

CHAPTER 20

Addressing practical and conceptual challenges in workplace-based assessment

Daniel Nel, Adrian P. Marty, Sonia Frick, Marije P. Hennis,
Machelle Linsenmeyer

Abstract

Despite its recognized importance in ensuring clinical competence, implementing and sustaining workplace-based assessment (WBA) in EPA-based programs faces various obstacles, including validity concerns, time constraints, administrative burdens, and a perceived lack of formative value. To overcome these challenges, the chapter proposes several strategies. First, it emphasizes the role of EPAs and entrustment in streamlining the WBA process, making it more time-efficient and relevant to real-world clinical practice. Second, the chapter advocates for interprofessional collaboration in WBA, highlighting the importance of incorporating input from diverse health care professionals who regularly interact with trainees. Additionally, the chapter explores the tension between formative and summative assessment in WBA, emphasizing the importance of creating a safe environment for both trainees and supervisors. By shifting the focus from high-stakes assessments to continuous learning conversations, stakeholders can optimize each assessment situation for learning while supporting trainee autonomy. Furthermore, the chapter discusses the role of technology in addressing the perceived assessment burden associated with WBA. By leveraging mobile applications, e-portfolios, and data analytics, technology can provide efficient means for data collection, storage, analysis, and visualization, ultimately enhancing the effectiveness of WBA in health care education. Lastly, the chapter considers strategies for implementing WBA in low-resource settings, highlighting the importance of local feasibility and resource adaptation. By simplifying assessment tools, leveraging low-cost tech platforms, and col-

How to cite this book chapter:

Nel D, Marty AP, Frick S, Hennis MP, Linsenmeyer M. Addressing practical and conceptual challenges in the implementation of workplace-based assessment. In: ten Cate O, Burch VC, Chen HC, Chou FC, Hennis MP. (Eds). *Entrustable Professional Activities and Entrustment Decision-Making in Health Professions Education*, Chapter 20, pp. 237–247. [2024] London: Ubiquity Press. DOI: <https://doi.org/10.5334/bdc.t>

This chapter uses cross-references to other chapters of the same book. For those who read this chapter as a standalone publication: all cross-references can be found at: <https://doi.org/10.5334/bdc>

laborating with colleagues from varying resource levels as well as different low-resource areas, low-resource settings can overcome barriers to WBA implementation and ensure the development of competent health care professionals tailored to their specific contexts.

Authors

- Daniel Nel, MD, MMed. Groote Schuur Hospital and University of Cape Town, South Africa. Correspondence: danielnel87@gmail.com
- Adrian P. Marty, MD, MME. University Hospital Balgrist, Zurich, Switzerland.
- Sonia Frick, MD. Limmattal Hospital, Schlieren, Zurich, Switzerland.
- Marije P. Hennis, MD, PhD, MSc Clin Ed. University Medical Center Utrecht, Utrecht, the Netherlands.
- Mabelle Linsenmeyer, EdD. West Virginia School of Osteopathic Medicine, Lewisburg, West Virginia, USA.

Introduction

Workplace-based assessment (WBA) is becoming increasingly crucial for ensuring and confirming clinical competence in trainees. However, a seemingly sound educational initiative does not always translate into something that is feasible in real-life practice. Perceptions of trainees and supervisors toward WBA have been mixed, with multiple conceptual and practical challenges identified that hinder its optimal implementation. The primary objective of this chapter is to offer a clearer perspective on overcoming these challenges and facilitating the realization of WBA. Special emphasis will be placed on how this process can be facilitated by entrustable professional activities (EPAs) and entrustment.

Limitations in the validity argument

A number of issues with the implementation of WBA are related to limitations in the validity argument. Although the validity argument for *entrustment decision-making* based on EPAs is discussed in more detail in Chapter 5, this chapter would be incomplete without mentioning some of the practical challenges and how they influence the validity argument of WBA. Table 20.1 summarizes some of the challenges that need to be addressed in WBA, in the context of Kane's validity model (for a deeper discussion, see Chapter 5).¹

In terms of scoring, supervisors are frequently confused about the high stakes/low stakes conundrum related to the dual-purpose use of WBA. In addition, many do not understand how to judge a trainee's performance using WBA tools or how to provide high-quality feedback, and often lack the time or the interest to be adequately trained (such as frame of reference and performance dimension training). In terms of generalization, although multiple EPA ratings should give a clearer picture of a trainee's competence, this may result in a high assessment quota that is required per trainee. With service pressures and the busyness of a clinical workspace, EPAs may not be observed frequently enough to enable trustworthy high-stakes decision-making. In terms of extrapolation, although workplace-based assessments are grounded in authentic clinical

Table 20.1: How the validity argument in WBA can be undermined by practical challenges: some examples.

Inferences in Kane's validity model ^{1,2}	Purpose of the inference	Examples of practical challenges to be solved
Scoring	Judgment and scoring of observed performance should reflect the quality of this performance	Observers (often clinicians as raters) who do not understand well how to judge and report trainee performance and have little time or interest to be trained; tools used are not construct-aligned to a discipline
Generalization	Multiple scores of similar EPAs should provide a fair picture of EPA required competence	High assessment quota required; however, EPAs are infrequently observed
Extrapolation	EPA required competence should hold across all possible or relevant contexts	EPAs are observed in one context or by one observer only
Implications (consequences)	The summative decision of entrustment is warranted, as associated risks are acceptable	Summative decisions are made in a too simplified manner, leading to substandard performance with little supervision; assessment burden on students, supervisors, and educational system

situations, if this occurs in one training or clinical context only, it may not necessarily translate to the practice situation or a different context a trainee may find themselves in. Finally, in terms of implications or consequences, summative decisions may be made in too simplified a manner under duress from service delivery pressures or due to inadequate or low-quality assessment data for proper high-stakes decision-making. In addition, there are also unintended consequences on the trainees, the faculty, and the educational system from an assessment that requires significant input and may add to the administrative burden for all concerned.

These unintended consequences can be considered more broadly in light of the consensus framework for good assessment, which include the following criteria: validity or coherence, reproducibility or consistency, equivalence, feasibility, educational effect, catalytic effect, and acceptability.³ The assessment burden introduced may limit the feasibility and acceptability of WBA. In addition, faculty and trainees often do not find that the perceived value of the assessment outweighs this burden, as the learning conversation or feedback may not be of sufficient value to overcome the requirements for completion. Potential solutions to address these and other practical concerns are discussed in the following sections.

Human resources in the clinical teaching environment

Critics of WBA often highlight its time-consuming nature, which translates into increased costs and adds to the administrative burden within an already-demanding work environment. Additionally, skeptics question the value of WBAs, citing a lack of demonstrated improvement in patient outcomes. This prompts the fundamental question: why invest time and resources into WBA? A succinct response to such skepticism echoes a quote often attributed to Abraham Lincoln: 'If you think education is expensive, try ignorance.' While this might seem clichéd, the underlying objective should be to cultivate competency efficiently, addressing the obstacles—money, time, administration—that hinder this process.

Despite the academic roots of medical professions, their real-world application unfolds in practical workplace settings. The pivotal task is to transfer theory into practice, emphasizing the importance of supervision and feedback in the workplace. Regularly employing WBAs within the structured framework of EPAs has proven to be remarkably time-efficient, averaging just three minutes per instance.⁴ This diminishes the argument of time constraints. Furthermore, the assessment workload can be distributed among various stakeholders, including patients, nurses, and student peers, provided they grasp their own role, that of the trainee, and the WBA concept. To facilitate this process, EPA-related entrustment–supervision scales for WBA articulate a concept familiar to all teachers, one they have implicitly used throughout their careers—entrustment, assigning the responsibility for doing something to someone.⁵ Emphasizing this point helps alleviate the common fear of something new and challenging. However, it is not necessarily straightforward for supervisors to explicitly elaborate an entrustment decision, and faculty development focusing on this process is important.⁶

In addition to assessor training, the increased emphasis on WBAs demands ongoing education for all involved parties to prevent assessment overload and subsequent stress. If trainees and supervisors do not perceive the benefits of WBA to outweigh the effort required, they may lose the motivation to participate. Establishing a cadre of 'champions' with dedicated time for introducing, teaching, and supervising the WBA process within an institution is crucial. These individuals must be well versed in the challenges of a feedback and assessment culture, addressing issues such as peer comparison, time pressures, overcontrol, and unrealistic expectations.⁷ In addition to developing a core team or champions, specific WBA meetings for all supervisors and trainees explicitly showing the benefits within an institution, especially the educational value, can facilitate the positive impact of WBAs and serve to increase buy-in.

Gathering interprofessional input

Working, learning, and collaborating in an interprofessional team are indispensable for achieving safe, effective, and sustainable health care.⁸ While multisource feedback (see Chapter 17 for more details) has demonstrated high reliability, validity, and feasibility in evaluating trainees,⁹ the incorporation of interprofessional direct observation for WBA remains uncommon.¹⁰ This discrepancy is particularly notable in postgraduate medical education, where trainees may have more frequent and intense interactions with nonphysician team members than with senior physician supervisors.¹¹ The reliance on a single assessor, typically a supervisor, may not be as defensible as incorporating input from diverse professional perspectives.¹²

Overcoming the scarcity of interprofessional WBA involves addressing practical and conceptual challenges. First, recognizing and highlighting the benefits and value of interprofessional input is crucial. This is especially pertinent when identifying and engaging a diverse range of assessors, including supervisors, nurses, physician assistants, dietitians, and other health care professionals that collaborate with the trainee on a regular basis. Furthermore, attending to the challenges associated with disparate professional perspectives, potential reluctance, and divergent opinions on competency is imperative.

To help establish a robust interprofessional assessment process, faculty development initiatives should extend beyond mono-professional supervisors to deliberately include all interprofessional stakeholders. Creating a standardized and seamless assessment process is pivotal, as is overcoming logistical hurdles such as ensuring access to digital platforms and addressing limited participant experience. In addition, legal considerations necessitate clear delineation of accountability and responsibility among the interprofessional team. For instance, how should the clinical competency committee (CCC), as the decision-making group responsible for evaluating trainees' progress in their specialty, value and utilize entrustment decisions made by interprofessional colleagues regarding their own trainees? Building trust and aligning expectations are essential in this context, requiring careful consideration to ensure a cohesive and effective decision-making process within the CCC. Finally, financial implications, particularly in regions linking remuneration to assessment outcomes, demand a balanced approach that ensures accuracy without compromising the assessment process's integrity.

By centering on interprofessional collaboration, WBA has the potential to become a more inclusive and effective tool in health professions education. This approach promotes a comprehensive and contextually relevant evaluation of trainee performance, contributing to the evolution of a more robust and holistic health care workforce.

The formative–summative tension

'Assessment drives learning'—well, not necessarily. When it comes to WBA there are some challenges to be aware of in order to optimize every assessment situation for learning. Collectively, a portfolio of WBAs can be used to make summative decisions regarding progress or promotion. However, on a spectrum from formative to summative, individual WBAs should be located in the formative corner. But, even if it is called 'formative,' from the trainee's perspective just using the term 'assessment' might create anxiety.¹³ In addition, if done infrequently, the assessment situation might feel like a summative test. As a result, trainees might only ask for a WBA if they are already proficient in a specific task (EPA); they fear getting a 'bad mark.' In a culture where each assessment is perceived as a high-stakes event, much of the trainee's energy goes into impression management instead of actual learning.¹⁴ On the supervisors' side, similar challenges exist as they might feel hesitant to use the lower spectrum of a performance scale because it might negatively impact a trainee's career or their relationship.¹⁵

In order to address these challenges in implementing WBA, the focus should shift to reducing stress and anxiety, and decreasing the perceived stakes as much as possible (for both trainees and supervisors). Every system of assessment needs to be absolutely transparent about the purpose of WBAs and how the data points are used to inform entrustment decisions of trainees. There is always some stake, even in formative assessment situations and especially if aggregated in an e-portfolio.¹⁶ Instead of using the terms 'formative' and 'summative,' terms such as 'low-stakes' and 'high-stakes' or a 'continuum of stakes' may be used, as is described in programmatic assessment.¹⁷ In addition, it may be recommended to avoid the term 'assessment' altogether, and instead call them 'observations' of performance in the workplace. Thus, rather than seeing it as an assessment, a workplace observation can be considered a perfect starting point for a 'learning conversation.' Trainees and supervisors should initiate frequent WBAs or 'observations' for facilitating learning from the first day of training until certification (and not just at the end). Using only the narrative descriptions of the entrustment-supervision scale in assessment tools (like 'direct supervision') emphasizes the clinical relevance of the rating, while using quantitative scales or levels at any point may still feel to the trainee like they are getting marked and that this should be avoided. In addition, no pass/fail decision or high-stakes decision should be made based on one single WBA.

If we succeed in our quest of decreasing trainee anxiety by carefully designing and communicating a system of assessment that is building on a growth mindset,¹⁸ we can, for trainees, truly optimize each assessment situation for learning. In addition, for supervisors, we can make our way toward autonomy-supportive teaching styles that fosters students' intrinsic motivation to learn.¹⁹

Ideal vs reality

Although multiple observations are required to provide a fair picture of a trainee's competence, there needs to be a practical sampling approach that provides sufficient evidence of progress and feedback opportunities, without becoming burdensome for both the trainee and the supervisor. Overambitious assessment requirements may lead to trainee and supervisor dissatisfaction and a 'tick-box' mentality, with WBA losing its formative and summative potential.²⁰ Insufficient opportunities for granting autonomy in training may also arise due to legal and regulatory constraints, coupled with concerns about patient safety.²¹ In particular, supervisors may not always trust the assessments of their colleagues, especially for higher-risk tasks like procedures.

Addressing these challenges may occur either in the context of establishing a new WBA strategy or refining an existing one. An essential starting point is gathering input from both supervisors and trainees to determine feasibility, including the number of required observations in a given time period and the selection of tasks or EPAs for assessment. Forming a stakeholder team, with or without surveys of the rest of the trainee and supervisor body, may facilitate this process, with feedback collection occurring iteratively during implementation. It is also valuable to examine what others have done and what principles they used to design their strategies, including barriers and facilitators identified to implementation and integration. However, it is essential to consider these insights in the light of the local context and adjust them based on local experience. In addition, the activities for assessment in the workplace (i.e., EPAs) should be mapped to curricular outcomes and the attributes of a successful graduate, as required by the relevant institution or regulatory body. Commencing with simplicity and gradual progression cannot be overemphasized. Starting with a few EPAs or a very low number of initial observations or both is advisable, and these can be progressively increased as feasibility is demonstrated and greater buy-in is achieved.

Multiple studies have defined minimum observation quotas for accurate assessments, but reliance on psychometrics should be balanced with subjective decision-making by a competence committee, emphasizing trust in trainees, supervisors, and in their high-stakes decision-making.²² In terms of autonomy, the use of prospective entrustment decisions are advised. Whereas retrospective scales report the actual supervision provided during an activity, prospective entrustment decisions require an estimation of the student's readiness for a specific level of supervision, focusing on future performance.²³ This means that they carry more weight and may have a greater influence on decisions regarding autonomy provision.²³ While entrustment decisions may not directly impact supervision levels in all contexts, they can lead to advancement within training, with senior roles carrying increased responsibility and autonomy. Though changing regulatory and legal frameworks is challenging, in some settings the trustworthiness of a competence committee's prospective entrustment decisions, based on multiple EPA observations from multiple supervisors, may enable trainees to legally assume more senior roles and thus experience greater autonomy in training.

Technology solutions to address practical challenges

WBA has challenges and limitations for which technological solutions could serve as a resource to overcome. Examples of challenges are: (a) competing clinical demands that interfere with the time available for faculty to complete assessments; (b) the need for the collection of multiple data points to support a decision regarding readiness; (c) the analysis and visualization of data points to support both self-reflection, progression decisions, and program evaluation; and (d) the security and confidentiality of data. In the past, assessment data has been collected in paper form. While the paper-based method of data collection has benefits (e.g., more comprehensive feedback), it makes the collection, storage, analysis, presentation, and security of a large number of data points cumulatively and across time less effective.²⁴

In looking to the future, it has been noted that technology such as mobile applications and dashboards or e-portfolios (if designed correctly) can provide efficient means to collect data immediately following a clinical interaction and allow instantaneous storage of data for analysis and further review in aggregate and across time. In addition to the efficiency in the collection, storage, and cumulation of data, technology also offers further ways for trainees and institutional entities (e.g., programs, directors, clinical competency committees, or institution administrators) to use the data. Trainees can benefit from seeing their progress across time and against other trainees, and from reviewing the feedback from each assessment as they consider their accomplishments and gaps toward unsupervised practice. Institutions can use the data more effectively for overall and longitudinal analysis. For example, CCCs, which are limited in their time to review trainee progress, can quickly see data displayed in multiple ways (e.g., individual data points, longitudinal progression, individual against aggregated group data) as they consider the next steps for a trainee. Regarding program evaluation, technology allows expansion from analysis of a trainee to broader perspectives of curriculum and the program (e.g., review of data by level of supervision for each EPA, looking at EPAs by program or specialty). Finally, it can provide a mechanism for digital 'badging' (electronically showing the qualifications for scope of practice of a trainee).²⁵

While technology certainly has benefits, it also has important considerations such as cost, design, security and data safety, Wi-Fi coverage and networks, legal and ethical issues, reporting, standardization, disinfecting or sanitizing devices, and training and support. These issues and considerations are extensively discussed in the literature by experts who have implemented technologies to support WBA.^{24,26,27}

Strategies in low-resource countries or areas

Although low-resource countries or regions encounter similar but often intensified challenges as those experienced in high-resource areas, some challenges are unique to resource-limited settings. In many low-resource environments, limited human resources and a high disease burden create service delivery pressure for clinicians, translating into less time for educational activities and fewer available human resources for initiatives like WBA.²⁸ Cultural dynamics as well as underdeveloped assessment systems and medical education departments may provide additional difficulties.²⁹ Further limiting factors include the cost of information technology platforms to make WBA user-friendly in the workplace, as well as the limited availability of Wi-Fi or cell phone data coverage. Low-resource settings may struggle to implement WBA strategies designed for high-income settings, with some concluding they lack the resources for WBA implementation altogether.³⁰

Addressing these challenges in low-resource settings requires a focus on feasibility within that specific context. This involves the lowest possible assessment burden for busy clinicians and the use of extremely simple tools, ensuring quick observation capture and minimal disruption to the clinical workflow. Local design of low-cost tech platforms for WBA, such as using Google packages, RedCap, or commercially available survey software, is possible. Paper-based systems, even in low-resource settings, are discouraged owing to their multiple limitations.²⁶ Implemented tech platforms should ideally have low data requirements or cache features for data syncing when data coverage is available. While guidance on EPA selection and description for WBA from other contexts is helpful, it is crucial for low-resource settings to ensure that EPA selection is appropriate and that the resultant assessment requirements are feasible to implement locally. Examples of strategies to improve feasibility include selecting a limited core group of EPAs (with or without 'elective' EPAs that are optional to be assessed) or opting for fewer, broader EPAs; both resulting in a lower assessment burden (see Chapter 9 for more details). In addition, the definition of EPAs by experts in a particular setting allows curricula to be aligned to train graduates who are fit for purpose in that specific context. For some countries, particularly from the Global South, this presents an opportunity to transform and decolonize their curricula through the process of EPA selection and implementation. To ensure greatest feasibility, including the perspective of the lowest-resourced area in a particular context is needed when selecting national EPAs. Low-resource settings can also seek assistance from colleagues in well-resourced environments with experience in WBA implementation, but must take care to ensure the advice is feasible. As local expertise grows, a community of practice within a low-resource setting may facilitate the exchange of ideas and strategies for overcoming resource restrictions. Finally, although collaboration between areas with varying resource levels holds significant value, collaboration among different low-resource areas is important, which may facilitate the sharing of potential solutions or even collectively addressing development costs.

Conclusion

Whether it is a new WBA strategy being implemented or an existing one being refined, challenges are inevitable. It is imperative for drivers of educational change to understand what they can do to limit the magnitude and shorten the duration of the initial period of disarray that inevitably follows the introduction of change. This chapter highlights many such strategies that can be used to create a more supportive external environment, as well as to address some of the cognitive and other internal barriers to WBA implementation (summarized in Table 20.2 below). In addition, we have discussed how EPAs and the concept of entrustment may assist in achieving this goal. We hope that this information empowers those who are embarking on an implementation journey or encourages those who feel that the challenges are too great to overcome.

Table 20.2: Practical and conceptual challenges to WBA and strategies to overcome them.

Challenge	Strategies
Assessment burden for busy clinicians	<ul style="list-style-type: none"> • Use EPA-based assessments with simple tools that include entrustment–supervision scales • Distribute the load through interprofessional involvement • Ensure continuous education of all involved parties • Establish ‘champions’ with dedicated time for introducing and supervising WBA process • Arrange WBA meetings for all supervisors and trainees showing local progress and stressing benefits to individuals and the team
Scarcity of interprofessional WBA	<ul style="list-style-type: none"> • Ensure faculty development initiatives include all interprofessional stakeholders • Create a standardized and seamless assessment process, including digital platform • Ensure clear delineation of accountability, legal responsibility, and remuneration
Tension between formative and summative purposes in WBA	<ul style="list-style-type: none"> • Avoid term ‘assessment’—instead use ‘observations’ of performance in the workplace/‘WBO’ • Use only narrative descriptions of the entrustment–supervision scale in assessment tools • Completely avoid numbers or ‘levels’ in rating scales • Ensure transparency about purpose of WBAs and how data points are used for high-stakes decision-making
Tension between educational ideals and reality of workplace environment	<ul style="list-style-type: none"> • Get local input from both supervisors and trainees to determine feasibility, especially regarding assessment quotas • Start with a few EPAs and/or a very low number of initial observations, then build up • Examine the literature to learn from the mistakes and successes of others • Continuously seek feedback from all participants during implementation and adjust as necessary
Logistics of continuous data collection in the workplace, and need to aggregate for later use	<ul style="list-style-type: none"> • Avoid paper-based system • Use mobile/smartphone-based applications to capture individual observations • Use e-portfolios for trainees to review own progress • Develop digital dashboards to aid competence committee view and analyze aggregated data points
Resource restrictions in lower-income countries/ contexts	<ul style="list-style-type: none"> • Ensure lowest possible assessment burden • Use of extremely simple tools • Local design of low-cost tech platforms • Incorporate low data requirements or cache features for data syncing when data coverage is available • Ensure EPA selection is appropriate and feasible locally

Competing interests

The authors declare that they have no competing interests.

References

1. Kane MT. An argument-based approach to validity. *Psychol Bull.* 1992; 112(3), 527–535. DOI: <https://doi.org/10.1037/0033-2909.112.3.527>
2. Cook DA, Brydges R, Ginsburg S, Hatala R. A contemporary approach to validity arguments: a practical guide to Kane’s framework. *Med Educ.* 2015;49(6):560–575. DOI: <https://doi.org/10.1111/medu.12678>

3. Norcini J, Anderson MB, Bollela V, et al. 2018 consensus framework for good assessment. *Med Teach*. 2018;40:1102–1109. DOI: <https://doi.org/10.1080/0142159X.2018.1500016>
4. Cheung K, Rogoza C, Chung AD, Kwan BYM. Analyzing the Administrative Burden of Competency Based Medical Education. *Can Assoc Radiol J*. 2022;73(2):299–304. DOI: <https://doi.org/10.1177/08465371211038963>
5. ten Cate O. When I say ... entrustability. *Med Educ*. 2020;54(2):103–104. DOI: <https://doi.org/10.1111/medu.14005>
6. Gingerich A. What if the 'trust' in entrustable were a social judgement? *Med Educ*. 2015;49(8):750–752. DOI: <https://doi.org/10.1111/medu.12772>
7. Ott MC, Pack R, Cristancho S, Chin M, Van Koughnett JA, Ott M. "The Most Crushing Thing": Understanding Resident Assessment Burden in a Competency-Based Curriculum. *J Grad Med Educ*. 2022;14(5):583–592. DOI: <https://doi.org/10.4300/JGME-D-22-00050.1>
8. Stalmeijer RE, Varpio L. The wolf you feed: challenging intraprofessional workplace-based education norms. *Med Educ*. 2021;55(8):894–902. DOI: <https://doi.org/10.1111/medu.14520>
9. Donnon T, Al Ansari A, Al Alawi S, Violato C. The reliability, validity, and feasibility of multi-source feedback physician assessment: a systematic review. *Acad Med*. 2014;89(3):511–516. DOI: <https://doi.org/10.1097/ACM.0000000000000147>
10. van Keulen SG, de Raad T, Raymakers-Janssen P, Ten Cate O, Hennus MP. Exploring Interprofessional Development of Entrustable Professional Activities For Pediatric Intensive Care Fellows: A Proof-of-Concept Study. *Teach Learn Med*. 2024;36(2):154–162. DOI: <https://doi.org/10.1080/10401334.2023.2200760>
11. Sonnenberg LK, Pritchard-Wiart L, Hodgson CS, Yu Y, King S. Assessment of Resident Physicians' Communicator and Collaborator Competencies by Interprofessional Clinicians: A Mixed-Methods Study. *Teach Learn Med*. 2017;29(4):392–401. DOI: <https://doi.org/10.1080/10401334.2017.1301817>
12. van der Vleuten CP, Schuwirth LW, Scheele F, Driessen EW, Hodges B. The assessment of professional competence: building blocks for theory development. *Best Pract Res Clin Obstet Gynaecol*. 2010;24(6):703–719. DOI: <https://doi.org/10.1016/j.bpobgyn.2010.04.001>
13. Schut S, Driessen E, van Tartwijk J, van der Vleuten C, Heeneman S. Stakes in the eye of the beholder: an international study of learners' perceptions within programmatic assessment. *Med Educ*. 2018;52(6):654–663. DOI: <https://doi.org/10.1111/medu.13532>
14. Huffman BM, Hafferty FW, Bhagra A, Leasure EL, Santivasi WL, Sawatsky AP. Resident impression management within feedback conversations: A qualitative study. *Med Educ*. 2021;55(2):266–274. DOI: <https://doi.org/10.1111/medu.14360>
15. McQueen SA, Petrison B, Bhandari M, Fahim C, McKinnon V, Sonnadara RR. Examining the barriers to meaningful assessment and feedback in medical training. *Am J Surg*. 2016;211(2):464–475. DOI: <https://doi.org/10.1016/j.amjsurg.2015.10.002>
16. Watling CJ, Ginsburg S. Assessment, feedback and the alchemy of learning. *Med Educ*. 2019;53(1):76–85. DOI: <https://doi.org/10.1111/medu.13645>
17. Schuwirth LW, Van der Vleuten CP. Programmatic assessment: From assessment of learning to assessment for learning. *Med Teach*. 2011;33(6):478–485. DOI: <https://doi.org/10.3109/0142159X.2011.565828>
18. Richardson D, Kinnear B, Hauer KE, et al. Growth mindset in competency-based medical education. *Med Teach*. 2021;43(7):751–757. DOI: <https://doi.org/10.1080/0142159X.2021.1928036>
19. Reeve J, Cheon SH. Autonomy-supportive teaching: its malleability, benefits, and potential to improve educational practice. *Educ Psychol*. 2021;56(1):54–77. DOI: <https://doi.org/10.1080/0461520.2020.1862657>
20. Massie J, Ali JM. Workplace-based assessment: a review of user perceptions and strategies to address the identified shortcomings. *Adv Health Sci Educ Theory Pract*. 2016;21(2):455–473. DOI: <https://doi.org/10.1007/s10459-015-9614-0>

21. ten Cate O, Jarrett JB. Would I Trust or Will I Trust? The Gap between Entrustment Determinations and Entrustment Decisions for Trainees in Pharmacy and Other Health Professions. *Pharmacy (Basel)*. 2023;11(3):107. Published 2023 Jun 18. DOI: <https://doi.org/10.3390/pharmacy11030107>
22. Hodges B. Assessment in the post-psychometric era: learning to love the subjective and collective. *Med Teach*. 2013;35(7):564–568. DOI: <https://doi.org/10.3109/0142159X.2013.789134>
23. Postmes L, Tammer F, Posthumus I, Wijnen-Meijer M, van der Schaaf M, ten Cate O. EPA-based assessment: Clinical teachers' challenges when transitioning to a prospective entrustment-supervision scale. *Med Teach*. 2021;43(4):404–410. DOI: <https://doi.org/10.1080/0142159X.2020.1853688>
24. Young JQ, Sugarman R, Schwartz J, McClure M, O'Sullivan PS. A mobile app to capture EPA assessment data: Utilizing the consolidated framework for implementation research to identify enablers and barriers to engagement. *Perspect Med Educ*. 2020;9(4):210–219. DOI: <https://doi.org/10.1007/s40037-020-00587-z>
25. ten Cate O. How can entrustable professional activities serve the quality of health care provision through licensing and certification? *Can Med Educ J*. 2022;13(4):8–14. DOI: <https://doi.org/10.36834/cmej.73974>
26. Marty AP, Linsenmeyer M, George B, Young JQ, Breckwoldt J, Ten Cate O. Mobile technologies to support workplace-based assessment for entrustment decisions: Guidelines for programs and educators: AMEE Guide No. 154. *Med Teach*. 2023;45(11):1203–1213. DOI: <https://doi.org/10.1080/0142159X.2023.2168527>
27. George BC, Bohnen JD, Schuller MC, Fryer JP. Using smartphones for trainee performance assessment: A SIMPL case study. *Surgery*. 2020;167(6):903–906. DOI: <https://doi.org/10.1016/j.surg.2019.09.011>
28. Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *Lancet*. 2010;376(9756):1923–1958. DOI: [https://doi.org/10.1016/S0140-6736\(10\)61854-5](https://doi.org/10.1016/S0140-6736(10)61854-5)
29. Atta K. Bridge to trust: EPAs and the cultural odyssey in Pakistan's medical training. *Journal of University Medical & Dental College*. Epub ahead of print November 27, 2023. DOI: <https://doi.org/10.37723/jumdc.v14i4.973>
30. Ras T, Stander Jenkins L, Lazarus C, et al. 'We just don't have the resources': supervisor perspectives on introducing workplace-based assessments into medical specialist training in South Africa. *BMC Med Educ*. 2023;23(1):832. DOI: <https://doi.org/10.1186/s12909-023-04840-x>