Tensions in Competence by Design implementation: A qualitative multidisciplinary study to identify factors that promote and impede Entrustable Professional Activity acquisition among faculty and residents at a Canadian university

Quinten S. Paterson
*Department of Emergency Medicine, University of Saskatchewan,* quintenpaterson@gmail.com

Sharon E. Card
*Division of General Internal Medicine, Department of Medicine, University of Saskatchewan.*

Benjamin Leis
*Department of Medicine, University of Saskatchewan*

Lindsey Broberg
*Department of Obstetrics and Gynecology, University of Saskatchewan*

Stéphanie Beckett
*Department of Hospitalist Medicine, Cornwall Community Hospital*

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Tensions in Competence by Design implementation: A qualitative multidisciplinary study to identify factors that promote and impede Entrustable Professional Activity acquisition among faculty and residents at a Canadian university

Authors
Quentin S. Paterson, Sharon E. Card, Benjamin Leis, Lindsey Broberg, Stéphanie Beckett, Tanya Robertson-Frey, Nina Gao, Brian Ulmer, and Lynsey J. Martin

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Purpose: The purpose of this qualitative study was to explore residents’ and faculty’s experiences with EPAs to identify barriers and facilitators to EPA acquisition. This supported the subsequent development of recommendations for residents and faculty, residency program leadership, and institution to ensure that residents’ training and Competence Committee promotional decisions are optimized.

Method: The authors conducted a qualitative study utilizing grounded theory and quality improvement research methods with residents and faculty from various specialties at a Canadian University. Through the utilization of a process mapping exercise, an interactive fishbone diagram exercise, and semi-structured focus groups, barriers and facilitators to EPA acquisition were identified and then thematically analyzed using a constant comparative technique, thereby generating a final codebook of results.

Results: Six residents and six faculty from eight specialties participated. Two resident focus groups and one individual resident interview generated 2 h and 36 min of audio-recorded data and 43 pages of transcribed data. Two faculty focus groups generated 1 h and 44 min of audio-recorded data and 33 pages of transcribed data. Four primary categories for EPA barriers and facilitators were pre-defined according to the fishbone diagram. Fifteen themes of barriers and fifteen themes of facilitators, with varying degrees of subthemes, were inductively identified through the coding process.

Discussion: This study found that the barriers residents and faculty face during EPA acquisition are similar to the challenges previously described in the pre-CBD assessment literature, suggesting that simply changing the assessment paradigm and modality will not necessarily alleviate pre-existing challenges to the assessment process or automatically improve assessment quality. Based on the results, a list of recommendations was generated as a starting point for change and improvement at a resident and faculty level, residency program leadership level, and institutional level.

Keywords: Competency-based medical education (CBME), Entrustable professional activity (EPA), Qualitative research, Quality improvement methodology, Residency education
1. Introduction

Consistent with the international movement away from time-based residency education [1], in 2017 the Royal College of Physicians and Surgeons of Canada (RCPSC) initiated postgraduate specialist training programs into competency-based medical education, termed Competence by Design (CBD) [2]. CBD is a form of programmatic assessment [3] with Entrustable Professional Activities (EPAs) utilized as the primary assessment modality [2]. EPAs are workplace-based assessments that focus on key tasks of a medical or surgical specialty [4] where residents are observed in vivo, provided with an entrustment score based on their performance, and provided with formative feedback for future practice integration [5]. Throughout their training, residents must be observed and assessed multiple times for each of their discipline’s EPAs. Compiled observational data are then periodically reviewed by a Competence Committee that uses them to make decisions on resident promotion through stages of training [2]. At the authors’ institution, residents, faculty, and Competence Committees alike have anecdotally described barriers to successfully documented EPA acquisition.

The medical education literature has identified several barriers to feedback provision to trainees in the clinical context, including lack of timeliness and specificity [6,7], lack of dedicated time for feedback after a clinical encounter [8,9], inconsistent institutional standards [10], stakeholder emotional responses [11–13], learners’ unwillingness to take an active role in utilizing feedback [14], and teacher approachability and comfort level in delivering feedback [14,15]. Many of these studies were conducted in a pre-CBD era which may limit their generalizability to today’s CBD context. Furthermore, though barriers and facilitators have been described in an Emergency Medicine CBD context [16], anecdotal challenges faced in the relatively modern climate of EPA utilization have exposed a paucity of research to inform all residency programs regarding what barriers residents and faculty may face in completing EPA observation and assessment. This information is critical to successful continuous quality improvement of postgraduate medical education.

The purpose of this qualitative study was to explore residents’ and faculty’s experiences with EPAs to: (1) determine barriers that prevent residents and faculty from acquiring EPA assessments; (2) identify factors and methods that facilitate EPA assessments for residents and faculty; and (3) utilize the lessons learned to inform and improve EPA assessment acquisition through the development of recommendations for residents and faculty, residency program leadership, and institutions, to ensure that residents’ training and Competence Committee promotional decisions are optimized.

2. Method

2.1. Overview

The authors conducted a qualitative study utilizing grounded theory and quality improvement research methods to identify barriers and facilitators to EPA acquisition amongst resident and faculty physicians. The authors anticipated that the identified barriers and facilitators would be consistent with previous research. Moreover, the authors predicted that this study would reveal context-specific elements of the EPA acquisition process. The authors were particularly interested in gathering these elements as they are most helpful in nourishing successful continuous quality improvement in residency education.

2.2. Participants

2.2.1. Ethics

This project was designated as a program evaluation activity and therefore met requirements for exemption status as per Article 2.5 of the University of Saskatchewan (U of S) Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans - TCPS 2 (2018).

2.2.2. Funding

This study received funding from both the U of S Department of Surgery ($2500.00) and the U of S Department of Internal Medicine ($2834.00). Funding was used for focus group materials, transcription, and hiring of assistants for data analysis.

2.2.3. Study location

This study was conducted at the University of Saskatchewan, which has the sole College of Medicine in its region, utilizing two cities’ training sites for resident physicians enrolled in RCPSC training programs. All focus groups were conducted in-person aside from one virtual focus group.

2.2.4. Participants & recruitment

To aid transition to CBD, the U of S created leadership positions for faculty and resident CBD leads within each specialty. As defined by the U of S College of Medicine’s 2019 CBD Guidelines, a Resident CBD Lead is a resident who “will help guide the
transition and implementation process for competency-based medical education at the program level [to] ensure resident interests are represented throughout all aspects of CBD implementation.” [17] Faculty CBD Leads are faculty who “will guide the transition and implementation process for CBD initiatives at the program level.” [17] These Resident and Faculty CBD Leads played a crucial role in their specialty program’s transition to CBD, meeting frequently with the program’s residents and faculty, which provided them with intimate knowledge of the CBD process, including challenges for implementation. This made them well suited to share insights on barriers and facilitators to EPA observation and assessment.

Ten U of S residency programs, including Anesthesia, Emergency Medicine, General Pathology, General Internal Medicine, Internal Medicine, Nephrology, Neurosurgery, Obstetrics and Gynecology, Rheumatology, and Surgical Foundations transitioned to CBD between July 2017 and July 2019. Notably, one program had two CBD Resident Leads in two geographic locations (one representative at each study site). As such, there were 11 Resident and 10 Faculty CBD Leads eligible for inclusion in the study. One author (TRF), a program evaluation specialist for the U of S College of Medicine, contacted eligible Resident and Faculty CBD Leads for inclusion in this study via email at one-week intervals on four occasions, requesting their participation in either a Resident or Faculty CBD Lead focus group.

2.2.5. Reflexivity statement

Study authors that were also Resident or Faculty CBD Leads were eligible to participate as study participants. While their lived experiences with CBD and EPA acquisition influences the processes described within this paper, they believe this experience lends an authentic lens to the identified problems and solutions to EPA acquisition. They view this as a strength, not a risk, to the contributions and understanding of the study’s results.

2.3. Materials

Questionnaires (Appendix A) were developed to collect demographic information from focus group participants. Process maps (Appendix B), demonstrating an example of a resident-generated process map and fishbone diagrams (Appendix C) were utilized during focus groups to facilitate problem definition, identify confounding factors, incorporate the sensitivity of the local environment, and provide a validated approach to the knowledge-action gap [18]. The fishbone diagram tool and its categories were used to best categorize the identified barriers and facilitators into groups for intervention, by way of a Plan-Do-Study-Act (PDSA) cycle [19], an approach that is gaining momentum in medical education implementation [19]. Sticky notes were then placed onto a large poster board under their specific fishbone category for easy visualization. Fishbone diagrams contained four generic, though major, categories of barriers which were used as a starting point for focus group discussion: (1) Environment, Setting and Culture; (2) Equipment and Technology; (3) People (Supervisors, Patients and Residents); and (4) Rules, Policies and Procedures. These categories reflect the common themes included in fishbone diagrams (measurements, materials, people, environment, methods, machines) but were adapted to reflect the medical education setting.

2.4. Procedure

Regarding data collection, participants first provided written informed consent and completed the demographics questionnaire. Second, participants underwent a process mapping exercise (Appendix B) whereby they individually outlined the typical steps of how their EPA acquisition experience routinely unfolds. This exercise was done to deliberately break down the different steps of the EPA acquisition process. This activity primed participants to consider the step-specific barriers and facilitators to the process during the subsequent fishbone diagram mapping exercise and focus group discussion.

Third, the fishbone diagram (Appendix C) creation was subdivided into two parts. Initially, participants individually wrote down on “sticky notes” as many barriers to EPA observations as possible based on personal experience or vicarious experiences. They were told they would be prompted for further discussion on each point in the following focus group. Next, participants placed their completed notes onto a large poster board under the corresponding system-based fishbone category for easy visualization by the group.

Fourth, participants were guided through semi-structured focus group questions (Appendix D) by an experienced program evaluation specialist (TRF). The goal was to elaborate on identified barrier and facilitators. Concurrently, TRF added information to the fishbone diagram based on participant responses and focus group discussion. Field notes were taken during each focus group. All focus groups were audio recorded on two devices and transcribed verbatim.
The final product of this process was triangulated data [20] consisting of written process maps of the EPA acquisition process, a large poster board filled with barriers and facilitators to EPA completion, as well as focus group transcripts with field notes elaborating upon the barriers and facilitators of the EPA acquisition process. All attempts were made to adhere to the Standards for Reporting Qualitative Research (SRQR) Guidelines [21].

2.5. Analysis

Demographic questionnaire data was analyzed by an author (SB) using Microsoft Excel (v16.0) to present frequencies of all categorical variables. Focus group audio recordings were transcribed by the U of S Canadian Hub for Applied and Social Research yielding focus group transcripts. Transcripts, field notes, process maps, and fishbone diagrams from all focus groups were de-identified of any participant identifiers and included for qualitative analysis.

Two authors (QSP & NG) and an independent data analyst (RT) performed thematic analysis of all qualitative data using a grounded theory approach and combined inductive and deductive coding strategies [22] to generate broad themes within the four main categories of the fishbone diagram. Next, NG and RT independently coded the qualitative data into sub-themes through inductive analysis using NVivo software (12 Pro for Windows). They met with QSP to compare their codebooks through a constant comparative technique [22], thereby creating a revised and final codebook (Appendix E). NG and RT then independently re-coded all data using the final codebook to generate the coding run for each theme and sub-theme under the primary four fishbone categories. NG and RT then met with the study team members to review the final list of themes, subthemes, and representative quotations.

Member checking of the final codebook was completed to increase the trustworthiness of the results [20]. TRF contacted all participants via email and provided each participant with a list of the final themes and sub-themes identified in the analysis, offering them the opportunity to respond if they felt the themes and sub-themes were not reflective of the information they provided.

3. Results

3.1. Participant demographics and focus group results

Six of eleven eligible Resident CBD Leads and six of ten eligible Faculty CBD Leads from ten programs participated in this study (see Table 1 for demographic data). Notably, one program had two CBD Resident Leads in two geographic locations (one representative at each study site). Given travel restrictions, the Resident CBD Lead from the distributed site participated in a virtual one-on-one interview using the same method as the in-person focus groups. Two resident focus groups and one individual resident interview generated 2 h and 36 min of audio-recorded data and 43 pages of transcribed data. Two faculty focus groups generated 1 h and 44 min of audio-recorded data and 33 pages of transcribed data.

3.2. Thematic classification

Four primary categories for EPA barriers and facilitators were pre-defined according to the fishbone diagram, as outlined previously. Themes with varying degrees of subthemes were inductively identified through the coding process by QSP, NG, and RT. Appendix E outlines the final codebook with theme and subtheme frequencies and key quotations from participants.

3.3. Barriers to EPA acquisition

All identified barriers were classified within the four primary categories resulting in 15 themes, 10 subthemes, and 4 sub-subthemes being identified (Fig. 1).

3.3.1. Environment, Setting and Culture barriers

Within this category, six themes were identified outlining barriers that residents and faculty face when attempting to acquire EPAs. Note was made about a perceived lack of time, particularly when balancing educational needs against clinical needs, as stated by Resident #2: “sometimes there’s just too much stuff to do, that you can’t actually specifically target your EPAs.” This was most significant for EPAs of rare clinical events, where certain EPAs were noted to be challenging to obtain given a lack of exposure to relevant cases because, “that might be the only opportunity that they have to see that thing. And if that doesn’t happen then you’re not going to get that EPA” (Resident #2). At the programmatic level, sometimes it was not the opportunity paucity that was a challenge, but rather the environmental challenges that are strongly associated with the structure of residency training, as Resident #1 made note of the challenges of completing EPAs while off-service. Similarly, Faculty #3 outlined the barrier of faculty and residents at distributed training sites feeling “out of the loop.”
Additionally, there were oft-cited struggles of significant delays to EPA completion, with Resident #6 stating that “the delay between observation and completion of the EPA ... [makes] it difficult to have it actually done,” which has a negative impact on the quality of comments correlating with the time to completion. At an institutional level, Faculty #1 raised concerns that poor “remuneration for time spent teaching [leads to] hostility [and the] group [feeling] undervalued,” with perceptions that clinical work is valued much more highly than educational work, where “on the list of things to do, [EPAs are] not high” (Faculty #6). Further, at a cultural level, “there is just a complete loss of buy-in for CBD” (Faculty #4), which negatively impact the implementation of CBD and EPA acquisition.

### 3.3.2. Equipment and Technology barriers

This category contains three major themes of challenge for residents and faculty alike. Residents and faculty “having difficulties memorizing their passwords” (Resident #1) combined with a “lack of flexibility with the software” (Faculty #5) made EPA software access and functionality a significant barrier. Additionally, sometimes the software was “crashing or down for maintenance or not working” (Faculty #5).

### 3.3.3. People barriers

Three themes within this category were outlined as barriers. On a personal level, challenges arise when a “particular staff is a bit unnerving [or] a little intimidating” (Resident #1), and even if they are approachable, some staff “don’t know how to [complete EPAs], and therefore, they just won’t ever do it” (Faculty #3). While poor engagement at a faculty level was noted by residents, poor resident engagement was also cited as a concern by faculty. Residents were perceived as being “quite unpunished sometimes” with the faculty expectation for them to “[prepare] beforehand and [let the] staff know what they want to do and ... taking responsibility for their own learning” (Faculty #4).

### 3.3.4. Rules, Policies and Procedures barriers

Within this category, three major themes with various subthemes were identified. At the level of EPA definition, “it’s hard if we’re not even sure what [EPAs are] trying to say ...” (Faculty #2) when referring to the EPAs to be assessed. Even if they were clear, at times “it didn’t seem fair to be asking residents to be doing something that we don’t normally [do]” (Faculty #2), illustrating that not all EPAs are appropriate for the learners’ current stage of training. The varied EPA completion methods were also a barrier, as Resident #2 noted that “staff have difficulty understanding how an EPA is perhaps different from other evaluations and using the scale [accordingly].” Furthermore, it was revealed that some faculty were “unsure how to use the entrustment scale” with a stated desire for the need to “give the narrative feedback that corresponds to the entrustment score that they gave” (Resident #5). At a programmatic level, “there wasn’t clarity on who was able to fill [EPAs] out” (Resident #5), and sometimes in programs with both CBD residents as well as legacy-cohort residents, “having two different ways to evaluate residents is ... confusing for staff” (Resident #2).

### 3.4. Facilitators to EPA acquisition

While many barriers were identified, many facilitators for successful EPA acquisition were highlighted as well. All facilitators were classified within the same four primary categories resulting in 15 themes and 10 subthemes (Fig. 2).
3.4.1. Environment, Setting and Culture facilitators

This category identified five themes of facilitators toward EPA acquisition for residents and faculty. At the ground level, importance was placed on developing cultures and environments that are conducive to a successful transition to CBD. A step toward this is “[getting the EPA] done early, and if you kind of switch the mindset to doing something early on in the shift” (Faculty #5) then you build a culture of timeliness. Resident #2 noted the importance of faculty being “invested in your [residents’] development … and your goals, and all of that”, noting this contributes to EPA buy-in. At a programmatic level, success has been found when programs collaborate with one another, as Faculty #2 “[finds] that this kind of thing of cross-pollinating to be very helpful because it’s interesting to hear how the challenges are slightly different, but the same”, referring to sharing ideas on how to improve CBD at their institution. Institutions can also facilitate EPA acquisition by providing “incentives to faculty and even residents who are evaluating for doing a good job to try and make it a positive thing” (Faculty #6), which will require the “[realization] that that requires money and people” (Faculty #6).

3.4.2. Equipment and Technology facilitators

Four themes of facilitators within this category were identified to improve EPA acquisition. Regarding the software barriers, it was noted that “the more user-friendly we can … make things [the] more streamlined and efficient for the … staff person; if it takes them 1 min to do it as opposed to five, they’re going to do it five more times.” (Faculty #3). When barriers are encountered, other novel solutions were proposed to overcome these barriers. For instance, when technology failed to work, “the only way to do it was to do paper and then have it scanned in” (Faculty #2). Additionally, some programs have “started doing some [simulation] for … things … that residents in our program just don’t [encounter]” (Resident #2) as a means of overcoming exposure variability in the clinical workplace. Other notable interventions included using “the cards that have those EPAs on them and even going as far as you have your daily piece of paper that you’re going to be taking notes on, write out a few EPAs to do” and “mapping the curriculum … to better match the EPAs that need to be achieved and the observations within those EPAs that need to be done” (Resident #6).

3.4.3. People facilitators

Faculty and resident development was a major theme within this category, with participants noting examples such as “[teaching] your residents how to approach scary people and teaching scary people how to be approachable” (Resident #2) as well as the importance of “faculty and learner development in terms of engagement, investment, [and] people actually having knowledge about what EPAs are …”
(Faculty #5), with a need for regular repetition of stakeholder development (Faculty #2). Furthermore, facilitators, with tangible actions, that were unique to faculty and residents were also identified to improve EPA acquisition. At the resident level, taking initiative to set goals for EPA targets, notifying their faculty, and specifically probing for constructive feedback within each EPA acquisition process have been noted to be helpful (Resident #1). At the faculty level, helping residents to match and choose clinical scenarios with actionable EPAs (Resident #3) and then offering to complete EPAs accordingly (Faculty #3) has been determined as a helpful step toward EPA facilitation. Additionally, building a culture of encouragement toward EPA acquisition amongst faculty could support EPA completion (Faculty #6).

3.4.4. Rules, Policies and Procedures facilitators

At the programmatic level, three themes can be targeted to improve EPA acquisition. Programs should clarify who can complete EPAs, be it certain faculty, senior residents, or other allied health care professionals (Resident #2). Additionally, programs should ensure “that the EPAs are actually feasible to do for every program” (Resident #4) and the time-line of residents’ clinical rotation of training. Lastly, various participants suggested mandating EPA training and timely completion to facilitate successful EPA acquisition.

4. Discussion

4.1. Discussion overview

It was anticipated that the switch to CBME would allow for improved feedback and timely delivery due to more direct observation of tasks through the use of EPA assessments [9]. However, this study identified and thematically categorized several barriers to EPA assessment that are consistent with barriers described in the existing assessment literature [6–16]. Our findings support the idea that simply modifying the assessment modality will not necessarily mitigate challenges to assessment [9]. Despite the multiple barriers, our study also identified numerous facilitators to EPA observation that

Fig. 2. Facilitators to EPA acquisition in categories, themes & subthemes.
respond to the identified barriers, providing a framework of actionable items to overcome challenges to feedback and assessment with EPAs in the CBD paradigm of resident assessment.

4.2. Recommendations

Given the results of this study, the authorship group proposes a list of actionable recommendations that CBD residents and faculty, residency program leadership, and institutions can pursue to improve their acquisition of high-quality EPAs.

4.2.1. Recommendations for residents and faculty

At the ground level, CBD residents and faculty are encouraged to: (1) Complete EPAs as early as possible during the clinical/teaching encounter and not leave it until the end of the day, thereby promoting a culture of timeliness; (2) Take equal responsibility in identifying and initiating EPAs for completion; (3) Keep with them an easily accessible point of care reference that summarizes relevant EPAs to be targeted based on their clinical environment [23]; (4) Ensure they can easily access the relevant software to complete EPA tasks (e.g., have passwords saved); and, (5) Participate in the program’s steps to building a culture of assessment through resident and faculty engagement.

4.2.2. Recommendations for residency program leadership

At the programmatic level, program leadership is encouraged to: (1) Provide regularly scheduled resident and faculty development and engagement opportunities to ensure ongoing CBD and EPA challenges are addressed and overcome; (2) Collaborate with other programs to seek CBD and EPA solutions as a team (both within one’s institution at a multidisciplinary level and outside one’s institution at a specialty-specific level); (3) Utilize simulation for hard to obtain EPAs (4) Utilize novel back-up strategies (e.g., paper-based EPAs when technology is failing); during challenging periods to ensure EPA acquisition momentum is maintained; and, (5) Be transparent with residents and faculty on who can complete EPAs, what the expectations are for EPA quality, and how EPAs are processed at a Competence Committee level.

4.2.3. Recommendations for institutions

At the institutional level, leaders are encouraged to: (1) Provide to faculty clear expectations regarding their participation in CBD and their EPA provision to residents; (2) Incentivize faculty and residents toward EPA acquisition (e.g., financial incentives, continuing medical education credits, academic promotional incentives, or special recognition incentives); (3) Ensure that technological platforms chosen for EPA collection are of high quality with appropriate technological support teams; (4) Advocate for EPAs to be decided upon and developed with appropriate stakeholder input to ensure EPAs are defined with clear language and appropriate to learners’ stages of training; and, (5) Support local researchers in their projects that seek to improve the CBD educational experiences for both residents and faculty.

4.3. Conclusion

This study found that the barriers residents and faculty face during EPA acquisition are similar to the challenges previously described in the pre-CBD assessment literature, suggesting that simply changing the assessment paradigm and modality will not necessarily alleviate pre-existing challenges to the assessment process or automatically improve assessment quality. The utilized methodology fits within the climate of calls for quality improvement in medical education [19,24] and provides an example in response to the new CanERA accreditation standards [25] that require that programs be able to demonstrate an approach to continuously improving their programs by seeking out input from multiple stakeholders. As these barriers were identified using a quality improvement methodology combined with more traditional qualitative research methods, we encourage all EPA utilizers to pursue quality improvement in EPA acquisition by using our list of recommendations as a starting point for change and improvement at a resident and faculty level, residency program leadership level, and institutional level, thereby providing tangible solutions for mitigating many identified EPA barriers to support residents’ training and Competence Committee promotional decisions.

Ethical approval

This project was designated as a program evaluation activity and therefore met requirements for exemption status as per Article 2.5 of the University of Saskatchewan Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans - TCPS 2 (2018) (29 October 2019, Beh 1516).

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Others

None.

Conflicts of interest

The authors have no conflicts of interest to declare.

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