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Optimizing feedback reception: a scoping review of skills and strategies for medical learners

Optimiser la réception du feedback : une revue de la portée des compétences et stratégies pour les apprenants en médecine

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Abstract

Background: Feedback remains essential to a learner's professional development. Most feedback literature focuses on provision of feedback, and there is a lack of evidence-based data to support learners in developing skills to receive, evaluate and use feedback, independently of context. This scoping review mapped the literature regarding strategies and skills that optimize medical learners' reception to feedback.

Methods: Investigators conducted searches in MEDLINE, Embase, ERIC, APA PsycINFO and Web of Science Core collection from inception to May 2023. Study inclusion criteria were primary evidence sources, and strategies or skills for improved feedback reception for medical learners. Data were screened and extracted by pairs of independent reviewers. Investigators summarized study characteristics, outcomes, educational methods, and interventions.

Results: Of 7692 total studies, six provided strategies and skills to improve feedback reception. Delivery of education was via workshops (*n* = 5 studies) that proposed cognitive, reflective and experiential learning activities, all reporting learners' self-perceived improvement of feedback behaviour. Nine strategies and seven tools were identified, focusing on general approach, soliciting or evaluating feedback.

Conclusion: The six included studies outline nine strategies and seven skills for improved learner feedback reception, focusing on overall approach and agentic behaviours without evaluation of the strategies or skills in practice. Key concepts and gaps in the literature were identified and may guide further investigation to optimize learner reception to feedback.

Résumé

Contexte : La rétroaction demeure essentielle au développement professionnel des apprenants. La majorité des publications sur la rétroaction se concentrent sur sa fourniture, et il existe un manque de données probantes pour soutenir les apprenants dans le développement de compétences permettant de recevoir, évaluer et utiliser la rétroaction, indépendamment du contexte. Cette revue exploratoire a cartographié la littérature portant sur les stratégies et compétences qui optimisent la réception de la rétroaction chez les apprenants en médecine.

Méthodes : Les chercheurs ont effectué des recherches dans MEDLINE, Embase, ERIC, APA PsycINFO et Web of Science Core Collection depuis l'origine jusqu'à mai 2023. Les critères d'inclusion des études comprenaient des sources de données primaires et des stratégies ou compétences visant à améliorer la réception de la rétroaction chez les apprenants en médecine. Les données ont été examinées et extraites par paires d'évaluateurs indépendants. Les chercheurs ont résumé les caractéristiques des études, les résultats, les méthodes pédagogiques et les interventions.

Résultats : Sur un total de 7692 études, six ont identifié des stratégies et des compétences pour améliorer la réception de la rétroaction. La formation était principalement dispensée sous forme d'ateliers (n = 5 études) proposant des activités d'apprentissage cognitives, réflexives et expérientielles, toutes rapportant une amélioration perçue par les apprenants de leurs comportements liés à la rétroaction. Neuf stratégies et sept outils ont été recensés, portant sur l'approche générale, la sollicitation ou l'évaluation de la rétroaction.

Conclusion : Les six études incluses décrivent neuf stratégies et sept compétences pour optimiser la réception de la rétroaction chez les apprenants, en mettant l'accent sur l'approche générale et les comportements proactifs, sans évaluation pratique des stratégies ou compétences. Des concepts clés et des lacunes dans la littérature ont été identifiés, pouvant orienter de futures recherches pour améliorer la réception de la rétroaction par les apprenants.

Introduction

Feedback interactions within medical education settings are complex, as they involve many factors such as the assessment of diverse skills at varying levels of training, patient safety and rights during clinical experiences, and the psychosocial aspects including the learner-preceptor dynamic, learner confidence and emotions.[1–4] Feedback is consistently considered critical to the recipient's learning process and professional development.[4–10] Feedback is defined as a process where learners assimilate information from various sources and apply the information to improve their work.[11] A supervisor often observes a learner then provides their evaluation for the purpose of closing the gap between the learner's actual performance and desired performance based on learning goals.[1,4,12] Ideally, this is a two-way discussion developed from an educational alliance, and involves learners' active participation and reflection to become aware of their strengths and weaknesses and further integrate this knowledge.[6,7,9,12–15] Within a medical education context, effective feedback interactions translate to improved learner competencies and clinical skills required to safely practice medicine.[12,15,16]

Current literature mainly focuses on the supervisor's provision of feedback, while highlighting the importance of forming an educational alliance with the students.[1–4,6,7,17–19] Based on conceptual presentations, many authors present advice to faculties such as tips concerning the learner-supervisor relationship,[8,15,16,19] the importance of an agentic role for learners in the interactive feedback process,[8,15,16] and explain how learners may perceive or manage feedback cognitively or emotionally.[8,16] They mention benefits of developing a culture of growth mindset for learners, without clear suggestions or strategies to develop this positive attitude.[19] Unfortunately, in medical education, students often perceive feedback as a "performance assessment" rather than a learning opportunity,[20] them from easily receiving and assimilating feedback.[1–4,6,7,17–19] As Telio et al define receptivity as consideration and acceptance of the information received,[7] there is limited evidence-based data supporting learners in developing feedback reception skills including agentic role and attitude needed to seek, receive, evaluate and use feedback effectively.[2,3,6] Within the literature, there has yet to be a comprehensive summary of the available evidence related to strategies and skills that empower learners to optimize feedback reception.

Objectives

This scoping review aimed to map the available literature regarding strategies and skills to optimize medical learners' feedback reception.

Methods

Scoping review

Scoping reviews outline existing evidence by examining the nature and extent of primary research to identify key concepts, knowledge gaps and available evidence.[21,22] They are particularly useful for broad research questions that have yet to be comprehensively summarized in the literature, such as the complex topic of optimizing reception to feedback.[22,23] This scoping review followed the five-stage framework as outlined by Arksey, O'Malley, and Levac et al, which includes identifying the research question, relevant published articles and further analyzing, summarizing and interpreting the data of the included references in relation to further research, education and practice.[21,24] A scoping review was a key first step to inform further research and educational models on this essential concept within medical education.

Protocol and registration

This scoping review was reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR).[23] The protocol for this scoping review was published on the University of Ottawa Research Repository (https://ruor.uottawa.ca/).

Eligibility criteria

Eligible references were primary sources, reporting both qualitative and/or quantitative data that discussed learner reception to feedback. Non-primary sources, such as reviews, editorials, conference abstracts, letters to the editor, commentaries were excluded. Articles were excluded if they focused on only providing feedback (i.e., teaching preceptors how to provide or deliver feedback). We defined strategies and skills as techniques or approaches (e.g.: identifying internal triggers, mindset development), and tools (e.g.: checklists, cognitive aids) designed to improve learner feedback reception. Given the extent of the literature, we limited the population to specific health care professionals including medical or nursing students and medical residents, fellows, and staff. The setting of feedback interactions was not limited. Studies written in English or French were included.

A peer reviewed search strategy was conducted with assistance of research librarian on August 6, 2021 in MEDLINE (Ovid), Embase (Ovid), ERIC (Ovid), APA PsycINFO (Ovid), and Web of Science Core Collection (see Appendix A for full MEDLINE search details). The MEDLINE search strategy underwent Peer Review of Electronic Search Strategies (PRESS) by a second trained information scientist.[25] A search update was run on May 24, 2023. No limits to language or publication date were applied. The main search concepts comprised of terms related to formative feedback, self-assessment, receiving, using, accepting, or applying feedback, medical education and medical learners. The final list of the included studies was reviewed by experts in the field of medical education feedback for both completeness and relevance. Search results were exported to DistillerSR [26] (Evidence Partners, Ottawa, Canada), and duplicates were eliminated using the platform's duplicate identification feature.

Selection of sources of evidence

A team of nine screeners (SC, EV, TH, JE, MK, NG, PG, EV, JW) were recruited and trained to use DistillerSR[26] software using the pre-established checklist for article eligibility criteria (Appendix B). The checklist was piloted with a subset of articles and further refined prior to the two-stage screening that identified eligible studies for inclusion.

Title and abstract screening consisted of four pairs of reviewers independently reviewing and recording eligibility of the assigned studies (SC, EV and TH; JE and MK; NG and PG; EB and JW).[23] Conflicts were resolved by consensus between the pair. Any study with disagreement of inclusion was advanced to full text review. Full text review consisted of three screening pairs (TH and EV; JE and MK; NG and PG) independently screening and recording the eligibility outcome. Any classifications resulting in disagreement between the individual pairs were resolved by consensus, with further assistance from a third member of the research team (JR) when required. The studies classified as either "included" or "unclear" were included for further analysis, with the excluded articles removed. Further full text evaluation was conducted by one screening pair (TH and JE) to validate the studies for qualitative synthesis, with further refined eligibility criteria from the previous level. The investigator team then reviewed all included articles for final acceptance based on the pre-defined criteria. DistillerSR[26] artificial intelligence quality check feature was used as a quality assurance check that reviewed and validated exclusion decisions and categorization of records in tandem to the reviewers.[26] The updated literature search sources of evidence were analyzed in the same fashion as the original database search by four members of the original research team (JR and CE; TH and DBL).

Data charting process

Two authors pilot tested the data extraction form (TH, JE) with two studies and compared extracted data to ensure efficacy (Appendix C). Data extraction was performed by two authors (TH, JE) with consensus from a third author (JR) and was guided by the Aksey and O'Malley framework to record study characteristics, intervention characteristics, instruments such as tools and strategies, outcomes (e.g.: better acceptance of comments, adoption of agentic behaviours) and evaluative measures of learner reception to feedback.[21,23,24] All data regarding intervention significance on learner outcome was reported as seen in the original source. If data was inadequately reported within the full-text article, we contacted the original authors for clarification and further details.

Data items and synthesis of results

The data were organized into categories and themes to outline the existing literature and identify potential gaps in current medical education research. The information was organized into delivery of education, type of learning activities and learning processes which involved identifying cognitive, reflective and experiential activities. We further identified specific strategies and tools and their use by learners, further analyzing them for similarities, differences and usage. The research team analyzed the findings to answer the research question with results summarized in tables with narrative synthesis

Critical appraisal of individual sources of evidence

Quality assessments of included studies were not reported because they are typically not completed during a scoping review.[23]

Results

Study selection

The literature search strategy yielded a total of 10848 sources of evidence, of which 3933 were duplicates with a total 6915 articles reviewed. After the title and abstract screening, 240 references were included for further review based on the pre-established criteria, with 238 retrieved for full text screening. After full text screening, with focus on actionable strategies to improve learner's ability to receive feedback, 232 articles were excluded as they did not meet the pre-established criteria for study language,

population, design, topic/content, outcomes and intervention. In total, six studies met the eligibility criteria and were used for data extraction and synthesis (Figure 1).

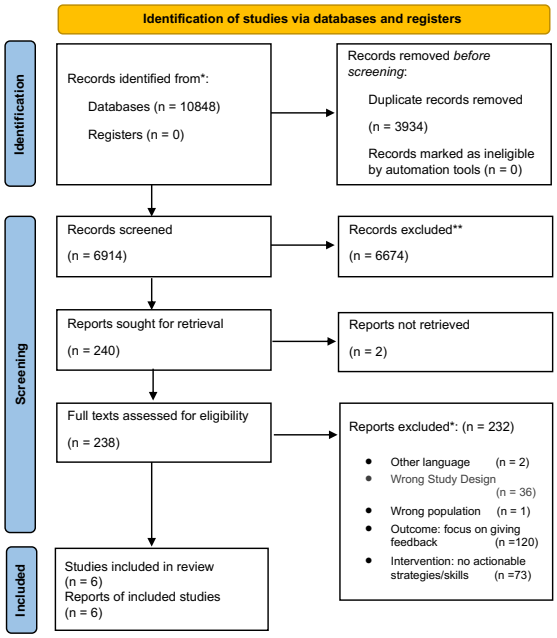

Figure 1. Scoping review literature search flow charts: Detailed outline of the review process and data synthesis of the original and updated literature searches (inclusive of 2023).

Study characteristics

Details of the included study characteristics including publication, participants, design, purpose, educational intervention, and reported outcomes were included in Table 1.[27–32] A total of six studies were focused on improving receptivity to and acceptance of feedback *n* = 820 participants [100%]). Most studies were completed in the USA (*n* = 5 studies [83%]) and published in the last three years (*n* = 4 studies [66%]), with two studies published before 2011.

Each study had clerkship medical students as the feedback recipients, with 820 participants total and 689 students in interventional workshops. The populations varied in clinical experience between 3rd and 4th year clerks (*n* = 4 studies; *n* = 523 learners) or second-year students (*n* = 2 studies; *n* = 166 students). Two studies used smaller populations to run pilot programs prior to implementing the final program (*n* = 30 pilot students; n = 374 program students). Most participants were selected with convenience samples (*n* = 4 studies; *n* = 721 students) and studies either used a case control (*n* = 3 studies; *n* = 386 students [47%]) or observational cohort designs (*n* = 3 studies; *n* = 434 students [53%]) (Table 1). All studies used educational workshops to deliver training content aimed at increased learner knowledge of the feedback process and promote medical student agentic engagement within feedback interactions (*n* = 6 [100%]; n = 689 learners in interventions [84% learners]. Only one study evaluated the effectiveness of a workshop combined with a long-term program to improve feedback, including both a faculty and medical student informative workshop and a post-program survey for students with open-ended questions (*n* = 1 [16.6%]; *n* = 144 students; *n* = 205 faculty). All other studies evaluated the effectiveness of the workshops with post-workshop surveys (*n* = 5 [83%]), with three studies using rating scales and open-ended questions and two studies only using rating scales. Of the post-workshop surveys, questions were asked regarding subjective student improved confidence of behaviours (*n* = 5 [83%]), workshop evaluation (*n* = 3 studies [50%]) and possible use of the skills taught (*n* = 2 studies [33.3%]). One study used an objective measure, OSTE (Objective Structured Teaching Exercises) to see pre and post workshop changes in performance, though the post workshop OSTE was optional (*n* = 1 study [16.7%]). The reported outcomes of the workshops demonstrate student perceived improvement in agentic behaviours of seeking feedback or self-reported confidence, with overall positive feedback for the workshops. Four studies identified barriers to feedback via pre-workshop surveys which included poor educational alliance, fear of negative feedback, and lack of time and skills to seek feedback. One study also highlighted the importance of the environment when providing feedback (Table 1).

Individual study results and synthesis

Most workshops were interactive (*n* = 5 studies [83%]; *n* = 557 students in interventions [80%]), while one study delivered only learning sessions about feedback interactions prior to students (*n* = 144 students) and faculty (*n* = 205 faculty) participating in a year-long feedback program aimed at developing individual learner and supervisor skills as well as the pedagogical alliance.

Workshops used different types of activities to explain the components of feedback interactions and present best practices when participating. All studies used cognitive and reflective activities, while three used role playing as experiential activities. Cognitive activities included passive learning sessions, often lectures, focused on building knowledge of the feedback process, emphasizing the importance of the feedback educational alliance, and of the learner adopting an agentic role and outlining teaching strategies or tools to develop these behaviours (*n* = 6 studies, [100%]; *n* = 689 learners [100%]) (Table 2).

Table 1. Summary of the included study characteristics including the title, publication information, purpose of study, educational delivery, design, population sample and size, and outcomes.

Title	1e author, Journal, year, Country	Purpose of Study	Delivery of Education	Study Design	Population Sample & Size	Reported Outcomes
Feedback Focused: a learner-teacher-centred curriculum to improve feedback exchange in the OB and GYN clerkship	Johnson, N. MedEdPortal, AAMC Journal of Teaching and Learning Resources. 2021. USA[27]	Create feedback focused learner-teacher program to change the culture of the learning environment and to improve frequency and quality of feedback to clinical students	Didactic session to introduce a descriptive longitudinal program.	Observational cohort	Convenience: 144 second year clerkship medical students; 205 faculty	1. Program overall had majority positive feedback. 2. Students reported increased frequency and quality of feedback. 3. Barriers to feedback during a long-term program: - student-preceptor relationship - time constraints - quality and quantity of feedback - resident participation in feedback
Soliciting feedback on the wards: a peer-to-peer workshop	Yau, B. The Clinical Teacher. 2020. USA.[28]	Design and implement a peer-peer workshop to educate medical students on strategies for seeking, evaluating, responding to and utilization of feedback and the impact of the teaching on student attitude and confidence in feedback interactions.	Didactic & Interactive Workshop	Observational cohort	Convenience: Pilot – 20 fourth year clerkship medical students Program - 248 third year clerkship medical students	1. Improved student likelihood and confidence in soliciting feedback. 2. Responding to internal triggers was the most helpful lesson. 3. Peer-peer format is a strength. 4. Barriers to feedback pre-workshop: - time constraints -skills and emotions when asking for feedback -fear of negative feedback - student-mentor relationship with intimidation
An educational intervention to increase student engagement in feedback	McGinness, H. Medical Teacher. 2020. Australia.[29]	Assess if a one-time feedback workshop improves agentic feedback behaviour and student satisfaction with feedback	Didactic & Interactive Workshop	Case-control cohort; pretest vs post-test design	Convenience: Pilot – 10 third and fourth-year students Program – 126 Third- and fourth-year clerkship medical students	1. Student perception of improved agentic behaviours and active role in feedback, except utilization to modify learning 2. Improved feedback quality and quantity from staff 3. Barrier to feedback pre-and post workshop: - poor quality or lack of educational alliance
How am I doing? Teaching medical students to elicit feedback during their clerkships	Milan, F. Medical Teacher. 2011. USA.[30]	Explore student perspective of formative feedback during clerkship and assess the impact of the brief intervention on student experience, attitude and behaviour in receiving oral feedback	Didactic & Interactive Workshop	Case control Control vs intervention group	Convenience: Pilot – 12 third year clerks. Program – 161 third year clerkship medical students (Intervention n=83; control n=78)	1. Increase in feedback-seeking behaviours 2. Importance of the learning climate on the learners' perception of the feedback process 3. Barriers to feedback pre workshop: - Faculty unapproachability - lack of time - fear of criticism

Receiving Real-Time Clinical Feedback: A workshop and OSTE Assessment for Medical Students	Matthews, A. Advances in Medical Education and Practice. 2020. USA.[31]	Assess the effectiveness of a short workshop on receiving feedback skills of medical students and assess their skills through subjective (self reported) and objective measures (OSTE)	Didactic & interactive Workshop	Observational cohort	Cluster: 22 second year clerkship medical students	1. Self perceived skill and confidence in receiving feedback improved 2. OSTE objective receiving feedback scores improved 3. Short yet impactful workshop with improved outcomes
Coaching Medical student in receiving effective feedback	Bing-You, R Teaching and learning in Medicine. 1998. USA.[32]	Improve skills of medical students in receiving feedback through emphasis on their active participation in the process	Didactic & Interactive Workshop	Case control; Quasi-experimental observational	Cluster: 77 third year clerkship medical students (Intervention *n* = 36)	1. Improved student perception of feedback skills and subsequent information they receive 2. No change in the frequency of formal feedback sessions with residents or staff

Abbreviation: OSTE – Objective Student Teaching Exercises

Table 2. Summary of the type of learning activities presented in studies.

Reported studies	Learning activities		
1e author and year	Cognitive	Reflective	Experiential
Johnson N, 2021[27]	-Lecture on recognizing, soliciting and utilizing feedback -Provided strategies and tools	-Program-long written portfolio using READY approach after feedback interactions	
Yau B, 2020[28]	-Interactive session on how to solicit (questions and timing), receive (identifying triggers) and respond (action plan) to feedback	-Small & large group discussions: -Attitude and confidence towards feedback -Internal triggers Characteristics of constructive feedback -Strategy development	
McGinness H, 2020[29]	-Interactive session on feedback process, educational alliance and student agency -Provided tools	-Small group discussion guided by evaluation tool: -Barriers to feedback -Educational alliance -Strategy development	
Milan F, 2011[30]	-Interactive session on feedback process, strategies, and attitude to elicit feedback -Provided strategies	Group discussion: Variables that affect feedback interactions Cognitive and emotional challenges for student and preceptor	-Role play: practice using strategies
Matthews A, 2020[31]	-Interactive session on learner comfort and skill in receiving feedback and responding to constructive feedback -Provided strategy	-Group debrief and constructive feedback following OSTE	-OSTE simulations pre-and optional post workshop -Role playing with pairs of medical students using LCABE approach
Bing-you R, 1998[32]	-Interactive session on purpose and characteristics of feedback, learner behaviours, creating learning objectives and learning contract -Provided tools	-Discussion: -Best student behaviours to facilitate feedback interaction -Critique of videotaped feedback scenarios -Tool development	-Peer-peer role play debriefing with peer feedback

Abbreviations: READY [27]: Reflect on performance, Engage in the process of feedback, Aspire about skills to develop, Define areas for improvement, You- responsibility for growth is yours; OSTE[31]: Objective Structured Teaching Exercises; LCABE[31]: Listen, Clarify, Accept, Be proactive, Express gratitude

Reflective activities focused on integrating new knowledge through their personal experience. These included small group discussion sharing on past experiences (*n* = 5 studies [83%]; *n* = 545 learners [80%]) to address different aspects of the feedback interactions including characteristics of effective feedback, educational alliance, and learner role (Table 2). Nine teaching strategies supported by seven tools were identified to improve directly or indirectly feedback reception (Table 3). All workshops presented strategies for elements of the feedback interaction (*n* = 6 [100%]), with two workshops using mnemonics as a framework for the approach to feedback (*n* = 2 studies). Milan et al and Mcginness et al mention the use of "specific strategies" to help students achieve certain behaviours without providing a detailed outline of the strategy, therefore the strategies were summarized from the text[29,30] (Table 3). Though four strategies involved emotional factors, most simply suggested presenting emotional readiness and engagement (*n* = 3 studies [50%]; *n* = 261 learners [38%]) with only one specific strategy to identify and control emotions with internal trigger monitoring (*n* = 1 study [16.7%]; *n* = 268 learners [39%]). Three studies provided tools (*n* = 3 studies [50%]), with one study providing four separate tools where verbal scripts and letter to supervisors were later abandoned due to lack of use and efficacy (Table 3).

Table 3. Outline of the teaching strategies and tools from the included studies that were proposed to learners to improve feedback reception

Recommended behaviours for optimal feedback reception	Strategies
	Approach to feedback interaction: 1. READY[27] 2. LCABE[31] 3. Present emotional readiness to learn from mistakes, take an active and facilitative role by asking specific questions[30]
	Management of internal triggers: 1. Identification of emotional triggers, attention to inner voice and associated behaviours/reaction[28]
	Preparing for learning and feedback interactions: 1. Creating an "action plan for improvement" to be reviewed with mentor[28] 2. Learning contract with written personal learning goals[32]
	Evaluation of feedback: 1. Differentiation between constructive vs degrading feedback to better evaluate and use feedback[28]
	Soliciting feedback: 1. Use a case presentation and ask preceptor specific questions[29] 2. Focus on 'one good thing' a student accomplishes[29]
Accessories to guide students during the feedback interaction	Tools
	1. Tip cards with mnemonic or cognitive aid (Ex READY)[27] 2. Feedback portfolio for documentation of feedback interactions[27] 3. Verbal scripts for students to use for initial discussion with staff[29] 4. Letter for supervisors to outline expectations of student involvement and establishment of learning goals[29] 5. Feedback map to outline important dates or time points where feedback would be beneficial[29] 6. Feedback evaluation tool intended to integrate student & preceptor perspective on goals and performance, with student reflection and evaluation of feedback and encourage co-construction of learning plans[29] 7. List of behaviours that facilitate feedback[32]

Abbreviations: READY[27]: Reflect on performance, Engage in the process of feedback, Aspire about skills to develop, Define areas for improvement, You- responsibility for growth is yours; LCABE[31]: Listen, Clarify, Accept, Be proactive, Express gratitude

Discussion

Summary of findings

We identified six studies with interventions to improve learner reception to feedback, all of which used workshops with cognitive, reflective, or experiential activities to endorse the learner's agentic role within feedback interactions. Nine teaching strategies supported by seven tools were identified from the studies, with limited findings on the success of the strategy/tool in practice, and all studies reported self-perceived learner improvement in feedback behaviours (Table 2 and 3).

The identified strategies and tools focus on different elements of feedback interactions, including preparation, solicitation, evaluation of feedback. They provide specific interventions such as the "action plan"[28] to prepare for the experience, or an approach such as "READY"[27] or "LCABE"[31] for students to follow steps to participate in the feedback process. These identified studies differ from previous literature which present conceptual knowledge of feedback to faculty, such as tips to provide feedback,[8,15,16,19] or students with reflective logs to enhance their understanding and experience of the feedback process without focusing on specific strategies and tools for students to implement.[33] With nine strategies supported by seven tools identified, these results highlight emergence of evidence in feedback education and could be explored further with the hope of improving student reception to feedback. Importantly, the studies with specific strategies and tools all used learning workshops to engage with students, with one also implementing a longitudinal program. They all reported positive outcomes for subjective improvement in confidence and feedback behaviours, aligning with the known educational value of learning workshops and further reinforcing the utility of learning workshops in medical education.[33–37]

Even though all studies mentioned strategies or tools in the workshops, the strategies and tools were not all clearly detailed or outlined with in Milan et al and McGinness et al having a vague mention of suggested strategies and tools,[29,30] and none were evaluated in practice.[27–32] In creating curricula, a frequently cited process is Kern's "*Cycle for Medical Curriculum Development",* which proposes six essential interrelated steps: Problem identification, Needs assessment, Goals and objectives, Educational Strategies, Implementation and Evaluation; for the development of learning sessions.[38] However, the final step: "the evaluation of the planned session" is often skipped, therefore the value and effectiveness of the educational activities are often assumed.[39] Only two studies asked for student feedback about the use of the skills taught in the workshop and the longitudinal program by Johnson et al, elicited positive reinforcement for the use of the feedback folio tool which reinforced the value of reflecting.[27,29,30,35,40] Therefore, the use and value of each strategy and tool remains unknown as there were no direct evaluations of these components in practice.[39,40]

Our results further support the importance of both interpersonal and intrapersonal aspects within the feedback interaction. As Ajjawi et al report, many factors including intrapersonal (e.g.: confidence and comfort to seek help), interpersonal (e.g.: trust and relationship) and sociocultural factors (e.g.: living and working in community) contribute to one's psychological safety in the context of feedback interactions.[34,35] Most interpersonal factors, specifically a weak pedagogical alliance, are difficult to control in clinical settings and within the context of two-way interactions, both preceptors and learners must be prepared. Despite only learners being present, Milan's et al workshop takes a step towards addressing interpersonal factors by emphasizing the emotional challenges preceptors may face.[30] By helping students understand the dynamic and human factors within feedback interactions, this step could strengthen their educational alliance and possibly view preceptors as less threatening.[6,7,30,35]

Additionally, feedback often induces defensive emotional state for learners.[2,3,34,35,41–43] Utilizing peer-peer experiential activities, as Yau et al and Matthews et al demonstrated, fostered a safe learning environment and psychological safety, decreasing that emotionally threatened state thereby allowing learners to apply their new knowledge.[28,31] The importance of psychological safety and pedagogical alliance is critical within feedback interactions, which could be explored further by creating simulated sessions with both students and preceptors within a safe learning context, encouraging participants to embrace the two-way interaction.[33]

Moreover, recent literature has proposed theoretical models explaining the link between emotions and feedback, with strategies such as mindfulness used to recognize one's mindset and emotions when approaching or engaging in feedback.[15,19,34,41–43] Collectively, six articles alluded to the importance of emotional regulation (e.g.: discussing confidence and attitude, presenting with emotional readiness) within their workshop content, though most do not provide specific strategies or tools on how to regulate or prepare one's mindset. One study within this review highlighted the usefulness of the inner dialogue and identification of internal triggers to improve attitude in feedback interactions, which was a strategy most appreciated by learners.[28] Buckley proposed three types of triggers, one related to the pedagogical alliance (i.e.: relationship trigger) and two related to the learner (i.e.: truth and identity triggers) when there is a discordance between self-evaluation and external evaluation–a perception of an attack.[42,44] Trigger identification could be paired with a conceptual framework

to promotes an attitude of inquisitiveness, such as viewing feedback comments as topics to investigate rather than an enemy to oppose.[15,37,44–46] By being mindful during feedback interactions, learners could then better identify emotions associated with each comment they receive, notice their inquisitive or defensive mindset, and make the necessary adjustments during the interaction. Given the unpredictability of feedback interactions, teaching control of intrapersonal aspects such as emotional regulation, mindfulness, intrinsic motivation and promoting self-evaluation with a growth mindset to learn from mistakes are all key pieces to include and promote in future educational models or sessions on reception to feedback.[8,37,41,44]

Future research

The strategies and tools proposed for student use were adjuncts to the learning workshops, rather than the focus of the study or evaluations. Without reported outcomes on these strategies and tools, little is known about their use or efficacy. Future research could evaluate the strategies and tools themselves and assess their utility and efficacy. This could lead to positive adaptation of the workshops to ensure the proposed learning tools are optimally beneficial for learners. Through continuous evaluation, this may lead to more standardized strategies and tools that can be widely accepted and applied.

Furthermore, intrapersonal aspects that create barriers to feedback reception are a key component to further explore. More recent literature focuses on self-determination theory, which identifies intrinsic motivation as a driving force of learning from feedback.[41,47] Future teaching could be focused on these intrapersonal aspects and explored through introspective learning activities. This may enhance the learning activities to also promote a growth mindset, where learners are actively choosing to learn from their mistakes with recent literature highlighting the importance of intrinsic motivation and growth mindset as key aspects to garnering value from feedback interactions.[8,41,43]

At the interpersonal level, future research could also explore an initiative involving simultaneous training of learner and preceptor to address the interpersonal dynamics of feedback interactions. Training both learners and staff may allow for participants to see different perspectives, understand the staff-learner emotional sensitivity from both parties, therefore encouraging the two-way interaction. This could secure the educational alliance by having both staff and learners developing their interpersonal skills together during simulation sessions.[7,34,35]

Limitations

The main limitation of this study was the lack of consensus on the definition of “receiving feedback” throughout the literature. The six included studies focused on learner behaviours and encouraged active participation and engagement as outlined, though Telio’s formative feedback definition includes assimilation and use of information. The focus of the review was on a narrow part of the feedback process; therefore one may only hypothesize that after improving feedback reception, learners’ then independently or indirectly improve their acceptance and further use of the feedback. Secondly, the population of the literature search was limited to learners in medicine or nursing, which did not allow inclusion of feedback interactions in other fields of healthcare professionals such as social work, occupational therapy or physical therapy. Of all six included studies, the participants were limited to medical students Finally, each study included used pre-post evaluations or survey evaluations, which demonstrates weak study design. These limitations result in potentially less generalizability of the strategies and tools that were outlined to a larger population of medical learners.

Conclusion

This scoping review summarizes the available published literature that provide specific strategies and skills to optimize medical learners’ feedback reception. We identified six interventional studies, all using educational workshops to provide strategies and skills for the learners. The importance of interpersonal and intrapersonal aspects while learning was alluded to in all studies, but most strategies and skills focused on learner agentic role and engagement in feedback interactions, with one on emotional regulation. All studies reported student perceived improvement in feedback reception following the workshops though none of the strategies or skills were evaluated in practice. We identified key concepts as well as gaps in the literature that may guide further investigation to improve learner reception to feedback.

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Appendices.

Appendix A: MEDLINE Electronic Search Strategy

Supplemental Table. MEDLINE (Ovid) Search Strategy		
#	Searches	Results
1	formative feedback/	1036
2	*Feedback/	6365
3	feedback.ti,ab. /freq=3	22064
4	(formative adj2 assess*).ti,ab.	949
5	or/1-4	27255
6	Self-Assessment/	12877
7	(behavio?r* adj2 chang*).ti,ab.	53204
8	(self-assess* or self-critic* or self-aware* or self-evaluat* or action plan*).ti,ab.	35355
9	(feedback adj4 (use* or using or usage or receiv* or receipt or recepti* or interpret* or incorporat* or accept* or integrat* or impact* or act or acting or acts or acted or improving or improve* or perform* or correcti* or formative or apply or applie* or applicat*)).ti,ab.	27873
10	or/6-9	123492
11	exp education, medical/	173454
12	Clinical Clerkship/	5417
13	Students, Medical/	37390
14	((medical or medicine) adj2 (student* or apprentic* or school* or educat* or intern or interns or interning or internship* or resident or residents or residency or clerkship* or learner* or trainee*)).ti,ab.	128289
15	(clinical adj1 (clerkship* or rotation* or apprentic* or learner* or trainee*)).ti,ab.	2770
16	or/11-15	250091
17	5 and 10 and 16	1509

Appendix B. Screening Eligibility Checklist

Title and Abstract Screening Checklist

1. Population: Do the participants in this reference include one or several **learners** in healthcare (trainees or staff)? Ex: Medical or nursing learners, students, residents, staff in a learning situation

2. Intervention: Does the article discuss an **actionable** strategy/skill to improve the participants ability to receive feedback?

The purpose is to identify specific skills or strategies discussed that will help learners to improve their receptivity to receiving feedback. The intervention can include strategies that focus on attitude or approach when receiving feedback, techniques to improve receptivity of feedback or workshops focused on learning how to better receive feedback. Strategies to improve providing feedback will not be included.

3. Study Design: Does this reference report primary research?

Yes if:

a. RCT, Non-randomized RCT, observational (cohort, case-control, before-and-after) or review (systematic, scoping, literature)

No if:

A. Commentary, letter, Editorial, Book chapter, Conference/meeting proceedings, poster, or presentation WITHOUT a corresponding peer reviewed published article or Dissertation or thesis WITHOUT a corresponding peer reviewed published article.

4. Language: Is the study in English or French?

We are including references with the full text available in English or French. The abstract may not be in English, but the full text is available or has been translated into English.

If the abstract and/or title is in English but the full text is not available in English/French, the article/study will not be included. This will be indicated with

a. [Article in ____(language)] – this will be stated below the title of the article
b. [Article title] – the title will be in square brackets

Full Text Screening Checklist

Additional questions:

Outcomes: Does the outcome of the paper focus on **receiving feedback or improving receipt of feedback?**

Outcomes are always stated in the paper to explain what the purpose of the paper is. We are looking to include papers that focus on receiving feedback, rather than ways of improving how to provide feedback.

Content: Does the paper outline qualities or skills that will be important for the student to receive feedback better AND explain how the student can implement these skills to better receive feedback?

Ex. In REF ID 59 you would include this paper as it discusses the skills that students within the study used to better improve their feedback learning.

We want to include studies where the student receiving feedback is the primary focus.

I.E: Is the outcome focused on students better receiving feedback? – Include!

Is the student the primary focus? – include!

Or is the article really talking about how providers of feedback can use the knowledge from the article to be better at providing feedback? - don't include

Intervention: Does the article discuss an **actionable strategy/skill** to improve the learners' abilities to receive feedback?

Identify specific skills or strategies discussed that will help learners to improve their receptivity to feedback.

These interventions can include education programs or courses, online modules, workshops, simulations, communication protocols/checklists, guidelines.

We want to identify articles that discuss HOW to better receive feedback.

We will not accept articles that discuss strategies in the discussion but have not introduced these strategies to the learner population.

Appendix C. Data extraction form

1. **Background:**
    - Title, authors, country of publication, year, language

2. **Study design: what study design does the study use?**
    - RCT, Non-randomized RCT, observational (cohort, case-control, before-and-after) --> specify with text

3. **Methods:**
    - Sample size, sample methods, Population included and targeting in outcome, Confounding variables within methods/bias

4. **Content:**

Does the paper outline qualities or skills that will be important for the student to be better at receiving feedback AND explain how the student can implement these skills to better receive feedback?

- What qualities or skills are described in the study? Ex: receiving feedback, seeking feedback, approach to feedback, mindset
- What approach is used to improve/discuss these? Workshop, didactic session, self-learning module,
- If it was a workshop, what did they do in the workshop?
- Setting: type of learning environment within the workshop? Type of learning environment intended for use of feedback à wards, general improvement, classroom
- Topic of the feedback (ex. Clinical performance, knowledge, peer-peer interaction, Hx, Physical exam skills)

5. **Outcomes: what is the outcome of the study (written answer)**

Ex: student emotions upon receiving, understanding of feedback, approach to feedback, mindset/preparation for feedback, seeking feedback

- Include Primary, Secondary Tertiary outcomes and how they were measured (describe) Ex pre-post survey; assessment

6. **Theme:**

Ex: workshop, emotional regulation, initiating feedback discussion, pre-post improvement, implementation of feedback, learning about importance of feedback

7. **Future suggestions within the discussion**