) of competency-based medical education into PGME.⁸ WPBAs are the norm when it comes to assessment and feedback during workplace learning, generally emphasizing both direct observation and feedback.⁶ Nonetheless, integrating meaningful feedback has been described as challenging.⁹⁻¹¹ Research has pointed to challenges in the execution of WPBAs, such as the amount of time required to provide meaningful feedback and document it well⁹ and the difficulty of comparing an observed performance to the desired outcome and identifying competency gaps.^{10,11}

Entrustable professional activities (EPAs) were introduced as a potential way to overcome the challenges arising with WPBA.¹² EPAs are units of clinical practice that can be entrusted to trainees for unsupervised execution as soon as they have demonstrated the necessary competence.¹³ Although EPAs are designed to simplify the assessment of competence in the clinical workplace, recent studies suggest that EPAs have not yet overcome all of the challenges to implementing meaningful feedback.^{14,15} For example, EPAs have to contend with various contextual and interpersonal factors that have been shown to impact feedback during workplace

learning.¹⁶⁻¹⁹ However, whether EPAs can be adjusted to ameliorate these factors and whether feedback quality improves because of EPA implementation remains an open question. Feedback quality in the workplace is influenced by institutional culture^{16,20} and learning culture,^{17,21} as well as interpersonal relationships,^{18,19,22} making it a complex sociocultural and interpersonal exchange.²³ With the aim of making the contextual factors impacting feedback quality more tangible, Ramani and colleagues constructed a model describing an organization's feedback culture on 3 levels: (1) unwritten and assumed values and operating principles; (2) written expectations, such as mission statements, learning objectives, etc.; and (3) day-to-day behaviors of organizational members.^{23,24} Understanding the values and practices of an institution's feedback culture is essential when seeking to implement a new assessment instrument, since they are likely to influence the feedback provided with the new instrument.^{24,25} By contrast, relatively little is known about the impact of new formative assessment tools on feedback culture. The aim of this study was to explore the extent to which the introduction of EPAs via a mobile app interface impacts feedback culture as experienced by anesthesiology residents and attending physicians.

Method

We used a constructivist grounded theory approach to explore how residents and attending physicians perceive the impact of EPAs on the existing feedback culture to get a better understanding of the interplay between EPAs and feedback culture.^{26,27}

Setting

We performed this study within the context of the largest PGME anesthesiology training program in Switzerland—the Institute of Anaesthesiology at the University Hospital of Zurich. During residency, trainees are supervised in their daily practice by fully qualified specialist

doctors (or attending physicians) working in hospitals. Residents are typically more closely supervised by attending physicians at the beginning of residency and during high-risk clinical tasks (induction, intubation, etc.). Resident-attending dyads change on a daily basis, due to attendings as well as residents rotating between operation tracts. Feedback training for attendings is not obligatory. Thus, residents receive feedback from several attendings with variable feedback skills over the course of a rotation. WPBAs are a mandatory part of postgraduate training and at least 4 WPBAs per resident per year have to be submitted for licensing purposes (with the implementation of EPAs this number increased to 16 per resident per year). WPBAs are purely formative in purpose.

Since April 2019, EPAs have been implemented as a voluntary alternative to the previous WPBAs at the Institute of Anaesthesiology. (See Supplemental Digital Appendix 1 [at <http://links.lww.com/ACADMED/B391>] for examples of the EPAs used in and designed for this EPA implementation.) That is, residents could choose to do and submit EPAs instead of WPBAs but were also free to do and submit WPBAs instead or a combination of both. EPA assessments were supported by a mobile app, which residents and attendings could download onto their work phones. The app guides trainees and supervisors through the assessment process. Both the resident and attending needed to independently provide a rating on the complexity of the task and level of supervision needed for the task to complete the assessment. Feedback conversations and documentation of learning goals were voluntary but encouraged within the app.

Additionally, the app included an intra-institutional ranking system, where a leaderboard revealed how a resident was positioned compared to their peer residents by the number of complete assessments. EPA data were aggregated in the app, which resulted in a color-coded competency profile demonstrating the level of entrusted independence (or needed supervision)

for each individual task. (See Table 1 for a detailed comparison of EPA-based assessments with the previous WPBAs). More information on the app has previously been published.²⁸

Participants and sampling

From February to November 2021, we invited residents and attending physicians within the Institute of Anaesthesiology to participate in this study. We first sampled participants purposively using the app database.²⁷ Based on the frequency of their EPA usage within the last 6 months, we sought to balance frequent and infrequent EPA users (total of 30 attendings and 73 residents), since we anticipated that frequent users would have a rather positive attitude toward EPAs and those who used them less frequently would be more critical. The first author (S.B.) invited participants to take part in the study via an email, which included study information and an informed consent form. After interviewing 7 attendings and 6 residents, we continued with theoretical sampling,²⁷ focusing on gender balance (due to an initially high number of male participants) and on whether participants had experienced the feedback culture before the EPA implementation (with WPBAs only) and therefore would be able to better identify the changes that EPAs had brought. This added 9 more interviews (4 with attendings and 5 with residents, for a total of 22 interviews overall) to the dataset. Overall, 6 residents and 9 attending physicians were already employed before the implementation of EPAs and could therefore provide detailed comparisons between the 2 feedback cultures.

Data collection

Using semistructured interviews, we explored participants' perception of the impact of EPAs on feedback culture. The design of the interview guide was informed by the existing literature on EPAs,^{13–15} feedback,^{1,18,23,29} and assessment.^{6,9,30} Using Ramani and colleagues' 3-level model of feedback culture^{23,24} as a conceptual framework,³¹ the interview guide included open-ended

questions on possible changes in unwritten and assumed values, written expectations, and day-to-day behaviors. In developing the interview guide, we were cognizant of the abstract nature of the concept of feedback culture and sought ways to tap into participants' experiences that could speak to all 3 levels of feedback culture. The resident interview guide was specifically focused on feedback-seeking behaviors and their perception of the delivery of attendings' feedback (see Supplemental Digital Appendix 2 at <http://links.lww.com/ACADMED/B391>). The attending interview guide was focused on giving feedback and their impressions of the residents' feedback-seeking behaviors (see Supplemental Digital Appendix 3 at <http://links.lww.com/ACADMED/B391>). S.B. drafted the interview questions and discussed and revised them with C.B. and R.E.S. before piloting them. We piloted both interview guides to check question comprehension by the participants, which led to a few minor changes in wording. S.B. conducted the interviews in German using the video-conference tools Zoom (Zoom Video Communications, Inc., San Jose, California) and Skype (Microsoft Corp., Redmond, Washington). Interviews lasted around 60 minutes each and took place between February and December 2021. All interviews were audiotaped and transcribed verbatim by S.B. Throughout the iterative data collection and analysis process,³² we refined the interview questions. Theoretical sufficiency was reached after 11 resident and 11 attending interviews. At this point, we had gained sufficient depth and understanding of the data to describe participants' perceptions of the impact of EPAs on the feedback culture.³³ The authors translated the quotes that were chosen for this article to English.

Data analysis

Data collection and analysis followed an iterative process.³² S.B. and C.B. independently read and initially coded the first 2 transcripts line-by-line to identify commonly occurring initial codes. S.B. primarily coded the remaining transcripts, using open and axial coding and a constant comparative approach,^{26,27,34} with C.B. checking S.B.'s codes for similar interpretation of data or possible disagreements in coding. Throughout the process, we met regularly to discuss established assumptions and interpretation to guide further data collection and develop theory on the impact of EPAs on feedback culture. We analyzed our results through the conceptual framework of Ramani and colleagues' 3-level model of feedback culture,^{23,24} comparing experiences pre- and post-implementation of EPAs within, between, and across the 3 levels of feedback culture. In the final phase of analysis, we grouped all transcripts together for selective coding. Team discussions between all authors led to the final presentation of results. We used MaxQDA2020 (VERBI, GmbH, Berlin, Germany) for data management.

Reflexivity

To optimally inform research design and execution, the research team was specifically assembled with the aim of combining several areas of expertise and lived experiences. At the time of this study, S.B. was a second-year internal medicine resident. She conducted her master's thesis on feedback and WPBA. R.E.S. is an educational scientist with a focus on workplace learning and program evaluation and with expertise in qualitative methodology. She was unfamiliar with the Swiss PGME context and so was able to provide an outsider's view and ask critical questions to ensure transferability of the research. A.P.M. is an attending physician in anesthesiology, who at the time of the study, worked at the University Hospital of Zurich. He is a member of the Swiss postgraduate EPA committee and an international consultant on EPAs. He

designed the EPA app referenced in this study. C.B. is a senior lecturer in medical education with a research focus on sociocultural processes that affect assessment. He has 2 decades of experience implementing various WPBA methods in Swiss undergraduate medical education and PGME settings.

Ethical considerations

This study was considered exempt from full ethical approval by the ethics committees of the participating Swiss cantons (i.e., the ethics committee of Bern, ethics committee of northwest and central Switzerland, and ethics committee of Zurich; Req-2021-00057). Participation was voluntary with no reimbursement, and all participants signed an informed consent form. We anonymized data prior to analysis.

Results

Participants reflected on a number of changes in their day-to-day experience of feedback culture with the implementation of EPAs and described several mechanisms instrumental in these changes. Of these, we identified 3 main mechanisms: (1) lowering the feedback threshold, (2) change in feedback focus, and (3) gamification. Whereas participants experienced previous WPBA-based feedback as being a time-consuming activity and a “must do,” EPAs were reported to make the process faster and something residents and attendings actively initiated. The straightforward use of the EPA mobile app in a busy clinical environment, combined with the ability to compile performance data, was appealing to the participants. Compared to the previous WPBAs, participants performed EPAs on a more regular basis, with more clearly defined conversation topics (due to the clearly specified task). Furthermore, whereas feedback outside of the assessment process was mainly triggered by an exceptionally good or bad performance, average performances increasingly received feedback within the EPA system too. Participants

also noticed that the introduction of EPAs amplified a pre-existing preference for providing and seeking feedback on technical skills and limited feedback on other competencies.

For the included quotes below, we use the abbreviation A to denote quotes from attending physicians and R to denote quotes from residents. The number indicates the numerical order of the interview. W+E indicates that the participant experienced both feedback cultures, before and after the implementation of EPAs (i.e., WPBAs and EPAs), and E indicates that the participant only experienced EPAs.

Lowering the feedback threshold

Participants felt that feedback based on EPAs was more focused on a specific topic, making feedback conversations shorter than in the previous WPBA system, which therefore enabled participants to conduct feedback discussions more often throughout the day. The emphasis of EPAs on clearly specified tasks, helped attendings stay on track in the feedback conversation, making it easier to integrate the provision of feedback into a busy working day.

[Feedback] is definitely provided more often, just because it is less laborious than filling out a [WPBA], and then written on paper too, and now it's just two clicks. One can also use it in situations where time is sparse and keep it pragmatic and short. (A07, W+E)

Several attendings experienced a growing confidence in feedback giving due to the sheer number of EPAs that needed to be completed. This also contributed to lowering the threshold for feedback giving.

EPAs helped me to simply give more feedback and that's why I learned new strategies and stuff like that. Simply because of the mass of feedback that you give, you already know a little bit [about] how to have such a conversation. (A03, W+E)

The ease of including assessment into daily clinical practice with the EPA system, not only lowered the threshold to give feedback for attendings, but also lowered the threshold for residents to seek feedback.

For a resident, it's easy to say "Hey, let's do an [EPA]." [An EPA] actually has a positive connotation within the institute and ... thanks to this ... the threshold got lower to ask for [feedback]. (R07, W+E)

Whereas the mere duration of the WPBAs held residents back from seeking feedback for fear of detaining the supervisor, the fact that EPAs require less time to complete reduced that fear and made seeking feedback easier.

Change in feedback focus

The implementation of EPAs led to a shift in focus on which situations received feedback in 2 ways: (1) EPAs increased the amount of feedback on technical skills and (2) EPAs led to more attention on average performances.

Our participants described anesthesiology as a very technical specialty, where feedback is mainly provided on technical skills. Feedback on nontechnical skills occurred mainly informally during situations outside of formal assessment moments.

For communication with the patient, [that is], you often get [informal verbal feedback]. ... Those soft skills, they are not getting documented ... [with EPAs] you focus more on technical stuff. (R10, W+E)

While in the previous WPBA system, attendings and residents sometimes mentioned nontechnical skills as a part of the observed task due to the wider analysis and longer discussion of the task, this became rarer with EPAs.

You then focus more on a certain point [with EPAs]. Because you don't want it, uh, you can't prolong it, or take it apart in as much detail as with [the WBPAs]. ... And I think these encounters were a little deeper than the encounters I'm experiencing today with the [EPA format]. ... Back then somebody addressed [the resident] more holistically ... (A09, W+E)

Our participants explained this phenomenon as arising from several contributing factors. At the time of this study, most EPAs addressed technical skills, and since the feedback conversation was very focused on the specific task addressed by the EPA, feedback was accordingly mainly limited to the technical task. Also, nontechnical skills happened mostly unsupervised, like preoperative patient briefing, communication with the surgeon, or handing over patients to the intensive care unit.

I have to admit, in such situations, like patient briefing, patient handing over, we are often absent. And that's why I find it difficult to give feedback on this. (A11, W+E)

Attendings also reported having difficulty rating nontechnical skills on the supervision scale, especially since they felt that the assessment of these skills was heavily dependent on the personality of the resident and personal taste of the attending.

So, for example, when someone is not treating a patient appropriately or something, maybe shows too little empathy ... I still feel the need to give feedback. But I don't really want to document it anywhere because it's [my personal view]. Someone else might find it okay how [the resident] did it. (A09, W+E)

Participants reported that the main reasons for feedback being provided outside of the assessment process were in the case of exceptionally good or bad performances. The previous WPBA system had already enabled the first steps toward feedback not only being given in those 2 extremes, since the main reasons for doing WPBAs were neither exceptionally bad nor exceptionally good performances, but new or difficult situations.

But that's not the point, that you present yourself well. ... You want to present a learning process. ... The [previous WPBAs] were like "Have you done that before?" You say "No." "Have you seen that before?" "Yes." ... and then we did a [WPBA]. ... You don't do [a WPBA] on something you did 20 times already, do you? (R09, W+E)

EPAs built on this culture of performing assessments in situations where there is still room for improvement. Therefore, attendings as well as residents perceived the increase in feedback on average performances after EPA implementation as filling a gap in a feedback system which had previously focused on extremes.

That more feedback is given about structures or actions that probably are in the middle of the Gaussian curve and not just, otherwise, one tends to comment on what was extremely good, what was extremely bad. (R11, W+E)

Gamification

With WPBAs, the main driver to initiate an assessment was the need to achieve the mandatory numbers of completed WPBAs; with EPAs, some residents were motivated to do as many EPAs as possible regardless of whether they had already met the mandatory number. Residents indicated that the app-based approach fostered a game-like motivation to “climb levels,” especially since the app presented documented assessment data in a color-coded competency profile, with colors changing according to the needed level of supervision. They also felt motivated by the included leaderboard, in which they could see where they were positioned among their peers according to the number of completed EPA assessments they had. Participating attendings did not perceive a game-like experience but acknowledged that there were some residents who were getting excessive in terms of feedback seeking.

And it was also a bit of fun, right? It was rewarding at times, because you were the best for a week, or something like that. It was rather fun. (R05, W+E)

But “making a sport” (A04, W+E) out of EPA seeking was also reported to have a negative effect on residents’ actual reflection on their performance, with the quantity of different EPAs needed to climb the leaderboard overshadowing in-depth reflection on individual pieces of feedback.

I believe, when I'm giving feedback on indwelling venous cannula insertion, then you must sit on it for a day. ... If you immediately afterwards get feedback on intraoperative management, plus [feedback] on handing over [to] the intensive care unit and then in the evening [feedback] on premedication, then that's too much.

(A04, W+E)

[The rating system within EPAs] is a bit like levels ... indirect supervision is one level above direct supervision and you're pleased when you achieve this level. ... And then the app also includes some ranking within our institution, which you can climb if you get as much feedback as possible. That's a motivation too. ... But now, while looking in the app, I realize that I haven't implemented several things ... although it's documented, because it's just a lot that I have to implement and learn at the moment.

(R01, E)

Discussion

Feedback on performance in the workplace is a complex interaction between supervisor and trainee, especially in the context of formative assessment.^{23,30} Over the last decade, many PGME training programs have implemented EPAs with the aim of helping supervisors to assess the competence of trainees in the context of clinical work.^{12,35,36} Yet, little is known about how EPAs might influence feedback culture. This study describes how residents and attending physicians in a PGME anesthesiology setting perceived a change in feedback culture after an app-based EPA implementation. Participants felt that EPAs lowered the threshold for feedback seeking and

giving, increased the frequency of feedback conversations, and resulted in feedback addressing more instances of average performances, but seemed to limit the content of feedback to technical skills.

Prior research on the impact of EPA introduction on the experienced feedback threshold has produced mixed signals. The lowering of the feedback threshold our participants perceived resonates with the findings of Martin and colleagues,¹⁵ who explored anesthesiology, nephrology, emergency medicine, and general internal medicine residents' experiences with the impact of EPAs on feedback and learning, but contrast with a recent study on the implementation of EPAs in internal medicine, where residents perceived EPA-seeking as anxiety provoking and at odds with the workflow of in-hospital internal medicine.¹⁴ While a lowered threshold for feedback is the ideal, there are many factors that influence the feedback threshold. From the perspective of feedback culture, we could argue that if the written expectations contributing to the feedback culture support EPAs, but the unwritten and assumed values and the day-to-day behaviors²³ do not support feedback seeking and giving, EPA introduction will not alter the feedback threshold. Lack of feedback in PGME is a widely heard complaint.³⁷⁻³⁹ The increase in feedback resulting from a lowered feedback threshold as well as the motivating effect of gamification in our study represents an important improvement in this regard. Our study suggests that EPAs do have the potential to increase feedback, given that residents and attendings reported the subjective experience of a lowered feedback threshold.

Participants in our study reported that the implementation of EPAs led not only to more feedback taking place overall, but in particular, to more feedback being given and documented on average performances. This result is particularly noteworthy with respect to a major problem of WPBA, namely, that residents only ask for assessments when they have performed well, as they are

aiming for higher ratings, instead of being assessed on an average performance and seeing it as a learning opportunity.^{14,30,40} Referring to van der Vleuten's metaphor for programmatic assessment as a pixelated picture,^{41,42} feedback on average performances could help to build a clearer and more comprehensive picture of the trainee's competence, whereas exceptional performances only help to define the edges of the picture. Furthermore, more feedback given on average performances could even help deliver the promise of programmatic assessment by assembling a holistic picture of competence for robust summative decision making.⁴³ Interestingly, however, the mechanisms we found could also have some undesirable effects on feedback culture. Our participants explicitly reported that WPBAs were often performed in difficult and new situations to support learning. EPAs enhanced this feature of assessments being done in learning situations, but due to gamification, also show some danger of valuing the numbers of EPAs over recognizing learning opportunities, which could additionally be enhanced by a lower feedback threshold. Shifting the feedback focus from learning toward quantity would be a most unwanted effect. These considerations add to the concerns of Sibbald and Regehr who caution against a gamification of EPA opportunity seeking, because chasing EPAs could come at the expense of engaging in the remaining and all-embracing practices of a professional group (i.e., engagement in experiences within the social dynamic of the profession).⁴⁴ Although a systematic review by van Gaalen and colleagues did not find any negative outcomes of the use of gamification in health professions education,⁴⁵ this is nevertheless a topic that deserves further analysis as medical educators seek to implement app-based EPAs. Mechanisms, such as gamification, thus could have a very broad range of effects on feedback culture, neither simply positive nor simply negative. Accordingly, it is important that those implementing and using

EPAs have a thorough understanding of the scope of each mechanism so that EPAs can be integrated as beneficially as possible.

The increase in feedback we saw with the implementation of EPAs came at the expense of limited feedback content. The concentration of feedback focusing on a specific task led to a higher amount of feedback being given on technical skills, while feedback on nontechnical skills, such as communication and interprofessional collaboration, moved further into the background. As mentioned above, participants described anesthesiology as a very technical specialty. It is therefore possible that this result would be less transferable to disciplines that are less focused on technical competence (e.g., psychiatry, family medicine, oncology). However, every EPA has some nontechnical aspects inherently included in it. For example, even during an intubation, the resident needs to communicate with their team members. However, our attending participants reported difficulties rating nontechnical skills since they felt that these skills were heavily dependent on the personality of the resident and personal taste of the attending. This phenomenon does not appear to be specific to anesthesiology, as Branfield Day and colleagues¹⁴ reported similar concerns in internal medicine.

We analyzed our results through the conceptual framework of Ramani and colleagues' 3-level model of feedback culture (see Figure 1).^{23,24} The changes in feedback culture our participants experienced happened mainly on the level of day-to-day behaviors, but also on the level of unwritten and assumed values. For example, the lower feedback threshold and motivational effect of gamification counteracted the influence of a busy clinical environment (day-to-day behaviors) and anesthesia's inherent focus on technical skills was further amplified by the introduction of EPAs (unwritten and assumed values). Thus, these levels of Ramani and colleagues' framework mutually influence and condition each other.^{23,24} That is, unwritten and

assumed values affect day-to-day behaviors and day-to-day behaviors in turn influence unwritten and assumed values. This supports existing research on cultural factors influencing feedback practice, including new assessment tools.^{24,25} However, our study also suggests that feedback culture and feedback instruments have a mutually interacting influence on each other. Feedback culture influences not only the implementation of assessment tools, but the implementation of such tools in turn influences the feedback culture leading to possible changes in feedback culture (see Figure 1). Shedding light on this complex interaction and identifying factors influencing it are important avenues for future research, especially with regard to the implementation of EPAs.

Suggestions for practice

In our setting, EPAs further increased the focus on technical skills, which were already highly valued, while nontechnical skills got pushed further into the background. This raises the question of how to make sure that the full gamut of competencies is truly assessed and that trainees receive feedback on all relevant facets of being a physician. Two strategies should be at the forefront of this endeavor: (1) faculty development and (2) complementing EPA-based assessments with other assessment methods. It is well known that the quality of WPBA is not an inherent property of the assessment tool used but resides with the supervisor using the tool.^{7,46} It is therefore of the utmost importance that supervisors receive training in how to observe a trainee through the lens of different competencies. For example, faculty require training in how to look at and provide feedback on nontechnical skills, such as communication while observing trainees.⁴⁷ To solve this problem, medical educators need specific faculty development and/or to design assessment tools in such a way that supervisors are nudged toward acknowledging nontechnical skills as an important part of EPA-based assessment. In the context of faculty development, it should also be conveyed that EPAs could have desired as well as undesired

effects on feedback culture. In line with the principles of programmatic assessment—that is, that each assessment tool has its specific strengths and weaknesses—the use of different assessment instruments should be promoted.⁴³ Especially for more complex (i.e., nontechnical) competencies, such as collaboration, communication, and professionalism, multisource feedback⁴⁸ could be an important complement to EPAs.

Limitations

This was a single-center study of one anesthesiology training program. As anesthesiology is a more technically oriented specialty, this might limit transferability to other disciplines. We aimed to augment transferability by building on the work of Ramani and colleagues,^{23,24} providing rich context description, and situating the study within previous research on feedback and assessment. Another limitation is that in the setting of the study, EPAs were assessed via a specific app, which may have affected the perceived impact of EPAs on the feedback culture. The gamification that led some residents to focus on the number of completed assessments rather than on reflecting on the feedback in the assessments could be attributable to the app-based approach rather than to EPAs themselves. Since the use of mobile devices is on the rise,^{49–51} this possible negative effect of gamification could occur in other settings and institutions as well. Therefore, this finding is important for the design and implementation of assessment tools on electronic devices, so that reflection on feedback can be fostered and encouraged.

Conclusions

This study investigated how the implementation of EPAs impacted a feedback culture in a PGME anesthesiology program. Based on our study, EPAs on a mobile app may provide a solution to the problem of infrequent feedback and increase feedback given on average performances but might come at the expense of less feedback on other, more complex

competencies (i.e., nontechnical skills) essential to being a physician, especially in specialties with an emphasis on technical skills. Our study suggests that feedback culture and feedback instruments have a mutually interacting influence on each other.

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Figure Legend

Figure 1

Experienced changes in feedback culture after mobile app-based EPA implementation, from a qualitative study of anesthesiology residents and attending physicians, Institute of Anaesthesiology, University Hospital of Zurich, 2021. EPA implementation affected the previous feedback culture through 3 main mechanisms: lowering the feedback threshold, change in feedback focus, and gamification. The experienced changes in feedback culture are the result of an interplay of these 3 mechanisms and the 3 levels of feedback culture (unwritten and assumed values and operating principles; written expectations, such as mission statements, learning objectives, etc.; and day-to-day behaviors of organizational members) in Ramani and colleagues' model.^{23,24} Abbreviations: EPA, entrustable professional activity; WPBAs, workplace-based assessments.

Table 1**Comparison of EPA-Based Assessments (Implemented in April 2019) With the Previous WPBAs, Used in a Qualitative Study of Anesthesiology Residents and Attendings, Institute of Anaesthesiology, University Hospital of Zurich, 2021**

Characteristic	Previous WPBAs	EPA-based assessments
Format	Paper form	Mobile app
Mandatory number of assessments	4 per resident per year	16 per resident per year
Necessary items for documentation during each assessment situation	Year of residency, task, task complexity (simple vs complex), ASA classification of the patient, narrative of what was done well and what needs improvement, learning goal, rating	EPA (i.e., task), individual documentation of task complexity (simple vs complex) and rating by the resident and the attending
Rating (metric for competence)	<ul style="list-style-type: none">• below expectation• meets expectation• above expectation	<ul style="list-style-type: none">• may observe• may act under direct supervision• may act under indirect supervision• may act under distant supervision• may supervise others
Data aggregation	None	Color-coded competency profile within the app (can be shared with supervisors), rank within the institution based on number of complete assessments

Abbreviations: EPA, entrustable professional activity; WPBA, workplace-based assessment; ASA, American Society of Anesthesiologists.

Figure 1

