Enhancing Feedback by Fostering Resident Feedback Literacy

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Feedback from faculty to residents is a core teaching method in the competency-based model used in graduate medical education. Despite numerous efforts to improve faculty provision of feedback, the quantity and quality of feedback within graduate medical education training remains inadequate. Feedback literacy training attempts to enhance learners' capabilities at seeking, understanding, and enacting feedback. This improvement study investigated feedback literacy within an Internal Medicine residency and studied whether a workshop on feedback literacy given to first year residents would improve the quality of feedback on subsequent clinical rotations. Over a six-month period, five feedback literacy workshops were given to first year residents in a single Internal Medicine residency program. Following each workshop, residents evaluated the quality of the workshop. Residents who consented to participate in the study completed pre and post workshop questionnaires on feedback literacy and participated in focus groups several months after the workshop. The focus groups discussed the impact of and barriers to employing feedback literacy behaviors in the clinical setting. Focus groups were transcribed, anonymized, and analyzed using provisional coding and thematic analysis. Residents reported a high degree of satisfaction with the quality of the workshop. First year Internal Medicine residents demonstrated high levels of feedback literacy prior to the workshop particularly in the areas of understanding feedback processes and valuing feedback. However, they were primarily passive in their approach to feedback. On post workshop questionnaires, attendees reported increased responsibility for their role in feedback processes. Analysis of focus group data revealed that use

of feedback literacy behaviors led to more frequent and higher quality feedback and fostered a sense of empowerment in residents. The use of feedback literacy behaviors by residents also appeared to lower barriers that inhibit feedback provision by faculty. However, a subset of residents was reluctant to employ feedback literacy behaviors in the clinical setting. This improvement study demonstrates that offering first year Internal Medicine residents training in feedback literacy can improve feedback provision in the clinical setting and may foster enhanced learner agency. Future interventions should identify how to extend these benefits to all workshop participants.

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Preface

First, I would like to acknowledge my wife, Anne, for her support throughout every step of my EdD journey. Anne encouraged me to pursue this challenge and was a constant source of assistance, sage advice, and reassurance. She assisted me in so many ways from helping me set up my study space to listening to me practice my presentations; I could not have succeeded in this program without her.

I also would like to thank my advisor, Dr. Jill Perry for her guidance and honest, actionable feedback. Dr Perry consistently challenged me to think more deeply and to explain my conclusions clearly and succinctly. I am particularly grateful to have worked with a national leader on using the tenets of improvement science to advance pedagogy and am looking forward to sharing her insights with my colleagues in medical education.

I would also like to recognize several physician colleagues who assisted me with my dissertation project. Dr. Jeffrey LaRochelle assisted me with development of my feedback literacy questionnaire. Dr. Tanya Nikiforova and Dr. Dheepa Sekar served as members of my implementation team, assisting with the design of my workshop, facilitation of the focus groups, and coding of qualitative data. Dr. Jennifer Corbelli, the Internal Medicine Residency Program Director at UPMC, provided common-sense advice and guidance as I was studying my problem of practice. More importantly, she has fostered a culture of scholarship toward graduate medical education that was essential to the successful completion of this project.

I was very fortunate to spend three years with the Higher Education Management EdD cohort. With their diverse talents, tremendous knowledge, and wonderful senses of humor, they made my Saturday afternoons educational and enjoyable.

Finally, I would like to express deep thanks and admiration to the residents who participated in this project. The active phase of this project occurred during the height of the COVID-19 pandemic. As front-line clinicians, residents braved the brunt of the workload, stress, and uncertainty associated with providing patient care during a pandemic. Nevertheless, many volunteered their limited free time to participate in this project. Their spirit and service during this challenging time was inspirational.

1.0 Naming & Framing the Problem of Practice

My problem of practice (PoP) is that faculty physicians in the Internal Medicine residency program at our institution do not consistently provide effective narrative feedback on residents' in-training rotation evaluations. This deficiency limits our program's ability to achieve its goal of graduating fully competent independent physicians.

1.1 Broader Problem Area

The purpose of graduate medical education (GME) is to provide physicians who have recently graduated from medical school supervised clinical experience in a designated medical specialty, such as Pediatrics, so that they can become competent to practice independently in that specialty. Clinical experiences are supplemented with other educational activities including classroom instruction, simulation-based skill practice, assigned readings, research activities, and individualized mentoring but supervised clinical practice is the foundation of GME. To assist with their professional development, each resident is assigned a faculty advisor with whom they meet regularly. Resident academic progress is more formally tracked by a Clinical Competence Committee, made up of faculty members and overseen by the residency program director (ACGME, 2020).

Historically, residency training was process based. GME programs designed a curriculum with a prescribed sequence of educational experiences; if a trainee successfully completed those experiences, they would be deemed to be ready to practice independently. However, in 2001, the

Accreditation Council for Graduate Medical Education (ACGME) mandated that residency programs revise their curricula to conform with competency-based medical education (CBME) principles (Holmboe et al., 2016). This change was designed to improve the educational quality of GME and to fulfill the profession's responsibility to the public to produce fully competent physicians. Drivers for the change included the burgeoning patient safety movement and the rapid changes in health care delivery.

The patient safety movement had identified that numerous inadequacies of the United States healthcare system were causing excessive harm and death to patients (Kohn et al., 2000). Errors were related to system failures, communication breakdowns, diagnostic errors, lapses in professionalism, and inadequate implementation of evidence-based practices. Patient safety experts emphasized the need to better equip current and future physicians with the abilities and attitudes required to safely provide patient care in complex healthcare systems.

Healthcare delivery was also rapidly changing, and physician training needed to adapt to meet those changes. The population was aging. Advances in healthcare meant that patients were living longer with multiple chronic diseases and requiring multiple medications. Research and technology were expanding diagnostic and treatment options at a pace previously unseen. Medical care was shifting from the inpatient setting to the outpatient setting, hospitalization was reserved for the sickest patients, and lengths of stay were kept as short as possible. Hospitals and clinics focused on efficiency and optimizing care processes. These volatile changes combined to increase the pace and complexity of patient care; team-based care is now the norm.

CBME focuses on outcomes; the core competencies of exemplary physicians are identified, and educational experiences and evaluation processes are designed to facilitate achievement of these competencies (Holmboe et al., 2016). The six general competencies identified by the

ACGME are (a) patient care; (b) medical knowledge; (c) interpersonal and communication skills; (d) professionalism; (e) system-based practice; and (f) practice-based learning (Carraccio et al., 2002).

Residency training is work-based education; residents learn and develop as professionals in the context of caring for patients under faculty supervision. In the work-based learning environment of GME, residents are evaluated by their supervising faculty at the end of each rotation using in-training evaluation reports (ITERs). These reports require faculty to numerically evaluate residents in specific competency areas; ITERs also have a space for narrative comments where faculty are requested to provide specific feedback on what the resident is doing well and areas for improvement. High-quality ITERs provide essential information to residents to assist their progression toward competency goals. They also serve as a source of specific recommendations for future learning strategies. However, in GME and in our program, most ITERs contain vague comments that provide little useful information to the learner or the program (Dudek et al., 2008; Ginsburg et al., 2016). The lack of effective narrative feedback diminishes our program's ability to foster resident growth.

1.2 Organizational System

In this analysis of the organizational system connected to my Problem of Practice, I used the pseudonyms, Riverbank University School of Medicine and NorthStar Healthcare to refer the medical school and healthcare system examined.

Our residency program is affiliated with the Riverbank University School of Medicine, but the education and patient care are delivered in a joint venture between the medical school and

NorthStar Healthcare, a large healthcare system. Although overlap exists, NorthStar Healthcare and Riverbank University School of Medicine have distinct missions, priorities, and strategic plans which intersect to influence the culture of the institutions in which our residents provide care and learn. Both the residency program and the Department of Medicine are very large. Like most academic medical centers, we have a tripartite mission which encompasses education, patient care, and research.

Over the past 20 years, the Riverbank University School of Medicine has become a leading research institution. The emphasis on funded research permeates all levels of medical education. Students and residents are required to complete research projects prior to graduation, are instructed by faculty whose primary focus is research, and are encouraged to pursue research careers. Faculty promotion is highly tied to research productivity and leadership positions throughout the medical school are dominated by research physicians.

NorthStar Healthcare is a large healthcare system and insurance plan that is in intense competition for market share with another regional healthcare system/insurer. NorthStar Healthcare has a distinct business approach to healthcare, emphasizing efficiency, productivity, and market opportunities. Physician clinic schedules, billing, patient satisfaction, and patient access are each closely monitored. Clinical productivity, as measured by patient volume, is a major determinant of NorthStar Healthcare faculty physician pay. NorthStar Healthcare values its reputation and publicizes its recognition as one of the top medical centers on the US News and World Report annual rankings.

Our residency program's goals are to provide excellent educational, clinical, and research experiences to each trainee. Although the program has over 160 residents, our program leadership promotes that it provides personalized instruction to each resident. The mission statement for our

residency emphasizes "developing leaders in current and future health systems", "dedicated mentorship" and "individualized educational experiences".

A goal for the Chair of Medicine at Riverbank University to be viewed as a destination residency program for graduates of the top tier of US medical schools. Our program generates a list of "peer schools", essentially the top 20 medical schools in the nation, and targets recruitment toward graduates from those institutions. The residency program prioritizes students who were elected to Alpha Omega Alpha, a medical school honor society. Finally, the program screens and selects applicants based on high scores on two required standardized tests, known as the USMLEs. These three data points are the primary metrics used to determine the success of our residency recruitment. Document analysis of residency recruitment brochures, residency and departmental websites, residency steering committee presentations, and the Department of Medicine's annual update demonstrate that these statistics are shared with multiple stakeholders as evidence of the quality of our program.

Residents learn in the context of caring for patients in the inpatient and outpatient settings. This care is supervised by faculty physicians who are charged with assuring safe and effective patient care. Supervising faculty are also responsible for teaching and evaluating the residents as well as providing feedback on areas for improvement. Both the medical (Archer, 2010) and general education (Hattie & Timperley, 2007) literature affirm the value of feedback in fostering improvement.

As noted above, our organization focuses on demonstrable signs of both institutional and individual achievement. This philosophy permeates the institution and impacts on my PoP in several ways. One way it impacts is by fostering a culture that is reluctant to provide forthright corrective feedback. The second way it impacts is by limiting the time faculty members have to

participate in the precursors of high-quality feedback. These precursors to feedback include setting performance standards, developing trusting relationships with learners, and utilizing effective assessment techniques.

Research has demonstrated that a culture of assumed trainee excellence can inhibit faculty from providing constructive feedback (Watling & Ginsburg, 2019). Faculty are reluctant to give what they perceive as negative feedback to residents who have been identified as "high-achievers". Additionally, our program's emphasis on resident autonomy further inhibits both feedback provision by faculty and feedback receptivity in residents (Ramani et al., 2019). Cultures, such as ours, that focus on external markers of success are often referred to as performance-based cultures and tend to promote a more fixed mindset among learners. In contrast, improvement-based cultures tend to foster a growth mindset.

The focus on efficiency and productivity in our clinical environments also impacts on provision of feedback. Faculty struggle to find the time to balance their patient care priorities with their educational responsibilities. Quality evaluation and personalized feedback take time, time that is in limited supply for most clinical faculty. Increased demands for productivity, incentivized through our compensation system, have tipped the scales toward documentation and billing.

My empathy interviews confirm that faculty feel that patient care and administrative responsibilities limit their ability to participate in faculty development, direct observation of learners, and documentation on residents' in-training rotation evaluations. The interviews also suggest that faculty are unclear on the goals of ITERs and narrative feedback. Most regard these evaluations as an end of rotation assessment rather than as a means of helping residents improve. This confusion is understandable, as the evaluations are sometimes used to document need for remediation and other adverse actions.

In summary, lack of clarity on the purpose of ITERs, faculty time constraints, limited formal faculty development, and a performance-based culture all intersect to impede faculty from providing constructive feedback on ITERs. My fishbone diagram (Appendix A) outlines the root causes of this PoP.

1.3 Stakeholders

In completing this stakeholder analysis, I elected to identify stakeholders as potential advocates, resisters, or influencers (Abercrombie et al., 2015). Although these labels are somewhat reductionistic, they have helped me identify potential leverage points for my PoP. The significant stakeholders involved in this PoP are (a) Internal Medicine teaching faculty; (b) Internal Medicine residents; (c) the Internal Medicine Residency Program Director; (d) NorthStar Healthcare.

1.3.1 Teaching Faculty

Since they are charged with completing ITERs and providing narrative comments, the teaching faculty are the most evident stakeholders in this PoP. At NorthStar Healthcare, the number of core faculty who supervise residents is about 150. Within this large group there are diverse opinions and practices related to written feedback. However, in my interviews and analysis of individual ITERs, several common themes were identified.

Although the quality of the ITERs completed by faculty is highly variable, most ITERs are of low quality. Dudek et al. (2008) developed and validated a tool called the Completed Clinical Evaluation Report Rating (CCERR) which assesses the quality of ITERs completed by teaching

faculty in 9 different categories (Appendix B). Using the CCERR, I evaluated the quality of 25 inpatient ITERs completed on my advisees. The individual category scores and total scores are listed in Appendices B and C, respectively. Only 20% of completed ITERs would be categorized as high quality. Faculty are particularly deficient at describing residents' responses to feedback (category # 3), providing examples of weaknesses (category #6), and offering recommendations for improvement (category #7).

My empathy interviews confirm faculty have difficulty providing written feedback. They are unsure the purpose of feedback comments, tending to view the comments as summative high-stakes evaluation. When documenting their comments, they see the program director and Clinical Competency Committee as their primary audiences. As a result, they tend to avoid corrective feedback so as not to negatively label their residents. Faculty wonder whether residents view these comments as analogous to a "final grade" and are uncertain whether the residents use the comments for self-improvement. Additionally, faculty cite competing commitments, including patient care and paperwork, as factors that limit the time they have available to provide high-quality evaluation and feedback. Because of concerns that changing feedback processes would place additional burdens on them, faculty would most likely be resisters to attempts to address this PoP.

An interesting subgroup of the faculty is the advisors. In our residency, in addition to serving as academic advisors to their residents, advisors are responsible for reviewing their assigned residents' academic files and presenting a summary of each advisee to the Clinical Competency Committee. Written comments are valuable to advisors, both for these summaries and for academic counseling. As both creators and utilizers of narrative comments, advisors have a different perspective on the utility of written feedback. Advisors bemoan the paucity of narrative

comments in ITERs and highly value the few ITERs that contain substantive comments. A more junior advisor commented, "I don't review faculty evaluations on an ongoing basis as they come in sporadically and are so rarely helpful". An experienced advisor remarked, "You prepare for a mid-year feedback session and there's almost nothing in the file, just a few vague platitudes. So, you concentrate on the few evaluations that have actionable comments, but you wonder if that's the whole picture". Advisors could serve as advocates in addressing this PoP and have a potential role in creating a new feedback culture.

1.3.2 Residents

The residents are the second group of stakeholders. In a program which embraced the tenets of CBME, they would train in a feedback rich environment (Holmboe, et al., 2011). However, on most rotations they receive minimal feedback and the feedback they do receive is mostly nonspecific positive feedback. On our annual ACGME surveys, residents have repeatedly identified lack of feedback after rotations as a shortcoming of our program. The program receives a compliance score of 79% for this ACGME survey question, much lower than our compliance scores on other areas of the survey which are consistently above 90%. Furthermore, the program's compliance score on this question has not improved over the last five years, despite the program's efforts to address the problem. The residents created a tongue-in-cheek video asking faculty to provide more actionable feedback. In this artifact, they specifically requested feedback that would help them improve and provided examples of the common clichés that characterize much of their written feedback. In my empathy interviews with residents, they identified wide variations in the quality of written feedback and repeatedly expressed the desire for more constructive feedback.

Residents also are confused whether written comments on their ITERs are meant to be summative or formative.

Organizationally, the residents are a group that has limited power. However, residents' opinions on their training programs are highly valued by the ACGME and play an important role in accreditation decisions. Recent feedback literature stresses learner feedback-seeking behaviors and learner uptake of feedback as key aspects of learner growth (Ramani et al., 2019). Therefore, I needed a better understanding of this group's perspective. As such, my intervention plan used questionnaires and focus groups to help me explore the residents' conception of their role in feedback processes.

1.3.3 Internal Medicine Residency Program Director

The program director is another important stakeholder. Ideally, she would have a critical mass of teaching faculty adept at utilizing CBME to teach, evaluate, and coach her residents. Since our ITERs have now been revised to reflect progress toward competency, accurate faculty assessments would provide her with high-quality data to identify where each specific resident stands on the spectrum from "critical deficiencies" to "ready for unsupervised practice" in each of the six core competencies. In my empathy interview with her, the program director reported that although she acknowledges that ITERs are used for summative evaluation, she sees their primary intent as a means of helping residents improve. She expressed frustration with the significant variation in the quality of written feedback, stating, "It just seems so unfair that some residents get great feedback while others can go an entire year without receiving any useful feedback". Unlike the faculty, her experience tells her that residents do respond to written feedback, particularly when it aligns to verbal feedback they receive. The program director's overall view is that it is unfair

that the residents work so hard on their clinical rotations yet receive almost no feedback from faculty whose input could help their progress as physicians.

The program director feels time pressures and affective issues are the most important barriers to written feedback and emphasized that it can be particularly challenging to provide actionable feedback to the high-performing learners who comprise most of our residents. As a leader who is committed to the educational value of feedback, the program director is a strong influencer and would play a significant role in creating a new feedback culture.

1.3.4 NorthStar Healthcare

The next stakeholder is NorthStar Healthcare. Ideally, NorthStar Healthcare would support faculty teaching efforts, including providing dedicated time for faculty development, while assuring strong support systems were in place to allow residents to focus on patient care and education. For the most part, NorthStar Healthcare is supportive of education because it aligns with their mission. However, conflict may arise if changes are made that pose potential threats to NorthStar Healthcare business practices. Because NorthStar Healthcare dictates how our teaching faculty apportion their time and effort, this stakeholder has significant power as a potential resister to my PoP.

1.4 Statement of the Problem of Practice

CBME is, at its core, an attempt to reach for higher standards by focusing on the individual development of each resident. The following figure outlines some of the important characteristics of CBME (Holmboe et al., 2016, p.6).

Principles	Characteristics
1. Competencies are role-derived (e.g. physician), specified in behavioral terms and made public 2. Assessment criteria are competency-based and specify what constitutes mastery level of achievement 3. Assessment requires performance as the prime evidence but also takes knowledge into account 4. Individual learners progress at rates dependent on demonstrated competency 5. The instructional program facilitates development and evaluation of the specific competencies	1. Learning is individualized 2. Feedback to the learner is critical 3. Emphasis is more on the exit criteria than on the admission criteria 4. CBET requires a systematic program (approach) 5. Training is modularized 6. Both the learner and the program have accountability

Figure 1-Principles and Characteristics of Competency-based Educational Models

CBME is a developmental process with the eventual goal of mastery in each of the six competencies. In CBME, the focus is on the learner, the teacher's role shifts to facilitating learner progression. Instruction is personalized and feedback from senior physicians is essential for optimal learner development (Holmboe et al., 2016). However, in our program, the quality of narrative feedback to learners is highly variable and much of the feedback is low in quality. The paucity of quality feedback in our residency program is a major threat to successfully realizing the promise of CBME. Improving narrative comments on ITERs is a key step in helping residents improve and assisting faculty in becoming more effective teachers.

1.5 Review of Supporting Knowledge

1.5.1 Introduction

Feedback in medical education is a complex process that incorporates standards, process, context, self-image, and intrapersonal factors (Hattie & Timperley, 2007; Ramani et al., 2019). The centrality of feedback to the new educational paradigm of CBME necessitates a better understanding of how to best utilize feedback to foster learning and professional development.

The three bodies of knowledge I will investigate in this review are the current status of feedback in medical education, optimal methods for providing faculty development on feedback, and the characteristics of organizations that promote an institutional culture of feedback and professional growth.

1.5.2 Feedback in Medical Education

While working closely with residents in clinical settings, supervising faculty form numerous assessments of their residents' knowledge, skills, and professional attitudes. Effective feedback assures this valuable information is shared with and utilized by the learner. Improving written feedback in medical education must address the factors that lead to clear feedback delivery from faculty; feedback acceptance, processing, and utilization by learners; and the sociocultural influences that modulate provision and uptake of feedback within an academic institution.

In medical education, feedback is defined as, "Specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance" (Van De Ridder et al., 2008, p. 193). Feedback is a highly effective

technique for improving learning outcomes. In a review of the educational literature, feedback from teachers was found to be one of the most powerful influences on student achievement (Hattie & Timperley, 2007). However, the impact of feedback was variable among studies, suggesting that some methods of feedback provision are more effective. The authors posited that feedback influences learning primarily by addressing the gap between a learner's current capabilities and the desired level of ability; effective feedback helps the learner narrow this gap. In Hattie & Timperley's model, effective feedback addresses three broad questions for the learner:

(a)Where am I? Feedback provides specific information on what the learner is doing well and what needs to be improved.

(b)Where do I need to go? Feedback helps the learner identify or conceptualize learning goals.

(c)How do I get there? Feedback assists the learner in advancing toward the learning goal using correction, instruction, resources, or motivation.

Feedback provides information from a content expert on the gap between where the learner currently is and a standard that is to be achieved. Since self-evaluation has been showed to be inaccurate (Eva & Regehr, 2008), feedback from experienced evaluators is critical for identifying and remediating deficits. Feedback also helps learners develop improvement plans, a valuable skill for life-long learning.

There is clear value in learners receiving written feedback, which is sometimes referred to as narrative comments. Narrative comments improve learners' satisfaction with the feedback process (Overeem et al., 2010) and enhance learner uptake of feedback (Lockyer et al., 2018). In fact, narrative comments are more effective than grades at improving future performance (Hattie & Timperley, 2007). When compared to numerical ratings, narrative comments in work

performance appraisals provide broader, more personalized, and more contextual measures of work-based aptitude; evidence also indicates that ratees pay more attention to narrative comments (Brutus, 2010). Narrative comments alone have been shown to be extremely reliable indicators of competency and can serve as an "early warning system" for identifying problem residents (Ginsburg et al., 2017).

Early literature on feedback focused on the characteristics of effective feedback provision by the teacher (Ende, 1983). Over time, optimal teacher feedback behaviors have been refined, validated, and categorized. Hattie and Timperley (2007) described three types of effective feedback: (a) feedback provided at the task level; (b) feedback provided at the process level; (c) feedback directed at the learner's self-regulation processes. Early learners benefit more from feedback at the task level whereas more advanced learners benefit more from feedback at the process and self-regulation levels, each of which foster deeper learning. Effective feedback is credible (Watling et al., 2012), tied to shared learning goals (Nicol, 2010), and based on clearly outlined criteria (Brutus, 2010). Praise feedback, although commonly provided in higher education, is notably ineffective in improving learner performance and can be detrimental (Hattie & Timperley, 2007; Watling & Ginsburg, 2019). Guidelines for written feedback are similar to those for verbal feedback; the most effective written feedback is timely, personalized, specific, contextualized, non-judgmental, and actionable (Nicol, 2010).

Following the identification and verification of model feedback delivery techniques, efforts were made to train faculty on providing feedback to learners (Hewson & Little, 1998). However, dissemination of guidelines for teachers on delivering effective feedback has not resulted in significant improvement in the feedback process in medical education (Bing-You & Trowbridge,

2009). As a result, learners are not reaping the full educational benefit of feedback. Teachers, learners, and institutional culture each play roles in attenuating the value of feedback.

To have an educational impact, feedback must lead to a change in learner behavior, ideally in the direction of the learning goal. However, learners sometimes avoid feedback, particularly when it is tied to evaluations perceived as summative (Harrison et al., 2015; Watling & Ginsburg, 2019). When constructive feedback is given, learners can reject or modify feedback or respond to feedback by lowering their learning goals (Hattie & Timperley, 2007). Learners report a variety of reasons for rejecting faculty feedback including unclear feedback, concerns about feedback relevance and validity, and feedback's threat to their self-esteem (Mann et al., 2011; Ramani et al., 2018; Watling et al., 2012). Learners also struggle with understanding feedback and identifying how to incorporate the feedback they receive into an improvement plan (Boud & Molloy, 2013). When feedback is unclear it can be difficult for the learner to identify both the deficit and the desired performance leading learners to disregard the feedback, thereby perpetuating a substandard performance.

Faculty provision of feedback in medical education is deficient in both quantity and quality. Learners continue to report that they receive inadequate feedback from faculty during clinical rotations (Holmboe et al., 2018). Faculty frequently provide no constructive feedback and much of the feedback provided is praise feedback (Hatala et al., 2017; McQueen et al., 2016). Negative comments are often vague and tempered, (Ginsburg et al., 2016) reducing their effectiveness. As a result, in the clinical setting, residents receive predominantly praise feedback and the minimal constructive feedback they do receive is often unusable. This type of feedback results in minimal behavioral change, delaying the developmental progression inherent to CBME.

Faculty identify multiple barriers that inhibit them from providing feedback to learners (McQueen, et al., 2016). The clinical environment in which GME training occurs is a significant barrier. While on teaching services, academic faculty have numerous other duties including patient care responsibilities, billing, and ensuring compliance with numerous hospital guidelines. These tasks limit the time available for assessment and feedback. Other barriers include lack of prior training on feedback provision, fear of personal repercussions for authoring negative performance evaluations, and concerns about harming the teacher-learner relationship (McQueen, et al., 2016). Additionally, faculty express concerns that residency program leadership will not support them if they document resident deficiencies (Ramani et al., 2018).

Feedback can be leveraged as a means for students to engage more deeply in the learning process and foster professional growth. Recognizing the limitations of the traditional teacher-centered model of feedback delivery, researchers have recently focused on other factors that influence learner reaction to feedback (Boud & Molloy, 2013). A trusting relationship between teacher and learner enhances uptake of feedback (Abruzzo et al., 2019; Mann et al., 2011). Training students in feedback reception (Bing-You et al., 1998) and providing them opportunities to give feedback to others (Nicol, 2010) have been identified as techniques for improving feedback uptake. Feedback that stimulates a dialogue between teacher and learner enhances learner uptake of feedback, fosters deeper learning, and results in a more learner-centered improvement plan (Ramani et al., 2019; Van De Ridder et al., 2008). Feedback that leads to a dialogue is especially effective for high achieving learners (Hattie & Timperley, 2007) such as those typically seen in GME.

Unlike verbal feedback, narrative feedback does not lend itself easily to dialogue. Nicol (2010), recognizing this dilemma, proposed specific techniques teachers can use to foster teacher-

learner dialogue around written feedback. His suggestions include empowering learners to specify what they want feedback on, having learners provide feedback to their peers, and providing a summary of the assignment along with the feedback to encourage goal setting behaviors.

Higher education is shifting to a new paradigm for feedback. This new paradigm emphasizes a feedback cycle (Archer, 2010) characterized by enhanced dialogue between teacher and learner (Boud & Molloy, 2013; Ramani, et al., 2019) with feedback occurring in low stakes but authentic settings (Van De Ridder, et al., 2008). Models that incorporate this new paradigm for verbal feedback have been developed (Holmboe, et al., 2018; Telio et al., 2015) and hold promise for enhancing the process of feedback in education. Equivalent models for optimizing narrative feedback are needed.

1.5.3 Faculty Development on Narrative Feedback

Physicians enter their role as academic faculty with minimal training in educational theory or effective teaching techniques (Holmboe et al., 2018; Turnbull et al., 1998). Therefore, it is not surprising that faculty struggle with providing effective feedback to learners. Faculty development is an important tool for addressing this deficiency and a variety of programs have been developed to improve physicians' teaching skills. In this section, I review general characteristics of effective faculty development as well as faculty development programs designed specifically to improve narrative feedback. I also examine barriers to faculty development.

In the area of medical education, numerous faculty development initiatives have been studied. A recent systematic review identified the key features of effective faculty development (Steinert et al., 2016). These features include courses that utilize diverse educational methods including experiential learning (video reviews, roleplays, and simulation), interactive dialogue

with colleagues (small group discussions), skill practice with feedback to participants from instructors, and provision of relevant knowledge (Steinert et al., 2016). Clear educational goals and a supportive learning environment enhance participant learning and satisfaction with the training (Steinert et al., 2016). Use of these techniques results in a participatory approach that fosters engagement, aligns with participant needs, and facilitates skill development (Sorinola et al., 2017). Faculty development participants report that such approaches result in improved confidence and competence as a teacher and enhance their credibility as educators with positive effects on career progression (Sorinola et al., 2017; Steinert et al., 2016).

Faculty development programs directed specifically at improving feedback have demonstrated some success at improving ITER quality. A half-day workshop utilizing experiential learning to improve verbal feedback demonstrated marked improvement in feedback knowledge and self-confidence but no significant impact on workplace feedback skills as assessed by students or educational experts (Marks et al., 2008). An intervention done specifically to improve narrative feedback demonstrated that a three-hour workshop resulted in improved ITER quality as measured by a validated scoring instrument (Dudek et al., 2012). However, the improvement was small and both pre and post intervention ITER scores were low, indicating that ITER quality, although improved, remained low after the intervention. A companion study led by the same lead author demonstrated that providing feedback to faculty on their ITERs had a small positive impact on ITER quality (Dudek et al., 2013). Taken as a whole, these studies demonstrate that either short workshops or feedback on ITER quality can improve written feedback on the ITER. However, the impact of these interventions is small.

Despite the proliferation of programs, the success of faculty development on improving faculty feedback to learners remains unclear. Although some studies have demonstrated a positive

impact of faculty development (Holmboe et al., 2004; Salerno et al., 2002), other authors have concluded that faculty development workshops have minimal impact on teaching behaviors (Cook et al., 2009; Williams et al., 2003). Positive studies often demonstrate only slight improvement in outcomes (Dudek et al., 2012). Furthermore, positive outcomes produced by faculty development tend to be confined to satisfaction with the programs or self-perceived improvements in skills or knowledge; higher level outcomes such as behavioral change in teachers, organizational changes in teaching practice, or improvement in learner outcomes are rarely demonstrated.

Participation in faculty development is a longstanding problem in medical education. Both workshops and longitudinal programs describe difficulty recruiting faculty for these programs which are traditionally voluntary for medical faculty (Dudek et al., 2012; Steinert et al., 2016). Faculty report that they recognize the value of faculty development (Steinert et al., 2010) and desire more faculty development, particularly narrative evaluation training (Dudek & Dojeiji, 2014; McQueen et al., 2016). However, they recount that logistical issues (timing and location of faculty development offerings), clinical workload (lack of protected time), and the perception that teaching excellence was not valued by their academic institution inhibit participation in faculty development (Steinert et al., 2010).

Motivating faculty to participate in faculty development training thus is an important facet of improving narrative feedback. Mandated attendance is one option but since the success of faculty development is highly dependent on both learning climate and a participatory methodology, most institutions continue to offer faculty development as an optional activity. Faculty report that they would be more likely to attend faculty development programs that align with their specific needs and provide realistic solutions to educational problems in the workplace (Sorinola et al., 2017). Frameworks and tools that save time and decrease cognitive burden on the

faculty evaluator are examples of such solutions (Steinert et al., 2016). One such framework is the RIME system which categorizes medical students or residents into one of four categories, reporter, interpreter, manager, and educator (Pangaro & ten Cate, 2013). The RIME framework allows medical faculty to "diagnose" the learner, a paradigm familiar to physicians, and place the learner in one of these four developmental categories. Another framework is the R2C2 model which outlines the sequential components of an interactive feedback session; build rapport, explore reactions, explore content, and coach for performance change (Sargeant et al., 2015). Frameworks make it easier for faculty to organize and categorize observations and assessments. Since credible feedback relies on specific examples of learner behaviors, work-based tools can assist faculty in documenting these examples. Learner diaries and pocket cards are examples of tools that have been used to record observations which can be later used for formulating narrative feedback (DeNisi & Peters, 1996; Peccoralo et al., 2012).

Institutional factors play a role in faculty development. Institutional support is important for funding faculty development, encouraging participation, recognizing teaching excellence, and fostering an institutional culture of continuous improvement. Research on faculty development indicates the most successful programs are longitudinal (Steinert et al., 2016). Recent research studies the role faculty development plays in helping physicians address educational issues in the complex but authentic setting of the clinical workplace (Cook et al., 2009). Steinert et al. (2016) recommend that faculty development needs to move from "workshops to the workplace" (p. 781). Longitudinal, work-based faculty development has the potential to address many of the barriers to faculty development implementation. However, it is an adaptive change characterized by complexity and uncertainty. Successful implementation of this new paradigm of faculty development will require strong institutional support.

Faculty development programs to improve narrative evaluations have demonstrated partial success. Although a variety of effective programs exist, the impact of these programs on improving ITER quality has been moderate, and recruitment of faculty remains an ongoing challenge. More robust results will likely require more intensive interventions and longitudinal, work-based faculty development programs.

1.5.4 Institutional Culture and Feedback in Medical Education

In graduate medical education, residents learn by working within complex healthcare delivery microsystems. The social and cultural norms of these systems impact on resident learning and professional growth (Kahlke et al., 2019). Emerging evidence indicates that institutional culture can facilitate or constrain feedback provision from faculty and feedback uptake by learners.

Using qualitative research approaches, several groups have studied the intersection of institutional culture and feedback to learners (Ramani et al., 2017; Ramani et al., 2018; Watling et al., 2013). When compared to learning cultures in music and teacher education, medical education learning cultures are characterized by limited continuity between instructors and learners, less direct observation of performance, less overall feedback, and significantly less constructive feedback (Watling et al., 2013). In medical education, patient care is often prioritized over learner needs, with a resulting decrease in feedback. This tension was not seen in the other educational cultures, where learning remained the primary focus. Cultural norms in medical education limit both feedback provision by faculty and feedback seeking by learners (Ramani et al., 2017; Watling et al., 2013). Feedback conversations are dominated by nonspecific praise feedback; constructive feedback and improvement plans are rarely provided to learners (Ramani et al., 2017).

Several aspects of institutional culture have been identified that appear to inhibit feedback in medical education. These include cultures that prioritize politeness (Ramani et al., 2018) and resident autonomy (Watling & Ginsburg, 2019). Politeness describes linguistic tactics faculty use when giving written feedback that attenuate or avoid constructive feedback in an attempt to "save face" of the learner (Ginsburg, 2016). Residency programs that emphasize autonomy prioritize resident independent decision-making regarding patient care over closer faculty supervision. Doing so has educational benefits, however, an emphasis on autonomy inhibits faculty's willingness to provide corrective feedback (Watling & Ginsburg, 2019). Perceived learner excellence is another factor that has been shown to inhibit feedback. Faculty report that the academic records of their residents and their institutions' academic reputations lead to "assumed excellence", decreasing the provision of constructive feedback (Ramani et al., 2018).

From the above studies, organizational factors that facilitate feedback have also emerged. Cultures that normalize constructive feedback by setting clear expectations for feedback, enhancing credibility of faculty feedback by more frequent direct observation, and encouraging feedback from residents to faculty lead to improved institutional feedback (Ramani et al., 2018). Longitudinal relationships between faculty and learners also enhance feedback, likely by fostering trusting relationships (Watling et al., 2013).

Recognizing that cultural factors impact on feedback, educators have called for institutional leaders to take a greater role in creating a "culture of feedback" (Ramani et al., 2017). Ramani's model identifies five components of such a feedback culture: 1) honest dialogue; 2) credibility and receptivity; 3) professional growth; 4) bidirectional feedback; 5) trusting relationships. In Ramani's model, the presence of these components characterizes an institution culture that facilitates feedback, while the absence of the components inhibits feedback.

Furthermore, Ramani postulates that these components are synergistic. For example, trusting relationships lead to more honest dialogue. Deliberatively development organizations (DDOs), which place an emphasis on professional growth of each employee, have been described in the business world (Kegan & Lahey, 2016). DDOs have successfully incorporated ongoing honest, actionable constructive feedback into their business models and could serve as archetypes for how a feedback culture can be incorporated into medical education institutions.

1.5.5 Review of Supporting Knowledge Synthesis

Competency-based education models foster excellence by focusing on specified educational outcomes. Formative assessment and constructive feedback are essential components of these models (Holmboe et al., 2011). Without effective feedback from supervising faculty, mistakes go uncorrected and resident professional growth is stunted. Although GME adopted a competency-based medical education model 20 years ago, inadequate feedback from faculty to residents remains an intractable problem in GME (Raaum et al., 2019).

Feedback in education has been evolving over the past decade. Early feedback literature focused primarily on feedback provision by the faculty member with the implicit assumption that providing feedback skillfully would lead to learner improvement. The limited success of this teacher-centered approach led to a focus on the learner response to feedback. Later studies investigated the challenging affective components of feedback that are experienced by both the teacher and the learner (Ginsburg et al., 2016; Kogan et al. 2012; Mann et al., 2011). Other authors addressed feedback from the learner perspective, identifying learner qualities and perceptions that either enhance or diminish feedback acceptance and utilization (Watling & Ginsburg, 2019). Finally, the role of institutional culture in fostering or inhibiting feedback is increasingly

recognized. Understanding of feedback in education has thus evolved from a teacher-centric concept to a complex dynamic interplay between the triad of teacher, learner, and institutional culture.

Feedback is hard. Credible feedback in medical education requires faculty time, including time for learning standards, time for directly observing learners in the clinical setting, and time for documentation. Effective feedback requires that faculty are knowledgeable and skilled at feedback delivery. Perhaps the most challenging aspect of feedback is that it is emotionally charged. Constructive feedback, the form of feedback most beneficial to residents, compels faculty to be frank and honest with learners about their areas for improvement (Archer, 2010). For faculty accustomed to respecting and encouraging their residents, providing feedback can activate negative emotions both in themselves and the feedback recipients. Additionally, the culture in most academic medical centers does not promote or reward constructive feedback (Ramani et al., 2018; Watling & Ginsburg, 2019). Faculty who do provide negative comments to learners are often countering unstated cultural norms.

Harnessing the educational power of feedback requires attention to each aspect of the feedback triad: faculty, learners, and institutional culture. Attempts to enhance faculty feedback skills through faculty development have significant, albeit limited, impact on feedback delivery. These interventions tend to be sporadic, time-limited workshops and are often poorly attended. Faculty development activities that are longitudinal, systemic, and based in the workplace are more effective for fostering high-quality feedback (Steinert et al., 2016). Feedback models that emphasize creating a dialogue between faculty and residents show promise in improving feedback in CBME (Sargeant et al., 2015; Telio et al., 2015). Dialogic feedback is enhanced when learners are instructed in feedback seeking and feedback uptake techniques; training learners in these

techniques is an important part of creating a feedback culture. Finally, institutions have a role to play in creating and sustaining an improvement culture, one that promotes conversations around improvement and personal growth.

2.0 Theory of Improvement and Implementation Plan

My problem of practice (PoP) is that faculty physicians do not reliably provide useful narrative comments on resident in-training evaluation reports (ITERs). My theory of improvement is designed to improve the quantity and quality of narrative comments provided to the residents in our Internal Medicine residency training program

2.1 Aim Statement

To support an improvement culture, the aim of my project is to increase the quality of written feedback comments on residents' in-training evaluation reports (ITERs) by 20% by July 2022. The quality of the written comments will be assessed by the composite score on Completed Clinical Evaluation Report Rating (CCERR), a validated tool for assessing ITERs (Dudek et al., 2008).

2.2 Theory of Improvement and Change

The clinical environment where residents learn and care for patients is challenging and often pushes residents to the edge of their competency. As such, clinical training provides a fertile environment for assessment and feedback. In this setting, feedback can be particularly powerful at stimulating learning (Hattie & Timperley, 2007).

Provision of feedback to learners in GME is a complex, contextual process influenced by the triadic relationship between faculty, residents, and institutional culture (Ramani, et al., 2019). Prior attempts to improve feedback in medical education have primarily focused on faculty feedback skills with limited success (Bing-You & Trowbridge, 2009). My theory of improvement is designed to address each of aspect of the feedback triad but recognizes the primacy of institutional culture in enhancing feedback provision to learners. The driver diagram for my theory of improvement is attached (Appendix D).

2.2.1 Theory of Improvement

My theory of improvement includes knowledge and skill training, to both faculty and residents, on the feedback process. Imbedded within this training are efforts to evolve the institutional culture as it relates to feedback and improvement. Our current culture is one where constructive feedback to residents is avoided or attenuated, reducing its effectiveness at identifying learning gaps and promoting change. My theory of improvement is designed to change the culture by normalizing the provision of constructive feedback and by building a community of faculty learners who create and share "best practices" on delivering feedback in the workplace setting.

Improvement science creates change by focusing on standard work processes. As such, my theory of improvement focuses on the standard faculty work processes related to resident evaluation and feedback including teaching a new model for constructive feedback provision, the R2C2 model (Sargeant, et al., 2015), providing faculty feedback on current ITER quality through use of the Completed Clinical Evaluation Report Rating (Dudek, et al., 2008), and creating interactive faculty development sessions on best practices for providing written feedback.

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Additionally, my theory of improvement recommends recognizing and rewarding faculty for efforts at helping residents improve through assessment and feedback.

An underrecognized work process related to feedback is the learner's role in seeking and responding to feedback. Learner behaviors have been shown to impact on the quantity and quality of feedback provided by faculty (Carless & Boud, 2018; Mann, et al., 2011). My theory of improvement addressed this aspect of the feedback triad by studying training for residents in feedback reception.

While investigating my PoP, my ideas on addressing the problem changed. I initially assumed my primary intervention would be workshop-based skill training provided to faculty physicians. However, through my investigation of this PoP, I concluded that skill training alone would not result in significant improvement unless it is accompanied by a change in culture. Through my literature review and my empathy interviews with faculty and residents, it became evident that our current performance-based culture inhibits both faculty feedback provision and resident uptake of feedback. Shifting to an improvement-based culture thus became important leverage point for my PoP.

2.2.2 Change

My change was to create and implement interactive workshops teaching first-year residents how to effectively solicit, interpret, and utilize feedback from Internal Medicine teaching faculty.

My theory of improvement posited that feedback in Graduate Medical Education is influenced by three primary drivers: faculty feedback provision, resident feedback seeking and uptake behaviors, and institutional culture. Feedback has traditionally been a teacher centric process where the teacher informs learners, either verbally or in writing, about areas of

improvement (Hattie & Timperley, 2007). The learner's role in this process tends to be as a passive recipient of the feedback. More recent feedback models stress a learner-centered process with learners taking an active role in the feedback process (Boud & Molloy, 2013). In the ideal version of this model, learners are adept at requesting, understanding, and utilizing feedback from multiple sources to advance their learning. Additionally, these types of learners are proficient at managing the emotions inherent in many feedback interactions. The effective use of these feedback seeking and uptake behaviors is termed feedback literacy and is seen by multiple educational researchers as a more effective method for assuring that feedback accomplishes its educational goal (Boud & Molloy, 2013; Henderson et al., 2019; Ramani et al., 2019).

However, feedback literacy is a paradigm shift for most learners who have been acculturated to a teacher-centered model of feedback provision (Crommelinck & Anseel, 2013). Feedback literacy requires learners to adopt a different perspective on feedback and necessitates new learner behaviors related to assessment and feedback (Winstone et al., 2017). I postulated that a workshop on feedback literacy could help learners transition to a more active role in the feedback process.

I considered several other interventions including providing faculty numerical scores on the quality of their written feedback. This can be done using the Completed Clinical Evaluation Report Rating (CCERR) which is a validated tool that assesses the quality of evaluations completed by teaching faculty. Having numerical scores on their feedback quality might stimulate faculty to seek opportunities to improve this aspect of their teaching. I opted not to do this at this time as doing so will require recruiting and training scorers and thus will not be as rapid an intervention cycle. However, I do plan to use this intervention as one part of the Problem of Practice improvement plan.

I also considered developing training modules for faculty on best practices for providing written feedback. Attempts to do this in the past using in-person workshops have been unsuccessful due to limited faculty attendance. Ultimately, I decided that faculty training would work best if faculty perceived a need to improve their own feedback practices and that the above two interventions have the potential to create such a need.

2.3 Methods and Measures

2.3.1 Overview of PDSA cycle

Our residency program schedule alternates, on a monthly basis, between inpatient and outpatient rotations. The ambulatory medicine rotation is a required outpatient rotation that has didactic educational time built into the schedule; five to seven residents are on this rotation each block. The feedback literacy workshop was given during the didactic portion of this rotation starting in January 2021. The timeline of implementation of the PDSA cycles is attached on the Gantt chart (Appendix E). My PDSA sheet is attached on Appendix F.

Although medical students and residents are encouraged to ask supervising faculty physicians for feedback, training in feedback literacy is not a common feature of medical school or residency curricula. As a result, no widely accepted programs exist for fostering feedback literacy in medical education learners. The implementation plan attempted to answer the following inquiry questions.

1) *How do residents currently conceive their role in feedback processes?*

2) *How effective is a two-hour workshop for teaching feedback literacy?*

3) What are the most useful feedback literacy skills for residents?

4) How will residents employ feedback literacy skills in the clinical workplace?

Programs designed to provide feedback literacy training have been described in the medical and higher education literature (Henderson et al., 2005; Milan et al., 2011; Noble et al., 2019). Molloy et al., (2020) developed a seven-item framework outlining the key characteristics of feedback literacy and identified specific behaviors utilized by feedback literate students. Other authors note that feedback practices are most effective when they align with discipline specific educational practices, specifically citing clinical teaching rounds as one example (Dawson et al., 2020).

I used information from the educational literature to design a workshop to teach PGY1 Internal Medicine residents the concept of feedback literacy and provide the residents an opportunity to practice using specific feedback literacy behaviors. PDSA cycles were used to assess and adjust the workshop.

I predicted the residents would enter the workshop believing that feedback is a faculty responsibility and that residents are primarily passive recipients of feedback. I also predicted that most residents would be receptive to the concept of playing a more active role in their feedback interactions. However, I anticipated that the residents would struggle with transferring feedback literacy skills to the clinical workplace. The signature pedagogy in the clinical workspace is hierarchical and I suspected that increasing resident agency in this setting might feel unnatural to the residents and they would encounter other real and perceived barriers to implementing feedback literacy behaviors. I hoped to identify these barriers during the PDSA cycles and use this information to modify my workshop.

2.3.2 Design of Workshop

The primary intervention was a workshop delivered to PGY1 residents on feedback literacy. The feedback literacy workshop was given to all residents on the ambulatory rotation, however, participation in the research study portions was optional. Institutional Review Board (IRB) approval was obtained for the study and informed consent was obtained from all study participants. Residents who consented to the study agreed to:

1. Complete a questionnaire on feedback literacy prior to the feedback literacy workshop.

2. Complete a second questionnaire on feedback literacy six to eight weeks after the completion of the workshop.

3. Participate, along with their resident colleagues, in a focus group discussing their experiences with utilizing feedback literacy in the inpatient clinical setting

I designed the workshop with input from two clinician-educators. One is a faculty general internist with a master's in medical education, the second is a current Academic Clinician-Educator Scholars fellow in our division of General Internal Medicine. These three physicians comprised the implementation team for my project and assisted with design of the workshop, conduct of the focus groups, and coding of focus group data. All members of the implementation team were approved as investigators by the IRB.

The design of the workshop was informed Malloy et al.'s (2020) feedback literacy framework. It also incorporated a model proposed by Carless and Boud (2018) which characterizes the learner's role in feedback interactions, emphasizing the internal processes learners' use when provided feedback from faculty and others.

Increasing learner agency in feedback processes is a relatively new concept for both educators and learners. Researchers have called for more learner training on feedback literacy (Henderson et al., 2019; Lefroy et al., 2015; Murdoch-Eaton et al., 2017) but the best methods for improving resident feedback literacy are unclear. Utilizing student surveys and focus groups, Malloy et al. (2020) developed a feedback literacy framework containing 31 characteristics organized into seven groupings. Groupings included themes such as, "Commits to feedback as improvement" and "Processes feedback information". Characteristics were more explicit learner attributes such as, "Acknowledges that mastery/expertise is not fixed, but can change over time and context" or "Selectively accepts and rejects views of others in coming to their own appraisals".

Malecka et al. (2020) discussed methods for embedding feedback literacy within a curriculum and identified the general categories of eliciting feedback, processing feedback, and enacting feedback. Our implementation team preferred this more simplified approach for our framework, adding facilitating feedback as a fourth general category.

2.3.2.1 Workshop Format

The workshop began with a group discussion on the residents' experiences with feedback on clinical rotations. Additional questions solicited residents' perspectives on the value of feedback and barriers to feedback provision in the clinical setting. We then watched a video on the benefits of improving one's ability to receive feedback (TEDx, 2015), followed by a brief description of growth mindset and its role in residency education. Workshop participants watched

a video in which a medical student reacted poorly to feedback given by her supervisor (Mariani et al., 2015) and brainstormed on phrases or behaviors the student might have used to improve the feedback interaction. The purpose of these video reviews was to introduce the idea that feedback receivers play a crucial role in feedback processes.

After a short break, I then gave a brief presentation to the residents on feedback literacy. The presentation examined the benefits to learners of feedback literacy and outlined a framework elucidating how residents can use specific behaviors to facilitate, seek, understand, and enact feedback in the clinical setting. Following the presentation, residents reviewed videos of feedback interactions and participated in a role play. These activities were designed to provide workshop attendees an opportunity to practice using feedback literacy behaviors. Finally, residents used a feedback literacy index card to identify two specific behaviors they intended to try on their upcoming clinical rotations, shared with the group the behaviors selected, and specified how they planned to employ the behaviors during their upcoming clinical rotations.

A unique aspect of this intervention was the development of specific feedback literacy behaviors that our residents could employ in the clinical workplace. The implementation team postulated that the general concepts on feedback literacy described in the literature might be challenging for residents to apply in the clinical settings and identified explicit learner behaviors within the general categories of facilitating, seeking, understanding, and enacting feedback. Workshop attendees received an index card listing the behaviors (Figure 2) and were encouraged to carry this reference card in their lab coats on future clinical rotations.
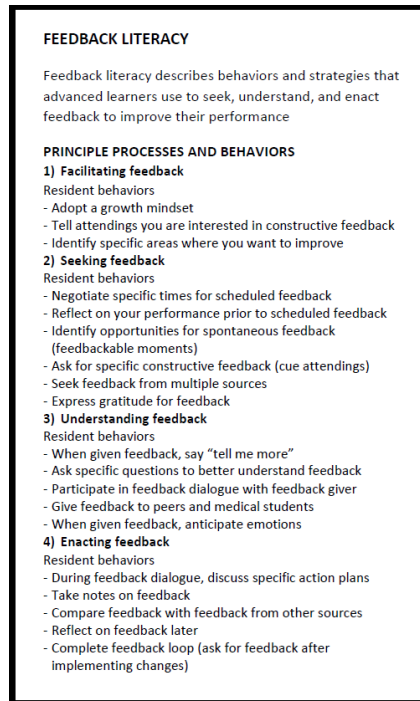
Figure 2- Feedback Literacy Index Card

The workshop was offered during the ambulatory rotation. After completing this rotation, the residents were assigned to a variety of different inpatient rotations. The workload on these rotations is heavy, cases are complex, and the pace is rapid. Residents on inpatient rotations worked under close supervision with an assigned faculty preceptor. Such an environment is a rich source of learning with multiple opportunities for assessment and feedback. As a result, following the feedback literacy workshop, residents had ample opportunities to employ feedback literacy behaviors. Their busy schedules and ACGME work hour restrictions precluded residents from participating in focus groups until the completion of these rotations, therefore, data gathering took place about 6-8 weeks after the workshop.

2.3.3 Data Collection Methods.

Methods used to collect data on the feedback literacy workshop intervention included:

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1) A **questionnaire** designed to assess resident feedback literacy. The questionnaire was completed by study participants prior to the workshop and six weeks later, after the completion of their first clinical rotation following the workshop.

2) An anonymous **workshop evaluation** offered to all attendees on completion of the workshop.

3) **Field notes** taken by the author at the conclusion of each feedback literacy workshop

4) **Focus groups** with workshop participants conducted 6-12 weeks after completion of the workshop.

2.3.3.1 Questionnaires

The questionnaire was designed to assess the degree of feedback literacy in residents prior to and after participation in the workshop. A literature search did not reveal any validated instruments assessing the construct of learner feedback literacy. Therefore, I developed a questionnaire to assess feedback literacy in residents using feedback literacy attributes identified in the literature (Carless & Boud, 2018; Molloy et al., 2020; Winstone et al., 2019) and relating those attributes to the signature pedagogies of clinical education (Shulman, 2005). A method for survey development described in the medical education literature (Artino et al., 2014) was used to develop the questionnaire. A clinician-educator, with expertise in questionnaire design, reviewed the questionnaire and provided suggestions for revision. Cognitive interviews with two recently graduated residents were then conducted to help refine the questionnaire. The final questionnaire is included on Appendix H.

2.3.3.2 Workshop Evaluation

Residents who participated in the workshop were asked to evaluate the quality of the workshop and provide suggestions for improvement. Responses were submitted anonymously using Qualtrics. The evaluation form in included on Appendix I.

2.3.3.3 Field Notes

At the completion of each of the five workshops, I recorded my reflections on the workshop as field notes. In these notes I documented common themes discussed by the residents related to feedback within the residency training program, how residents' experiences and perspectives related to feedback differed from my assumptions, my perceptions of the format of the workshop, and my perceptions on the effectiveness of various workshop components.

2.3.3.4 Focus Groups

Focus groups were held with study participants 6-12 weeks after the workshop, following their clinical rotations. Questions for the focus group explored whether the residents utilized specific feedback literacy behaviors, whether use of those behaviors impacted the nature of feedback, and what barriers they encountered to employing feedback literacy skills. The focus group interview guide is attached on Appendix J.

A total of two focus groups were conducted. Due to the pandemic, focus groups were done virtually using the Zoom videoconference platform. I moderated the focus group sessions, a second member of the implementation team attended both sessions, serving as an observer and note taker. The sessions were recorded on Zoom. I transcribed each focus group verbatim, de-identifying study participants during transcription.

2.4 Analysis of Data

In analyzing my data, my goals were to elucidate how Internal Medicine residents perceived their role in feedback processes and to determine whether my intervention, a feedback literacy workshop, improved the quality of feedback provided to residents during clinical rotations.

My intervention was based on prior studies on teaching learners feedback literacy (Noble et al., 2019; Winstone et al., 2019) and used organizing concepts from prior literature to structure the workshop and develop the resources provided to the residents (Carless & Boud, 2018; Malloy et al., 2020). As a result, I elected to use provisional coding for the qualitative portions of my data analysis.

Provisional coding is a method commonly used for "qualitative studies that build on or corroborate previous research and investigations" (Miles et al., 2020, p. 69). Provisional coding was used for initial coding of the qualitative data, the six initial provisional codes (facilitating feedback, seeking feedback, understanding feedback, enacting feedback, barriers to feedback, and feedback value) were predominant topics related to feedback literacy.

After initial coding, thematic analysis was used to identify common themes and these identified themes were compared and contrasted with my inquiry questions.

2.4.1 Questionnaires

The feedback literacy questionnaires were distributed, collected, and stored using the Qualtrics platform. Preworkshop questionnaires that were incomplete or received after the start of the workshop were not included in the analysis.

Information from the preworkshop and postworkshop questionnaires was reviewed and analyzed concurrently with the implementation of the workshops, allowing the author to adjust the workshop to emphasize feedback literacy areas where workshop attendees appeared to have less experience, confidence, or competence. The following is a description of the analysis of the quantitative and qualitative sections of the questionnaire.

2.4.1.1 Quantitative analysis

Responses to the pre workshop questionnaires were analyzed using means and standard deviations. Pre and Post scores were compared in aggregate (without matching) between Pre and Post using two-sided Wilcoxon rank-sum tests.

2.4.1.2 Qualitative analysis

Free text comments from the questionnaires were analyzed using qualitative research methods. The preworkshop questionnaires and postworkshop questionnaires were coded and analyzed separately using NVivo. For each questionnaire subtype, all free text comments were entered into a single document. The documents were coded using provisional and structural coding methods. To promote reflexivity, analytic memoing occurred simultaneously with coding.

2.4.2 Workshop evaluations

Workshop evaluations were also collected and stored using Qualtrics and were reviewed analyzed concurrently with the implementation of the workshops. Qualitative data was explored using the analytic functions in Qualtrics. Free texts comments were analyzed and coded using

provisional and structural coding methods. Analytic memoing occurred simultaneously with coding.

2.4.3 Field notes

Field notes were recorded by the dissertation author immediately after each workshop. Themes from the workshop were compared with themes from the workshop evaluations to help identify areas for improvement of future workshops. Improvement ideas were generally incorporated into the subsequent workshops.

2.4.4 Focus groups

First cycle coding was done by the implementation team. Prior to initial coding, the dissertation author met with the team, reviewed the purpose of the study and the focus groups, outlined the plan to use provisional coding using six initial codes (*facilitating feedback, seeking feedback, understanding feedback, enacting feedback, barriers to feedback, and feedback value*) and in vivo coding as the initial coding methods (Miles et al., 2020). The implementation team was provided with a qualitative analysis guide to assist with initial coding. Provisional codes were expanded and modified during the initial coding process. As the team coded the transcripts, subcodes were developed under these categories.

 After coding one focus group transcript, the team met again and reviewed their initial codes, their analytic memos, and the overall coding process. This was done to enhance interrater reliability. During this review, the implementation team identified three additional coding categories which we labeled: *situational aspects of feedback, impact of workshop, and workshop*

improvement. Situational aspects of feedback encapsulated contextual factors (time of year, role on the team, responsibility for feedback, etc.) residents described that impacted on feedback seeking and provision in the clinical workplace. The impact of workshop category coded actions that focus group participants described trying in the clinical workplace specifically based on insights gained from the workshop.

The implementation team then developed a coding book (Appendix K) which was used to recode the first focus group transcript and to code the second focus group.

2.4.5 Development of Categories and Themes

Following initial coding, all data sources (questionnaires, workshop evaluations, and field notes) and analytic memos were reviewed and analyzed by me. Categories were developed and the data base was queried for additional information related to these categories. In vivo codes were reviewed to assure congruence with emerging categories. Various query functions in NVivo including, word frequency searches, word search queries, coding hierarchy maps, and matrix coding queries were used to analyze the categories. During this analysis, themes were identified.

3.0 PDSA Results

3.1 Workshop Attendance and Study Participation

Due to COVID-19 pandemic related restrictions, the workshops were held using the Zoom videoconferencing platform. Five workshops were held; one scheduled workshop was cancelled by residency program leadership due to conflicting curricular requirements. A total of 27 residents were scheduled for the feedback literacy workshops. 17 residents attended the workshops. 10 residents were unable to attend due to vacation (4), a scheduled licensing exam (2) or illness (1); three residents were reassigned to cover COVID units. 16 residents consented to participate in the research portion of the intervention and competed the preworkshop questionnaire, 13 of those residents attended the workshop.

3.2 Implementation Challenges

Lack of resident participation, both in the workshop and in the research portion of the implementation plan was a major challenge. Residents were scheduled for the workshop during their ambulatory medicine rotation on a Friday morning dedicated to educational activities. Although the ambulatory medicine rotation is a required rotation, residents are permitted to take vacation and schedule licensing exams during this rotation. Additionally, residents on this outpatient rotation are on "jeopardy call", meaning they can be pulled to cover inpatient care services when other residents are ill, quarantined, or when services are impacted by excessive

inpatient census. The COVID-19 pandemic significantly increased use of jeopardy call; several residents, some of whom had already consented to the study, were reassigned to inpatient units and unable to attend the workshop.

Although residents on the rotation were required to attend the workshop, participation in the research portion of the study was optional and, despite strong support from residency program leadership, several residents did not consent to the study. Fostering resident participation in research studies is challenging (Colbert et al., 2021), residents typically work 60-80 hours each week under stressful conditions and often do not see personal benefit in participating in research studies. Furthermore, the topic of the study, feedback, can be an uncomfortable topic and the design of the study, using focus groups, may have dissuaded some residents from participating.

Among the residents who consented to participated in the study, questionnaire completion (11 out of 13) was very good. However, it was very challenging to identify times when residents could participate together in the focus groups. Despite offering multiple scheduling options, only seven residents participated in the two focus groups.

In retrospect, providing an incentive for participation may have slightly improved my enrollment numbers, however, the primary challenge with recruitment was the workload and stress of residency training, barriers that were only exacerbated the pandemic.

3.3 Iterative Changes to the Workshop

I used the workshop evaluations, questionnaires, and my field notes to determine improvement areas for subsequent workshops. Several areas for improvement were identified. First, on workshop evaluations residents recommended that the workshop be more interactive.

Additionally, analysis of questionnaires and my field notes indicated that residents were familiar with and open to discussing the value and barriers related to feedback. This allowed me to condense the lecture portion of my workshop by identifying and eliminating redundant topics. I also made the minilecture portion more interactive, incorporating polling and open-ended questions into the presentation.

Second, although the residents enjoyed using videos to discuss feedback interactions and consider which feedback literacy behaviors could have been used, they did not find the roleplays to be helpful. On workshop evaluations, attendees rated the roleplays as the least effective component of the workshop; eliminating the roleplays was the most frequent improvement recommendation. As someone who has used roleplays successfully in the past, I am aware that authenticity, trust, and sense of safety are important prerequisites to effective use of roleplays. The use of the online format, coupled with the fact that I was a new instructor for most of these residents likely diminished the perceived effectiveness of the roleplays. Adjusting the roleplay prebrief and the scenarios did not result in any improvement in attendees' opinions on the use of roleplays. Therefore, after three workshops, I eliminated the roleplays, adding in an extra video for review and discussion. Going forward, I plan to create one or two additional videos of feedback interactions to use to stimulate discussion in future workshop.

Third, I relocated the discussion on growth mindset to earlier in the workshop. Studies on feedback seeking in medical education have found that learners with a learning goal orientation are more likely to engage in feedback seeking behaviors (Bing-You et al., 2018; Bok et al., 2013). Therefore, I wanted to review growth mindset, its role in residency education, and how feedback is a valuable resource for growth mindset learners. Moving the discussion on growth mindset to an earlier part of the workshop allowed attendees to reflect on the general concepts of learner

agency and progressive improvement prior to discussing the more focused topic of feedback literacy.

Finally, in early workshops residents, expressed concerns that utilizing feedback literacy behaviors might feel confrontational and that attendings might not provide residents the "space" to employ these behaviors. To address this concern, I tried two interventions. First, I talked about why the topic of feedback literacy was important to me, stressing my belief that fostering learner agency was a key component of their professional identity development and that feedback literacy assists them in becoming the type of physician that they want to be. Secondly, using suggested language from prior workshop participants, we talked about the strategy of leaning into feedback literacy by framing these behaviors in a positive, rather than argumentative, manner. Thus, the behavior, "Ask questions to better understand feedback" was framed as being "curious, not defensive" about your feedback. Having participants identify and practice the specific language they would use to employ feedback literacy behaviors became an important part of the workshop.

As these small adjustments to each workshop was made, I was able to strengthen the delivery of the workshop and document how these changes improved participants' ability to use feedback literacy.

3.4 Insights on Feedback from the Workshops

Discussing the workshop attendees' experiences with feedback during clinical rotations was a valuable source of information. Analysis of my field notes revealed four common themes: the initial level of feedback literacy among PGY1 residents, the variability of feedback among clinical rotations, the negative impact of lack of continuity with attendings on feedback provision,

and the high value PGY1 residents place on the feedback interactions they have with their supervising residents.

Residents valued feedback and understood its role in their education. Residents recognized that, in clinical education, feedback comes in different forms and from many different people. They were very knowledgeable about the characteristics of high-quality and low-quality feedback. However, they had limited experience with generating feedback. The relatively high level of initial feedback literacy among PGY1 residents was surprising to me and will be discussed further in the section on questionnaire results.

Residents described significant variability with the quantity and quality of feedback among the various clinical rotations with a few rotations regularly offering high-quality feedback and many other rotations providing almost no useful feedback. One rotation, General Internal Medicine inpatient service, was repeatedly cited as a rotation where faculty routinely provided frequent, actionable feedback. The residents viewed faculty provision of feedback as an indicator of faculty investment in their education. Low quality feedback was common and was typified by residents as vague, general feedback that does not lead to a specific plan or that cannot be generalized to future educational activities.

The lack of continuity with supervising attendings was viewed by the residents as a persistent barrier to effective feedback. Residents reported frequent changes in supervisors, often with four or more supervising attendings over a four-week rotation. Furthermore, residents frequently got pulled from elective and outpatient rotations to cover inpatient services, exacerbating the discontinuity with their supervising faculty.

One surprise was how frequently PGY1 residents cited their supervising residents as their best sources of high-quality feedback. Supervising residents, who are only one or two years more

advanced in their training, were described as providing feedback that focused on specific areas for improvement and typically included forward facing feedback, feedback dialogue, discussion of action plans, and reevaluation. These characteristics are similar to the Mark 2 learner-centered feedback paradigm described by Carless and Boud (2018). These types of supervising relationships occur on several of the inpatient rotations, but the high-quality feedback interactions described above tend to occur predominantly on the General Internal Medicine inpatient service where supervising residents have much more autonomy and team leadership responsibilities.

In summary, although residents indicated during the workshop that feedback was an important aspect of their educational program, they also expressed dissatisfaction with the wide variability in quantity and quality of feedback among their clinical rotations. Residents believed continuous relationships with faculty, faculty investment in their learning, and building feedback into the structure of the rotation each facilitated high-quality feedback but that these characteristics were lacking in most clinical experiences. As one resident remarked, "Feedback is kind of helpful, but could be so much more helpful".

3.5 Workshop Evaluations

13 residents completed an evaluation following the workshop. Results of the evaluation are shown in table 1. Attendees indicated that the workshop was well-organized, used effective teaching methods, and enhanced their understanding of feedback literacy. On free text comments, residents reported that the video reviews and feedback literacy index cards were the most valuable features of the workshop. They reported that the role-play portions were the least valuable aspect of the workshop.

Table 1 Attendee Evaluation of Workshop

Evaluation Item	Range	Mean
Learning objectives of workshop were clear	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.85
Workshop achieved the learning objectives	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.85
Workshop was well organized	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.92
Presenter was effective at engaging audience	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.92
Videotapes effectively reinforced the content	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.62
Use of roleplays effectively reinforced the content	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	3.92
As a result of this workshop, I have a better understanding of feedback literacy	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	5.0
The workshop provided useful tips on how to implement feedback literacy on clinical rotations	1. Strongly disagree 3. Neither agree nor disagree 5. Strongly agree	4.92
Please rate overall quality of the workshop	1. Poor 3. Good 5. Excellent	4.77

3.6 Questionnaire Results

Feedback literacy is defined as the *"students' ability to understand, utilise and benefit from feedback processes"* (Molloy et al., 2020, p.528). Feedback literate learners also use specific techniques to generate useful feedback, effectively address emotional aspects of feedback, and apply the feedback to improve future performance (Noble et al., 2020). The questionnaire was designed to assess residents' attributes in these areas prior to and following the workshop. Results of the Likert portion of the questionnaires are listed in table 2.

Table 2 Feedback (FB) Literacy Questionnaire

Survey Item	Range	Pre-survey response mean	Post-survey response mean	P-value
Importance of FB to improvement	1. Not important 3. Moderately important 5. Essential	4.13	4.45	0.47
Satisfaction with FB from attendings	1. Not all satisfied 3. Moderately satisfied 5. Very satisfied	2.94	3.09	0.49
Teacher FB skill- importance relative to other skills	1. Not important 3. Moderately important 5. Essential	4.31	4.27	0.64
Do you discuss specific areas for improvement with teacher at start of rotation?	1. Almost never 3. Sometimes 5. Almost always	2.88	3.09	0.38
Responsibility for FB- teacher vs learner	1. Attending responsibility 3. Equally shared responsibility 5. Resident responsibility	2.5	3.0	0.02
Asking questions during FB sessions	1. Almost never 3. Sometimes 5. Almost always	3.13	3.45	0.33
How often do you understand FB?	1. Almost never 3. Sometimes 5. Almost always	3.31	3.45	0.73
How often are you upset by the FB?	1. Almost never 3. Sometimes 5. Almost always	1.44	1.36	0.86
Emotion as barrier to feedback	1. Not a barrier 3. Somewhat of a barrier 5. Extreme barrier	1.88	1.64	0.61
Resident's level of concern with potential risks of FB	1. Not concerned 3. Somewhat concerned 5. Extremely concern	1.5	1.73	0.40
Frequency of completing FB loop	1. Almost never 3. Sometimes 5. Almost always	2.19	2.55	0.33
Level of confidence at FB giving	1. Not at all confident 3. Moderately confident 5. Extremely Confident	2.44	2.73	0.33

3.6.1 Preworkshop Questionnaires

Overall, the residents demonstrated a moderate level of feedback literacy prior to the start of the workshop. They recognized the value of feedback in fostering improvement and viewed the benefits of feedback as outweighing potential risks. Specifically, they indicated that negative emotions related to feedback were not a significant barrier for them. They were moderately satisfied with feedback within the residency program.

However, they were relatively passive in their approach to feedback. Although they acknowledged some role in the feedback process, they saw feedback as primarily an attending responsibility. Residents did not routinely discuss areas for improvement with their attendings, did not consistently ask questions during feedback episodes, and rarely revisited prior feedback. Finally, residents were not confident in their skills at providing feedback to others.

One question (not shown in table above) asked residents to rank their preferred method for requesting or receiving feedback. Residents' answers to this question further demonstrated a passive approach to feedback. Of the 16 responses, 12 residents preferred to *"wait for the attending to give feedback"*, 4 preferred to *"request general feedback"* and only 2 preferred to *"request specific feedback"*.

The survey contained one free-text question, "*How do you think the feedback experience during residency can be improved?"* Analysis of answers to this question revealed one predominant theme which was the importance of creating a structure within each rotation's curriculum to assure feedback was provided from attendings to residents on a weekly (or more frequent) basis.

In summary, the preworkshop questionnaires demonstrated that prior to the workshop, the residents had a moderate level of feedback literacy. They appreciated the educational value of feedback and did not report being deterred by the affective aspects of feedback processes. However, they reported limited agency in the feedback process. These same themes of recognizing the purpose and value of feedback but expressing limited personal agency in the feedback process emerged in discussions with the residents during the workshops.

3.6.2 Postworkshop Questionnaires

Eleven residents completed the second feedback literacy questionnaire four to six weeks after completing the workshop. Comparisons between aggregate scores on the feedback literacy questionnaire pre and post workshop are shown in Table 2. Although there was a trend toward improved feedback literacy following the workshop, the only Likert item that showed a statistically significant change was the question, "*Who do you feel is most responsible for assuring effective feedback occurs?*". Following the workshop, residents were more likely to see feedback as a shared responsibility.

Additionally, on the rank order question where residents were asked their preferred method for receiving feedback, the response *"wait for the attending to give feedback"* went from the most selected option preworkshop to the least selected option postworkshop. This change was also statistically significant.

Responses to the free text question on how the feedback experience in residency can be improved again emphasized the importance of structured feedback embedded within curricular components.

3.7 Focus Groups

Two focus groups were held. Three residents participated in the first focus group and four residents participated in the second focus group. The two focus groups described different experiences with implementing feedback literacy behaviors in the clinical setting.

The first group employed multiple feedback literacy behaviors and identified significant improvements in their feedback interactions with faculty. Although the second group utilized some of the feedback literacy behaviors, this group was more selective in their use of the behaviors and described a general reluctance to try these behaviors in the clinical workplace.

3.7.1 Coding data

Although residents employed a number of specific feedback literacy behaviors, in the focus groups they spent more time discussing the overall concept of feedback literacy and its positive impact on both their approach to learning and their relationships with their attending physicians. Residents tried behaviors from all four feedback literacy categories (facilitating feedback, seeking feedback, understanding feedback, enacting feedback), but preferentially reported using behaviors in the categories of facilitating and seeking feedback. The hierarchal chart of codes (Figure 3) demonstrates this tendency.

Figure 3-- Focus Group Hierachal Codes

Several specific feedback literacy behaviors were more frequently used by residents. The most common was cueing the attending for specific constructive feedback. Residents in both focus groups reported using this behavior and found it consistently resulted in more actionable feedback. One resident described the benefit of this behavior, "Being proactive with these things enables the attending to really home in on specific aspects of your performance that you want feedback on rather than just getting a little bit of generalized feedback."

Residents also described being more proactive in negotiating specific times for feedback with their attendings. On clinical rotations, attendings traditionally determine when feedback will be given to residents. Unfortunately, time pressures and affective issues often results in no actual provision of feedback. Focus groups residents reported using different strategies they to assure time was set aside for feedback. One resident said she would recommend to future PGY1 residents, "Just not being shy to ask, can we set up a time to get this feedback done and just finding a way to make it happen."

Adopting a growth mindset orientation toward constructive feedback was another commonly described change. Participants viewed this less as a behavior than as an evolving way of approaching learning in the clinical setting. As shown in the quote below, participants described a change in goal orientation during residency away from a focus on grades and performance and toward an emphasis on improving as a physician.

> I know that evaluations are still important in residency, but I think you're able to have more frank, open conversations and take things in stride as a resident because at the end of the day you're really more worried about being the best physician you can be, and you take that constructive criticism and the praise in stride and you're

able to build upon that. So, I think as a resident it's really much more about the gradual improvement process rather than, you know the grade, as in medical school.

3.8 Themes

After analysis of the questionnaires, workshop evaluations, field notes, and focus group findings, four themes were identified.

1. The feedback literacy workshop promoted higher quality and more frequent feedback conversations in the clinical setting.

2. The feedback literacy workshop fostered a sense of empowerment in residents who employed feedback literacy behaviors.

3. The use of feedback literacy behaviors by residents appeared to lower traditional feedback barriers that inhibit feedback provision by faculty.

4. Despite attending the workshop, a subset of residents was reluctant to try feedback literacy behaviors.

Data from the questionnaires and focus groups demonstrated that residents utilized several different feedback literacy behaviors. When they used these behaviors, they reported receiving feedback that was timelier, addressed specific areas where they wanted to improve, and provided information that they could transfer to future learning activities. Since resident-initiated feedback often related to workplace challenges, it was described as more authentic and actionable. When addressing the value of receiving more frequent constructive feedback one resident stated, "You're able to take one bit or one piece of that feedback and digest that and incorporate that into your next floor month or your next consult month and improve that aspect".

Residents described use of feedback literacy behaviors as reinforcing, the improved feedback they received after utilizing the behaviors encouraged them to expand their use of these behaviors.

The second theme was the sense of empowerment many of the residents reported from employing feedback literacy behaviors. One resident stated, "I think that to ask, it felt, it felt kind of empowering I think to be able to find comfort in asking these questions". The resident's colleague concurred adding, "I would agree. I think it definitely gives you a little bit more, it kind of brings the power back to you instead of watchful waiting for feedback". This enhanced learner agency was not universal; other residents, particularly those that less actively employed feedback literacy behaviors, did not describe this degree of empowerment. The sense of empowerment also led residents to a greater sense of responsibility for within the feedback process. One resident remarked, "I feel like before that it seemed, not entirely, but more like feedback was the attending's responsibility but now I feel like it's more of a shared responsibility".

The third theme was that resident use of feedback literacy behaviors seemed to result in a diminution of traditional barriers to faculty feedback provision. Surprisingly, residents believed their efforts to solicit feedback made it easier for their attendings to also provide unsolicited feedback. As noted previously, faculty describe numerous barriers that inhibit them from providing constructive feedback to residents. These barriers include lack of time, competing patient care demands, short working relationships with residents, discomfort with providing corrective feedback, concerns of harming the teacher-learner relationship, and an institutional culture that prioritizes performance over improvement (McQueen, et al., 2016; Ramani et al., 2018). In the focus groups, residents related that employing feedback literacy behaviors resulted in attendings allocating more time for feedback, providing more constructive feedback, focusing feedback on

mutually identified learning goals, and connecting the feedback to the resident's overall progression.

These attending behaviors occurred independently from resident feedback seeking behaviors, however, focus group residents believed that their efforts at facilitating and soliciting feedback motivated attendings to provide constructive feedback and lowered other barriers to feedback. In reflecting on how feedback literacy changed the dynamic with their attending, one learner remarked,

I think one of the takeaways from the workshop is that just understanding

that people who are used to giving feedback also want to be better at giving

feedback. When I as the receiver offer more specific things that I want them

to focus on, I just think it helps on both of our experiences.

Residents also described that discussing goals with and soliciting feedback from attendings enhanced their relationship with the attending and served to normalize constructive feedback. One resident, who was particularly active in enacting feedback literacy behaviors, commented on the impact of these behaviors on her interactions with attendings, "And, in the end I felt like that also worked to improve my relationships with each one of them, so I think that was important to take away." In fact, several residents noted that their attendings increasingly sought feedback from their resident team on their performance as teachers. These three characteristics, trusting relationships, credible feedback, and bidirectional feedback are among the most important features of a strong feedback culture (Ramani et al., 2017).

Not all residents who attended the workshops actively employed the feedback literacy behaviors. A subset of residents described a general reluctance to try the behaviors in the clinical

workplace. Although no residents reported that attendings were resistant to feedback seeking behaviors, residents who were hesitant to using feedback literacy behaviors inferred that their attendings were less likely to be receptive to these behaviors. These residents described concerns about taking up attending time and patient care priorities as barriers to feedback seeking, mirroring traditional barriers to feedback described by attendings. One resident stated, "If you feel like everyone's rushed you are less likely to ask for feedback because you don't want to be a burden". Other residents related negative emotions related to feedback seeking and doubted that utilizing the behaviors would actually result in actionable feedback. As one resident said, "Sometimes it feels awkward, I don't know how to ask for feedback without it sounding almost like you are fishing for compliments."

3.9 Inquiry Questions

Once themes were identified from the qualitative data analysis and triangulated with the quantitative data, my insights from the data were analyzed with reference to the inquiry questions.

3.9.1 How do residents conceive their role in feedback processes?

Residents entered the workshop with a more advanced approach to feedback than I had anticipated. As demonstrated in the pre workshop questionnaire (Table 2) and field notes from the discussion portions of the workshop, workshop attendees valued feedback from their attendings, were very familiar with the characteristics of high-quality feedback, and viewed the benefits of constructive feedback as outweighing the potentially negative affective aspects of feedback. In

feedback interactions with their supervising residents (known in our educational setting as senior residents or seniors) they employed a number of feedback literacy behaviors including setting weekly learning goals with their senior, identifying opportunities for spontaneous feedback, participating in dialogue around the feedback given, and completing the feedback loop.

However, in feedback interactions with their faculty attendings residents were generally passive in their approach to feedback. In both the preworkshop questionnaire and workshop discussions, they viewed feedback as primarily a faculty responsibility. Residents preferred that faculty initiate feedback interactions and when residents did engage in feedback seeking, they preferred to seek general feedback rather than inquiring on specific areas for improvement.

As previously noted, residents reported high variability in attending provision of feedback among their clinical rotations. Although the variability was a source of frustration among the residents, the passive approach residents had toward feedback provided them few options to address the problem. One resident described this feeling as "watchful waiting".

3.9.2 How effective was a two-hour workshop for teaching feedback literacy?

Effectiveness of educational programs can be assessed using the Kirkpatrick model (Kirkpatrick, 1998). which describes four levels of participant outcomes, reactions (level 1), learning (level 2), behavior (level 3) and results (level 4). The effectiveness of the feedback literacy workshop was evaluated using the workshop evaluations, the feedback literacy pre and post workshop questionnaires, and the focus group interviews.

The results of the workshop evaluations are shown in Table 1. Attendees were highly satisfied with the quality of the workshop, reported the workshop provided them a better understanding of feedback literacy, and indicated that they were provided useful tips on

implementing feedback literacy behaviors on clinical rotations. On free text comments from workshop evaluations, attendees identified, *"reviewing feedback literacy principles, processes, and behaviors"* and *"finding ways to elicit better feedback for myself"* as the most valuable parts of the workshop. The positive learner reactions to the workshop are consistent with a strong Level 1 Kirkpatrick score.

In the Kirkpatrick framework, learning (level 2) can be evaluated by demonstrating changes in knowledge, skills, or attitudes. My feedback pre and post workshop questionnaire primarily assessed changes in attitudes toward feedback and feedback literacy behaviors. Comparison between pre and post workshop questionnaire results (Table 2) showed statistically significant improvement in only one item, responsibility for feedback. Following the workshop, attendees were significantly more likely to express the attitude that feedback was a shared responsibility between the teacher and the learner rather primarily a responsibility of the teacher.

The focus group explored resident use of feedback literacy behaviors in the clinical workplace. As noted, residents self-reported increased use of feedback literacy behaviors particularly in the areas of facilitating and seeking feedback. Use of the behaviors was variable among workshop participants; some residents reported using these behaviors frequently while others used them sporadically. Changes in behavior are consistent with Kirkpatrick level 3. However, some authors (Alexandria et al., 2021) describe self-reported behavior changes as level 3a, seeing these changes as less reliable than observed behavior changes (level 3b)

In summary, the feedback literacy workshop was clearly effective at Kirkpatrick level 1, marginally effective at Kirkpatrick level 2, and effective at Kirkpatrick level 3a. Larger studies may better demonstrate the effectiveness of the workshop.

3.9.3 What were the most useful feedback literacy skills for residents?

Focus group data indicated that residents primarily used behaviors from the facilitating feedback and seeking feedback categories. The most useful behaviors for these categories were, identifying specific areas where they wanted to improve, negotiating time for feedback, and cueing the attending for specific constructive feedback. Residents reported that when they utilized these feedback literacy behaviors, they received feedback that was more constructive and more specific. The feedback they received was also more focused to their personal learning goals. They also felt that utilizing these behaviors promoted closer relationships with their supervising attendings, an important enabler of high-quality feedback (Ramani, et al., 2019; Sargeant et al., 2015). In the often-chaotic clinical setting, use of feedback literacy behaviors fostered feedback by instilling a more defined structure for feedback where feedback is anticipated, requested, and scheduled. One resident described the impact of feedback seeking on their education remarking, "I think it helps to let the attendings focus on specific areas and I think it also kind of opens the window."

3.9.4 How did the residents employ feedback literacy skills in the clinical workplace?

In focus groups, residents reported being strategic in employing feedback literacy skills. This approach led to significant variability in implementation of feedback literacy skills. Some residents opted to try several skills and determine whether this resulted in improved feedback. As noted above, they predominantly used feedback literacy skills in the facilitating and seeking feedback categories. This group of residents identified specific times and settings (start of rotation, patient care discussions, end of day sign out, etc.) to try feedback literacy behaviors and adapted the behavior to the context.

Other residents preferred to intuit whether the attending was open to feedback seeking prior to utilizing feedback literacy behaviors, often determining that the time or setting was not optimal for feedback seeking. Although they also predominantly used feedback literacy skills in the facilitating and seeking feedback categories, these residents utilized fewer feedback literacy behaviors and sought feedback less frequently.

4.0 Learning and Actions

Feedback is a core component of competency-based education, the educational framework used in graduation medical education. As noted in Table 1, additional characteristics of competency-based education are that learning is individualized and that both programs and learners are accountable for learning.

Unfortunately, in medical education much of the best constructive feedback remains unspoken (Bing-You et al., 2018). Newer feedback paradigms stress the important role learners play in the feedback process (Carless & Boud, 2018) and educators have proposed that learners receive training on how to solicit, understand, and enact feedback (Henderson et al., 2019; Tripodi et al., 2021). The goal of this improvement cycle was to determine the impact of a feedback literacy workshop delivered to first year Internal Medicine residents on subsequent feedback interactions in the clinical environment.

4.1 Key Findings

The primary key finding was that a workshop on feedback literacy provided to first year residents was effective method for improving feedback within an Internal Medicine residency. The workshop helped attendees learn and practice a new approach to feedback, increased feedback seeking behaviors in the clinical workspace, and fostered an enhanced sense of agency toward their learning.

A second key finding of the intervention was that resident use of feedback literacy behaviors seemed to lower traditional barriers to faculty feedback provision and enhanced feedback dialogue between faculty and residents. The third key finding was that not all residents who participated in the workshop actively employed feedback literacy behaviors in the clinical workplace.

Several investigators have studied the impact of feedback literacy training on provision of feedback in the clinical setting. Milan et al. (2011) demonstrated that medical students who attended a workshop on eliciting feedback were more likely to ask for feedback from their supervisors than control group students. Noble et al. (2019) provided feedback literacy training to medical and nursing students prior to their clinical rotations. Participating students reported improved understanding of feedback and more active engagement in feedback processes following the training. Participants recommended that future workshops, "have an increased focus on sharing and engaging students in practical feedback engagement strategies" (Noble et al., 2019, p.298). McGinness et al. (2020) demonstrated that a 60-minute workshop designed to increase medical student agency in feedback was highly valued by attendees, increased feedback seeking by students, and improved the students' satisfaction with the quality and quantity of feedback. Similar to my findings, each of the above studies identified that despite receiving training in feedback literacy, some students still found it challenging to engage in feedback seeking in the clinical workplace.

Each of these studies demonstrated that instructing medical learners on feedback literacy led to increased feedback seeking and increased engagement with feedback in subsequent clinical settings. However, my intervention differed in several aspects.

First, my study population, residents participating in graduate medical education, was a more advanced group of learners with more experience in the clinical educational setting and entered the workshop with higher baseline levels of feedback literacy than described in other studies (Noble et al., 2019, p. 295).

Secondly, as suggested by Noble et al. (2019, p.298), my intervention focused more on learning and practicing specific feedback literacy behaviors.

Thirdly, the use of focus groups in my intervention provided more information on the specific behaviors and strategies residents used to solicit feedback. Using focus groups also led to more detailed description of the settings and factors that inhibit resident feedback seeking in the clinical settings.

Finally, the finding that residents' use of feedback literacy behaviors promoted more unsolicited constructive feedback from faculty was not described in prior studies on feedback literacy instruction.

4.2 Impact of the Change

In improvement science, measurements are utilized to better understand the impact of the intervention particularly how the intervention is influencing educational practices in the workplace. Measurements provide information on whether an intervention is working, how it is working, and for whom it is, or is not, working (Milder & Lorr, 2018).

4.2.1 Impact on process measures

The preworkshop questionnaires, workshop evaluations, and field notes were the primary process measures used to assess this PDSA cycle. The questionnaires identified that residents were primarily passive in their approach to feedback and thus would benefit from the workshop. Workshop evaluations and field notes identified that the workshop was highly valued by attendees, effective at introducing the concept of feedback literacy, and provided attendees practical strategies for implement feedback literacy in the clinical workplace.

4.2.2 Impact on driver measures

In revisiting the driver diagram developed for my PoP (Figure 4), the drivers primarily impacted by my intervention were the resident feedback seeking/uptake behaviors (primary driver) and residents' conception of their role in the feedback process (secondary driver).
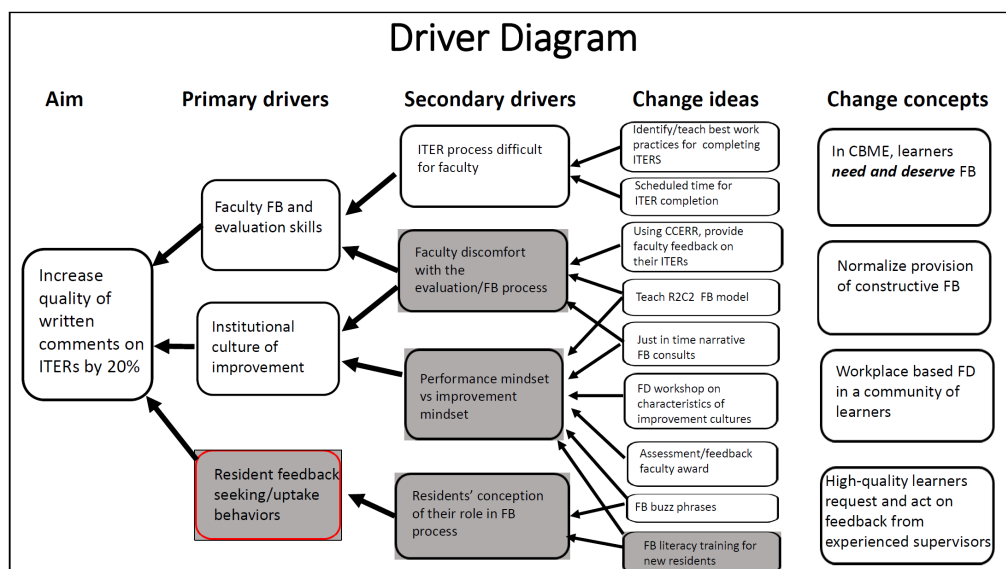
Figure 4- Impact of Intervention on Driver Diagram

The feedback literacy workshop positively impacted these drivers by expanding residents' understanding of the feedback process, providing them with new feedback literacy skills, and fostering increased resident agency in the feedback process.

The intervention also impacted other secondary drivers. In the focus groups, participants related that their use of feedback literacy seemed to lessen faculty discomfort with provision of constructive feedback. Additionally, residents described that use of feedback literacy behaviors led to more frequent conversations about growth and improvement, and more instances where faculty requested feedback from residents on the faculty member's performance as a teacher. Honest dialogue, improvement focus, and bidirectional feedback have been identified as components of a strong feedback culture (Ramani et al., 2017). These findings suggest that more widespread implementation of feedback literacy training may help normalize constructive feedback within our institution.

4.2.3 Impact on balance measure

Other than two hours of resident curricular time, my intervention used minimal institutional resources. Incorporating the feedback literacy workshop into the residency curriculum will likely require some additional administrative and faculty resources but overall resource utilization will be minimal.

One concern identified prior to the intervention was that increasing resident agency in feedback processes might negatively impact on faculty- resident relationships particularly since graduate medical education has traditionally used a teacher-centric educational paradigm. In the focus groups, residents did not identify this as a concern. In fact, residents described that use of feedback literacy behaviors positively impacted on their relationships with supervising faculty.

4.2.4 Impact on outcome measures

My problem of practice (PoP) is that faculty physicians in our program do not consistently provide effective narrative feedback on residents' in-training rotation evaluations. Will this intervention have a significant impact of my problem of practice? The design of this intervention study does not provide an answer to that question.

However, since I began investigating this problem of practice, several other clinician-educator teams in our department have initiated parallel interventions designed to improve feedback within the residency program. One team is studying the residency wide implementation of the R2C2 feedback model, a feedback strategy designed to enhance faculty-learner feedback conversations (Sargeant et al., 2015). Additionally, one of our academic clinician-educator fellows has created an asynchronous online faculty development workshop designed to improve the quality of written evaluations of residents and is studying the workshop's impact on decisions made at the residency clinical competence committee. I am serving as her faculty mentor for this project.

Of note, both of these interventions, teaching the R2C2 model and providing faculty training on written evaluations, were change ideas listed in my driver diagram.

In summary, as shown in Figure 5, there are currently multiple ongoing efforts to shift the culture of our residency toward enhanced provision of constructive feedback. These interventions are providing faculty and residents with evidence-informed knowledge and skills on effective feedback; more importantly, they are normalizing honest communications, both verbal and written, on improvement and growth.

Driver Diagram

| Aim | Primary drivers | Secondary drivers | Change ideas | Change concepts |

- ITER process difficult for faculty
- Faculty FB and evaluation skills
- Faculty discomfort with the evaluation/FB process
- Institutional culture of improvement
- Performance mindset vs improvement mindset
- Resident feedback seeking/uptake behaviors
- Residents' conception of their role in FB process

Increase quality of written comments on ITERs by 20%

- Identify/teach best work practices for completing ITERS
- Scheduled time for ITER completion
- Using CCERR, provide faculty feedback on their ITERs
- Teach R2C2 FB model
- Just in time narrative FB consults
- FD workshop on characteristics of improvement cultures
- Assessment/feedback faculty award
- FB buzz phrases
- FB literacy training for new residents

- In CBME, learners *need and deserve* FB
- Normalize provision of constructive FB
- Workplace based FD in a community of learners
- High-quality learners request and act on feedback from experienced supervisors

Figure 5-Institutional Initatives to Improve Feedback

4.3 Strengths and Weaknesses of the Change Process

My primary intervention was implementing a feedback literacy workshop and studying its impact. Inadequate feedback is a longstanding problem in medical education; prior attempts to improve feedback by training faculty in feedback provision have had limited success (Bing-You & Trowbridge, 2009).

A strength of this intervention was that it targeted the learner's role in the feedback process, an approach that other institutional feedback change efforts have not taken. Recognizing that multiple attempts to get faculty to "push feedback to learners" had not been fully successful, I elected to determine if having residents "pull feedback from faculty" might be an effective means of improving the feedback process.

Another strength of the intervention was that workshop was well-designed. It was informed by evolving information on feedback literacy training in the educational literature (Carless &

Boud, 2018; Molloy et al., 2020; Winstone et al., 2019) and used an interactive format to introduce a novel concept to residents and provide them opportunities to practice feedback literacy behaviors. The intervention plan identified a complex pedagogical concept, feedback literacy, analyzed how this concept might be effectively implemented in the clinical workplace of residency education, and provided workshop residents with discrete actions for incorporating feedback literacy into their education. I did this by identifying and categorizing feedback literacy behaviors, providing residents with pocket cards listing those behaviors, and asking residents to commit to trying at least two behaviors. Participant evaluation of the workshop affirmed that they valued the design and content of the workshop.

A final strength of the intervention was the use of qualitative analysis methods to study the impact of the intervention. Using these methods provided a rich description of the successes and challenges residents experienced when attempting to implement feedback literacy in the complex sociocultural context of the clinical workplace. It also was a very effective method for assessing the success of the intervention and identifying specific areas for improvement.

The primary weakness of my intervention was that, due to a number of factors, I only enrolled 13 residents in the study portion of the intervention and only 7 residents attended the focus groups. As a result, qualitative analysis of the focus groups did not reach thematic saturation making it difficult to generalize my findings. The small sample size also precluded me from enacting my original plan of conducting monthly focus groups and using the focus group data to iteratively improve my intervention and data collection methods.

Another limitation was the lack of a valid method for measuring learner feedback literacy. To address this, I developed a questionnaire to try to measure resident feedback literacy before and after the workshop. Although there was a slight trend toward improvement, the change was

not statistically significant; low numbers of enrolled residents contributed to the lack of statistical significance.

4.4 Next Steps and Actions

The persistence of inadequate feedback in medical education has led to a call for new approaches to address this deficiency (Mann et al., 2011; Telio et al., 2015). Educational scholars have increasingly highlighted the importance of learner agency and institutional culture in improving the quantity and quality of feedback provide to learners (Lefroy et al., 2015). Learner agency refers to,

> The psychological processes involved in someone being in control of their own performance. These processes of self-control include being aware of and monitoring one's performance; involve being aware of and controlling strategies to maintain accurate and efficient performance; and having the sense of being in control, one's self-efficacy (McNaughten, 2018).

Feedback literacy training has the potential to enhance learner agency in residency education; the most effective methods to do this have not been identified.

Henderson et al. (2019) identified 12 conditions that enable effective feedback in higher education, then surveyed educational leaders at Australian universities to rate the importance and the level of implementation of each condition at their institutions. The condition, *"Learners are active in the feedback process"* was ranked as the second most important condition for enabling effective feedback. However, this was the condition where the gap between importance and level

of implementation was greatest, suggesting that higher education needs to intentionally instruct our learners how to be more active in feedback processes related to their education.

4.4.1 Adding feedback literacy training into the residency curriculum

A recent review on feedback literacy in medical education highlighted the importance of making feedback a curricular focus (Tripodi et al., 2021). Based on the evaluations of the workshops and the data obtained from the questionnaires and focus groups, I propose that a workshop on feedback literacy should be a required part of our residency curriculum. The workshops increased the quality and quantity of feedback, fostered learner agency, and reduced traditional feedback barriers. The goals of our curriculum are to provide individualized learning pathways, promote progressive independence, and produce knowledgeable, compassionate physicians. Enhancing the abilities of our residents to facilitate, seek, understand, and enact feedback will help our program to achieve these goals in each resident.

What would it take for feedback literacy training to succeed? Our program already schedules several half-day workshops each year for all PGY1 residents. To assure maximal attendance, the residents are relieved of all clinical duties during this time. I recommend that the feedback literacy workshop be provided during one of these sessions. In my view, the workshop should be broken into two sessions, a plenary session, and a small group session. During the plenary session, the session leader would discuss growth mindset, introduce the concept of feedback literacy, and outline the feedback literacy behaviors. The small group sessions would be led by trained facilitators who would use group discussion on feedback and videos portraying feedback interactions to stimulate residents to identify, implement, and practice feedback literacy skills.

Optimal timing of the workshop is important. My intervention revealed that, due to the stresses of transitioning to residency, some PGY1 residents may not be ready to take on a greater role in the feedback process until later in the academic year. The November workshop seems like the optimal time for residents to be introduced to this new skill.

4.4.2 Addressing resistance to using feedback literacy behaviors

The finding that some residents remained reluctant to engage in feedback seeking behaviors even after the workshop suggests that the intervention was not equally effective for all learners. This finding has been seen in other studies (Noble et al., 2019; McGinness et al., 2020; Milan et al., 2011). Factors that contribute to reluctance to seek feedback include a diminished sense of self-efficacy (Bandura, 2001) and a desire to avoid negative emotions often associated with feedback (Forsythe & Johnson, 2017). In my intervention, residents that utilized the feedback literacy behaviors reported positive experiences. Future workshops should address the above barriers to feedback seeking and should include post workshop processes that foster use of the feedback literacy behaviors in subsequent clinical rotations.

Ideas to stimulate reluctant residents to try feedback literacy behaviors include:

1) Providing more instruction during the workshop on how to address negative emotions associated with feedback.

2) Having residents who attended prior workshops discuss their experiences with implementing feedback literacy behaviors in the clinical workplace.

3) Providing regular email reminders in the weeks following the workshop encouraging use of feedback literacy behaviors.

4) Training resident advisors on feedback literacy so that residents' use of these

   behaviors can be discussed at regularly scheduled advising sessions

4.4.3 Training faculty in feedback literacy

Prior studies on instructing medical learners in feedback literacy have recommended enhancing faculty understanding of feedback literacy as an important component of fostering an institutional culture of feedback (Noble et al., 2019; McGinness et al., 2020). The residents in my intervention expressed concern that faculty may not provide them "space" to implement feedback literacy. Another next step would be to provide brief faculty development sessions on feedback literacy to our clinician educators. This will allow them to better understand why and how residents are taking a more active role in the feedback process.

An important goal of this faculty development should be to describe how faculty can foster resident feedback literacy. Factors that foster feedback seeking from medical learners have been described (Bing-You et al., 2018; Delva et al., 2013; McGinness et al., 2020). Incorporating this information with findings from this study, I identified several themes and faculty behaviors (Figure 6) that encourage residents to assimilate feedback literacy into their learning and professional development.

Theme	Faculty behaviors
Demonstrate that you value learning as much as clinical work	Set team goal of learning AND excellent patient care Balance patient care questions with learning questions
Show, through words and actions, that you are invested in resident growth	State that you want to give them feedback Ask each learner to identify areas for improvement State that you want to receive feedback from them
Work within your residents' schedules to find dedicated time for feedback	Schedule dedicated weekly feedback (Feedback Fridays) Intersperse with less formal, "on the go" feedback
Develop relationships with residents	Get to know residents personally Adjust your schedule to maximize continuous time with learners Avoid the tendency to "act too busy"
Good feedback giving begets good feedback seeking	Never imply feedback is perfunctory Provide authentic (vs. scripted) feedback Expect and encourage questions on the feedback you provide When providing feedback, seek the broader message

Figure 6-How Faculty Can Facilitate Resident Feedback Literacy

4.5 Implications for policy

My intervention identified several issues which may be best addressed by policy changes.

Understanding variation is a key tenet of improvement science (Bryk et al., 2016). A consistent finding in my study was that faculty provision of quality feedback to residents is highly variable. Within divisions, some faculty provide excellent feedback, others provide only vague, non-actionable feedback and others provide no feedback at all. This variability is even more marked when comparing the different divisions within the Department of Medicine. Residents reported receiving much more useful feedback from General Internal Medicine faculty than from faculty in subspecialty divisions. Residents also described feeling resigned to the reality that certain rotations were feedback deserts and viewed the paucity of feedback on certain rotations as a "lack of investment" in their education.

Since feedback is one of the strongest methods to foster learning and is a core component of competency-based education, feedback should be one measure of educational quality. Recent

evidence that a lack of faculty feedback negatively impacts on patient care outcomes (Hayes et al., 2017) and resident wellness (Colbert et al., 2021) further supports policy efforts to address this issue

Our department currently evaluates faculty in six domains, teaching is one of the six. The faculty teaching evaluation section focuses on numbers of courses and learners taught, overall teaching evaluation scores, and teaching awards. The faculty are not assessed on important aspects of pedagogy such as: provision of feedback to learners, participation in faculty development programs, and self-designed efforts to improve teaching skills. As a result, faculty who do not provide feedback are rarely given feedback on this deficiency.

The ACGME now requires graduate medical education programs to annually evaluate each faculty member's performance as a teacher and incorporate the composite results of these evaluations into program improvement initiatives (ACGME Program Requirements, 2019). An efficient way to do this would be for the Department of Medicine to design and implement a rubric that assesses selected faculty teaching skills. Other higher education institutions have utilized this strategy to improve educational practice in targeted areas (Follmer Greenhoot, et al., 2017). Based on my investigation of this problem of practice, I developed a teaching effectiveness rubric (Appendix L) which includes both feedback and self-improvement as a teacher as measured domains. I have shared my proposed rubric and discussed its possible implementation with our departmental academic leadership.

As previously noted, faculty physicians on teaching services have numerous clinical and administrative responsibilities. In addition, many have important roles within the medical school and healthcare system with responsibilities that do not "go away" when they are on the teaching

services. Traditionally, teaching faculty have been expected find time to fit these additional responsibilities into their schedules. Unfortunately, time for feedback is often sacrificed.

Polices should be developed to assure that busy faculty members are provided protected time to provide feedback while on teaching services. Clinician-educators who already do this well can serve as sources of "best-practices" for structuring feedback time into a weekly teaching schedule in a way that optimizes learning. Some of this time will be used for verbal feedback and some for completing evaluations and providing written feedback. Creating structured time for feedback will likely require delegation of some clinical and administrative responsibilities and therefore will have some financial implications. However, a departmental policy on this will send a strong message that feedback to our residents and students is a departmental priority.

4.6 Areas for Further Study and Dissemination

This intervention identified several areas for further study. To facilitate further research on feedback literacy interventions, developing a validated measure of feedback literacy would be an important step. Additionally, it would be beneficial to better understand the factors that led to hesitancy of some residents to employ feedback literacy behaviors. Finally, it would be informative to determine whether feedback conversations are different after resident feedback literacy training, how this impacts on future resident learning activities, and whether feedback literacy training leads to more rapid progression through competency-based milestones.

Because feedback literacy has an important role in the competency based educational model used in graduate medical education, I plan to submit this intervention for poster presentation as an educational innovation at an upcoming ACGME annual meeting. Additionally, I will brief

our institution's GME leadership on this information and offer sessions on feedback literacy to other residency programs within our academic medical center. These workshops will be adjusted to meet the specific feedback literacy needs of their programs.

Finally, our medical school is currently undergoing a curriculum reform and is interested in strengthening longitudinal formative evaluation and coaching for their medical students. I have discussed my workshop and preliminary results with their office of medical education and offered to design modules on feedback literacy for their students.

4.7 Summary of Learning and Actions

By the time they complete medical school and start residency training, PGY1 residents have spent at least 21 years in formal education. They are experienced learners who have developed skills in setting goals, designing learning plans, using effective strategies to optimize learning, and monitoring the success of their learning efforts. PGY1 residents are advanced learners with significant agency toward most aspects of their learning. However, they are relatively passive in their approach to feedback.

Training in feedback literacy has the potential to further advance the agency of medical residents, better preparing them for both the competency-based model used in graduate medical education and the decades of self-directed improvement that characterize the career of consummate practicing physicians. Furthermore, training in feedback literacy appears to be an important component in shifting residency training away from a performance culture and toward an improvement culture.

The best methods for developing and measuring feedback literacy in medical education trainees have not yet been elucidated. My intervention suggests that an interactive workshop on feedback literacy is an effective means of introducing PGY1 residents to the concept of feedback literacy.

5.0 Reflections

As a practicing physician who has held several leadership positions, I am very familiar with the tenets and methods of quality improvement in healthcare settings. Applying improvement science principles toward educational problems was a new paradigm for me but I quickly recognized the value of this approach in medical education. Similar to other educational settings, clinician-educators spend much of their time fixing educational problems. Many problems are solved with simple interventions but a few problems, including feedback to learners, seem to persist despite multiple, seemingly well-designed, interventions. My intervention to improve feedback within an Internal Medicine residency program helped advance my understanding of improvement science in several ways.

The most important concept I learned was that "insolvable" problems generally involve multiple stakeholders with competing and overlapping needs, challenges, and agendas. Understanding these complex issues requires much more investigation, analysis, and empathy than the cursory methods we often employ to seek stakeholder input. As a result, we are often confounded when the solution we crafted meets resistance upon implementation. Through my course of study, I learned to spend time identifying, anticipating, and understanding resistance before developing my improvement plan and to use this knowledge in designing each aspect of the improvement plan.

For me, humility is the most important lens to employ when trying to understand resistance. My expertise in medical education, my trust in evidence-based knowledge, and my investment in the education of our residents, sometimes makes it more difficult for me to understand other's viewpoints, challenges, and ideas. I found the empathy interviews, where we listened to the

experiences of various stakeholders related to our educational problems, to be revelatory. The stakeholder input I received from these interviews provided me a more nuanced understanding of my educational problem and informed potential solutions. In retrospect, my intervention may have been more impactful if I had continued to seek stakeholder input throughout the development of my intervention plan. Going forward, I plan to routinely include stakeholders, particularly potential resistors, as members of implementation teams.

I plan to continue to use improvement science methods to address medical education problems and will teach this approach to the residents and General Internal Medicine academic fellows in our department who are interested in careers as educational leaders. Some important concepts from improvement science that I plan to highlight include the value of simplicity, the unique challenges of studying improvement science in graduate medical education, and the mutability of a "problem of practice".

Improvement science often produces novel implementation ideas, informed by evolving theory and discipline-specific literature, to address areas for improvement. Additionally, the issues we address are often complex systemic problems involving multiple stakeholders. Translating improvement ideas to the real-world educational setting can be difficult. If end-users, in my case resident physicians, are unclear on how to apply the change in their educational setting, implementation is likely to fail.

In a way, this reminds me of my clinical practice. As a general internist, I specialize in providing primary care to patients with multiple conditions, who are often on numerous medications, have differing healthcare goals, and have variable levels of healthcare literacy and self-efficacy. Designing effective care plans with patients can be challenging and must accommodate the patient's interests and capabilities. One of my mentors stated that internal

medicine physicians, "Embrace complexity, but act with simplicity". This mindset applies nicely to educational improvement science.

One lesson I learned from this intervention was the critical importance of providing low-inference methods for employing feedback literacy and the importance of anticipating potential barriers to implementation. Iterative frameworks such as the PDSA cycle are rarely utilized in medical education innovations but have tremendous potential for fostering success and sustainability of these innovations.

Studying educational innovations in graduate medical education is challenging (Keune et al., 2013). On the clinical rotations that comprise the majority of residency training, residents work long hours and irregular schedules. Patient care and learning are prioritized, leaving little time for participation in surveys, interviews, or focus groups. Nevertheless, it is important that we understand how to best educate our residents so that we can assure they are fully competent to provide independent patient care upon completion of their training. Although this may seem to be a problem unique to medical education, I learned through my course of study that classroom teachers in elementary, high school, and higher education face many of these similar time constraints.

Improvement science, with its focus on solving real world problems in authentic settings, provides an opportunity to identify and employ more effective techniques to study educational challenges and innovations. Study design is crucial to improvement science inquiry in these settings. Both the implementation plan and the measurement of outcomes must be tailored to account for the time limitations and contextual challenges inherent in studying resident learning in the clinical setting. For example, because feedback in the clinical workplace is a complex sociocultural phenomenon (Ramani et al., 2019), I elected to use focus groups to study the impact

of feedback literacy training. However, it proved challenging to schedule focus groups within the residents' inflexible work schedules. Multiple interviews with individual residents may have been a more pragmatic outcome choice. In future improvement efforts, I plan to devote more thought to identifying outcome measures that are both authentic and feasible within that educational environment. Reviewing the evolving literature on improvement science in education may provide some examples of these types of study designs and outcome measures.

Although problems of practice tend to be longstanding issues in educational settings, they are not static. As I studied my problem of practice over three years, I could see that, even without intervention, the problem space was changing. Initially it appeared that faculty lacked the knowledge and skills require to provide high quality narrative feedback. However, over that time, faculty in certain areas such as General Internal Medicine, began developing and sharing best practices for narrative feedback using both formal and informal methods. As written feedback from those faculty improved, the variability of feedback within the department became more marked.

Additionally, as I studied the literature on feedback, it became clear that our department's efforts to enhance faculty provision of feedback were based on an incomplete model of feedback, one that did not consider the importance of the feedback receivers (residents) and the institutional culture in the feedback process.

As I revisit my problem of practice, that faculty physicians in our program do not consistently provide effective narrative feedback on residents' in-training rotation evaluations, I wonder if that is truly the problem that I now most want to address. It remains an important problem, one that other faculty members are addressing with well-designed interventions. However, I now believe the more salient problem related to feedback is institutional culture and

that our department should focus efforts on fostering an institutional culture of feedback and improvement.

As I have worked on my problem of practice and implementation plan, I have experienced several challenges and have learned about myself as an educational leader and improver.

I changed jobs during my doctoral program, moving from a position as an Associate Program Director in the residency to an educational leadership role at our VA affiliate. Doing so made it more difficult for me to plan my intervention, recruit residents for the study portion, and collaborate with residency program leadership. It required me to ask more favors, something I am reluctant to do. Additionally, as I was finalizing my implementation plan, the COVID pandemic began. This necessitated that I change from in person workshops, a format I am very comfortable with, to virtual workshops, a format less conducive to the type of workshop I had designed. Finally, I struggled with enrolling residents into the study. Residents traditionally eschew participation in research studies, but increased patient care responsibilities related to the pandemic prevented many of the residents from participating.

When I switched jobs, I was aware that it would be more difficult to proceed with my implementation plan. I was also aware that conducting studies on residents presents unique challenges. I persisted with my original plan because I feel strongly that improving educational practices in residency training programs is an important endeavor and that medical educators often shy away from studying improvements to residency education due to challenges with enrollment, study design and data collection. I also believed that I had found an improvement intervention that aligned with competency-based education and had significant potential for enhancing the education of our residents.

This sense, that I was doing meaningful work, was instilled in me through my experiences in this EdD program. I spent three years with a diverse group of instructors and fellow classmates each of whom demonstrated a commitment to improving educational practices by addressing the tough problems within education. Interacting with them exposed me to educators who valued learning, demonstrated creativity in their teaching, and were persistent advocates for their students.

Through my challenges, I reaffirmed that persistence is one of my stronger traits, but I also realized that adaptability is another strength that I have developed. Through my participation in this program, I am more comfortable with the broader educational literature and its methods of inquiry and research. In particular, I better understand the value of qualitative research. I was also introduced to other areas of research such as organizational psychology and implementation science that will be valuable in my role as an educational leader. As a result, I am a better mentor to residents and fellows wishing to pursue educational research. I also have a better understanding of the systemic forces in education and how these forces undermine efforts to provide more just, equitable education.

Participation in the EdD program affirmed and strengthened my commitment to residency education and provided me with new skills to assess and improve complex educational systems. Graduate medical education is the final step in the training of future physicians; the care they provide as practicing physicians is largely dependent of the quality of their resident training. Our responsibility to our residents' future patients is to assure we graduate residents fully capable of providing excellent care.

Appendix A Problem of Practice Fishbone Diagram

Problem: Faculty do not provide useful written feedback on in-training evaluation reports (ITERs)

Process for giving written feedback perceived as difficult
- Cognitive load (remembering/categorizing)
- Affective dimension of FB
- Hard to give corrective FB

Faculty do not know how to give written FB
- Inadequate assessment
- No FD on FB
- Limited understanding of educational value of FB

Overburdened faculty
- Patient care prioritized
- Competing commitments
- Filling out ITER takes time

Institutional culture does not foster FB
- Culture characterized by niceness, assumed excellence, autonomy
- FB not normalized
- Performance based culture
- No incentive/reward for well done FB
- Is FB summative or formative?

Learner FB seeking behaviors
- Asking for FB
- FB dialogues
- How to utilize FB

Problem

ITER- in-training evaluation report
FB- feedback
FD- faculty development

Appendix B Average CCERR Scores

Average CCERR scores by component from 25 resident ITERs

		Average
1.	**Checklist/numeric ratings** show sufficient variability to allow identification of **relative** strengths and weaknesses of the trainee.	2.52
2.	Comments are **balanced** providing both strengths **and** areas for improvement.	2.72
3.	The trainee's **response to feedback and/or remediation** during the rotation is described in the comments.	1.12
4.	Comments **justify** the ratings provided.	2.44
5.	Clearly explained **examples of strengths** using specific descriptions (not generalizations) are provided in the comments.	2.72
6.	Clearly explained **examples of weaknesses** using specific descriptions (not generalizations) are provided in the comments.	1.96
7.	Concrete **recommendations** for the trainee to attain a higher level of performance are provided.	2.24
8.	Comments are provided in a **supportive manner**.	3.40
9.	Overall, this ITER provides enough **detail** for an independent reviewer to clearly understand the trainee's performance on the rotation.	2.50
	Total score	21.68

Appendix C Ratings of Individual ITERs using CCERR

Category	1	2	3	4	5	6	7	8	9	Total	Current	Desired
	5	4	4	4	4	4	4	4	4	37	20%	50%
	3	5	1	4	5	4	4	5	4	35		
	3	4	1	2	4	4	4	4	4	30		
	3	3	1	4	4	1	2	5	4	27		
	4	4	1	2	4	2	3	4	3	27		
	3	4	1	3	3	2	2	4	3	25	40%	40%
	3	3	1	3	2	3	3	4	3	25		
	3	3	1	4	3	2	2	4	3	25		
	2	3	1	3	3	3	3	3	3	24		
	2	2	1	4	4	2	1	4	4	24		
	3	3	1	1	4	2	4	4	2	24		
	2	2	1	4	4	1	1	4	4	23		
	2	4	1	2	2	3	3	3	2	22		
	3	3	1	3	2	2	3	3	2	22		
	2	4	1	3	2	2	3	3	2	22		
	4	1	1	2	3	1	1	4	2	19	40%	10%
	2	3	1	1	1	2	3	3	2	18		
	1	2	1	2	2	1	2	4	3	18		
	2	2	1	3	2	1	1	3	2	17		
	2	2	1	2	2	1	1	3	2	16		
	2	2	1	1	2	2	2	3	1	16		
	2	2	1	1	2	1	1	3	2	15		
	2	1	1	1	2	1	1	2	1	12		
	2	1	1	1	1	1	1	1	1	10		
	1	1	1	1	1	1	1	1	1	9		

The CCERR measures the quality of in-training evaluation reports (ITERs); scores range from 9-45. A score of 27 represents an adequate quality ITER. In this table, scores highlighted in green represent high quality ITERs, those outlined in yellow represent moderate quality ITERS and those outlined in red represent low quality ITERs

Appendix D Driver Diagram

Driver Diagram

Aim	Primary drivers	Secondary drivers	Change ideas	Change concepts

Aim

Increase quality of written comments on ITERs by 20%

Primary drivers

Faculty FB and evaluation skills

Institutional culture of improvement

Resident feedback seeking/uptake behaviors

Secondary drivers

ITER process difficult for faculty

Faculty discomfort with the evaluation/FB process

Performance mindset vs improvement mindset

Residents' conception of their role in FB process

Change ideas

Identify/teach best work practices for completing ITERS

Scheduled time for ITER completion

Using CCERR, provide faculty feedback on their ITERs

Teach R2C2 FB model

Just in time narrative FB consults

FD workshop on characteristics of improvement cultures

Assessment/feedback faculty award

FB buzz phrases

FB literacy training for new residents

Change concepts

In CBME, learners *need and deserve* FB

Normalize provision of constructive FB

Workplace based FD in a community of learners

High-quality learners request and act on feedback from experienced supervisors

Feedback Literacy Project

Period Highlight:	1		Plan Duration		Actual Start

ACTIVITY	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE	PERIODS Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
FB literacy workshop project	Sep	12														
Questionnaire development	Sep	3														
Workshop agenda	Sep	3														
Workshop logistics	Sep	2														
Focus group script/questions	Oct	2														
Workshop 1	Jan	1														
Focus Group 1	Mar	1														
questionnaire 1	Mar	1														
Workshop 2	Feb	1														
Focus Group 2	Apr	1														
questionnaire 2	Apr	1														
Workshop 3	Mar	1														
Focus Group 3	May	1														
questionnaire 3	May	1														
Workshop 4	Apr	1														
Focus Group 4	Jun	1														
questionnaire 4	Jun	1														
Workshop 5	May	1														
Focus Group 5	Jul	1														
questionnaire 5	Jul	1														
Data Analysis	Jun	3														

Appendix F PDSA Form

Tester:	Thomas Grau		Date:	Nov 7, 2021
Change Idea:	Workshop on feedback literacy to PGY1 Internal Medicine (IM) residents			
Goal of the Test:	Improve residents' feedback literacy (the ability to solicit, understand and enact feedback received from physician supervisors)			

1. PLAN

Questions:	Predictions:
What do residents see as their role in the feedback process?	Most residents see FB as "the teacher's job"
Can feedback literacy be taught to residents?	Residents will understand/ be favorably predisposed to the concept of FB literacy
Is a workshop an effective method of teaching feedback literacy?	FB literacy knowledge will improve but behavioral changes may not occur
Will residents implement FB literacy behaviors in the workplace?	• Residents will avoid utilizing FB behaviors learned in workplace • Residents who utilize FB literacy behaviors will face resistance from faculty

Details:

FB has traditionally been a teacher-driven process of telling learners (or providing learners written comments) about areas of improvement. The learner's role in FB provision tends to be as a passive recipient. More recent FB models stress the importance of active learners who play a vital role soliciting, understanding, and enacting FB. This is a paradigm shift for most learners; a workshop on feedback literacy could help learners transition to a more active role in the feedback process.

2. DO:

A 2-hour interactive workshop introducing the concept of feedback literacy will be provided to first year IM residents. Workshops will have 5-6 attendees and will consist of a short presentation on FB literacy, videotape reviews/discussion of FB scenarios and opportunities for attendees to practice FB literacy skills. Attendees will identify 1-2 FB literacy skills that they will implement on their upcoming clinical rotation.

3. STUDY

What were the results:

The workshop was an effective method of teaching the concept of feedback literacy to residents

Residents who utilized the feedback literacy behaviors from the workshop noted improvement in the quality of the feedback they received on subsequent clinical rotations

Some residents were reluctant to employ feedback literacy behaviors in the clinical setting

Residents' use of feedback literacy behaviors seemed to promote more unsolicited constructive feedback from faculty

What did you learn?

A workshop on feedback literacy increased resident feedback seeking behaviors in the clinical setting and fosters increased agency toward their learning. However, the impact is not uniform, some residents remain reluctant to seek feedback even after the workshop. Faculty did not resist resident use of feedback literacy behaviors and actually provided more unsolicited feedback. Training residents in feedback literacy may improve the feedback culture within a residency program.

4. ACT

- An annual workshop on feedback literacy should be provided to all PGY1 Internal Medicine residents
- Future workshops should discuss strategies for dealing with the affective issues that limit feedback-seeking among some residents
- Future workshops should incorporate post-workshop reminders to encourage residents to use feedback literacy behaviors
- Faculty should receive training on feedback literacy outlining faculty behaviors that foster resident feedback seeking

Appendix G Workshop Agenda

Feedback literacy workshop agenda

1) Format

    a. 2-hour session
    b. Interactive workshop
    c. Zoom videoconferencing platform
    d. 4-6 learners/sessions

2) Learning objectives

    a. Review the educational value of feedback
    b. Analyze the current "teacher-centric" feedback paradigm
    c. Describe the concept of feedback literacy
    d. Identify the key components of learner feedback literacy
    e. Practice feedback literacy skills

3) Outline of session

    a. Mind mapping exercise
    b. Discussion on feedback experiences during residency
        i. Your experiences with FB
        ii. Value of feedback
        iii. Challenges with seeking/receiving feedback
    c. Videos on feedback followed by discussion
        i. Ted talk Sheila Heen (first 6:28)
           https://www.youtube.com/watch?v=FQNbaKkYk_Q
        ii. MedEdPortal video on student feedback
    d. Minilecture
        i. Provide handout and goal cards
    e. Practice feedback seeking behaviors
        i. Role play of FB scenario
    f. Goal setting
        i. Commit to 2 behaviors you plan to try on your next rotation

Appendix H Feedback Literacy Questionnaire

INTRO This questionnaire is designed to assess your thoughts and preferences related to feedback in medical education. Please review all answer options before selecting your response.

Q1 How important is feedback from attendings in helping you improve as a physician?

◯ not important to helping me improve (1)

◯ slightly important to helping me improve (2)

◯ moderately important to helping me improve (3)

◯ quite important to helping me improve (4)

◯ essential to helping me improve (5)

Q2 How satisfied are you with the feedback you have received from attendings during your residency training?

◯ Not at all satisfied (1)

◯ Slightly satisfied (2)

◯ Moderately satisfied (3)

◯ Quite satisfied (4)

◯ Extremely satisfied (5)

Q3 When compared to other teaching competencies, how important is it for teaching attendings to provide effective feedback?

○ Not important (1)

○ Slightly important (2)

○ Moderately important (3)

○ Quite important (4)

○ Essential (5)

Q4 At the start of your clinical rotations, how often do you discuss **specific** areas where you want to improve with your attending?

○ Almost never (1)

○ Once in a while (2)

○ Sometimes (3)

○ Often (4)

○ Almost always (5)

Q5 In medical education, who do you feel is most responsible for assuring effective feedback occurs?

○ Assuring effective feedback is primarily the attending's responsibility (1)

○ Assuring effective feedback is mostly the attending's responsibility but the resident is somewhat responsible (2)

○ Residents and attendings equally share responsibility for assuring effective feedback (3)

○ Assuring effective feedback is the mostly the resident's responsibility but the attending is somewhat responsible (4)

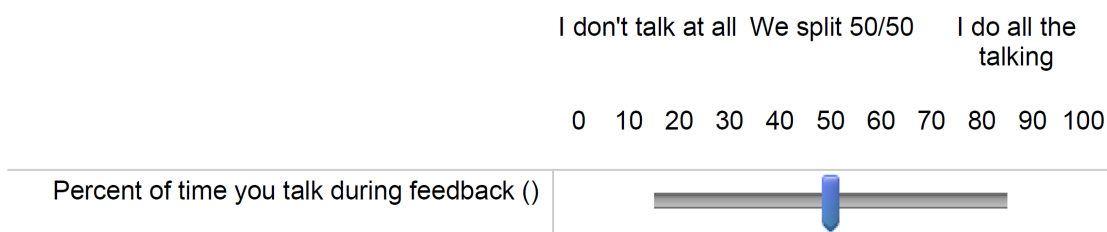○ Assuring effective feedback occurs is primarily the resident's responsibility   (5)

Q6 Please rank from 1 to 3 your preferred method for requesting/receiving feedback

_____ I prefer to request *general* feedback (e.g., "I would like some feedback on how I am doing on this rotation") (1)

_____ I prefer to request *specific* feedback (e.g., "I would like some feedback on my ECG reading skills") (2)

_____ I prefer to *wait for the attending* to provide feedback (3)

Q7 In a typical feedback scenario, how much time do you talk (as opposed to the amount of time the faculty talks)

	I don't talk at all	We split 50/50	I do all the talking
	0 10 20 30 40 50 60 70 80 90 100		
Percent of time you talk during feedback ()			

Q8 During a feedback session, how often do you ask questions to help you better understand the feedback?

○ Almost never (1)

○ Once in a while (2)

○ Occasionally (3)

○ Often   (4)

○ Almost always (5)

Q9 After receiving feedback from an attending, how often do you have **a clear understanding** of how you can improve?

○ Almost never (1)

○ Once in a while (2)

○ Occasionally (3)

○ Often   (4)

○ Almost always (5)

Q10 How often are you upset by the feedback you receive?

○ Almost never (1)

○ Once in a while (2)

○ Occasionally (3)

○ Often   (4)

○ Almost always (5)

Q11 How much of a barrier do negative emotions play in your willingness to solicit constructive feedback?

○ Not a barrier (1)

○ Slight barrier (2)

○ Somewhat of a barrier (3)

○ Moderate barrier (4)

○ Extreme barrier (5)

Q12 How concerned are you about the potential risks of soliciting feedback?

○ Not at all concerned (1)

○ Slightly concerned (2)

○ Somewhat concerned (3)

○ Moderately concerned (4)

○ Extremely concerned (5)

Q13 After receiving feedback on an area for improvement, how often do you check with your attending to see if you successfully addressed the deficiency?

○ Almost never (1)

○ Once in a while (2)

○ Occasionally (3)

○ Often (4)

○ Almost always (5)

Q14 How confident are you in your ability to provide effective feedback to medical students with whom you work?

○ Not at all confident (1)

○ Slightly confident (2)

○ Moderately confident (3)

○ Quite confident (4)

○ Extremely confident (5)

Q15

Please provide your thoughts on the following question. How do you think the feedback experience during residency can be improved?

_____

_____

_____

_____

_____

Appendix I Workshop Evaluation Form

FB literacy workshop evaluation

Intro: The feedback literacy workshop is a change idea designed to improve the educational experience for Internal Medicine residents. We are very interested in your feedback on how we can improve the workshop. Please take a few minutes to evaluate the feedback literacy workshop.

Q1 The learning objectives of the workshop were clear

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q2 The workshop achieved the learning objectives

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q3 The workshop was well organized

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q4 The presenter was effective at engaging the audience in the topic

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q5 Videotapes used in the presentation effectively reinforced the content

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q6 The use of role plays improved my understanding of feedback literacy

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q7 As a result of the workshop, I have a better understanding of the concept of feedback literacy

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q8 The workshop provided useful tips on how to implement feedback literacy behaviors on clinical rotations

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Q9 Please rate the overall quality of the workshop

- ☐ Excellent
- ☐ Very Good
- ☐ Good
- ☐ Fair
- ☐ Poor

Q13 What parts of the workshop did you find valuable?

Q14 What parts of the workshop did you find least valuable?

Q15 For future feedback literacy workshops, what should be left out or changed?

Appendix J Focus Group Interview Guide

Introductory Script

Thank you for agreeing to participate in this focus group.

The goal of these focus groups is to better understand residents' experiences with feedback from attendings on clinical rotations and to talk about the impact of the feedback literacy workshop on your most recent feedback experiences in the clinical setting. We are particularly interested in your opinions and experiences on **the residents' role** in the feedback process.

We recognize each of you may have different opinions or experiences related to feedback. Please do not feel obligated to strive for agreement or consensus, we are interested in capturing and discussing the broad range of feelings, opinions and experiences related to feedback in residency. Please note, this improvement cycle is interested primarily in how residents experience feedback rather than the content of the feedback itself.

I have developed some questions to get us started. For several of the questions, I will ask each one of you for your thoughts. However, for most of the questions, we will just discuss the topic as a group. Sometimes, I will ask if anyone has a different viewpoint, again just trying to gauge the range of perspectives on these topics.

We will be recording the session using Zoom. Only I and my coinvestigators will have access to the recording. Our recorded discussion will be de-identified, transcribed, and then coded for common themes that arise among the focus groups conducted. You will not be named nor described in a way that would allow your identification in the transcript or any other written work related to the study. If names are to be used, we will use pseudonyms.

Does anyone have any questions?

Discussion Guide

A. Opening questions
1. What rotation did you just complete?

B. Introductory questions
1. What was your experience with feedback during this rotation?
2. Did you solicit feedback during this rotation?
   a. What was that experience like for you?
   b. Did you use any particular techniques or strategies to solicit feedback?

C. Transition question
   1. Learners sometimes say that feedback involves both benefits and risks, what are your feelings on the benefits and risks of feedback?

D. Key questions
   1. Did the workshop change the way you think about feedback?
      a. If yes, in what way?
      b. If no, why was that?
   2. On this rotation did you do anything differently based on the information from the feedback literacy workshop?
      a. Did you do anything to help you better understand the feedback you received?
   3. Did you encounter any obstacles or sense any resistance to feedback literacy behaviors?
      a. Tell me more about that resistance
         i. Or those obstacles?
      b. Did others have similar experiences?
      c. How did you deal with this resistance (or the obstacles)?
   4. Feedback conversations can provoke emotions, how do you deal with that aspect of feedback?
      a. Do emotions impact on your tendency to reflect and act on the feedback?
   5. Did you find the workshop to be helpful?
      a. What recommendations do you have for making the workshop more effective?

E. Ending question
   1. These are all the questions I have, does anyone in the group want to share some additional thoughts related to feedback literacy?

Appendix K Coding Book

Name	Description
Enacting feedback	Themes, statements, or behaviors related to leaners' attempts to utilize the feedback they have received
closing FB loop	Themes, statements, or behaviors related to getting addtional FB after receiving prior FB. Includes concepts like FB update, asking for FB after FB, and revisiting prior FB.
FB looking forward	Themes, statements, or behaviors related to learner perceiving current feedback as useful to future performance. Includes FB that is generalizable and FB related to future roles (e.g. being a senior resident, subspecialty fellow,or staff physician)
Facilitating feedback	Behaviors or themes related to learners' efforts to foster conditions that increase the likelihood they will receive feedback.
goal setting	Themes or behaviors related to learning goals, professional development goals or personal development goals. Mainly deals with specific goals in these categories. A general overall goal of improvement should be coded under growth mindset
growth mindset	Themes, behaviors, or statements related to growth mindset and its role in FB processes.
Making time for FB	Theme, comments or behaviors related to making time for feedback (does not include comments related to lack of time for feedback, code those under barriers)
Structured feedback-attending driven	Themes or behaviors related to planned FB from attending to learners. In this code, attending or system (e.g., feedback Fridays) initiates planning of FB interaction
Structured feedback- resident driven	Themes or behaviors related to planned FB between attendings and residents. In this code, the resident themselves initiates planning of FB interaction

Name	Description
relationships	Themes, statements, or behaviors related to the importance of relationships in FB processes
continuity with supervisors	Themes related to how continuity impacts on feedback
Trust	Themes or behaviors related to trust between residents and attendings (does not include lack of trust which falls under FB barriers)
two way feedback	Themes related to attendings asking for FB from residents on their performance
FB barriers	Themes or behaviors related to barriers to feedback especially when these barriers inhibit FB. Barriers can be personal, interpersonal, or structural and can impact on either feedback seeking or feedback giving. This category overlaps at times with other categories, particularly situational aspects of feedback, and may be cocoded.
emotions inhibiting feedback	Themes, statements, or behaviors related to how negative emotions, either on part of FB giver or FB receiver, can inhibit the feedback process
Lack of time for FB	Themes related to difficult finding time for FB, or attendings not setting aside time for FB, or time pressures preventing FB
less FB on certain rotations	Themes, statements, or behaviors related to the variability of quantity or quality of FB provided on certain rotations.
FB value	Themes, statements, or behaviors related to the educational value or importance of feedback. Includes concepts such as how the FB led to improvement,led to deeper reflection, helped address a challenge, or helped develop an action plan. Statements may include phrases such as actionable FB, useful FB, FB perceived as important
help with transitions	Themes, statements or behaviors related to how FB helps with transitions

Name	Description
Improving workshop	Themes, statements, or behaviors related to how FB literacy workshop can be improved
Seeking feedback	Themes, statements, or behaviors related to learners' attempts to seek feedback from others on their performance
attending receptivity	Themes, comments, or behaviors related to attending's receptivity to feedback seeking behaviors used by the residents
cueing attending	Themes, behaviors, or statements related to resident asking attending for constructive feedback on specific areas. In essence, cueing the attending on what they would like feedback on
empowerment agency	Themes, behaviors, or statements referring to residents' sense of control over their learning and/or the feedback process. Related terms include self-initiation, ownership, empowerment, self-efficacy
strategies for FB seeking	Themes, comments, or behaviors related to particular strategies residents utilize to seek feedback
Situational aspects of FB	Themes, comments, or behaviors related to how the situation or context impacts on facilitating FB or seeking FB
Emotions or discomfort with FB seeking	Themes or behaviors related to resident discomfort or negative emotions associated with utilizing FBL behaviors. Does not include negative emotions related to receiving FB (coded under FB barriers)
Med student role	Refers to themes related to feedback in the medical student role
Time of year	Themes related to how FB differs qualitatively or quantitatively based on time of year
Understanding feedback	Themes or behaviors related to efforts by learners to better understand and process the feedback they receive. Also includes behaviors related to better understanding the feedback process in

Name	Description
	medical education. Effectively asking questions, fostering dialogue, and dealing effectively with emotions during FB sessions all fall under this code
Making judgments	Themes, comments, or behaviors related to the judgments learners make on the feedback they receive. Includes comparing FB to self-assessment, comparing FB to others' assessments, and determining whether FB is "accurate"
Managing emotions in FB interactions	Themes or behaviors related to the role of emotions, both negative and postive, during and following feedback interaction
specific FB	Themes, comments, or behaviors related to residents attempts to gain specific information during a feedback interaction
Workshop Impact	Themes or behaviors related to the impact the FBL workshop had on the feedback process.
Changes res made or plans to make	Themes or behaviors related to changes resident made or plans to make because of the FB literacy workshop
Impact of FBL behaviors on res-att relationship	Themes or behaviors related to impact use of FBL behaviors had on the relationship between the attending and resident
Negative impact	FBL behaviors had a negative impact on att-res relationship
positive impact	FBL behaviors improved att-res relationship

Appendix L Teaching Effectiveness Rubric

University of PITTSBURGH

Faculty Teaching Effectiveness Rubric

	Developing	Accomplished	Mastery
Learning Environment How well does faculty member: Engage and motivate learners? Utilize a "learner-centered" teaching approach? Demonstrate enthusiasm for topic/learners? Demonstrate respect for learners?	• Utilizes a teacher-centric approach to instruction • Occasionally dismissive of or disrespectful to learners • Does not effectively engage learners	• Captures and maintains learners' attention • Uses interactive teaching approaches • Consistently demonstrates respect to all levels of learners • Creates a safe but stimulating learning climate	• Seen by peers as a role model for inspirational teaching • Integrates high standards with a supportive learning environment • Motivates learners to pursue self-improvement
Teaching Practices Does faculty member utilize goals to organize teaching sessions? Can faculty member adapt teaching as needed? Are teaching sessions organized and efficient? Does faculty member incorporate learning science into instructional practices?	• Does not routinely solicit learner goals • Unaware of evidence-based techniques to facilitate learning • Has trouble adjusting teaching to different learners and different settings • Struggles with organization and efficiency when teaching	• Regularly solicits goals from learners • Can adapt teaching to learning venue or learner needs (reflection on action) • Uses evidence-based techniques to facilitate learning • Teaching sessions are usually organized and efficient	• Collaborates with learners on learning goals • Skillfully adapts teaching based on observations made while teaching (reflection in action) • Teaching sessions consistently well-organized and efficient • Colleagues seek their advice on teaching issues
Supervision Practices Does faculty member make themself available to the team if needed? How well does faculty member balance supervision and autonomy?	• Tends to micromanage residents to the detriment of resident learning/growth • Provides residents minimal autonomy **OR** • Allows residents too much autonomy to the detriment of patient care • Provides minimal supervision	• Consistently available to learners when needed • Balances resident supervision and autonomy	• Consistently available to learners when needed • Uses evaluation of learners to adjust level of supervision required • Uses evaluation/feedback to nurture progressive autonomy
Feedback Practices Does faculty member provide high-quality verbal feedback? Does faculty member complete In-training evaluation reports (ITERs) in a timely manner? Quality of ITERs completed by faculty Does written feedback demonstrate investment in resident growth?	• Provides minimal verbal feedback to learners • ITERs occasionally not completed • ITER written comments are absent, minimal or contain vague statements such as "read more" • CCERR scores average <20	• Regularly provides verbal feedback to learners • ITERs consistently completed on time • ITER written comments provide both praise and constructive feedback • CCERR scores average between 20-27	• Provides verbal feedback as a prelude to a coaching conversation • ITER written comments provide specific constructive feedback AND suggestions for improvement • Solicits feedback from learners • CCERR scores average between >28
Self-improvement as a teacher Does faculty member participate in activities designed to improve their teaching effectiveness? How does faculty member use assessment data, feedback or reflection to improve as a teacher?	• Participated in 0-1 faculty development (FD) sessions in the past year • No evidence that faculty member has adjusted their teaching based on feedback or reflection • Teaching evaluations raise similar concerns identified in previous year(s)	• Participated in 2 or more FD sessions in the past year • Can provide supervisor specific examples of how they have adjusted their teaching based on feedback and/or reflection	• Regularly participates in medical school and/or DOM FD activities • Provides FD presentations locally • Consistently incorporates feedback and assessment data into improving their teaching practices
Involvement in teaching service In what ways has faculty member contributed to the teaching community, both within Pitt/UPMC and nationally?	• Does not serve as an advisor or mentor • Did not serve on an education task force • Did not attend any teaching retreats • Participates in teaching activities when requested or scheduled but does not volunteer for additional duties • Achieved ≤ 100 % of ECU target	• Exceeded ECU target • Served as resident advisor • Volunteered for additional teaching responsibilities • Served on local educational task force • Mentored a resident research, QA or educational project	• Participated in multiple activities listed in accomplished column • Holds one or more educational leadership roles • Regular involvement on teaching committees and/or task forces

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