# Closing the feedback loop in the workplace-based learning of undergraduate health professions education: a BEME scoping review

## Background:

Feedback in health professions education has been a topic of high interest to educators and researchers over the past few decades. Design of feedback processes requires using of concrete information to improve performance, skills and conceptual understandings, and an alignment of activities and assessments focusing on student´s learning and performance. In undergraduate workplace-based learning, feedback processes can be challenged by the limitation of direct observation, the lack of systematic learning opportunities, and the limited time available for teaching. To assure learning, it is advocated to design and implement diverse formats of teaching and assessment activities in clinical placements, where students must be guided to use the feedback and close the loop between current and desired levels of performance.

## Aim:

The aim of this study is to explore which activities (i.e., tasks, assessments, observations) are conducted in the undergraduate health professions workplace to promote feedback processes and close the feedback loop between current and desired performance. The research questions are:

1. Which activities (i.e., tasks, assessments, observations) are conducted in undergraduate WBL to promote closing the feedback loops?
2. How are feedback processes organized in the undergraduate health professions workplace-based learning to promote feedback processes and close feedback loops?

## Methods:

A scoping review using the five steps of the Arksey and O'Malley framework is proposed. Relevant studies will be identified in eight education and health science databases. Inclusion and exclusion criteria are defined to obtain studies that can contribute to answering the research questions. Two members of the research team will review and select the relevant studies. The data will be organized and analyzed using a thematic approach, and a discussion based on the three-layers model of feedback practice is planned.

**Importance:**

This review aims to understand how feedback processes are designed within the undergraduate health profession workplace, and how students use feedback to close loops between their current and desired performance. Therefore, a focus will be on exploring which activities (i.e. tasks, assessments, observations) are conducted in the clinical workplace to promote closing feedback loops.

For educational practice, we hope that the reflections that arises from the findings can lead readers to implement concrete actions and activities to enhance the impact of feedback processes focusing on the design and use of feedback.

**Keywords:**

Feedback; formative feedback; feedback processes; feedback loop; feedforward; workplace learning; clinical clerkships; undergraduate medical education; health professions.

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**Background**

Feedback in higher education has been a topic of high interest to educators and researchers, which has led to publications on the potential mechanisms, theoretical frameworks, and best practice examples over the last decades. Initially, research focused more on teachers, positioning feedback as something they "do" or "give" to learners, and students as passive actors who receive feedback and may or may not use it to improve their performance (Boud & Molloy, 2013; Henderson, Ryan, et al., 2019; Winstone & Carless, 2019). Recently, the conversation around feedback has shifted from focusing on delivery to an active focus on interaction, sense-making, outputs in terms of action, and interaction with learners (Henderson et al., 2019). This shift must be aligned with using the feedback process as a social interaction, or a dialogue, aimed to improve performance (Ajjawi & Boud, 2015). Henderson et al. (2019) defined feedback processes as "where the learner makes sense of performance-relevant information to promote their learning." Every time a student makes sense and takes action about the information given about their performance in the purpose of the expected learning outcome, a feedback loop is closed (Carless, 2019). Closing a feedback loop is a process where analysis of the feedback takes place, followed by concrete actions so that the student can work on the gap and reach the expected level (Sadler, 1989). Accordingly, three fundamental stages of the feedback loop have been described: the feedup, which corresponds to the desired learning outcomes or competency; the feedback, or the current performance observed of a student; and the feedforward, which is understood as the action that students can take to achieve an expected goal (Carless, 2019; Reimann et al., 2019). Thus, the understanding of the value of feedback is associated with improving a future state or condition, indicating the relevance to focus on how students use feedback to close the loop (i.e., feedforward).

Designing feedback processes need actionable feedback as a key feature which enables learners to use concrete information to improve performance, skills or conceptual understanding ( Winstone & Carless, 2019). This is especially important in workplace-based settings, because in these rich learning environments students work on authentic tasks more independently to develop and demonstrate their competencies in terms of integration of knowledge, skills and attitudes. Workplace-based learning (WBL) is an integral and essential component in health professions education programs. It provides students a unique opportunity to learn from experience in real clinical contexts, where they are trained in different settings depending on their discipline, and must acquire and demonstrate the

competencies needed to become a professional. Typically, undergraduate health professions education programs incorporate the learning of clinical practice in clinical placements. WBL in undergraduate health professions education has the essential feature that the unpredictable clinical context drives learning, which may be an advantage for enhance self-directed learning, or a disadvantage in ensuring systematic learning opportunities for students (Bransen et al., 2020). Thus, instruction and alignment of activities and assessments within WBL is a challenge for clinical educators and faculty, as students must continuously work on tasks that help them to close the loop and reach the required professional learning goals. To assure learning, it is essential to design and implement diverse formats of teaching and assessment activities in the clinical placements, i.e. formative assessments, direct observations, clinical cases, etc. In addition, the student must be guided to use the feedback and close the loop (Boud & Molloy, 2013; Carless, 2019). An appropriate way to embed feedback within the workplace could be using the constructive alignment theory which is a way of outcome-based teaching and learning that refers to the idea that students construct meaning through relevant learning activities and assessment, that are aligned with learning outcomes (Biggs, 1996; Biggs & Tang, 2009).

During undergraduate clinical education, direct observation has reported to be limited, given the prioritization of clinical work, and often there is a lack of protected time for teaching (Ramani et al., 2019). Therefore, the student must be more active in asking and receiving feedback and be part of the dialogue that emerges from it. It has been identified that a lack of supervision and feedback deprives students of essential educational support and increases students' tendency to utilize a surface approach of learning (Al-Kadri et al., 2013). In addition, direct observation and feedback improve clinical skills (e.g., communication) (Schopper et al., 2016). Considering that feedback processes must be based on observed information about a student's performance, it is important to organize nested teaching and learning activities within the undergraduate workplace-based learning. As is outlined above, actionable feedback in the workplace must ideally be designed, planned, and implemented to align learning outcomes, learning activities, and assessments. Moreover, it has been described that the best way to incorporate feedback within the workplace is when it (1) is embedded in the instructional process and/or clinical work flow, (2) provides specific and actionable feedback, (3) is ongoing, and (4) is timely (Norcini et al., 2018). A scoping review by Bing-You et al. (2017) pointed out that systematic or repeatedly feedback during clerkships appeared to be beneficial, as well as immediate delivered feedback. In this sense, well designed feedback processes appear to be a key feature for learning and performance in WBL (Lefroy et al., 2015; Shaw et al., 2017).

For institutions, the problem outlined above translates into what the literature describes as the feedback dilemma, which is a discrepant situation between students and teachers: on the one hand, teachers strive to generate quality information or feedback (O'Donovan et al., 2016; Scott, 2013). On the other hand, students continue to make little use of the information they receive to improve their future work and not engage with the feedback process. Students claim for more systematic and timely feedback (Kim et al., 2014), and results of satisfaction on evaluations regarding feedback is a concern for both teachers and institutions. This discrepancy has also been described in medical education (Liberman et al., 2005), and more attention is required from all stakeholders to improve it.

One interesting view of feedback from a sociocultural lens, described by Esterhazy (2019), presented feedback as a social practice made up of complex relations and embedded in a learning context. The main feature of this theory is that students learn from feedback only when the feedback encounter includes generating, making sense of, and acting upon the information given. In other words, feedback has an impact on student learning if students engage and interact with it. This productivity of feedback practices depends on epistemic relations (i.e., how is knowledge is organized) and social relations (i.e., how relations are arranged) (Esterhazy, 2019; Esterhazy et al., 2019). Based on epistemic and social relations, she proposed a three-layers model to visualize feedback practice in a course unit (i.e. the feedback encounter layer, the course design layer, and the knowledge domain layer). This view of feedback processes might be an interesting way of analyzing the existing literature and propose insightful ideas for incorporating in the clinical workplace.

Although feedback has been the topic of numerous investigations, a large proportion of the studies involve residents or specialist training programs (Dennis et al., 2018; Watling et al., 2016). This distinction should require attention, as the levels of supervision, levels of expertise, and clinical experience are different. In fact, recent reviews that incorporate feedback interventions within medical learners differentiated undergraduate medical students from residents or fellows (Bing-You et al., 2017). A comprehensive scoping review of the current literature that gathers feedback-based initiatives focused on the use of actionable feedback in the WBL of undergraduate students would be an insight into how feedback processes are designed in this context. Therefore, this study aims to explore which activities (i.e., tasks, assessments, observations) are conducted in the undergraduate workplace-based learning to promote feedback processes and close the feedback loop between current and desired performance.

**Review Questions, Objectives, Type of Review and Keywords**

A scoping review will be conducted using the five-step methodological framework proposed by Arksey and O'Malley (2005) (Table 1), intertwined with the PRISMA checklist extension for scoping reviews to provide reporting guidance for this specific type of knowledge synthesis (Tricco et al., 2018). Scoping reviews allow to study the existing literature without restricting the methodological quality of the studies found. Besides, a scoping review will systematically and comprehensively map the literature and identify gaps (Colquhoun et al., 2014). Furthermore, this special topic is not suitable for a systematic review due to the varied approaches described and the large difference in the methodology used (Bing-You et al., 2017).

| Arksey & O´Malley Framework |
| --- |
| 1. Identifying the research question |
| 2. Identifying relevant studies |
| 3. Study selection |
| 4. Charting the data |
| 5. Collating, summarizing and reporting the results |

Table 1. Adapted from Arksey & O´Malley.

### 1. *Identifying the research question*

According to the abovementioned, the research team has formulated two research questions:

3. Which activities (i.e., tasks, assessments, observations) are conducted in undergraduate WBL to promote closing the feedback loops?
4. How are feedback processes organized in the undergraduate health professions workplace-based learning to promote feedback processes and close feedback loops?

Objectives:

- To identify how actionable feedback process are organized in the undergraduate health professions workplace

- To have an overview of which activities are conducted in undergraduate workplace-based learning of the health professions to promote feedback processes and close the loop between current and desired performance.
- To describe the literature findings using the sociocultural lens.

2. ***Identifying relevant studies***

We will use the research questions and the purposes of the scoping review to guide the searching strategy. For this step we have the support of an expert librarian in systematic searches. Firstly**,** we will develop an online database search including: Medline/PubMed, Web of Science, CINAHL, Cochrane Library, Embase, ERIC, ProQuest Dissertations and Theses Global, and PsycINFO. Secondly, we will conduct a directed search on the most relevant journals in the health sciences education field (Academic Medicine, Medical Education, Advances in Health Sciences Education, Medical Teacher, Teaching and Learning in Medicine, Journal of Surgical Education, BMC Medical Education, Medical Education Online, Perspective in Medical Education, The Clinical Teacher, and the Journal of General Internal Medicine). For this directed search we will use the key terms derived from the research questions. Finally, we will search additional papers in the reference lists of the updated bibliography of systematic and scoping reviews detected in the initial search following the recommendation of Arksey & O'malley (2005) and Levac et al., (2010).

The keywords use for the searching strategies will be:

Keywords: feedback; formative feedback; feedback processes; feedback loop; feedforward; workplace learning; clinical clerkships; undergraduate medical education; health professions.

*Keywords definitions:*

**Feedback***: "information about the gap between the actual level and the reference level of a system parameter which is used to alter the gap in some way"* (Ramaprasad, 1983). "*Feedback is where the learner makes sense of performance-relevant information to promote their learning"* (Henderson, Ajjawi, et al., 2019).

**Formative feedback:** "*information communicated to the learner that is intended to modify the learner's thinking or behaviour for the purpose of improving learning*" (*Feedback - MeSH - NCBI*).

**Feedback processes:** "*involve information which usually comes from a peer, a teacher, or oneself. They also involve sense making when students engage with and interpret comments they have received*" (Carless, 2016).

**Feedback loop:** process composed by three fundamental stages: the feedup, the feedback, and the feedforward.

**Feedforward:** "*specifically associated with 'nested tasks', timed and designed to elicit input, judgements of students' own performance and that of others, and improved performance on subsequent tasks*" (Reimann et al., 2019).

**Workplace-based learning:** "*interaction between a qualified health care professional or patient and a student healthcare professional that takes place in the clinical workplace rather than in a classroom*" (Bird et al., 2015).

**Undergraduate medical education**: is the period of medical education in a medical school. Usually includes the clerkships which is the clinical practice phase.

**Clinical clerkship:** Undergraduate education programs for second- , third- , and fourth-year students in health sciences in which the students receive clinical training and experience in teaching hospitals or affiliated health centers.

**Health professions:** Professions or other business activities directed to the cure and prevention of disease.

As an example, we included the searching strategy that we will use in Medline/PubMed database when conducting the full search:

(("Formative Feedback"[Mesh] OR "Feedback, Psychological"[Mesh] OR Feedback OR "feed up" OR "feed forward" OR "feedback loop") AND ("Workplace"[Mesh] OR WBL[ti] OR "Clinical Clerkship"[Mesh] OR clerkship[ti] OR ("Based learning"[tiab] AND (workplace* OR worksite* OR job OR work))) AND ("Education, Medical, Undergraduate"[Mesh] OR ((undergraduate[tiab] OR learner*) AND "health profession*")))

### 3. *Study selection criteria*

Studies will be selected according to the inclusion and exclusion criteria described in Table 2. We will include studies written in English due to feasibility issues, with no time span limitation. There will be no analysis of study quality or risk of bias during study selection, which is consistent with conducting a scoping review.

One member of the team (MO) will identify the papers in all databases describe above. After eliminate the duplicates, two other members of the research team (JF and LI) will review independently all the titles and abstracts using the exclusion and inclusion criteria. The same data form will be used to include or exclude the article. If they disagree, we plan that a third member of the team decides whether or not the study is selected according to the criteria.

| | Exclusion | Inclusion |
|---|---|---|
| Population | Residents, postgraduate students, fellows, attendings, staff, house officers, house staff. | Undergraduate students of any health profession |
| Context | Campus-based learning, simulation lab. | Workplace-based learning (inpatient or outpatient settings) |
| Intervention | Pre-clinical course/intervention | Any feedback practice described within clinical education in the WBL setting |
| Language | Other language than English | English written studies |

Table 2. Exclusion and inclusion criteria.

*Initial/Pilot search*

An initial search in six databases was performed on August 2020, were the revision of the databases resulted in 469 papers, with 360 remaining after the elimination of duplicates. According to the inclusion criteria, one member of the research team reviewed all the titles and abstracts and selected 99 references. Additionally, we conducted a directed search on the most relevant journals in the health sciences education field. For this directed search we used the key terms derived from the research questions. Finally, we searched the reference lists of the updated bibliography of systematic and scoping reviews detected in the initial search following the recommendation of Arksey & O'malley (2005) and Levac et al., (2010). After checking six

papers, no new references appeared. In addition, a recent study in the field of feedback processes in undergraduate students in health sciences (Garino, 2020) was checked, which did not provide new references to our selection. The direct search (i.e. relevant journals) and reference lists search (i.e. relevant papers) yielded 812 papers. According to the criteria, we selected 119 of these titles, eliminated 58 duplicates, and added 61 papers to the final selection (Figure 1). To ensure the results' reliability, a second member independently revised one of every ten titles, obtaining an interrater reliability coefficient of 0.88.
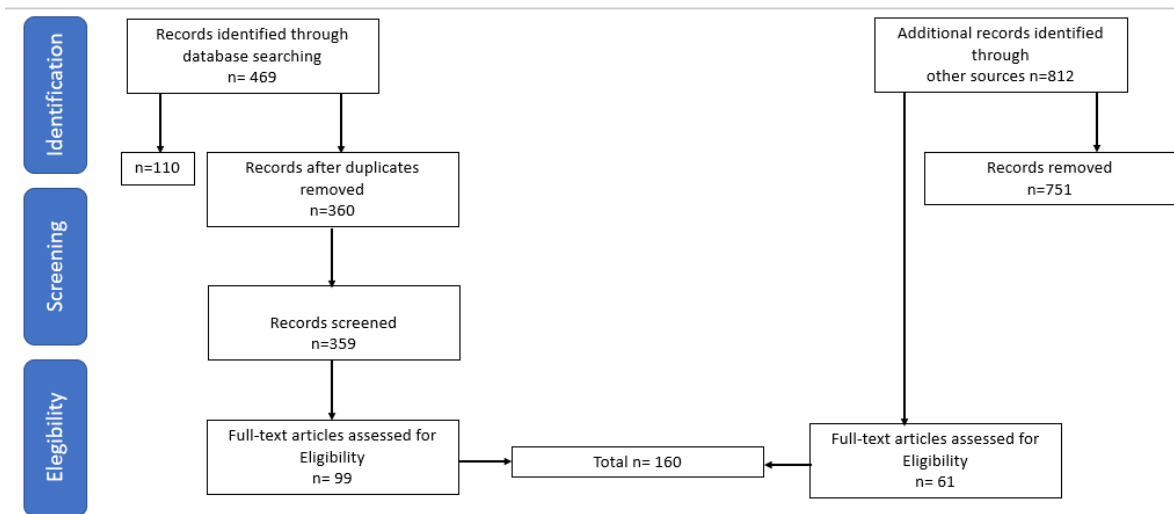


Figure 1. Flow chart of the initial search.

As an example, we included three papers which fulfilled the inclusion criteria:

1. Lewis KD, Patel A, Lopreiato JO, K.D. L, A. P, J.O. L. A Focus on Feedback: Improving Learner Engagement and Faculty Delivery of Feedback in Hospital Medicine. Pediatr Clin North Am [Internet]. 2019 Aug;66(4):867–80.
2. Garino, A. (2020). Ready, willing and able: a model to explain successful use of feedback. *ADVANCES IN HEALTH SCIENCES EDUCATION*, *25*(2), 337–361. https://doi.org/10.1007/s10459-019-09924-2
3. Schopper H, Rosenbaum M, Axelson R. "I wish someone watched me interview:" medical student insight into observation and feedback as a method for teaching communication skills during the clinical years. BMC Med Educ. 2016 Nov 9;16(1):1–8.

## 4. <u>Charting the data</u>

The research group will develop a data-charting form to organize the information obtained from the studies. The process will be iterative, as the data chart will be continuously reviewed and improved as necessary. Besides, following Levac et al.'s recommendation (2010),

two team members (JF, LI) will independently review the first ten selected studies to determine whether the data extraction is consistent with the objectives of this scoping review and to ensure consistency. Then, all the team will meet on Zoom to review the results and adjust any detail in the chart. The same two members will then extract data independently from all the selected studies. If any conflict appears whether extracting data, a third member of the team will be consulted as needed.

The data chart will identify demographic patterns and facilitate the data synthesis. Moreover, it will allow the structured data extraction to, later on, conduct the thematic analysis. To organize data, we will use a shared Excel spreadsheet, considering the following headings:

| Title of the paper | Aim/Purpose of the study | Study design/approach | Outcome measure |
|---|---|---|---|
| Abstract | Research questions (if any) | Underpinned theory | Key findings |
| Author(s) | Population/Sample size | Data collection | Relation of findings to RQ1 |
| Year of publication | Participants | Data analysis | Relation of findings to RQ2 |
| Journal/Source | Discipline | Type of intervention | Limitations of the study |
| Main topic | Setting | Duration of intervention | Implications |
| Country/Origin | Methodology | Outcomes | |

## 5.  **Collating, summarizing and reporting the results**

We will analyse the information obtained in the previous stages according to the recommendations proposed by the literature. The analysis of the results will incorporate a quantitative descriptive summary and a qualitative thematic analysis, which will be carried out to clarify and give consistency to the results' reporting (Arksey & O'malley, 2005; Colquhoun et al., 2014; Levac et al., 2010). Quantitative data will be analysed to report the characteristics of the studies, populations, settings, methods, and outcomes. Qualitative data will be labelled, coded and categorized. To avoid summarising the literature, the proposal we chose the three-layers for feedback practice model proposed by Esterhazy (2019) as a theoretical framework to analyse the results (Arksey & O'malley, 2005; Colquhoun et al., 2014; Levac et al., 2010). Preliminary results will be shared to some stakeholders (i.e. clinical teachers, students, medical educators) to elicit their opinions as an opportunity to build on the evidence and offer a greater level of meaning, content expertise and perspective to the preliminary findings (Levac et al., 2010).

For this scoping review, no quality appraisal of the studies is considered, which aligns with the frameworks for guiding scoping reviews (Peters et al., 2015).

**Synthesis of evidence and transfer to research and practice**

The present scoping review aims to contribute to the current discussion about feedback processes in the undergraduate workplace-based learning of health professions. From this review, we aim to describe some meaningful insights from the data using the sociocultural lens, where concrete ideas shall emerge regarding how is actionable feedback designed within the workplace, and which activities are conducted in undergraduate workplace-based learning of the health professions to promote feedback processes and closing feedback loops. Moreover, our goal is to develop future studies around the design of feedback processes in the WBL of undergraduates' health professions.

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