Fostering students'

INTERPROFESSIONAL FEEDBACK DIALOGUES

in health professions education

CLAUDIA TIELEMANS

voor Tineke

Colofon

Fostering students' interprofessional feedback dialogues in health professions education.

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Fostering students' interprofessional feedback dialogues in health professions education

Het bevorderen van interprofessionele feedbackdialogen in het gezondheidszorgonderwijs

(met een samenvatting in het Nederlands)

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Preface

Six years ago, when I was studying to become a physician, I was asked to speak to a group of teachers, students, clinicians, and faculty officials, to share my opinions and views on interprofessional education. On May 24th, 2018, I said the following:

[…] As an 'almost-doctor', I anticipate that the role I will have to fulfil will be very different from what it was a few years ago, and, likely, it will keep changing at a rapid pace. Instead of a paternalistic encyclopedia, my colleagues and I will need to be mediators, teachers, managers, critical appraisers, and much more.

The training I've received aimed to prepare me to work in that changing healthcare system. This training has made the effort to educate me broadly through medical humanities, social medicine, joint training with pharmacy students, and several internship-interactions with nurses or paramedical professionals taking on a teacher role. I have always experienced these elements of my training as valuable. Thus, interprofessional education has already been a part of my medical training. However, if you ask me, it has not been enough. Because, during that same training, I have also noticed that I do not know my future team members, the nursing interns, midwifery students, and physiotherapists in training, at all. In fact, I would not be able to tell you what my faculty-buddies at biomedical sciences or clinical health sciences do all day. […]

So, I asked myself, what if it were up to me? What if I were the dean or medical school director here at UMCU. How would I do better? What would my UMC look like? I came up with the following:

In my UMC, physicians and nurses work in the same room. In my UMC, physicians' assistants have a larger role in the clinical supervision of medical interns, especially when residents are still in the process of getting comfortable in a specialty. In my UMC, there is a student culture where medical, nursing, and paramedical students, intermingle and organize joint social activities. In my UMC, research is done with teams from different disciplines, so it can more easily be put in the 'bigger picture', and more readily implemented in practice. In my UMC, medical students go to [classrooms of] other faculties for their electives. So not, like we do now, delving into an extracurricular medical topic with other medical students, but really leaving the building, and joining other students in their classrooms. […]

By making this effort to: get out of our social bubbles, gain more diverse skills, and connect with our future colleagues in the broadest possible sense, we will be better able to collaborate with team members, communicate with patients, and deal with unexpected situations that we may encounter in the future. As a result, the 'almost-doctors' of the future, will be better adept to deal with their changing roles in a changing workplace.

After giving this speech that May-day in 2018, I met some faculty members who shared my views. Among them was Tineke Westerveld, who was, off course, way ahead of me. As medical school director, she was planning to transform the curriculum into a program filled with interprofessional experiences. I was lucky enough

to get to join her. Together, joined by a great team of people, all inspired by her enthusiasm and vision, we embarked on this PhD project. To my greatest regret, we were not able to finish that journey together. I will, however, be forever grateful to Tineke for introducing me to this wonderful research field and all the people I met along the way. We did, and still do, our very best to complete the work in her vision. This thesis is only a small part of that. In this part, we try to find out how we can best support dialogic feedback processes among our medical and nursing students. In Tineke's memory, we continue to work towards an interprofessionally trained, future-proof healthcare workforce.

1

General Introduction

Box 1
Definitions used in this thesis.

To foster -	"To promote the growth or development of-" (Merriam-Webster Dictionary)
Interprofessional teamwork -	Collaborative care performed by an (often changeable) composition of individuals from different professional backgrounds, with a shared patient goal (Versluis et. al., 2024).
Interprofessional education -	Education where "two or more professions learn with, from, and about each other to improve collaboration and the quality of care" (CAIPE, 2016, p2).
Feedback information –	"Information learners can use to improve the quality of their work or learning strategies" (Winstone et al., 2021a, p224).
Feedback process –	"The activities undertaken by learners to obtain, understand and use feedback information" (Winstone et al., 2021a, p224).
Feedback dialogue –	Constructing a feedback process through an ongoing exchange, clarification, and alteration of ideas through asking and responding to questions (Tielemans et. al., 2023).

INTRODUCTION

Healthcare is constantly subject to change. Aging populations, a rapidly multiplying knowledge base, and shifting boundaries of specialty domains all increase the complexity of care. To guarantee safe and efficient practice in this complex field, professionals from different backgrounds need to be able to work with and learn from each other. Interprofessional feedback processes are an essential part of this. To ensure interprofessional feedback processes are fostered in our future workforce, in this thesis, we draw from the broader theoretical field of feedback in higher education. In this field, feedback definitions are transitioning (Molloy & Boud, 2013b; Winstone & Carless, 2019). Scholars are moving away from traditional definitions of feedback as information transmission, and increasingly defining feedback as a process in which learners "obtain, understand and use feedback information" (Winstone et al., 2021a, p224). The argument for this shift in focus is that performance improvement of the feedback receiver (in educational research often defined as learner, student, or trainee) is the core goal of education and, therefore, the receiver's feedback process should be the focus of that education (Molloy & Boud, 2013a). After all, years of

putting all efforts towards teaching feedback givers (often teachers, supervisors) how to formulate feedback messages and approach receivers, has not shown great improvements in student engagement (Winstone et al., 2017).

Moving away from transmission-based views on feedback has led some scholars to advocate feedback dialogue - the ongoing exchange, clarification, and alteration of ideas through asking and responding to questions – as a means to construct feedback processes (Ajjawi & Regehr, 2019; Nicol, 2010). In this thesis, we argue that this dialogue perspective is especially relevant and necessary in health professions education. Drawing from these contemporary insights in feedback literature, we investigate how, when, and why feedback dialogue training in the interprofessional setting works. Through this, we aim to gain insight into how to foster students' interprofessional feedback dialogues through educational design.

Healthcare's need for adaptive, interprofessional team players

Teamwork, where healthcare professionals from different professional backgrounds, in an (often changeable) composition, perform collaborative care with a shared patient goal, has always been an essential part of healthcare. However, the demands on teamwork differ over time and between settings. Aging populations and increased treatment options lead to more patients with more chronic health problems, sometimes all being treated simultaneously by different professionals (Thistlethwaite, 2012). At the same time, the explosive growth of medical knowledge and technical possibilities means no one person can know all, requiring the system to move away from relying on generalist individuals and put their care in the hands of teams of (sub)specialized professionals (WHO, 2010). Additionally, views on which specialties ought to be included in these teams are broadening and depend on goals and definitions of the healthcare domain (Geelen & Milota, 2022). For instance, with a goal to cure disease, a team could exist of physicians, nurses, physiotherapists, and psychologists. However, when the goal is to prevent disease (or promote public health), a team would also include professionals in social systems like schools, sports associations, or local authorities. A focus on developing new treatment options would mean the inclusion of scientific disciplines, like biomedical scientists, or clinical technologists. A focus on global health, or planetary health, the inclusion of governmental institutions, or NGO's (non-governmental organizations).

Thus, which professionals take part in teamwork in healthcare, is situation and goal-dependent. In addition, the roles of those professionals themselves, are also subject to change, as new specialties (e.g., clinical geneticist) and new fields of professional practice (e.g., physician assistant) emerge over time to respond to the changing needs of patient populations (Fraher & Brandt, 2019). To function safely and efficiently in this complex field, individual professionals need to be able to constantly communicate with, and learn from each other, whilst crossing professional boundaries that are not fixed. Training future professionals as adaptive team players has therefore been a main goal of health professions education for decades (McCreary, 1962; Stalmeijer & Varpio, 2021; WHO, 1988, 2010).

Interprofessional education to meet healthcare's need

To train these (future) adaptive team players, academic physicians (McCreary, 1962), governmental institutes (WHO, 2010), and experts (CAIPE, 2016; IPEC, 2016), among others, have recommended investing in interprofessional education. Interprofessional education is defined as: education where "two or more professions learn with, from, and about each other to improve collaboration and the quality of care" (CAIPE, 2016, p2). Traditionally, training of healthcare professionals happens separately, meaning nurses are trained in nursing school and physicians in medical school. Likewise, all other professions have their own training programs, each with their own infrastructure, timetables, and curricula. This separation of professional training is often described using the metaphor of siloes (Kreindler et al., 2012). Investing in interprofessional education would help healthcare education move away from this siloed structure. The underlying thought closely relates to the 'contact hypothesis', which states that by putting members of different social groups together, prejudice will reduce, and intergroup behavior will improve (Allport, 1979; Hean & Dickinson, 2005). By learning "with, from, and about each other", future healthcare professionals will be better able to navigate professional boundaries and collaborate in their future clinical workplace (Frenk et al., 2010). This, has been hypothesized, can increase quality, safety, accessibility, and effectiveness of healthcare (Kohn et al., 2000; Paradis & Whitehead, 2018; WHO, 1988, 2010).

Education to develop interprofessional competencies

To guide the design and evaluation of interprofessional education, several expert groups have published competency frameworks (e.g., CIHC, 2010; D'amour & Oandasan, 2009; IPEC, 2016). These frameworks define team competencies required of health care professionals and serve as outcomes for designing and evaluating interprofessional education. O'Keefe et al. (2017), reviewed six national and international interprofessional competency frameworks. They found that, though developed in different settings, the frameworks generally agree on which core competencies teamwork requires. O' Keefe et al. used their review to formulate eight overarching interprofessional competency statements (box 2). One of these eight statements is that healthcare professionals need to be able to "give timely, sensitive, instructive feedback to colleagues from other professions, and respond respectfully to feedback from these colleagues" (p466).

Interprofessional feedback: current education & research

Despite similarities in visions on the learning outcomes of interprofessional health professions education, serious challenges to interprofessional education remain. It is unclear how and when interprofessional education is best introduced (Fraher & Brandt, 2019; Paradis & Whitehead, 2018), and under what circumstances it has the desired effects on student behavior or patient outcomes (Reeves et al., 2017; Thistlethwaite et al., 2014). Even the central benefit of putting multiple professions together in a room to learn with each other, based on the contact hypothesis, has been questioned, as this hypothesis requires uncoerced participants of equal status,

Box 2
The Interprofessional learning competency statements
(O'Keefe et. al. 2017)

On completion of their program of study, graduates of any professional entry-level healthcare degree will be able to:

- Explain interprofessional practice to patients, clients, families, and other professionals
- Describe the areas of practice of other health professions
- Express professional opinions competently, confidently, and respectfully avoiding discipline specific language
- Plan patient/client care goals and priorities with involvement of other health professionals
- Identify opportunities to enhance the care of patients/clients through the involvement of other health professionals
- Recognize and resolve disagreements in relation to patient care that arise from different disciplinary perspectives
- Critically evaluate protocols and practices in relation to interprofessional practice
- Give timely, sensitive, instructive feedback to colleagues from other professions, and respond respectfully to feedback from these colleagues

both not necessarily present in interprofessional education (Hean & Dickinson, 2005; Paradis & Whitehead, 2018). Specifically in workplace-based learning settings, interprofessional education studies are sparse (Stalmeijer & Varpio, 2021), and the small amount of research that has been done, has focused on postgraduate students (Rees et al., 2018).

Research on giving and receiving interprofessional feedback

Giving and receiving interprofessional feedback is thus one of the main focus points for interprofessional education. Relatedly, over the years, a field of interprofessional feedback education research has emerged. This field contains two main lines of research. One line regards studies aiming to identify and understand workplace factors that influence students' receptiveness to, and acceptance of, interprofessional feedback information. Examples are the perception of strong power imbalances and hierarchical structures (Miles et al., 2021; van Schaik et al., 2015; Yama et al., 2018), and the absence or presence of a strong interprofessional team identity (van Schaik et al., 2015; Vesel et al., 2016; Yama et al., 2018). Other studies in the interprofessional feedback research field concern the development and evaluation of tools to support the provision of feedback information from different interprofessional sources. Perhaps the biggest example of this are tools for multisource feedback. Multisource feedback, or 360-degree evaluation, is a survey-based tool which helps professionals in training gather performance feedback from a variety of perspectives

in their network, e.g., in a healthcare context, physicians, nurses, patients, students (Lockyer, 2003). It is widely used in (continued) health professions education, where it has consistently shown positive but small effects on trainee performance (Smither et al., 2005).

So far, the interprofessional feedback research field has thus shed light on workplace factors that can challenge reception of interprofessional feedback information and has offered practical tools to transmit such information. However, this field is also limited in several ways. First, like in the general interprofessional education field, existing research is mainly done in post-graduate settings (e.g., Miles et al., 2021; Vesel et al., 2016; Yama et al., 2018), and has not yet extended to the undergraduate student population: the population most easily reached with educational initiatives. Second, the reasoning in all existing frameworks, tools, and research seems to be based on traditional views on feedback as information-transmission. E.g., Feedback provides professionals with information about gaps, or shortcomings, in their knowledge and performance. Thus, feedback helps them to close those gaps and improve their performance and is therefore an essential tool for learning in healthcare (Bing-You et al., 2017; Ramani & Krackov, 2012, Sadler, 1989). As interprofessional feedback gives professionals information from different team members' perspectives, it can help them improve their teamwork performance. This transmission-based thinking dominating the field is illustrated by the formulation of the overarching competency statement on feedback in box 2, which talks of 'giving and receiving' not 'using, understanding or discussing'. Moving away from these traditional views, offers opportunities to progress, or transition, the development of interprofessional feedback education.

Feedback in higher education research: transitioning from information transmission to dialogue

To further our understanding of interprofessional feedback processes and to inspire the design of innovative interprofessional feedback education in healthcare settings, we can look to the broader field of feedback research in higher education. As stated at the start of this chapter, in recent years, feedback research has undergone some significant changes in focus. Where research and practice formerly focused on the feedback giver, and how to promote their feedback giving, now, the feedback receiver, and their process of seeking, understanding, and using information, are the focus point (Carless & Boud, 2018; Nieminen et al., 2021). It may, therefore, be argued, that feedback user, instead of feedback receiver, is a more suitable term for that specific role in the feedback process. Focusing on the user, does not mean feedback giving has become obsolete, simply that this should also be oriented to the user's process.

Both giver and user have an essential role in the feedback process. Thus, developing feedback education from a dialogue perspective has been proposed as a way forward (Ajjawi & Regehr, 2019; Nicol, 2010), to foster students in both roles. A dialogue perspective on feedback means, instead of seeing feedback as information transmitted from a giver to a user, feedback is an ongoing exchange, clarification,

and alteration of ideas through asking and responding to questions. The giver and user roles are both essential to, and integrated in, the same feedback process. Especially in the interprofessional healthcare context, everyone with a different background from your own can be a relevant source of feedback information to you, but also a receiver to feedback information from your perspective. In such a context, where boundaries between giver and user are flexible, feedback dialogues are key to adaptive teamwork. In information box 3, we provide two examples, based on scenarios from clinical practice, to illustrate how a perspective on feedback as a dialogue, being different from feedback as information-transmission, could transform teamwork in healthcare.

Box 3
Examples of feedback as information-transmission vs. feedback as a dialogue

Example 1
Instead of giving and receiving feedback as comments:

Nurse: I saw you started reading charts during our start-of-shift deliberati on. This made you miss out on relevant information.
Physician: I didn't mean to. I'll try to pay more attention.

Feedback as a dialogue would entail asking questions and follow-up questions:

Nurse: Why did you walk away during our start-of-shift deliberation?
Physician: I was very busy. Why? Do you need me there?
Nurse: We discuss relevant topics like which nurse will take care of which patient. If you do not know this later on, it costs us time and extra work when you address the wrong nurse for tasks.
Physician: I see, it's just, I am usually very time stressed at this point in the day, could we explore if this start-of-shift deliberation can happen at another time or in another form?

In the second scenario a mutual understanding of motivations is reached, and first steps are made towards adapting work structures to support team work practice.

Example 2
Instead of providing and receiving information about shortcomings:

Nurse: I noticed you told the patient that they could go home tomorrow as the antibiotics will not have to be given intravenously anymore. But, as the patient is not yet mobile and we need to get them home-care, discharge tomorrow isn't realistic.
Physician: Right, thanks for letting me know.

Feedback as a dialogue would lead to seeking or suggesting strategies for improvement:

Nurse: I noticed you told the patient that they could go home tomorrow as the antibiotics will not have to be given intravenously anymore.
But, as the patient is not yet mobile and we need to get them home-care, discharge tomorrow isn't realistic.
Physician: good to know. I didn't realize there was a chance they would have to stay. How can we prevent this from happening again?
Nurse: Perhaps we could discuss this together before we see the patient next time? That way we can set realistic expectations for them.

In the second scenario, in addition to learning about discharge difficulties, again, first steps are made towards adapting work structures to support teamwork practice.

Transitioning to such a dialogue perspective on feedback in interprofessional healthcare, may be achieved by putting dialogue at the basis of the design of interprofessional feedback education. Currently however, the 'giving feedback information' narrative dominates health professions education, with transmission-based models like the Pendleton rules and feedback sandwich being taught widely (Molloy et al., 2020). It also dominates interprofessional feedback research where reception and transmission tools have been the focus. Only a small body of publications in health professions education research base their thinking in a user-focused perspective on feedback (Molloy et al., 2020; Noble et al., 2023; Van Der Leeuw et al., 2018). Hardly any employ an even more specific, dialogical perspective on feedback (Ajjawi & Regehr, 2019). Few of these publications contain empirical work, or concern interprofessional interactions.

Aim and research question

In this thesis, we take a dialogue perspective on feedback, and use the contemporary body of feedback research in higher education, as we investigate interprofessional feedback education in undergraduate health professions education. We aim to gain insight into how to foster students' interprofessional feedback dialogues through educational design by investigating how, when, and why students in interprofessional feedback education develop and use their feedback dialogues.

The overarching research question in this thesis is:

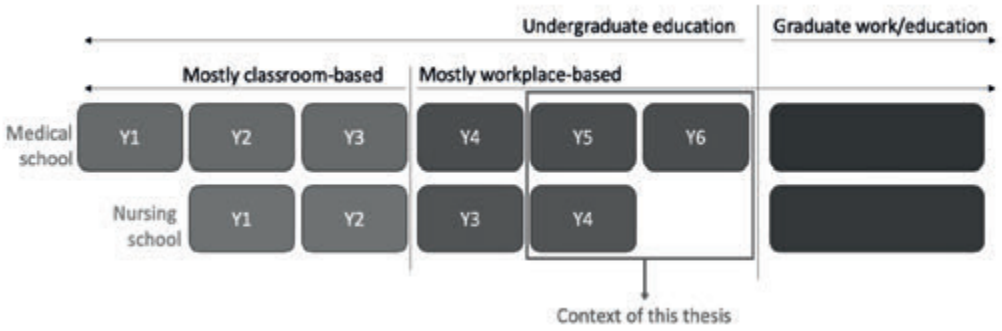
How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?

Study context

This research question is answered using non-empirical and empirical studies. The empirical studies focus on two medical professions: physicians and nurses. Though definitions of the interprofessional team can include many more professions, the core team players in patient care, most constant across different healthcare settings, are physicians and nurses. The empirical studies are conducted at the medical school of the University Medical Center Utrecht, and the nursing school of Utrecht University of Applied Sciences. Both educational institutes are committed to educating their students as team players, able to cross the boundaries of healthcare systems to contribute to care in a broad sense of the word (Geelen & Milota, 2022; Landelijk Overleg Opleidingen Verpleegkunde, 2020; van Herwaarden et al., 2009). The medical school program consists of six years, the program of the nursing school consists of four years (see figure 2).

After starting with more theoretical, classroom-based education, the final two years of nursing school, and final three years of medical school are mostly workplace based. This means that the majority of learning in this phase takes place in internships in the clinical setting where students are (increasingly) a part of the healthcare team (see figure 1). This phase does still contain classroom-based sessions, but these are usually oriented to the workplace context. For example, preparatory courses to teach practical knowledge and skills needed in a subsequent internship, and workshops or 'return-days' interrupting internships with similar additional workplace-oriented teaching. After licensing, both nursing and medical graduates can choose to continue working at the achieved graduate level, or to continue their education with post-graduate education, like residency training for physicians, or nurse-specialist training for nurses.

Figure 1. Study context: nursing and medical school programs
Research approach and design



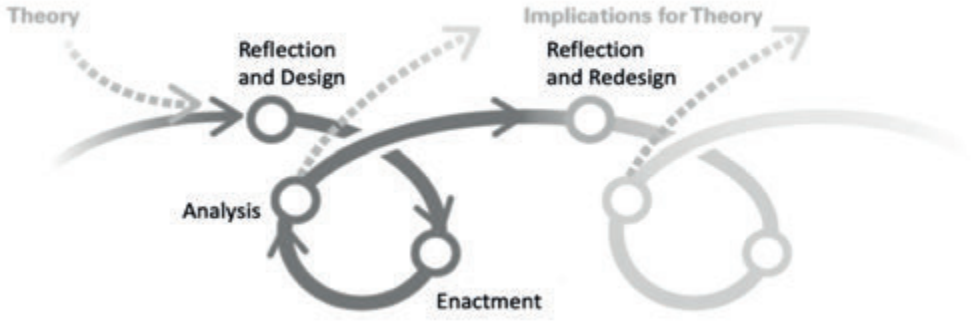
This thesis focuses on the context of pre-licensing, undergraduate workplace-oriented (classroom and workplace) learning, in the final year of undergraduate nursing education, and the final two years of undergraduate medical education (see figure 1). Participating students are thus senior undergraduate students who have had at

least one year of experience with workplace learning, including working in interprofessional teams (nursing students from year 3 of their program, medical students from year 4).

Research approach and design

To answer our research question, we use an iterative research design. This was inspired by the design-based research approach, "which blends empirical educational research with the theory-driven design of learning environments" and "is an important methodology for understanding how, when, and why educational innovations work in practice" (Baumgartner et al., 2003, p1). This approach structures the research of educational design in cycles. One cycle consists of three phases 1. Reflection and design, 2. enactment, and 3. analysis (see figure 2) (Bakker & van Eerde, 2015; Scott et al., 2020). In this thesis, we conduct one full cycle of design (figure 2), and end with a reflection and suggestions for redesign, which can be seen as the first step of a new cycle. Furthermore, in our research approach, to challenge tacit assumptions of ourselves as researchers, we triangulate multiple data sources, research techniques, and theoretical perspectives.

Figure 2. Phases of thesis research design, inspired by design-based research (Figure adapted from Fraefel, 2014)



Outline of thesis

Reflection and design phase

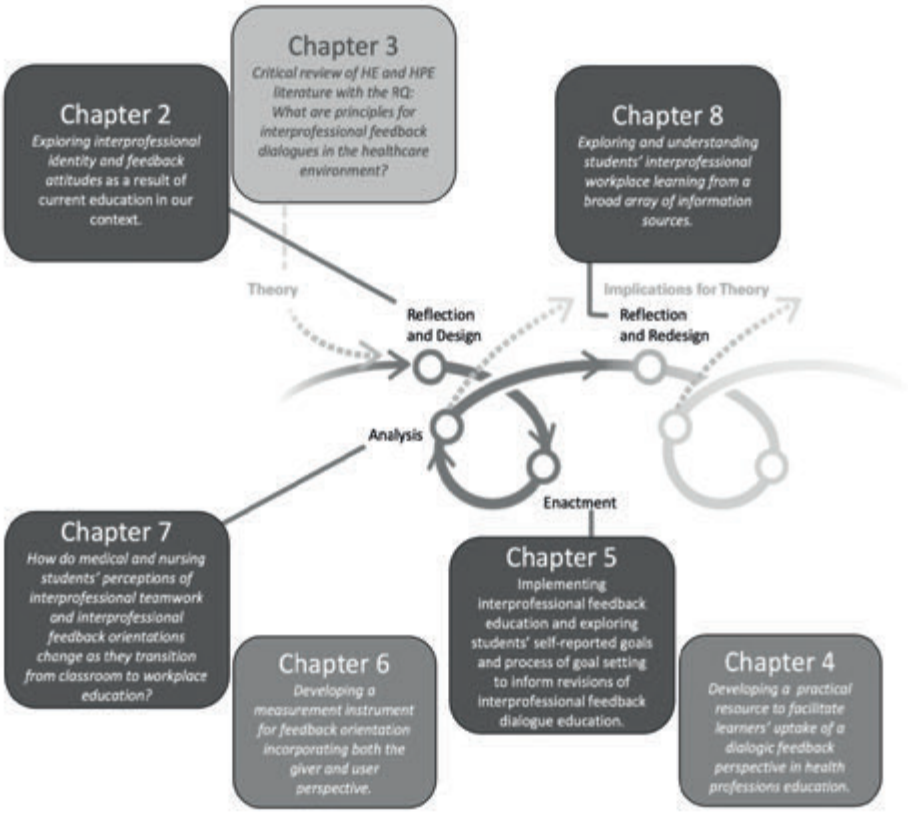
In this phase we first critically reflect on existing tools and current implementation of theory in practice. Next, we create design principles for future education.

Positive attitudes towards interprofessionalism are a prerequisite to interprofessional learning (Visser et al., 2017). Similarly, a strong interprofessional team identity facilitates interprofessional feedback receptivity (van Schaik et al., 2015; Vesel et

al., 2016; Yama et al., 2018). Therefore, in **chapter 2** our research aim is *to explore interprofessional identity and feedback attitudes* as a result of current education in our context, to provide insight in the readiness of our students for interprofessional feedback initiatives. Using questionnaires, we measure the strength of mono- and interprofessional identity (Cameron & Cameron, 2004; Obst & White, 2005), of senior medical and nursing students in the workplace learning phase. Additionally, we use open-ended questions to determine their definition of the interprofessional team and their attitudes regarding interprofessional feedback. Following this exploration, in **chapter 3**, using the research question *What are principles for interprofessional feedback dialogues in the healthcare environment*, we critically review feedback literature in general, and the interprofessional feedback literature specifically, as well as its current translation to (interprofessional) healthcare education. Based on this review and an expert panel we develop the Westerveld framework of principles for interprofessional feedback dialogue.

Figure 3. Research outline of thesis (Figure adapted from Fraefel, 2014)
Chapters in green represent empirical studies directly contributing to answering our research question:

How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?



Enactment phase

In this phase we develop practical tools, based on the outcomes of the reflection phase. These tools serve to translate contemporary feedback theory to the practice of health professions education. We then implement this in an educational intervention, closely monitor this implementation, and revise where necessary.

In **chapter 4** we develop a compact, visual overview of six common pitfalls of receiving feedback, including mindsets and conversational prompts to help students avoid these pitfalls. In **chapter 5** we aim *to explore students' self-reported goals and process of goal setting to inform future interprofessional feedback dialogue education*. In this chapter we describe the development of the *Westerveld Interprofessional Feedback intervention*, a workplace-oriented training for medical and nursing students, based on the *Westerveld Framework* of principles. The main goals of this training are to develop students' interprofessional-, and feedback dialogue attitudes and skills. We analyze educational data and focus groups using goal setting theory (Locke et al., 2006; Locke & Latham, 2002, which leads to theoretical insights as well as practical recommendations.

Analysis phase

In this phase we analyze learning processes in the revised learning environment. To enable such analysis, in **chapter 6** we develop a measurement instrument for feedback orientation that incorporates both the giver and user perspective in feedback dialogues. Such a scale for *dialogic feedback orientation* is thus far non-existent in the feedback literature. We adapt the Feedback Orientation Scale (Linderbaum & Levy, 2010), which measures receptivity to feedback from a user perspective, and mirror its items to include the giver perspective in the instrument. In **chapter 7** we analyze learning of students that participated in the revised design of the *Westerveld Interprofessional Feedback intervention* using the research question: *How do medical and nursing students' perceptions of interprofessional teamwork and interprofessional feedback orientations change as they transition from classroom to workplace education?* In this chapter we aim to explore if and how learning takes place in this intervention, and to see if this learning is maintained in the workplace. To do so, we analyze changes in perceptions of interprofessional teamwork (students' teamwork valuing and their definitions of the interprofessional team), and dialogic feedback orientation of students, at three time points in training: at the beginning and end of the classroom phase, and after 12 weeks of workplace training.

Reflection and redesign phase

In this phase, inspired by the outcomes of the enactment and analysis phases phase we commence a new phase of reflection and design.

In **chapter 8**, we explore ways of offering students safer, more agentic, and more efficient feedback processes in the workplace. We broaden the scope of feedback information, beyond dialogic comments, to understand how students' learning from

other sources of performance relevant information in the workplace contributes and relates to their learning from comments. The internal feedback model (Nicol, 2021, 2022), allows us to better understand students' learning through the central process of comparison. Our research question is: *What do medical students learn from the comparisons they make using different information sources in the interprofessional workplace?* In this chapter, we use reflective self-reports and interviews from senior medical students to explore their learning in the interprofessional workplace interactions.

In **chapter 9** we summarize our findings, draw general conclusions, and offer recommendations for further redesign and research of interprofessional feedback dialogue education in our context.

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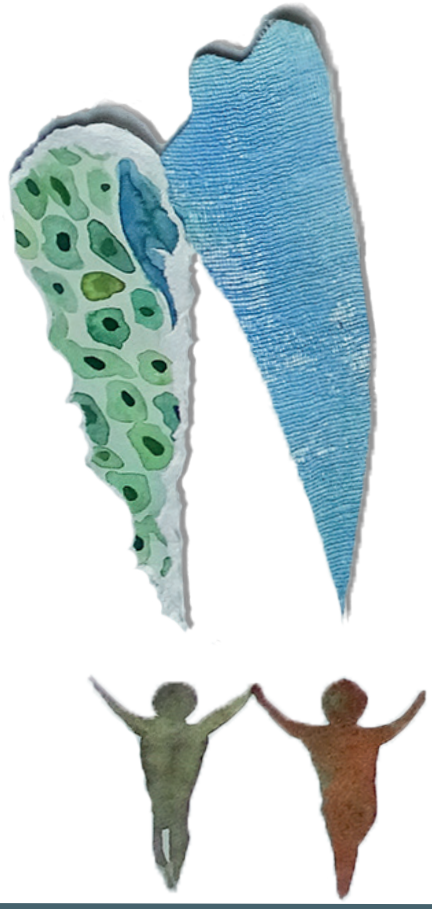

2

Professional and Interprofessional Group Identities of Final Year Medical and Nursing Students

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ABSTRACT

This small study explores group identification among healthcare students. Identifying with a professional group serves professional identity formation. Social Identity Theory however shows how social identification with a group can result in negative attitudes towards 'out-groups', possibly other health professions. 276 Final-year nursing and medical students received a questionnaire measuring strength of social identification (SSI) with their professional group and their interprofessional team, and their views on interprofessional feedback and who they viewed as team members. 38 Medical and 15 nursing students responded. Mean SSI differences were found favouring the professional group, statistically significant for the nursing students. Participants had a broad view of their interprofessional team and valued interprofessional feedback. Despite the mean SSI differences, final year students' broad perspective of team members and openness to interprofessional feedback suggest that group processes do not hinder the development of inclusive, interprofessional attitudes.

INTRODUCTION

Professional identity formation and interprofessional collaborative skills are two topics, high on agendas for innovation in health professions education (Frenk et al., 2010; Interprofessional Education Collaborative, 2016; Monrouxe, 2010; Visser et al., 2018). When exploring these multifaceted professional requirements through the lens of Social Identity Theory (SIT) (Ellemers & Haslam, 2011), a theoretical approach from social psychology, questions arise whether these two important goals of training may give rise to tension (Best & Williams, 2019; Burford, 2012).

SIT, with its later extension of Self-Categorization Theory (SCT) (Turner & Reynolds, 2012), explains how humans in social circumstances categorise themselves and the people around them as belonging to social groups. It posits that people can incorporate these social group memberships into their self-concept or "social identity", which is defined by Henri Tajfel, the creator of SIT, as "that part of an individuals' self-concept which derives from their knowledge of their membership of a social group (or groups) together with the value and emotional significance attached to that membership" (Tajfel, 1982). As a result of social identification, people behave in accordance with the values and norms of the social group they identify with, in particular with the social group which is salient in the social situation at hand. According to SIT, a need for a positive self-esteem drives people to have unconscious psychological strategies to see the group they identify with as the 'in-group', and as more favourable than other groups, the 'out-groups'. Social identification can therefore result in positive attitudes towards in-group members (in-group favouritism) and negative attitudes towards out-group members (out-group derogation) (Burford, 2012; Ellemers & Haslam, 2011).

A professional group is such a social group (Burford, 2012; Willets & Clarke, 2014). A strong identification with members of the professional group can be regarded as beneficial, as a professional is expected to think, act and behave in accordance with the profession's norms and values (Cruess et al., 2014). However, from the perspective of interprofessional collaboration and learning, a strong mono-professional identity formation may not be beneficial. It can be hypothesised that professionals and healthcare students with a strong professional identity could exhibit lower readiness for interprofessional collaboration and learning, as they will strongly use the perspective from their own professional group in patientcare (Visser et al., 2018). This may, for example, mean they would not consider feedback from other professionals on their work as valuable. Also, interprofessional collaboration and learning might be hindered as a result of out-group derogation (Bochatay et al., 2019; Burford, 2012; Sollami et al., 2018).

On the other hand, group processes may also be beneficial to interprofessional collaboration and learning. In an interprofessional team, professionals may come to develop their identities as members of the broader team, including members of different professions as in-group members (Reinders et al., 2018; Thomson et al., 2015). The literature shows conflicting views regarding this topic (Whitehead, 2007).

Some authors propose to stimulate team identities as a solution to break through professional silos, others are sceptic whether this is possible, due to the complexity of professional dynamics and differences in status between groups (Burford, 2012; Whitehead, 2007).

Similar dynamics will occur for healthcare students who are exposed to interprofessional collaboration during their rotations. In many undergraduate medical and nursing curricula students experience an increase in clinical responsibility, building up to a final year in which the trainees perform clinical tasks approaching the level of a starting postgraduate trainee (ten Cate et al., 2018). This includes authentic exposure to interprofessional medicine-nursing collaboration.

Our study is a small explorative study in which we measure and compare these students' strength of social identification with the own professional group and with the interprofessional team. Though we are interested in students' social identification with the interprofessional team, it is not clear from the literature who exactly students perceive as members of that team. To gain more insight into this, we also collected information on who – of the professionals they encounter during their clinical work - they consider as their team members. Additionally, we collected information on whether they would be open to interprofessional feedback, as we see openness to interprofessional feedback as a positive attitude to interprofessional collaboration and learning.

METHODS

Educational context

Our study was conducted at Utrecht University School of Medicine and Utrecht University of Applied Sciences School of Nursing in the Netherlands. The medical school consists of a 3-year bachelor's and 3 year-master's program, both full-time, and has a curriculum which provides learners with early clinical experience (first clerkships in year 3), long clerkships during the final years of training and increasing levels of clinical responsibility during the clerkships (ten Cate et al., 2018). The Utrecht University of Applied Sciences School of Nursing offers a 4 year full-time bachelor level program including clinical rotations as early as the first year, increasing in rotation length and clinical responsibility towards the final year. Variations on the program are possible, depending on the previous nursing work and education of learners. Both the nursing and medical programs inherently include interprofessional collaboration in the workplace. With the exception of the unique feature of early clerkships in bachelor year 3 at the medical school, these educational programs, especially regarding the final year, are overall comparable to other medical and nursing school programs in the Netherlands.

Participant selection and invitation

In October 2018 all final-year medical and nursing students of Utrecht University School of Medicine and Utrecht University of Applied Sciences School of Nursing

respectively, who at that moment had completed a final year clinical hospital ward rotation of eight to twelve weeks in a large training hospital in the region of Utrecht, were invited by email to fill out an electronic questionnaire using Formdesk® (N= 164 medical and N=112 nursing students).

Instrument

The questionnaires contained items about biography (age, gender and study program of the student). Furthermore, Cameron's "Three Dimensional Strength of Group Identification Scale"(Cameron, 2004; Obst & White, 2005), was used to measure Strength of Social Identification (SSI). To ensure the Dutch translation of the instrument was still sufficiently equal to the original validated English version of the questionnaire, the scale was translated to Dutch through forward and backward translation by three bilinguals. The authors checked whether the final version of the Dutch translation represented the intended meaning of the original English version of the questionnaire. Previous research has demonstrated reliability and provided validity support for this scale (Cameron, 2004; Obst & White, 2005). In these studies the items were developed and validity support was gained using mostly student populations, measuring their identification as students or their gender or nationality identification. Since then it has been used in a variety of populations such as organizational, gamer, migrant and sports team identities. This scale has, to our knowledge, not been used previously to measure identity formation in interprofessional education or practice in health care. It consists of twelve statements to be rated on a seven-point Likert scale (1= completely disagree, 7= completely agree). The instrument assumes that social identification includes multiple dimensions (Milanov et al., 2014). The 12 statements have been developed based on a three dimensional model of social identification that stays close to Tajfel's definition of social identity (Tajfel, 1982). These dimensions are cognitive centrality (the cognitive prominence of group membership), in-group affect (the emotional evaluation of group membership) and in-group ties (the perception of bonds with other group members) (Cameron, 2004). The questionnaire (original version in English) can be viewed in supplement 1. To quantify identification with both groups separately so we could compare them statistically, the scale was presented to each participant twice. First they were asked to rate the statements with the professional group with which they had worked during that rotation in mind (nurses for the nursing students and physicians for the medical students). Next, we asked them to rate the statements regarding the interprofessional team of healthcare professionals with whom they worked in patient care on a regular basis in the same rotation. Finally, students were asked to answer two open-ended questions: "Which professionals do you view as belonging to the interprofessional team?" and "How would you feel about being assessed by or receiving feedback from the members of another profession than your own about your clinical performance?" The online questionnaire was available for two weeks; one reminder was sent after one week.

Data analysis

Normality of the data was assessed to determine that parametric analysis was sui-

table. The difference in mean SSI scores of the professional group and interprofessional team was assessed by paired-samples t-tests for the medical and nursing students using IBM SPSS® software version 25. Analysis of the answers on the open-ended questions was performed by CT, SB and TW. First, they independently reviewed the data, followed by a discussion with all three authors together. Data on who a participant perceived as team was analyzed by coding the professionals that were mentioned by a single participant as team members at three levels: At level A the participants mentioned doctors and nurses only; at level B the participant also mentioned one or more members of a paramedical profession (e.g. physical therapists, dieticians); at level C the participant, in addition to professionals from level A and B, also mentioned one or more professionals who could be considered supportive staff (involved in patientcare but not directly 'at the bedside' such as cleaning staff) or management staff (e.g. team manager). Data on whether the participant would consider assessment or feedback from a member of another profession as useful was coded as "positive" or "negative". Next, many participants mentioned reasons for their answer or conditional elements for interprofessional feedback. These were analyzed in an open coding process, followed by axial coding to identify main themes. CT and SB independently analyzed all transcripts, and TW analyzed a subset of the data for analytical rigor purposes.

Ethical approval

The research proposal was approved by the ethical review board of the Netherlands Association for Medical Education (NVMO), file number 2018.6.10. Participation was voluntary, informed consent of participants was obtained, and no personally identifiable information was collected. In reporting our findings we used numbers (1-53) followed by N (nursing student) or M (medical student) to distinguish between different participants.

RESULTS

Participant demographics

Table 1: Participant characteristics

			Nursing	Medicine
Participants	(Total n = 53)	n (%)	15 (28,3)	38 (71,7)
Gender	Female	n (%)	14 (93,3)	29 (76,3)
	Male	n (%)	1 (6,7)	9 (23,7)
Age		Mean (SD)	22,73 (2,549)	25,05 (1,488)
In final year clinical rotation	During data collection	n (%)	15 (100)	9 (23,7)
	< 3 months prior to data collection	n (%)	-	14 (36,8)
	3-8 months prior to data collection	n (%)	-	15 (39,5)

The questionnaire was completed by 15 nursing students and 38 medical students (response rate 13.4 and 23.2%). Mean ages were approximately representative for the total cohorts of students (mean (SD) 22.7 (2.55) and 25.1 (1.49) for nursing and medical students). The number of participating male students was low but also approximately representative for this cohort. See table 1.

Mean SSI scores of both groups

Based on Shapiro-Wilk's test on the difference in SSI scores of professional and interprofessional team ($p > 0.05$ for nursing and $p = 0.042$ for medical) in combination with the sample sizes, and a visual inspection of their histograms, normal Q-Q plots and box plots, the assumption of normality for paired T tests was deemed justified. For the nursing students there was a statistically significant higher mean SSI score for the professional group than for the interprofessional team (Table 2), with a mean difference of 0.64 on a 7 point Likert-scale (Cohen's d is 0.65). For the medical students there was no statistically significant difference, with a mean difference of 0.29 (Cohen's d is 0.32).

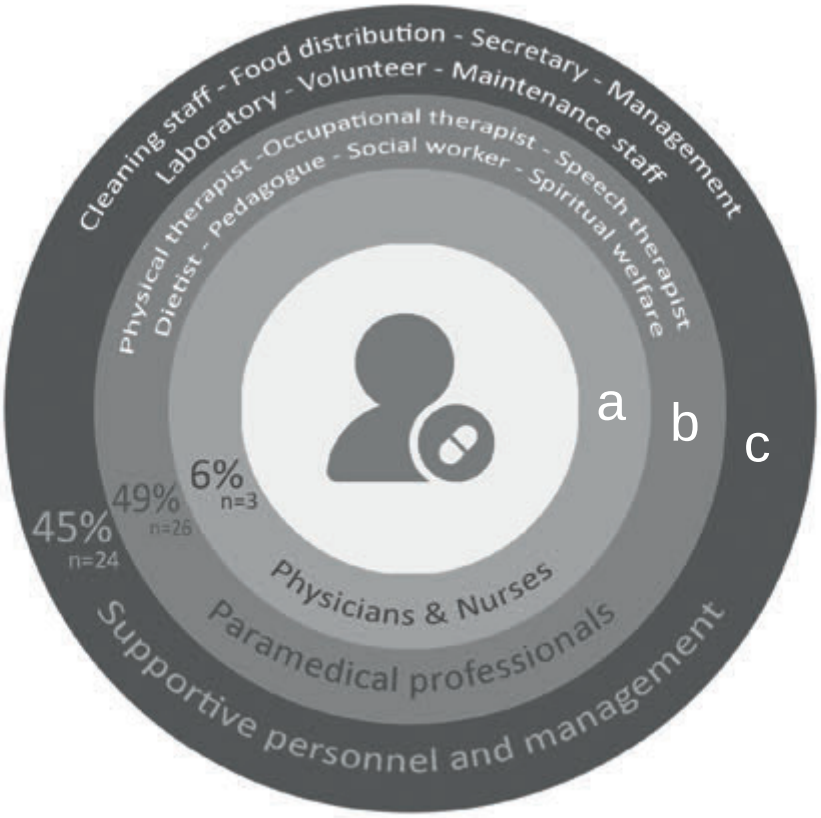
Table 2: Within group Strength of Social Identification (SSI)

		Professional	Interprofessional	p-value
Medical n=38	Mean (SD)	5.16 (0.77)	4.87 (0.76)	0.055
	Mean difference (SD)	0.29 (0.91)		
	95% CI, Cohen's d	(-0.01 ; 0.59), 0.32		
Nursing n=15	Mean (SD)	5.15 (0.62)	4.51 (0.62)	0.025*
	Mean difference (SD)	0.64 (0.98)		
	95% CI, Cohen's d	(0.10; 1.18), 0.65		
* = p < 0.05				

Professionals perceived as 'team members' by the participants

In analyzing the answers to the open-ended question "Which professionals do you view as belonging to the interprofessional team?" we found three levels of extensiveness. By grouping these responses according to their 'level of extensiveness' we attempted to indicate the differences in broadness of view participating students had of who did and who did not belong to their interprofessional team. A lower level meant students were less inclusive in their view whilst a higher level meant they saw many different types of professionals as part of their team. All participants mentioned (a) several types of physicians and nurses (Figure 1). We considered this to be the first level of extensiveness. Many respondents (b) also included several paramedical professionals aside from those physicians and nurses. We considered this to be the second level of extensiveness. Finally, many respondents additionally included (c) supportive personnel. By 'supportive personnel' we mean professionals who are not involved at the direct care 'at the patient's bedside' but who have supportive or management roles on the hospital wards.

Figure 1. Three levels of interprofessional team extensiveness as mentioned by the participants with examples of mentioned professionals



Participants' attitudes towards interprofessional feedback

In their reactions on the open-ended question "How would you feel about being assessed by or receiving feedback from the members of another profession than your own about your clinical performance?" almost all participants (N=49, 92.5%) indicated they would value being assessed by or receiving feedback from the members of the interprofessional team other than from their own profession. They mentioned it would be "useful", "a good idea", "informative", "good" or other reflections of a positive attitude. Some of them indicated they had already taken the initiative to ask for interprofessional feedback. Although not specifically asked for, many participants gave reasons for their positive attitude towards feedback from members of another profession. Many explained that they thought or experienced that interprofessional feedback could give insights on their functioning from a different perspective, or could give useful feedback on specific skills such as teamwork and communication. For example they mentioned:- "I would like that! I think you can learn a lot from it, because you would also get feedback on other aspects than those your own professional group pays attention to." #36N - A few participants mentioned conditions they viewed as necessary: as main themes we found they consider the interprofessional feedback would only be useful when provided by someone with whom they had en-

ough contact during work. And the feedback providers would need to be familiar with the expected level of expertise of the learner. Also, final assessments should be done by someone from their own profession. Only two participants expressed they would not consider interprofessional feedback necessary or would "find it difficult" without specifying. One just said "Not a good idea. Not necessary.", the other explained why: "Not always the right view, for they probably aren't clear about what they should be assessing me on. Besides, for doctors, for example, it would be difficult to assess me because they might expect me to think at their level of expertise." #19N

DISCUSSION

As we proposed earlier, a strong identification with the professional group could theoretically hinder students' readiness for interprofessional collaboration (Burford, 2012; Ellemers & Haslam, 2011; Visser et al., 2018). In this first exploration among final year healthcare students, we found relatively small differences between strength of identification with professional and interprofessional groups, favouring the professional group. Although this was significant for the nursing students only, we found a substantial overlap in the confidence intervals of the differences for the nursing and the medical students. This implies that the observed dissimilarity in the differences in how medical and nursing students identify with both groups could be coincidental. If there is an actual difference, we can speculate about the cause. It may be that nursing students feel a stronger connection with their professional group as the daily work of a nurse involves more working as a team with the other nurses primarily. It would also be interesting to explore whether hierarchical or group status differences between medical and nursing students may play a role.

The group that students perceive as 'interprofessional team members' includes a wide variety of colleagues who collaborate in patient care. The vast majority of participants included paramedical personnel in addition to physicians and nurses. Many also mentioned supportive personnel and management. These findings suggest that students have a broad/inclusive perspective of their interprofessional team. An aim of our study was to gain insight into how students' social identifications may affect their views of working in an interprofessional team in practice. They apparently consider many different professionals as their interprofessional team members. On the one hand, we think this broad perspective could be seen as a sign that the students are very aware that good patientcare is a result of team performance. A result of a process with many professionals involved, not only from their own profession or the ones they meet 'at the bedside' regularly, but also supportive personnel. On the other hand, it would be interesting to learn what such a wide definition of this group means for students' readiness to see the interprofessional team as an in-group. It is known that individuals create a hierarchy for their multiple social identities. This 'ranking' of the multiple social identities by the individual determines the probability of a single identity to become salient in a given context (Willets & Clarke, 2014). This has implications for interactions with in-group and out-group members. Being a physician or a nurse and being a member of an interprofessional team of healthcare workers are related group identities, as they are 'nested'. This means one identity (being a nurse) is nested within the other identity (being a team member of a health-

care team), the latter being more inclusive (Willets & Clarke, 2014). Lower-order identities are more proximal to the individual, are salient more often, and therefore have more impact in daily life. It could be that when the interprofessional team is defined more exclusively, with a smaller range of members, it would make this team identity more accessible.

We also learned that, while identifying stronger with the professional group than with the interprofessional group, students are open to feedback from other professionals. Though based on merely a slight difference in identification, we consider this informative as it indicates that stronger in-group identification with members of the professional group does not seem to lead to a less favourable attitude towards learning from members of the interprofessional healthcare team. Students especially value the possibility to receive feedback about competencies on which their own supervisors would not have a clear view, namely teamwork skills like interprofessional communication. Students also mentioned conditions under which interprofessional feedback should occur, such as: the feedback givers should have enough opportunities to observe and be familiar with the training program of the receiver to know what their expected level of expertise could be. These reflect themes found for residents' perceptions of interprofessional feedback (Vesel et al., 2016).

One limitation is that our study was conducted among students of one medical and one nursing school. Other schools and other countries may show different findings. In the European health care system, professionals providing health related services, such as physical therapist and dieticians, are part of regular hospital based care. Medical and nursing students from The Netherlands therefore have the opportunity to interact with these professionals during their rotations which may lead them to perceive these professionals as team members more easily, thus leading to a more positive attitude concerning these other health professionals. This may be different in countries with different health care systems. Another important limitation is the low response rate and the possible bias this brings. Participation was voluntary, which may have attracted students already open to interprofessional learning or more aware of group processes in the workplace. We collected participants' answers anonymously, however there may still be some socially desirable responses. We also defined the professional group as the group of all nurses for the nursing students and all physicians for the medical students with whom they work(ed) during their (latest) rotation. We considered this to be clear to the participants. For future use, we would now consider defining this more broadly, as the professional group one comes to identify with is not limited to the few professionals at one specific department.

This study is a small explorative study. The findings suggest that group processes do not hinder interprofessional collaboration in final year medical and nursing students. With publication of the findings we aim to highlight the possible effects of group processes on interprofessional learning and contribute to the discussions regarding professional identity formation and its consequences for interprofessional learning. Furthermore, it would be interesting to find out how the strength of social identification with both the professional group and the interprofessional team develops over the years as the experience of health care professionals grows.

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APPENDIX 1

Questionnaire for study "Professional and interprofessional group identities of final year medical and nursing students"

1. Demographic questions

- Are you a nursing or medical student?
- What is your age?
- What is your gender?
- Did you do a rotation for a minimum of 8 and a maximum of 12 consecutive weeks at the same department in your final year of education?
- Are you currently in this rotation? If no, How many months ago did you finish it?

2. The following statements from the "Three Dimensional Strength of Group Identification Scale" were used.

Obst PL, White KM. Three-dimensional strength of identification across group memberships: a confirmatory factor analysis. Self Identity. 2005;4:69-80.

Of note: Students were presented with the statements twice. In this, students were asked to replace '(ingroup member)'. First, by the professional group with which they had worked during that rotation in mind (nurses for the nursing students and physicians for the medical students). Next, by the interdisciplinary team of healthcare professionals with whom they worked in patient care on a regular basis in the same rotation.

Cognitive centrality statements
- I often think about being an (ingroup member).
- Being an (ingroup member) has little to do with how I feel about myself in general.
- Being an (ingroup member) is an important part of my self-image.
- The fact I am an (ingroup member) rarely enters my mind.

Ingroup affect statements
- In general I'm glad to be an (ingroup member).
- I often regret being an (ingroup member).
- Generally I feel good about myself when I think about being an (ingroup member).
- I don't feel good about being an (ingroup member).

Ingroup ties statements
- I have a lot in common with other (ingroup members).
- I feel strong ties to other (ingroup members).
- I find it difficult to form a bond with other (ingroup members).
- I don't feel a strong sense of being connected to (ingroup members).

Answering options for all statements

1 I completely disagree
2 I disagree
3 I somewhat disagree
4 Neutral
5 I somewhat agree
6 I agree
7 I completely disagree

3. Open-ended questions

- Which professionals do you view as belonging to the interprofessional team?
- How would you feel about being assessed by or receiving feedback from the members of another profession than your own about your clinical performance?

3

The Westerveld Framework for Interprofessional Feedback Dialogues in Health Professions Education

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ABSTRACT

Interprofessional feedback dialogues play a crucial role in educating the adaptive team members that health care practice requires. The aim of this study is to develop principles for interprofessional feedback dialogues, to support healthcare education on feedback processes in an interprofessional context. A critical review of the literature on (interprofessional) feedback, and discussions with local experts resulted in an initial framework. This was input for a two-round expert panel with international, leading scholars in the fields of feedback (n=5) and interprofessional education (n=5). Experts showed increased agreement and consensus over the rounds resulting in a framework, called the Westerveld framework, structured around seven criteria: Open and respectful; Relevant; Timely; Dialogical; Responsive; Sense making; and Actionable. The framework contains columns with feedback dialogue principles for information givers and users, and columns with additions to be taken into account in an interprofessional healthcare context. Structuring the information giver and user columns around the same criteria, emphasises shared responsibility of participants in a feedback dialogue. The integration of interprofessional additions facilitates transfer to the healthcare context. The Westerveld framework can provide guidance to teachers and students in interprofessional education, contributing to both student and teacher feedback literacy.

INTRODUCTION

Health professions education aims to train professionals with the collaborative competence to work together safely and effectively as interprofessional team members, and with the adaptive expertise to keep doing so despite changing and complicating practice (WHO, 2010; Engeström, 2018; Lingard, 2012). Defined as 'occasions when members or students of two or more professions learn with, from and about each other to improve collaboration and the quality of care and services' (CAIPE, 2016, p. 1), interprofessional education aims to support healthcare professionals in acquiring the competencies needed for this teamwork and expertise (WHO, 2010). Within interprofessional education, feedback is indicated as one of the core competencies we ought to be teaching as it strengthens team relationships and collaborative care provision (IPEC, 2016; Curtin University, 2011).

Feedback is one of the most influential 'means' for students' learning (Hattie & Timperley, 2007; Wisniewski et al., 2020), and though feedback is widely researched and deployed in order to improve healthcare students' workplace training (Anderson, 2012; Bing-You et al., 2017), interprofessional feedback as a research field, especially regarding dialogue between members from different professions, is only just emerging. Synthesis of the available publications on interprofessional feedback, or a specific focus on its desired content and structure are lacking. In order to advance this research field, this study aims to develop a framework of principles for interprofessional feedback dialogues. First, the conception of feedback we use, the interprofessional context, and the challenges this context poses for effective feedback dialogue between different professions, are discussed.

Changing conceptions of feedback

Feedback as a research focus in the general higher education field has a significant background, containing ample synthesis. In recent years, this research focus has evolved, complementing the more traditional focus on giving feedback information (Hattie & Timperley, 2007), with a focus on the receiver's perspective (e.g., Boud & Molloy, 2013; Winstone & Carless, 2019), and the process in which that receiver seeks, makes sense of, and uses information to improve learning or performance (Anseel et al., 2013; Carless & Boud, 2018; Molloy et al., 2019). Essential for achieving this receiver process in practice, is developing learners' feedback literacy, or, 'the understandings, capacities and dispositions needed to make sense of information and use it to enhance work or learning strategies' (Carless & Boud, 2018, p1316). To enable contradictory conceptions of feedback-as-information and feedback-as-a-process to co-exist, Winstone et al. (2021) recommend explicitly using the term feedback process when referring to the learner's seeking, sense making and using, and to refer to feedback information when talking about that which is used in that process.

This more socio-cultural approach positions learners as an active agents, who, as they change roles as information receivers and givers, share responsibility for the feedback process (Ajjawi & Regehr, 2019; Winstone et al., 2020). Dialogue, as an

ongoing exchange, clarification and alteration of ideas (through asking and responding to questions), is promoted as the vehicle for these learners to be able to co-construct meaning in their feedback processes (Ajjawi & Regehr, 2019; Nicol, 2010). Integrating the two roles of information giver and receiver into one framework, can advance the feedback research field, in which publications, including existing frameworks (e.g., Nicol & McFarlane-Dick, 2006; Yang & Carless, 2013; Carless & Boud, 2018), usually focus on either the giver or receiver side of the feedback process.

Implementing feedback dialogues in interprofessional healthcare

A socio-cultural approach to feedback suits the goals of interprofessional healthcare education to train adaptive experts, capable of collaborative learning in the workplace (Engeström, 2018; Lingard, 2012). Healthcare professionals however, currently often retain more cognitive and even giver-centred views of feedback. For instance, Noble et al. found that, even when specifically trained to be feedback literate, medical, nursing and allied healthcare students, 'had to work hard against orthodox feedback expectations and habits in healthcare' (Noble et al., 2020, p. 56). This is not surprising as healthcare professional are educated using transmission-based models such as the feedback sandwich or Pendleton rules (Molloy et al., 2020), and they often encounter feedback in practice as checkbox forms and numeric scores (Vesel et al., 2016). Such practices maintain perceptions of learners as passive information receivers, instead of as agentic agents. In this case, agency refers to autonomy, control and voice of (interprofessional) feedback dialogue participants (Klemenčič, 2015), by which they take their part in the shared responsibility for the feedback process, and influence the culture and environment in which the dialogue takes place. To emphasise the preferred agency of the receiver during these feedback dialogues, we use the term feedback information user instead of feedback information receiver.

Whilst learners, as agentic agents, can influence their context through dialogue, the context (culture, (implicit) rules and structures) of interprofessional healthcare, in return can also mediate (support or hamper) that same feedback dialogue. Recent research calls for attention to such socio-cultural context factors, and to how they impact feedback literacy and engagement (Chong, 2020; Quigley, 2021). Possibly, the most significant examples of these contextual mediations to the feedback process are credibility and hierarchy.

The challenges of credibility and hierarchy

The extent to which physicians perceive interprofessional feedback information givers as credible, depends strongly on the role and expertise of the information giver, and how these align with the information given (Feller & Berendonk, 2020; Miles et al., 2021; Vesel et al., 2016; Yama et al., 2018). The perceived role and expertise of interprofessional colleagues, however, are often not acknowledged or (partially) misconceived (Miles et al., 2021; Tariq et al., 2020). This can lead to structural misjudgments of credibility (and a lack of openness) in dialogues with team members from another profession. For example, a physician may judge a nurse as a non-cre-

dible source of feedback information regarding their medication prescribing, because this task is reserved for physicians and not educated in nursing school. Most nurses, however, administer medication constantly, giving them ample experience with drug indications, dosing and side-effects. Due to a credibility judgement based on misperceived expertise, valuable feedback information on medication prescribing from this nurse may be discarded by this physician, impeding future collaboration and creating possibly dangerous situations.

Furthermore, (perceived) hierarchy is often present in interprofessional relations in the health care setting (Foronda et al., 2016; Gergerich et al., 2019). This can result in complex power dynamics that significantly impact the willingness to engage in feedback dialogues with interprofessional colleagues and the acceptance and use of their feedback information (Leonard et al., 2004; Miles et al., 2021; S. van Schaik et al., 2015). For instance, Miles et al. (2020, p524) describe how allied health professionals temper their corrective feedback information to physicians in fear of getting in trouble by offending those higher up in the healthcare hierarchy. Aside from these traditional, superimposed, role structures, power dynamics can stem from other structures, such as years of experience or educational relationships (Miles et al., 2021; S. van Schaik et al., 2015; Yama et al., 2018). For example, newly graduated physicians can struggle to give feedback information to experienced nurses who have worked the ward for years, and healthcare students may feel limited in their responsiveness in feedback dialogue with graduated professionals.

Aims and research question

In sum, to train the adaptive team members it needs, health professions education would benefit from interprofessional feedback dialogue principles that incorporate the challenges of its unique context, especially taking into account credibility and hierarchy. Ideally, these principles would integrate the roles of feedback information giver and the information user, and focus on their shared responsibility for the feedback process, thus communicating a socio-cultural conceptualisation of feedback, positioning learners as active agents. This would make an important contribution to current available frameworks, as this integration of both roles in one framework is currently lacking in existing feedback frameworks. Therefore, this study provides a synthesis of contemporary insights on feedback processes, integrating the literature on giving and using feedback information, aiming to develop a framework of principles for feedback dialogues that can be used to develop feedback literacy. We then identify additional elements that support applicability of these principles in interprofessional healthcare practice. The research question is: What are principles for interprofessional feedback dialogues in the healthcare environment?

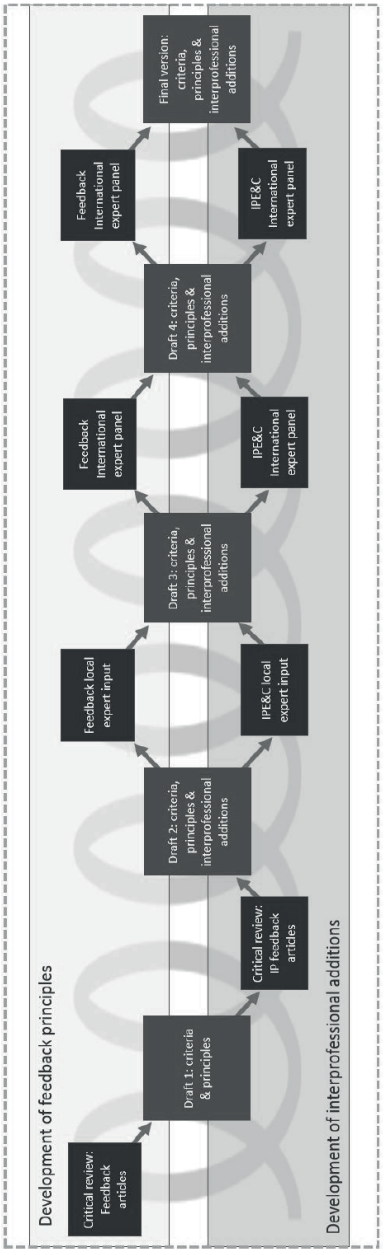
METHODS

Study design

We developed our framework in an interconnected process of critical literature review (Grant & Booth, 2009), interpretive analysis by team members and local ex-

perts, and input from an international expert panel, which we consulted using two rounds of short questionnaires. See figure 1 for a graphic overview of the process.

Figure 1. Graphic overview of the study design



Procedure

Critical review

Relevant feedback articles

To identify relevant articles on feedback in higher education, for our purpose of formulating principles for feedback dialogues, we used two steps. First, we screened the top ten most cited and most read articles, from the most impactful higher education journals, that publish on the topic of feedback (Winstone et al., 2021), and those aimed at publishing overview articles (see figure 2). This was followed by full-text screening; Figure 2 lists the exclusion criteria used in determining relevance.

Relevant interprofessional feedback articles

Likewise screening the most cited and read publications of the most impactful (interprofessional) health professions education journals, as a first step in identifying relevant articles on interprofessional feedback, heeded no results. Therefore, a systematic search was conducted. Figure 2 lists the databases and search terms used. To increase the efficiency and quality of review screening processes, we used ASReview machine learning software (version 0.16; van de Schoot et al., 2021). Following van de Schoot's (2021) recommendations, screening continued until at least 25% (i.e., 26,42%) of the abstracts were seen and at least 100 in a row were deemed irrelevant. To assure we did not overlook relevant interprofessional communicative competencies we additionally included the 4 most widely used competency frameworks on interprofessional collaboration (Thistlethwaite et al., 2014). Figure 2 lists the exclusion criteria used in determining relevance.

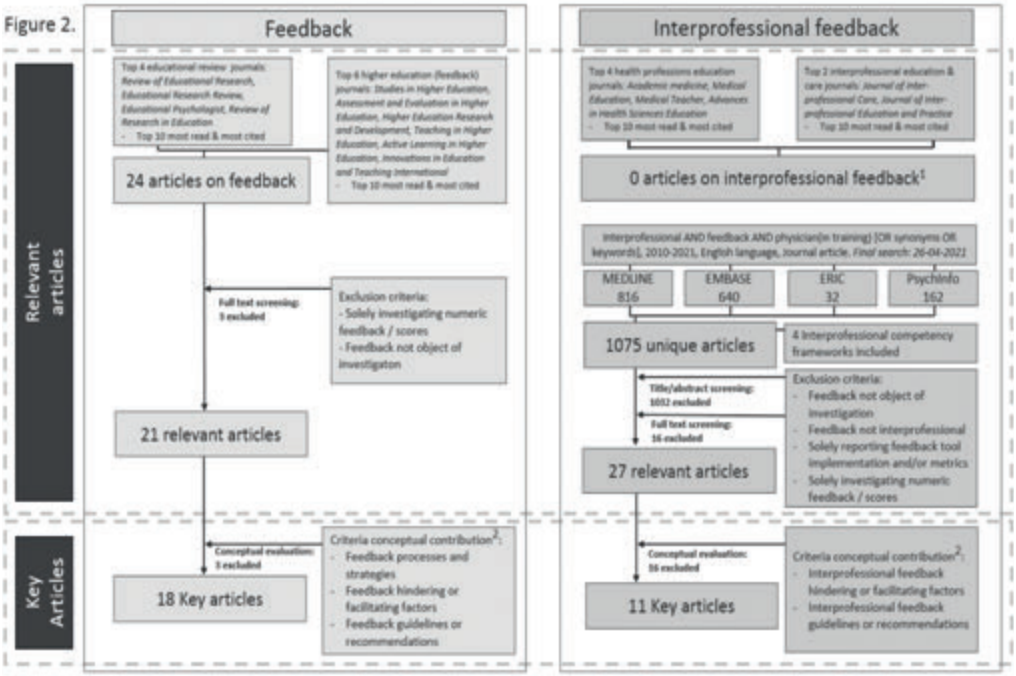
Key articles

Critical reviews seek to provide a conceptual synthesis by evaluating publications based on their contribution (Grant & Booth, 2009). To identify the key articles for our purpose of formulating principles for feedback dialogues, we evaluated the conceptual contribution of the relevant articles in both fields, using criteria for conceptual contribution as listed in Figure 2.

Interpretive analysis of key articles

First, in an iterative process, CT and RK used the key articles on feedback to formulate criteria and principles in the following steps: a) Exploring the key publications; b) Extracting recommendations for feedback dialogues; c) Grouping recommendations to formulate overarching themes; d) Rearranging themes in search of a comprehensive framework that integrates giver and user recommendations and communicates shared responsibility; e) Rephrasing and merging recommendations and translating them to practical actions to synthesise dialogue principles. Table 1 illustrates the development of one criterion and its corresponding principles using the steps of our interpretive analysis. This resulted in draft 1 (see figure 1) of the framework with central themes and symmetrically structured information giver and user feedback dialogue principles. The themes were renamed into criteria.

Figure 2. Critical review search strategy



[1] Screening top publications of top journals did yield articles on interprofessional education, some of which referred to feedback, but as interprofessional feedback was not a main focus of these articles we did not consider them sufficiently relevant.

[2] Feedback processes and strategies include goal setting, motivation, self-assessment, sense-making, and seeking. Feedback hindering or facilitating factors include characteristics of message (e.g., purpose, jargon and tone), dialogue participants (e.g., perception of credibility of giver and hierarchy) and context elements (e.g., formal structures and education).

Table 1. Example to illustrate the development of the criterion timely and its giver principles

Selected key articles (step a)	Extractions of recommendations for feedback dialogues (step b) (examples are not exhaustive)	Formulated overarching theme (step c)	Translation of recommendations to giver dialogue principles (step e)
Carless 2011 Evans 2013 Hattie 2007 Nicol 2006 Nicol 2014 Poulos 2008 Price 2010 Winstone 2017 Yang 2013	- Hattie 2007: p103 "To be able to devote time and thoughts to feedback is aided when teachers automate many other tasks in the classroom (…) and thus have the time and resources to be responsive to	Timely	Verifies readiness of giver and user [moment of the day, (safety of) setting, states of mind] when either is not ready, considers postponing.
	- Hattie 2007: p81 "Feedback thus is a "consequence" of performance"		Gives user the opportunity to first learn independently
	- Nicol 2006: p210 "providing timely feedback—this means before it is too late for students to change their work (i.e. before submission)" - Price 2010: p285 "There was near consensus about when feedback is useful, that is when it can be and is applied"		Times giving feedback information so that user has the opportunity to adapt performance on a future occasion

Next, the key interprofessional feedback articles were used to formulate additions to these general dialogue principles in the following steps: a) Exploring the key publications; b) Extracting hindering factors for interprofessional feedback dialogues; c) Formulating hindering processes as overarching themes; d) Formulating, for each hindering process, professional background characteristics that play a role in the hindrance of feedback dialogue through these processes. e) Rearranging themes and professional background characteristics to the (template of) general feedback criteria and principles and translating them to practical actions. This resulted in draft 2 of our framework.

Local expert input

Following this, group discussions with all authors and four additional local experts, i.e., two feedback scholars, a physician, and a nurse, contributed to reaching consensus on the framework's structure and content and resulted in the 3rd draft of the framework.

International expert panel

Design
Seeking evidence for content validity of the feedback dialogue principles as well as improvement suggestions, we consulted an expert panel with two online questionnaires (November 2019 and February 2020). Round 1 was used to develop the 4th draft of the framework. Round 2 was used to seek agreement and consensus with the changes made based on round one, as well as additional improvement suggestions, and led to the development of the 5th draft of the framework. Inspired by the methodology of Delphi studies, the second questionnaire addressed the adjustments made, based on the results of the first questionnaire. The approach, using anonymous questionnaires to independent experts, was chosen over focus groups to minimise bias. It helped prevent group processes (e.g., polarisation, group pressure) and ensured the same weight was given to each experts' opinion.

Participants
We aimed to select two international expert groups, with a minimum of four experts each, with a research focus in the fields of feedback and interprofessional education/collaboration. Experts were selected through purposeful, maximal variance sampling (Patton, 2002), based on place of residence/work and sub-expertise or specific perspective in the feedback or interprofessional field. We invited ten feedback and nine interprofessional experts. With a response rate of 53%, this led to the inclusion of five experts in both groups. The feedback experts had an h-index ranging from 20-40. For the interprofessional experts, the h-index ranged from 7-46. The five feedback experts came from Europe and Oceania. The five interprofessional experts came from the United States, Europe, and Oceania and had backgrounds as physicians and/or as educators. Due to time constraints, one feedback expert only participated in the first round whilst another feedback expert only participated in the second round.

Instruments
The questionnaires contained closed questions focusing on the experts' degree of agreement with whether the framework from their perspective exhaustively encompassed feedback literature and interprofessional literature (to discern if important themes were missing), and with the structure, and usability of the framework. It contained open questions seeking suggested alterations of the framework's criteria and principles (see Appendix 1).

Data analysis.
After both rounds, descriptive analysis of the closed questions took place. Next, CT and RK analysed the answers to the open-ended questions by listing individual themes, categorising and comparing them on similarities and differences. All suggestions were first judged on rationale by CT and RK. Next, these judgments were discussed with TW and MS until consensus was reached. Next, the suggestions were used to improve the framework and listed, with their rationale, as input for the next round.

Between rounds, degree of agreement and consensus were calculated and compared, regarding: coverage of literature, framework structure and usability. Degree of agreement was operationalised as the number of experts that agreed with the principles. Degree of consensus was determined by the scope of suggestions for improvement, and the standard deviation in experts' estimation of whether they would use the instrument in their own education or research.

Reflexivity

Despite all procedures, throughout data analysis, our own professional perspectives might have impacted our interpretation of the findings. CT and TW are physicians and interprofessional educators. SB is a physician and professionalism remediation coach, and RK and MS are feedback scholars and educational researchers. The different backgrounds of team members contributed to a design and research process from several perspectives. The authors frequently met for dialogues and discussions that challenged underlying assumptions.

Ethical approval

The research proposal was approved by the ethical review board of the Dutch Association for Medical Education (NVMO), file number 2019.7.9. Participation was voluntary and informed consent of participating experts was obtained.

RESULTS

Critical review

Table 2. Criteria for feedback dialogue and their descriptions

Criteria	Descriptions
Open and Respectful	Participants are open to each other's input and communicate on this respectfully.
Relevant	Participants address agreed upon goals and observed performance.
Timely	Participants engage in dialogue when user is ready and has started but not finished learning.

Criteria	Descriptions
Dialogical	Participants use a repertoire of behaviour needed to achieve two-way communicative exchange.
Responsive	Participants contribute to adaptivity of the feedback dialogue to the specific context of the user.
Sense making	Participants contribute to the user's interpretation and prioritisation of information.
Actionable	Participants contribute to the usability of the feedback information.

The critical review on feedback included 18 key articles. The selected key articles are indicated in the reference list with an asterisk. The critical review resulted in the 1st draft of our framework of dialogue principles, structured around seven criteria. Table 2 presents these seven central criteria and their descriptions. These remain the centre of our framework in its final version. The criterion dialogical, not to be confused with the overarching term dialogue, addresses the two-way communicative exchange structure that characterises a dialogue.

The critical review on interprofessional feedback included 11 key articles. The selected key articles are indicated in the reference list with a double asterisk. Analyses of the articles on themes led to the identification of four hindering processes to feedback dialogues, and eight corresponding professional background characteristics that play a role in the hindrance of feedback dialogue through these processes. (see Table 3)

Table 3. Hindering processes in interprofessional dialogues and corresponding professional background characteristics

Hindering processes	Professional background characteristics
Power dynamics Complex hierarchies and the power dynamics stemming from them can hinder interprofessional feedback processes (including goal setting, motivation, self-assessment, sense-making, and seeking)	Superimposed role *Determined by a professional's place in formal (hierarchical) structures in health care*
	Years of experience *Determined by the experience gained by a professional working in practice*
	Educational role *Determined by a professional's role as a learner, teacher or peer*

Hindering processes	Professional background characteristics
Credibility Credibility judgements are made by assessing feedback information provider's professional role and expertise and its alignment with the interprofessional feedback information they provide.(Mis)judgements can hinder interprofessional feedback processes	Expertise *Determined by a professional's competencies gained through education and experience*
	Professional role *Determined by a professional's work tasks and responsibilities*
Identity Professional identity formation, and group processes stemming from that, can hinder interprofessional feedback processes	Professional identity *Determined by a professional's socialisation within professional groups or interprofessional teams*
Structural work processes Workloads and structural differences in work habits form practical barriers and thereby hinder the interprofessional feedback process	Work habits *Determined by, e.g., work shift hours, handover & education times, communication styles*
	Workload *Determined by, e,g., patient load, administrative tasks, educational responsibilities*

Expert panel

In the first round, the experts gave various suggestions to improve the framework. These concerned: adding (parts of) sentences for completeness or to improve usability, moving elements of principles to a more logical place in the framework and rephrasing principles for clarity, nuance or completeness.

In round two we received some minor additional suggestions for improvement. Additionally, the number of experts answering the question Does this instrument encompass the current feedback literature exhaustively? with yes, increased from two out of five in round 1 to four out of five in round 2. Next they were questioned: Does this instrument encompass the current interprofessional literature exhaustively? Four out of five interprofessional experts already agreed in round one. One expert indicated not feeling comfortable assessing the full body of interprofessional literature and answered 'do not know' in both rounds. The third question was: Is the structure of this tool (feedback principles and interprofessional additions divided into criteria) logical to you? In round one, three out of nine experts disagreed, whereas all participants agreed in round two. Lastly, they were asked: How likely is it that you would use this instrument in your own education or research? The mean for self-reported likeliness to use the framework, increased from 5.2 to 5.8 on a 7-point scale, whilst the standard deviation decreased from 1.5 to 0.8.

Framework of criteria, feedback principles and interprofessional additions.

The final framework with the original seven criteria, the dialogue principles, and the interprofessional additions is presented in table 4.

DISCUSSION

Interprofessional feedback dialogues play a crucial role in educating the adaptive team members that health care practice requires (Engeström, 2018; Lingard, 2012). In this study we developed principles for interprofessional feedback dialogues to support health professions education in this aim. Through a critical review and an international expert panel we synthesised the Westerveld framework. This symmetrical framework centres around seven criteria: Open and respectful; Relevant; Timely; Dialogical; Responsive; Sense making; and Actionable. For each criterion, the framework describes feedback dialogue principles for the information giver and user, as well as additional elements that should be taken into account in an interprofessional healthcare context.

The Westerveld framework provides two major theoretical contributions. First, integrates literature on giving feedback information with that on seeking and using feedback information into one framework. To our knowledge, it is the first study to do so. Therewith, we operationalise a socio-cultural conceptualisation of feedback, positioning learners as active agents that co-construct meaning in a dialogue, in line with recent directions in feedback literature (Ajjawi & Regehr, 2019; Winstone et al., 2020; Nicol, 2010). The framework helps articulate and explicate shared responsibility in feedback processes, by incorporating both the information giver and user roles in feedback dialogues.

Second, the Westerveld framework offers a synthesis of the interprofessional feedback literature and integrates its findings with the solid base of feedback literature in general. The prescriptive framework progresses the relatively novel, and so far highly descriptive, interprofessional feedback literature. It offers an initial evidence base for what to address in interprofessional feedback education, taking into account that power dynamics, credibility, identity, and structural work processes influence interprofessional feedback processes. It offers a concrete repertoire of behaviors for the feedback information giver and user to address these themes in dialogues.

Implications for practice

The combination of principles on giving and using feedback information in one framework can help students realise their agency and responsibility both as active information givers, and users, in feedback dialogue, instead of considering themselves to be passive recipients of information. As such, the framework helps students acknowledge feedback as a reciprocal process, and appreciate feedback as an active process, both essential competencies in student feedback literacy (Molloy et al., 2019, p529).

Table 4: The Westerveld framework for giving and using feedback information in interprofessional dialogues

Interprofessional additions	**Feedback principles**	**Criteria**	**Feedback principles**	*Interprofessional additions*
INFORMATION GIVER			**INFORMATION USER**	
- Gives feedback to professionals from another professions *- Crosses professional group boundaries and contributes to an interprofessional team identity* *- When applicable, addresses and overcomes power differentials from superimposed hierarchy, years of experience or educational role (teacher, learner or peer)*	- Is open to responses to feedback information including critique - Uses substantive, not authoritative arguments - When appropriate, addresses and corrects defensive reactions to feedback information	**Open and respectful**	- Is open to learn from- and proactively seeks positive and negative feedback information - Responds respectfully, avoiding defensiveness	*- Seeks and accepts feedback information from all team members from other professions* *- Crosses professional group boundaries and contributes to an interprofessional team identity* *- When applicable, addresses and overcomes power differentials from superimposed hierarchy, years of experience or educational role (teacher, learner or peer)*
- Clarifies how the feedback information provided ontributes to patient care *- Clarifies feedback dialogue goal: improving users' personal growth or work-efficiency* *- Addresses alignment betwe n feedback information and role or expertise: why perspective of specific provider is valuable for user*	- Discusses goals until mutual understanding is achieved - Gives feedback information related to mutually understood goals - Gives feedback information based on observed task performance	**Relevant**	- Discusses goals until mutual understanding is achieved - Seeks feedback information related to mutually understood goals - Seeks feedback information on performed task from observer	*- Clarifies how the sought feedback information contributes to patient care* *- Clarifies feedback dialogue goal: improving users' personal growth or work-efficiency* *- Addresses alignment between feedback information and role or expertise: why perspective of specific provider is valuable for user*

Interprofessional additions	**Feedback principles**	**Criteria**	**Feedback principles**	*Interprofessional additions*
INFORMATION GIVER			**INFORMATION USER**	
- Considers and verifies possible differences in (timing of) work process between professions whilst assessing readiness	- Verifies readiness of giver and user [moment of the day, (safety of) setting, states of mind] when either is not ready, considers postponing. - Gives user the opportunity to first learn independently - Times giving feedback information so that user has the opportunity to adapt performance on a future occasion	**Timely**	- Verifies readiness of giver and user [moment of the day, (safety of) setting, states of mind] when either is not ready, considers postponing. - Seeks feedback information after attempting to learn independently - Seeks feedback information when there is still opportunity to adapt performance on a future occasion	*- Considers and verifies possible differences in (timing of) work process between professions whilst assessing readiness*
- Addresses when differences in professional background characteristics[1] influences exchange of feedback information *- Avoids the use of professional jargon and asks clarification when jargon is used*	- Offers feedback information in a dialogical manner: asks questions, listens actively, answers questions, offers room to respond, verifies understanding - Uses clear and unambiguous language	**Dialogical**	- Participates actively in dialogue: listens actively, asks clarifying questions when necessary, answers questions, verifies understanding - Uses clear and unambiguous language	*- Addresses when differences in professional background characteristics[1] influences exchange of feedback information* *- Avoids the use of professional jargon and asks clarification when jargon is used*

Interprofessional additions	**Feedback principles**	**Criteria**	**Feedback principles**	*Interprofessional additions*
INFORMATION GIVER			**INFORMATION USER**	
- Explores and clarifies differences in professional background characteristics[1] and addresses how these differences affect feedback processes including: seeking, acceptance, understanding and use.	- Asks about: user needs, user competence, user motivation, contextual factors (recent experiences of user, personality of user, personal circumstances of user), expressed emotions (verbal or non-verbal) - Addresses how previous feedback information has been used	**Responsive**	- When appropriate and relevant, shares: user needs, user competence, user motivation, contextual factors (recent experiences of user, personality of user, personal circumstances of user), user emotions - Feeds back on previous and current feedback information in terms of content, use, and emotional respons	*- Explores and clarifies differences in professional background characteristics[1] and addresses how these differences affect feedback processes including: seeking, acceptance, understanding and use.*
- Addresses how differences in professional background characteristics[1] influence interpretation and prioritisation of feedback information	- Prioritises to most important, mutually understood information - Summarises message - Invites user to come back for further clarification if needed	**Sense making**	- Interprets and prioritises received feedback information by comparing to: (1) Curricular and personal learning goals (2) Previously received feedback information from provider and or others (3) Personal view on performance (4) Perception of own strengths and weaknesses - Based on interpretation, judges whether feedback information is adequate and useful - Seeks additional clarification when sense making stagnates	*-Explores how differences in professional background characteristics[1] influence interpretation and prioritisation of feedback information.*

Interprofessional additions	**Feedback principles**	**Criteria**	**Feedback principles**	*Interprofessional additions*
INFORMATION GIVER			**INFORMATION USER**	
- Discusses possible facilitators and barriers stemming from differences in professional background charactheristics[1] when directing towards actions for improvement	- Gives forward looking feedback information: suggests improvement strategies - Encourages user to make an action plan - Directs user towards useful resources to support relevant actions	**Actionable**	- Revisits learning goals based on sense making of feedback information (and suggested improvement strategies) - Discards feedback information when judged inadequate or not useful - Creates action plan to achieve refined learning goals - Implements action plan on the next occasion	*- Discusses possible facilitators and barriers stemming from differences in professional background charactheristics[1] when creating and implementing actions for improvement*
1. Professional background characteristics are Superimposed role; Years of experience; Educational role; Professional role; Expertise; Professional identity; Work habits; Workload				

Furthermore, the principles can help equip students with the repertoire of behaviours needed to bring this responsibility into practice, actively contributing to their feedback process, and therein further developing their feedback literacy. For instance, students at the beginning of an internship can use the principles (as information users) to self-asses their feedback understandings, capacities and dispositions, determine in what elements they wish to improve, and relatedly determine specific feedback-on-feedback questions to ask supervisors or peers. Furthermore, using the framework (as information givers), they can provide peers with feedback information on feedback seeking, dialogue and use. The synthesis and integration of interprofessional feedback literature in the framework can help healthcare students to apply their general feedback dialogue competencies to health care practice, by creating awareness for the interprofessional context-specific challenges and offering practice-ready repertoire to help navigate these challenges. The specific challenges of credibility and hierarchy are addressed in the framework. It emphasises the value of proactively seeking out feedback dialogue with members of other professions and accepting them as legitimate givers of feedback information and recommends addressing power differentials and role alignment when applicable. This contribution helps answer a recent call for consideration of the contextual dimension of feedback literacy (Chong, 2021).

As the proactivity needed by students to initiate and responsively take part in interprofessional dialogues in practice are thwarted by current culture, including supervisors that retain giver-focused views of feedback (Noble et al., 2020), solely targeting students in educational practice will probably not suffice in achieving the intended feedback dialogues. Supervisors in healthcare practice must become feedback literate themselves. Furthermore, aside from their role as dialogue participants, healthcare supervisors, as (clinical) teachers of these students, have an additional part to play in creating learning environments to support students' literacy. Carless and Winstone (2020), addressed this interplay of teachers competencies with students feedback literacy, when they introduced teacher feedback literacy. Boud and Dawson (2021) further explain this concept with a practice based, empirical study. They point out how the role of teachers is similar to that of students, on what they call the micro level of teacher feedback literacy (relating to individual student assignment). On this micro level, but also on the meso and macro level, the Westerveld framework can be used to develop teacher feedback literacy.

The combination of principles on giving and using feedback information in one framework can help teachers design educational environments that support effective feedback dialogues and the development of student feedback literacy. For instance, in pre-clinical courses, teachers can have students discuss dialogue examples or simulate dialogues themselves, focussing on the viewpoints of both dialogue participants, using the symmetrical principles to guide discussions. Or, for workplace based education, dialogue assignments can be developed that offer students the opportunity to have a shared dialogue, and to be (formatively) assessed accordingly, using criteria based on the two-sided framework. The synthesis and integration of interprofessional feedback literature in the framework can help healthcare teachers design educational environments that integrate the contextual dimension in students

(literacy) education. For instance, by using the interprofessional additions to make students discuss or consider interprofessional challenges in pre-clinical education, and by creating opportunities for safe interprofessional dialogues in practice, educational efforts may be better matched to the practice it aims to prepare for. Using the framework like this could support teacher feedback literacy competency development, at the meso- and macro level as described by Boud and Dawson (2021). A final note on the implication of the framework is that, though it offers practice-ready behaviours, it should not be regarded as a strict rulebook or script for feedback dialogues. Users should always take into account the specific situation the feedback process takes place in, and strive be flexible in supporting that process optimally.

Limitations and suggestions for further research

We performed a critical review, selecting key literature based on their conceptual contribution to the formulation of our principles (Grant & Booth, 2009). Though expert responses confirmed that we encompassed current literature with the contents of our framework, a limitation of this interpretive process is that we cannot exclude the possibility that a different research team might have identified other publications (making the same points) as key literature.

Our expert panel design had several important limitations. First, we limited inclusion to feedback and interprofessional education experts with a research focus. Though some experts had experience as educators, future research needs to include (more) teachers and students with varying professional backgrounds, as essential stakeholders to further test usefulness for, and possible impact on, students' and teachers' feedback literacy. Second, participating experts were offered anonymity, which limits transparency in our reporting on their selection and inclusion. Third, changes were made to the framework based on insights gained from the peer review process. These were not presented to the experts, somewhat reducing the power of the results of our expert panel. Similarly reducing that power is the fourth limitation. Due to time constraints, only three consistent feedback experts participated in the panel. The extensive and insightful suggestions for alteration, given by the experts only contributing to the first or second round, however, did motivate us to include their perspectives.

Lastly, the interprofessional feedback literature was strongly focused on the influence of professional differences on acceptance and (perceived) use. If, and how, sense making is influenced by interprofessional differences appeared to be a lacune. This is reflected in the framework, which merely recommends the exploration of professional differences on this process by information users. The introduction of the internal feedback model by Nicol (2020), building on his earlier work (Nicol 2014), may offer possibilities to advance understanding regarding this lacune. This model suggests the interplay of beliefs and dispositions with information passing from the external environment into the internal process of comparison (Nicol, 2020). Future research may explore how interpretation, prioritisation and comparison of feedback information is influenced in interprofessional settings.

Conclusion

Aiming to contribute to both student and teacher feedback literacy in interprofessional healthcare education, this article presented The Westerveld framework. This framework, with principles for giving and using feedback information in interprofessional dialogues, centres around seven criteria: Open and respectful; Relevant; Timely; Dialogical; Responsive; Sense making; and Actionable. The Westerveld framework offers a starting point for promoting feedback dialogues with shared responsibility among interprofessional team members in healthcare education, with the ultimate goal to contribute to safe, effective and adaptive healthcare.

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APPENDIX 1

Overview of questionnaire items used in round 1 and 2 of the Expert panel.

	Round 1[1]	Round 2	Answering type /scale
Feedback experts/ interpro-fessional experts	Does this instrument encompass the current [feedback/interprofessional] literature exhaustively?	Does this instrument encom-pass the current [feedback/ interprofessional] literature exhaustively?	Yes No Don't know
	If not, what elements are missing?	Do you have any additional comments or suggestions?	Open-ended
	(Per criterion) When looking at [this specific criterion and both *perfor-mance descriptions*/ the interprofessional additions in the outside columns], do you consider them to be usable in education and *observable in practice*?	(Per criterion) In light of the intended use (as a conceptu-al overview to be used as a starting point for the develop-ment of practical tools), do you find the [feedback principles/ interprofessional additions] comprehensively and correctly cover their content?	Yes No Don't know
	(Per criterion) What altera-tions would you suggest to make it more usable and/or *observable?*	Do you have any additional comments or suggestions regarding the feedback prin-ciples either per criterion or in general?	Open-ended
All experts	Is the structure of the *crite-ria and performance des-criptions* in this instrument logical to you and are the interprofessional additions integrated logically?	Is the structure of this instru-ment (feedback principles and interprofessional elements divided into criteria) logical to you?	Yes No Don't know
	If not, what changes would you suggest?	Do you have any additional comments or suggestions?	Open-ended
	How likely is it that you would use this instrument in your own education or research?	How likely is it that you would use this instrument in your own education or research?	1 (very unlikely) - 7 (very likely)

[1] Questions in round one contained terminology (indicated in italics) that was adapted for round 2.

APPENDIX 2

Westerveld framework infographic and pocket card

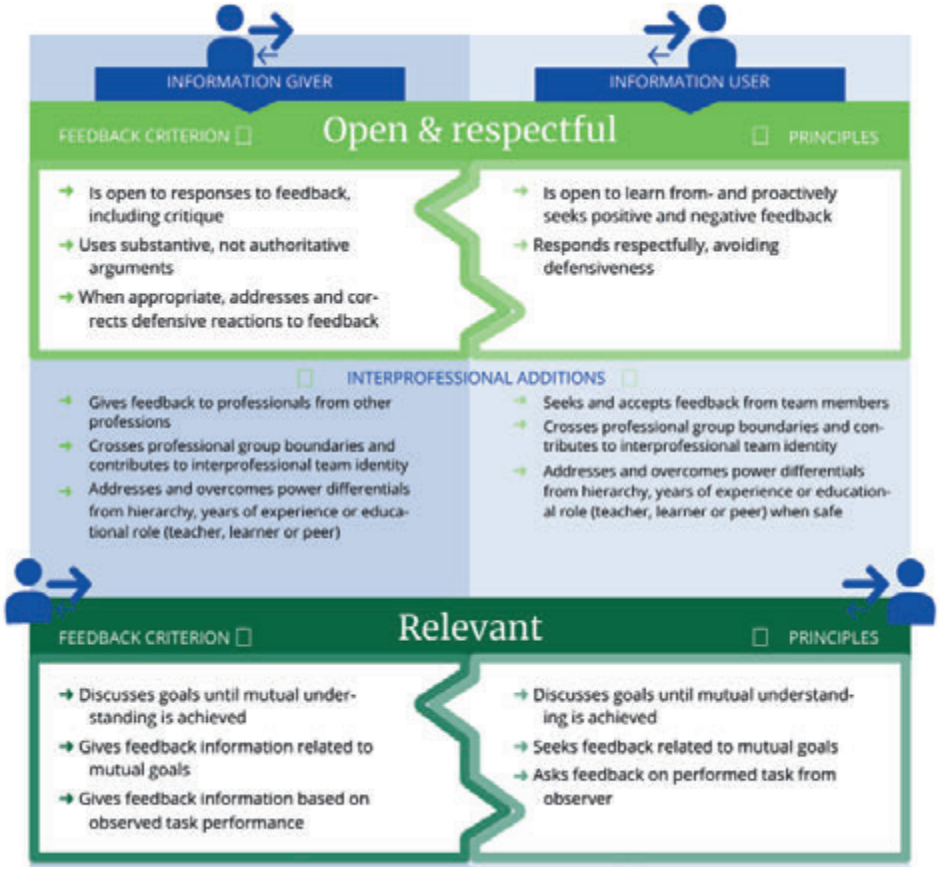
Utrecht University

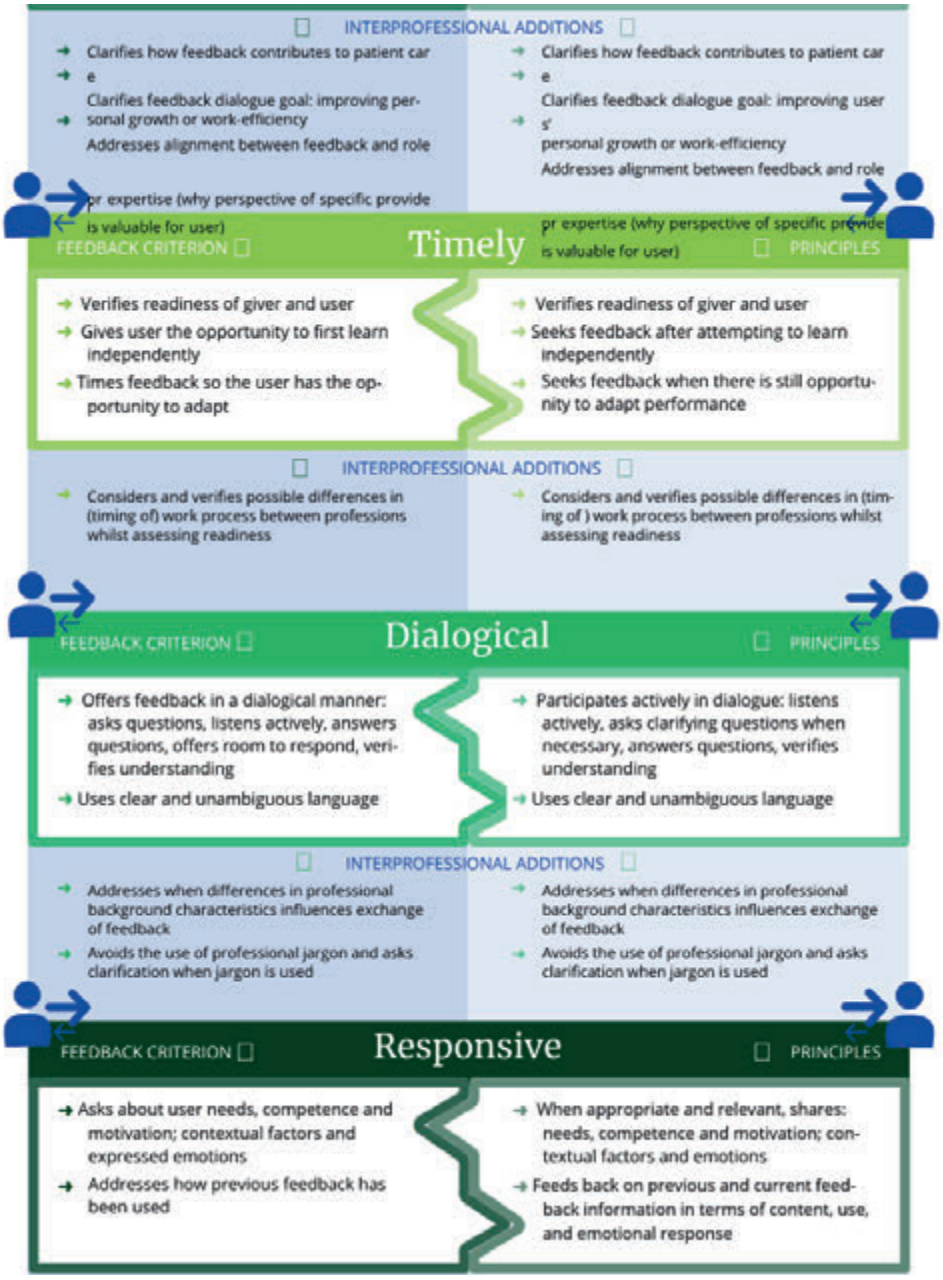
Centre for Academic Teaching and Learning

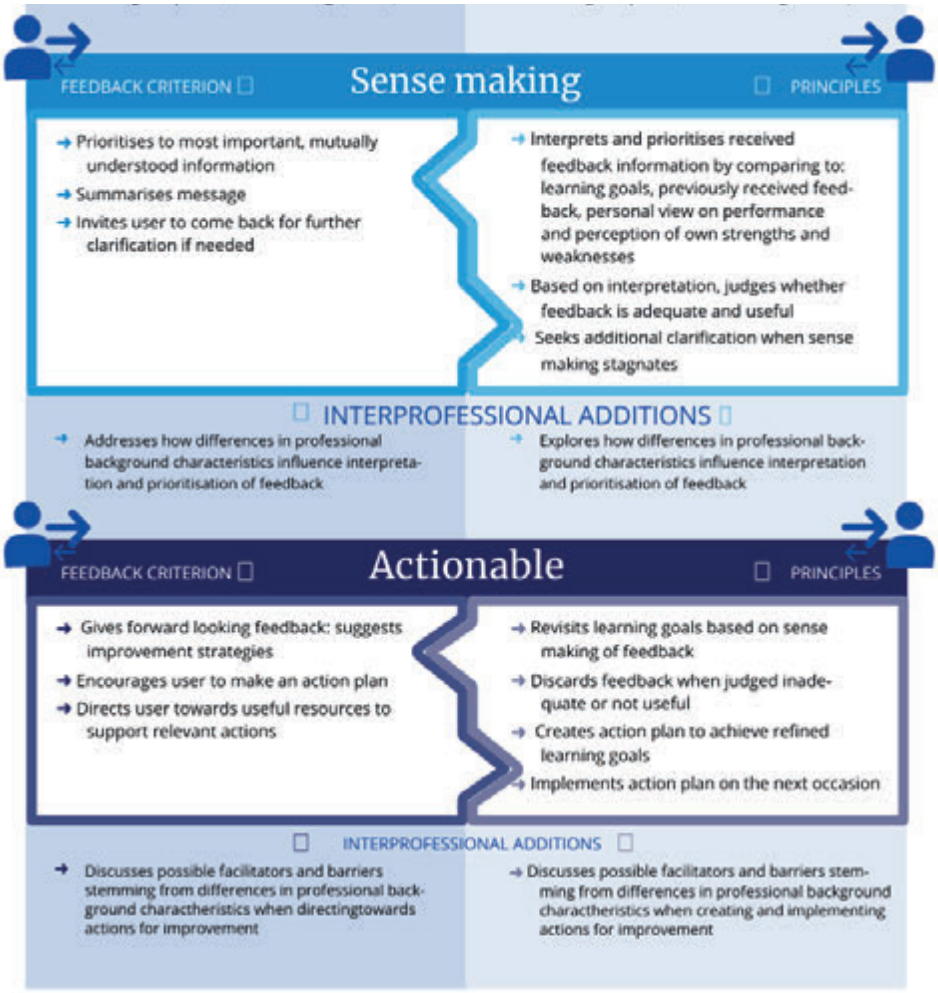
The Westerveld Framework

for giving and using feedback information in interprofessional dialogues

Claudia Tielemans, Renske de Kleijn, Marieke van der Schaaf, Sjoukje van den Broek & Tineke Westerveld (2021)




INTERPROFESSIONAL ADDITIONS
Clarifies how feedback contributes to patient car
e
Clarifies feedback dialogue goal: improving per-
sonal growth or work-efficiency
Addresses alignment between feedback and role
pr expertise (why perspective of specific provide
is valuable for user)
Clarifies how feedback contributes to patient car
e
Clarifies feedback dialogue goal: improving user
s'
personal growth or work-efficiency
Addresses alignment between feedback and role
pr expertise (why perspective of specific provide
is valuable for user)
FEEDBACK CRITERION
Timely
PRINCIPLES
Verifies readiness of giver and user
Gives user the opportunity to first learn independently
Times feedback so the user has the opportunity to adapt
Verifies readiness of giver and user
Seeks feedback after attempting to learn independently
Seeks feedback when there is still opportunity to adapt performance
INTERPROFESSIONAL ADDITIONS
Considers and verifies possible differences in (timing of) work process between professions whilst assessing readiness
Considers and verifies possible differences in (timing of) work process between professions whilst assessing readiness
FEEDBACK CRITERION
Dialogical
PRINCIPLES
Offers feedback in a dialogical manner: asks questions, listens actively, answers questions, offers room to respond, verifies understanding
Uses clear and unambiguous language
Participates actively in dialogue: listens actively, asks clarifying questions when necessary, answers questions, verifies understanding
Uses clear and unambiguous language
INTERPROFESSIONAL ADDITIONS
Addresses when differences in professional background characteristics influences exchange of feedback
Avoids the use of professional jargon and asks clarification when jargon is used
Addresses when differences in professional background characteristics influences exchange of feedback
Avoids the use of professional jargon and asks clarification when jargon is used
FEEDBACK CRITERION
Responsive
PRINCIPLES
Asks about user needs, competence and motivation; contextual factors and expressed emotions
Addresses how previous feedback has been used
When appropriate and relevant, shares: needs, competence and motivation; contextual factors and emotions
Feeds back on previous and current feedback information in terms of content, use, and emotional response



Based on: Claudia Tielemans, Renske de Kleijn, Marieke van der Schaaf, Sjoukje van den Broek & Tineke Westerveld † (2021). *Westerveld framework for interprofessional feedback dialogues in health professions education*, Assessment & Evaluation in Higher Education.

The Westerveld Framework is the result of a collaboration between partners:

Utrecht University

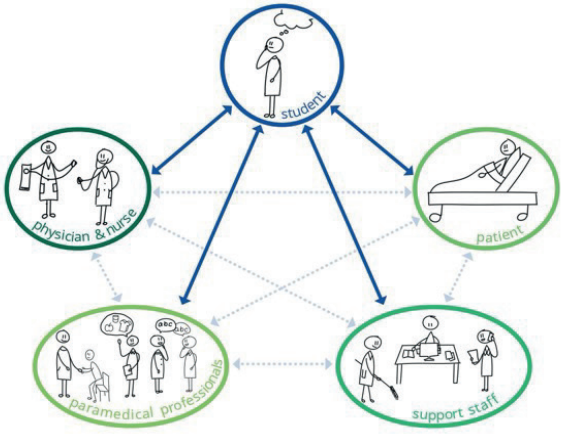
UMC Utrecht

HOGESCHOOL UTRECHT

Receiving and giving feedback is not always easy. The Westerveld framework describes what can be done by feedback givers and users to promote effective feedback processes.

This card contains a summarized version of the framework along with dialogue prompts to help you apply it in practice.

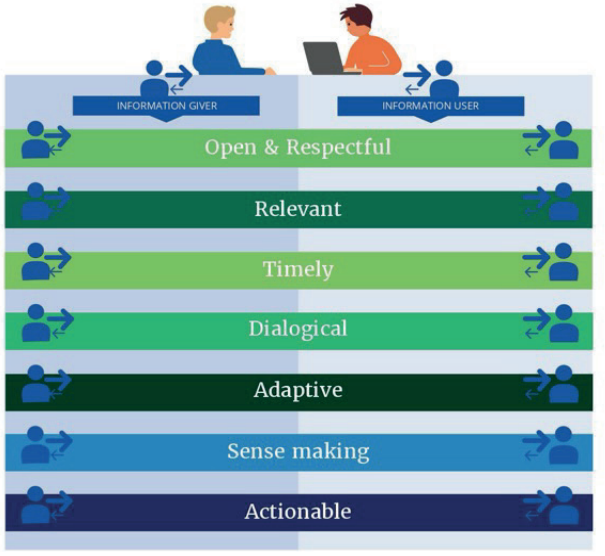
Interprofessional dialogue partners in healthcare



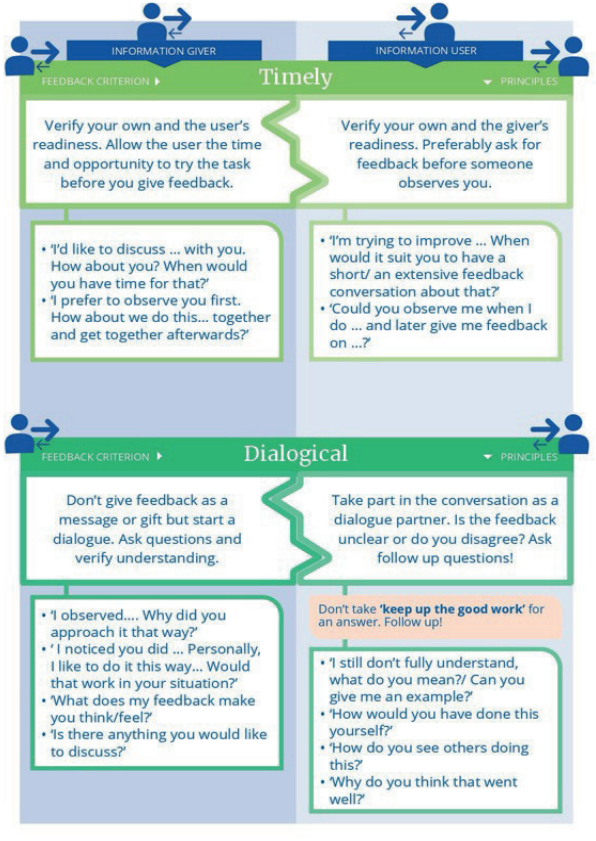
This framework was developed in the context of interprofessional healthcare education. However, it can be applied to all feedback processes. If you are interested in the interprofessional healthcare context, use the QR code to see interprofessional additions to all criteria and/or the full framework

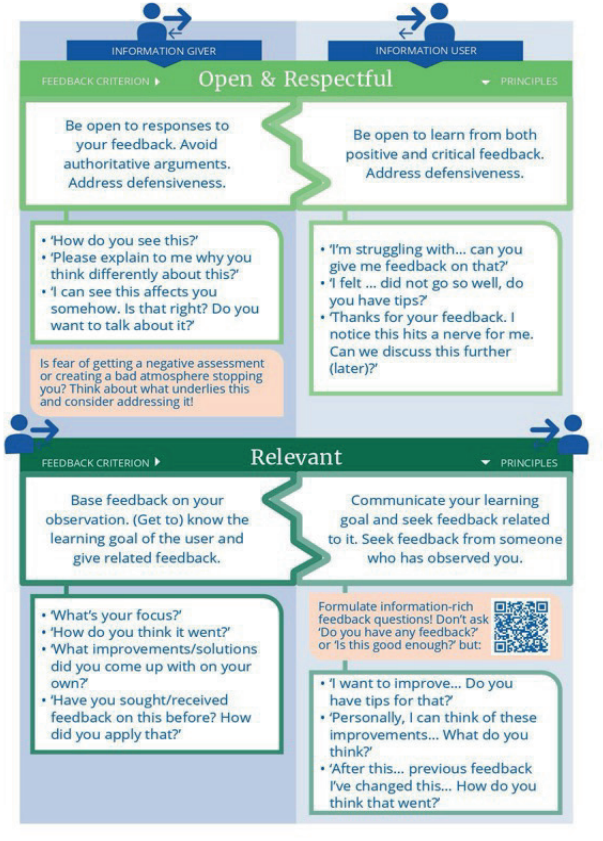
Westerveldframework

Tips & Tricks for feedback dialogue



UMC Utrecht · Universiteit Utrecht · Hogeschool Utrecht


INFORMATION GIVER
INFORMATION USER
FEEDBACK CRITERION
Timely
PRINCIPLES
Verify your own and the user's readiness. Allow the user the time and opportunity to try the task before you give feedback.
Verify your own and the giver's readiness. Preferably ask for feedback before someone observes you.
• 'I'd like to discuss ... with you. How about you? When would you have time for that?'
• 'I prefer to observe you first. How about we do this... together and get together afterwards?'
• 'I'm trying to improve ... When would it suit you to have a short/ an extensive feedback conversation about that?'
• 'Could you observe me when I do ... and later give me feedback on ...?'
FEEDBACK CRITERION
Dialogical
PRINCIPLES
Don't give feedback as a message or gift but start a dialogue. Ask questions and verify understanding.
Take part in the conversation as a dialogue partner. Is the feedback unclear or do you disagree? Ask follow up questions!
• 'I observed.... Why did you approach it that way?'
• ' I noticed you did ... Personally, I like to do it this way... Would that work in your situation?'
• 'What does my feedback make you think/feel?'
• 'Is there anything you would like to discuss?'
Don't take 'keep up the good work' for an answer. Follow up!
• 'I still don't fully understand, what do you mean?/ Can you give me an example?'
• 'How would you have done this yourself?'
• 'How do you see others doing this?'
• 'Why do you think that went well?'


INFORMATION GIVER
INFORMATION USER
FEEDBACK CRITERION
Open & Respectful
PRINCIPLES
Be open to responses to your feedback. Avoid authoritative arguments. Address defensiveness.
Be open to learn from both positive and critical feedback. Address defensiveness.
• 'How do you see this?'
• 'Please explain to me why you think differently about this?'
• 'I can see this affects you somehow. Is that right? Do you want to talk about it?'
Is fear of getting a negative assessment or creating a bad atmosphere stopping you? Think about what underlies this and consider addressing it!
• 'I'm struggling with... can you give me feedback on that?'
• 'I felt ... did not go so well, do you have tips?'
• 'Thanks for your feedback. I notice this hits a nerve for me. Can we discuss this further (later)?'
FEEDBACK CRITERION
Relevant
PRINCIPLES
Base feedback on your observation. (Get to) know the learning goal of the user and give related feedback.
Communicate your learning goal and seek feedback related to it. Seek feedback from someone who has observed you.
• 'What's your focus?'
• 'How do you think it went?'
• 'What improvements/solutions did you come up with on your own?'
• 'Have you sought/received feedback on this before? How did you apply that?'
Formulate information-rich feedback questions! Don't ask 'Do you have any feedback?' or 'Is this good enough?' but:
• 'I want to improve... Do you have tips for that?'
• 'Personally, I can think of these improvements... What do you think?'
• 'After this... previous feedback I've changed this... How do you think that went?'

INFORMATION GIVER | INFORMATION USER

FEEDBACK CRITERION ▸ **Actionable** ▾ PRINCIPLES

Give improvement suggestions. Help the user make an action plan: point out opportunities to apply feedback.

Decide what feedback you want to use first. Think of how (where/when/with whom) you will do this. Plan how you will seek feedback on this.

- 'At what kind of activity could you try this again?'
- 'Coincidentally, I will be doing ... tomorrow, will you join me?'
- 'Personally, I always do ... you could try that next time.'
- 'This person/profession is very good at this. You could ask (one of) them to observe you.'

- 'First, I want to focus on improving... I will retain ...'
- 'Do you have any advice on where/when/with what kind of activity I could try this again?'
- 'I would love the opportunity to apply this feedback, could I join you another time?'
- 'Can you observe me some time in the future?'

Pitfalls of receiving feedback

Passively waiting for feedback	Seeking feedback only to impress assessors	Only seeking feedback from your superiors	Being overwhelmed by feedback, reacting defensively	Not (thoroughly) analyzing feedback	Not acting on feedback

More information and help to avoid these pitfalls?
Use the QR code!

INFORMATION GIVER | INFORMATION USER

FEEDBACK CRITERION ▸ **Adaptive** ▾ PRINCIPLES

Adapt to the person before you: What do they need/feel/know? (How) have they used previous feedback?

Let the giver know who you are: What do you know/need/feel? What is your relevant (feedback) experience?

Beware! Use feedback models like the Pendleton rules for guidance, not as a strict script. Be adaptive!

- 'Why did you choose to approach this the way you did?'
- 'Can you explain to me why this is important to you?'
- 'I see you're getting better at... but can still improve ...'

- 'This is extra important/difficult/interesting for me because...'
- 'I've previously received contradictory feedback. Can you further explain to me why you are saying this now?'
- 'I was taught to do it this way, why do you think it is different in this case?'

FEEDBACK CRITERION ▸ **Sense making** ▾ PRINCIPLES

Prioritize important information. Summarize it. Invite the user to ask clarifying questions.

Compare received feedback to: your learning goal, your own vision, and previous feedback. Decide what you will use. Make it explicit. Ask for clarification if needed.

- 'Do you recognize this feedback?'
- 'I think these... are my key points. Do you agree? Why (not)?'
- 'What will you take with you from this conversation?'
- 'Let me know if you want to discuss it again.'

- 'I felt it went well/needs improvement because... What do you think?'
- 'So I will try to do... differently.'
- 'I still do not fully understand. Can you give me an example?'

4

Receiving Feedback is not Easy. 6 Common Pitfalls

Claudia Tielemans*, Charlotte Eijkelboom*, Marije Lesterhuis, Lars de Vreugd, Helena Pennings, Renske de Kleijn

Published as: Tielemans, C. J. M., Eijkelboom, C. M. C. L., Lesterhuis, M., de Vreugd, L. B., Pennings, H. J. M., & de Kleijn, R. A. M. (2023). Receiving Feedback Is Not Easy! Six Common Pitfalls. Academic Medicine, 98(5), 647.
**These authors contributed equally*

INTRODUCTION

Feedback at the workplace provides important learning opportunities for health care professionals. Both providing feedback (Palanganas & Edwards, 2021) and receiving feedback are prone to common pitfalls. This AM Last Page aims to help those receiving feedback avoid or overcome common pitfalls by proposing viewpoints and questions to consider.

	PITFALL	KEEP IN MIND	ASK YOURSELF	ASK THE FEEDBACK PROVIDER
No Questions Asked	**Passively waiting for feedback** obtaining no, little, or unspecified feedback	· I am responsible for seeking both positive and critical feedback to improve my professional performance (de Kleijn, 2021). · I realize dedicating time to seek feedback is part of patient care.	· What feedback would help me improve my performance? · When and how can I ask for this specific feedback?	· My goal is to […], do you have feedback to help me with this?
I Did Well, Right?	**(Not) asking for feedback, for the wrong reasons** obtaining no points of improvement	· I see feedback as a tool to improve, not to impress (Anseel et. al., 2007). · When I perform suboptimally, seeking feedback will help me, not harm me (Anseel et. al., 2007).	· (Why) do I feel the need to impress? · (Why) do I fear feedback on flaws?	· I struggled with […], how can I improve my performance?
What Do YOU Know?	**Only seeking feedback from your superiors** obtaining a narrow perspective on performance	· Considering different perspectives facilitates collaborative care (Tielemans et. al., 2023). · Patients, students, and colleagues all have credible perspectives and can provide valuable feedback (Tielemans et. al., 2023).	· Which patients, students, and colleagues observe my performance? · How can I benefit from *their* feedback specifically?	· I value feedback from your perspective in particular because […] ; Can you give me feedback on […]?

	PITFALL	KEEP IN MIND	ASK YOURSELF	ASK THE FEEDBACK PROVIDER
But, but, but…	**Reacting defensively** feedback analysis and use are hindered	· Feedback focusses on my performance and development, not me as a person (Anseel et. al., 2007). · Emotional responses to feedback are natural; I acknowledge them and can address them(de Kleijn, 2021).	· (Why) do I feel the urge to defend myself? · How can I manage or express my emotions?	· Thank you; This makes me feel […], can we discuss this now/ later?
As You Wish	**Not (thoroughly) analyzing feedback** no (deep) learning occurs	· I analyze feedback critically to learn from it instead of simply accepting or rejecting it (de Kleijn, 2021, Tielemans et. al., 2023). · Analyzing confusing feedback can be very valuable.	· How does this feedback compare to previous feedback, my goals, and my personal view (Tielemans et. al., 2023)? · Do I need to ask clarifying questions?	· I do not yet understand your perspective regarding […], can you explain?
Chapter Closed	**Not acting on feedback** performance does not improve	· Feedback is meant to be used and can be transferred to other contexts. (de Kleijn, 2021). · I monitor my feedback use, set new goals, and continue to seek feedback (de Kleijn, 2021, Tielemans et. al., 2023).	· How, when, and where can I use this feedback (Palanganas & Edwards, 2021)? · What barriers or facilitators do I expect, and how can I overcome or use them?	· I want to use previous feedback in this situation, can you observe me?

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3. Anseel F, Lievens F, Levy PE. A self-motives perspective on feedback-seeking behavior: Linking organizational behavior and social psychology research. Int J Manag Rev. 2007;9(3):211-236. https://doi.org/10.1111/j.1468-2370.2007.00210.x
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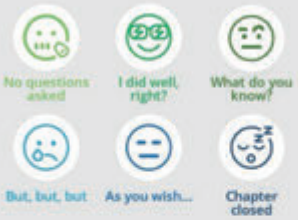
APPENDIX 1

Pitfalls pocket card

Feedback at the workplace provides important learning opportunities for professionals (in training). Both providing feedback and receiving feedback are prone to common pitfalls. This card aims to help those receiving feedback to avoid or overcome common pitfalls by proposing viewpoints and questions to consider.



	Pitfall	Keep in mind	Ask yourself	Ask the feedback provider
	**Passively waiting for feedback** ↓ Obtaining no, little, or unspecified feedback	I am responsible for seeking both positive and critical feedback to improve my professional performance. I realize dedicating time to seek feedback is part of my work.	What feedback would help me improve my performance? When and how can I ask for this specific feedback?	My goal is to […], do you have feedback to help me with this?
	**(Not) asking for feedback, for the wrong reasons** ↓ Obtaining no points of improvement	I see feedback as a tool to improve, not to impress. When I perform suboptimally, seeking feedback will help me, not harm me.	(Why) do I feel the need to impress? (Why) do I feel fear feedback on flaws?	I struggle with (…), how can I improve my performance?
	**Only seeking feedback from your superiors** ↓ Obtaining a narrow perspective on performance	Considering different perspectives contributes to the quality of our work. Colleagues, clients and students all have credible perpectives and can provide valuable feedback.	Which colleagues and others involved (e.g., clients or students) can see my performance? How can I benefit from their feedback specifically?	I value feedback from your perspective in particular because (…); Can you give me feedback on (…)?
	**Reacting defensively** ↓ Feedback analysis and use are hindered	Feedback focusses on my performance and development, not me as a person. Emotional responses to feedback are natural; I acknowledge them and can adress them.	(Why) do I feel the urge to defend myself? How can I manage or express my emotions?	Thank you; This makes me feel (…), can we discuss this now/later?
	**Not (thoroughly) analizing feedback** ↓ No (deep) learning occurs	I analyze feedback critically to learn from it instead of simply accepting or rejecting it. Analyzing confusing feedback can be very valuable.	How does this feedback compare to previous feedback, my goals, and my personal view? Do I need to ask clarifying questions?	I do not yet understand your perspective regarding (…), can you explain?
	**Not acting on feedback** ↓ Performance does not improve	Feedback is meant to be used and can be transferred to other contexts. I monitor my feedback use, set new goals, and continue to seek feedback.	How, when, and where can I use this feedback? What barriers or facilitators do I expect, and how can I overcome or use them?	I want to use previous feedback in this situation, can you observe me?

5

Preparing Medical and Nursing Students for Interprofessional Feedback Dialogues

Claudia Tielemans, Renske de Kleijn, Emy van der Valk Bouman, Sjoukje van den Broek, Marieke van der Schaaf

Based on: Tielemans, C., de Kleijn, R., van der Valk-Bouman, E., van den Broek, S., & van der Schaaf, M. (2023). Preparing Medical and Nursing Students for Interprofessional Feedback Dialogues. Perspectives on Medical Education, 12(1), 472.

ABSTRACT

In healthcare education, preparing students for interprofessional feedback dialogues is vital. However, guidance regarding developing interprofessional feedback training programs is sparse. In response to this gap, the Westerveld framework, which offers principles for interprofessional feedback dialogue, was developed. Using the Westerveld framework, we developed and implemented an interprofessional feedback intervention for 4th-year nursing and 5th-year medical students. It encompasses two half-day workshops comprising small group sessions, interactive lectures, and a goal-setting assignment for the rotations. This paper describes the intervention and reflects on students' self-reported goals, as learning outcomes, to inform future interprofessional feedback dialogue education. To understand student's learning outcomes, we coded the content and specificity of 288 responses to the goal-setting assignment. Students indicated they mainly aimed to improve their feedback actionability, but contrastingly set – largely unspecific – goals, addressing the initiation of feedback dialogues. To better understand the process of setting these goals, we held three focus groups (N = 11): aside from the Westerveld framework, students used previous experience in rotations, outcome expectations, and personal characteristics as sources in their goal-setting process. The contrast between students' aims to improve their actionability and their goals to initiate dialogues, suggest that overcoming practice barriers to initiating dialogues are conditional to developing other feedback dialogue aspects. These and other goal conflicts in the workplace may hinder their setting specific feedback dialogue goals. We recommend explicit discussion of these challenges and conflicts in interprofessional feedback dialogue education.

INTRODUCTION

Background and need for Innovation

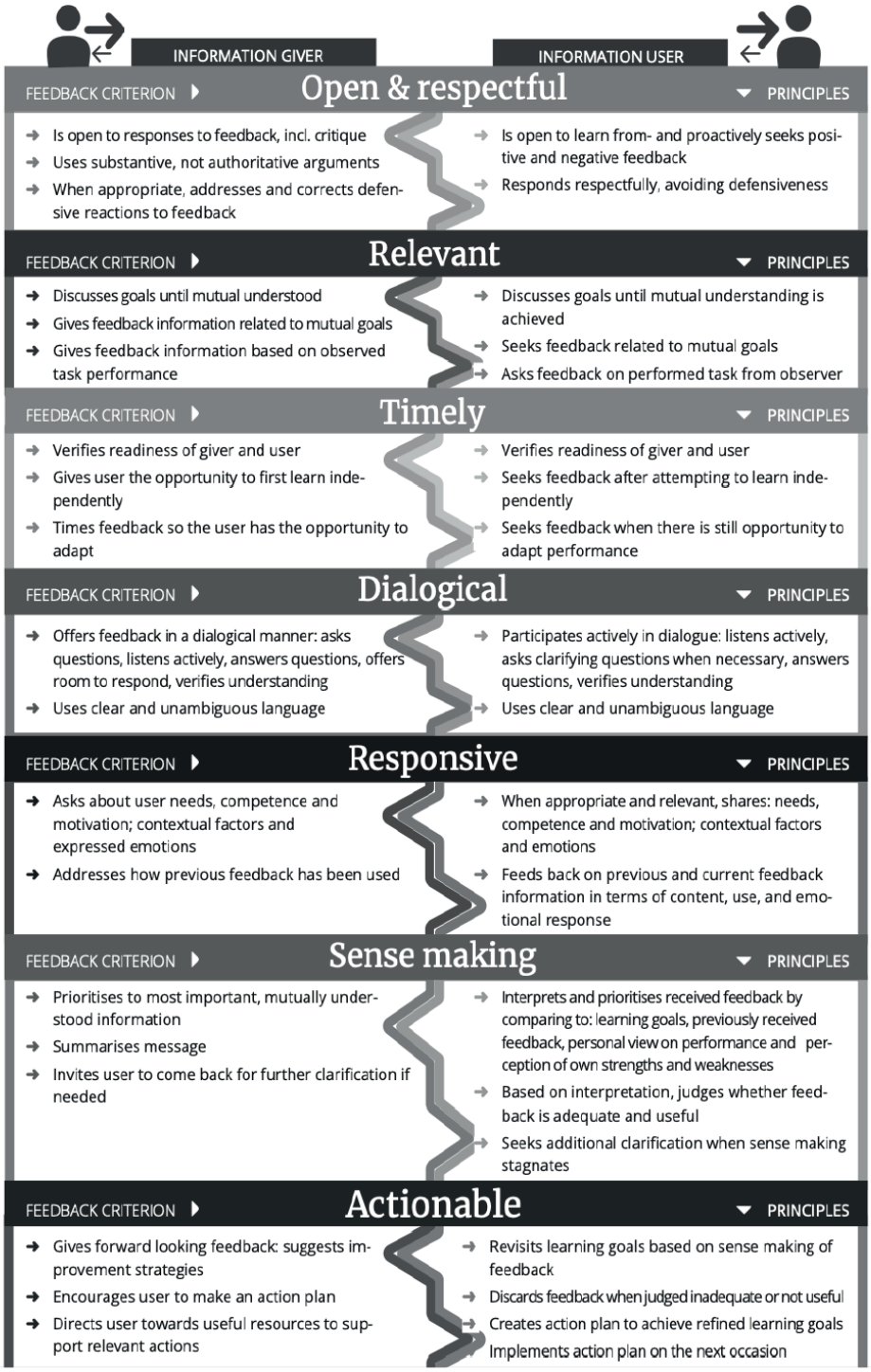
Healthcare professionals increasingly need to collaborate interprofessionally (WHO, 2010; van de Pol et. al., 2020; Reeves et. al., 2017). Essential during this collaboration are feedback dialogues, which involve professionals actively seeking, giving, sharing, and discussing feedback information (Tielemans et. al., 2023). We hereby follow the current trend in higher education to define feedback as (communicative) process, rather than as information (Wistone & Carless, 2019). Defined in the interprofessional context these dialogues are held by 'members of two or more professions' and are 'about individual or team performance' CAIPE, 2016, p1). Though preparing students for interprofessional feedback dialogues is a well-established aim for healthcare education, guidance for developing interprofessional feedback training has been sparse (CAIPE, 2016; O'Keefe, 2017; Vesel et. al., 2016; Sonnenberg et.al., 2017; Yama et. al., 2018).

Goal of Innovation

Therefore, we developed and implemented an intervention aimed at enhancing the feedback-giving and -receiving skills of nursing and medical students in interprofessional workplace dialogues. The intervention was based on the Westerveld Framework for Interprofessional Feedback Dialogues (WVF; for a summary visual, see Figure 1). This framework was developed through critical literature review and an international expert panel (Tielemans et. al., 2023). The Westerveld framework comprises seven criteria to describe the principles of interprofessional feedback dialogue: *Open and Respectful, Relevant, Timely, Dialogical, Responsive, Sense making, Actionable.* The framework has two distinctive features: a) it is the first to integrate giving *and* using feedback information in one framework, as healthcare professionals are expected to take both these feedback roles, b) it describes how to recognize and address interprofessional context barriers in feedback dialogues.

The overarching aim of the innovation was for students to reflect on complex interprofessional feedback dialogues and set individual learning goals to further improve their interprofessional feedback dialogue skills. We specifically chose to focus on students setting individual learning goals, as this would require them to relate the content of the WVF to their own (interprofessional) rotation experiences and their views on what they already master and do not master yet. Literature shows that goal setting is a powerful way to direct performance and manage learning in training, as intention is considered an important step towards behavioral change and intentional learning (Locke & Latham, 2002; 2006). So, goal-setting requires a meaningful connection between the WVF and students' experiences. With the goal-setting assignment, we aimed to converge their attention and focus for their next rotation towards a specific element they wanted to improve on.

Figure 1. Summary of the Westerveld framework for interprofessional feedback dialogues.



METHODS - Steps taken for Development and Implementation of Innovation

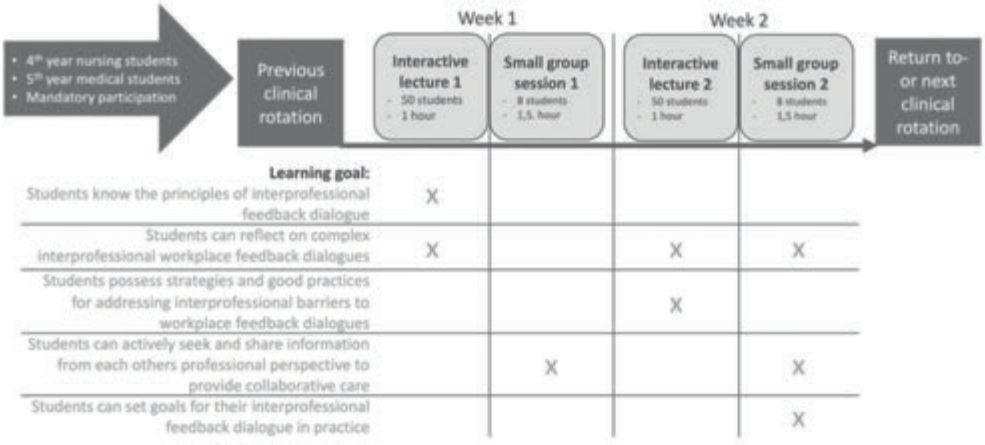
Timing and placement in curricula

We designed and piloted the Westerveld Interprofessional Feedback Intervention (WIFI) during the 2019-2020 academic year and have since iteratively refined its design. WIFI is mandatory for all 4th year nursing students (in a four-year curriculum) and 5th year medical students (in a six-year curriculum) in a medical and nursing school in the Netherlands (figure 2). This place in their curricula was selected because these students all: a) had at least one year of clinical-rotation experience, always including interprofessional collaboration, to inform their participation in the intervention. b) would immediately, or soon after the classroom sessions return to practice, where they could apply what they had learned. c) had experience with reflection, self-assessment, and goal-setting from previous years of training.

Overall structure

Approximately 100 students (30% medicine, 70% nursing) participated in WIFI every six weeks (figure 3a). WIFI was a classroom-based intervention consisting of two half-day workshops, one week apart, both containing two elements: a 1,5-hour small group session and a 1-hour interactive lecture (figure 2). Both were taught by healthcare professionals.

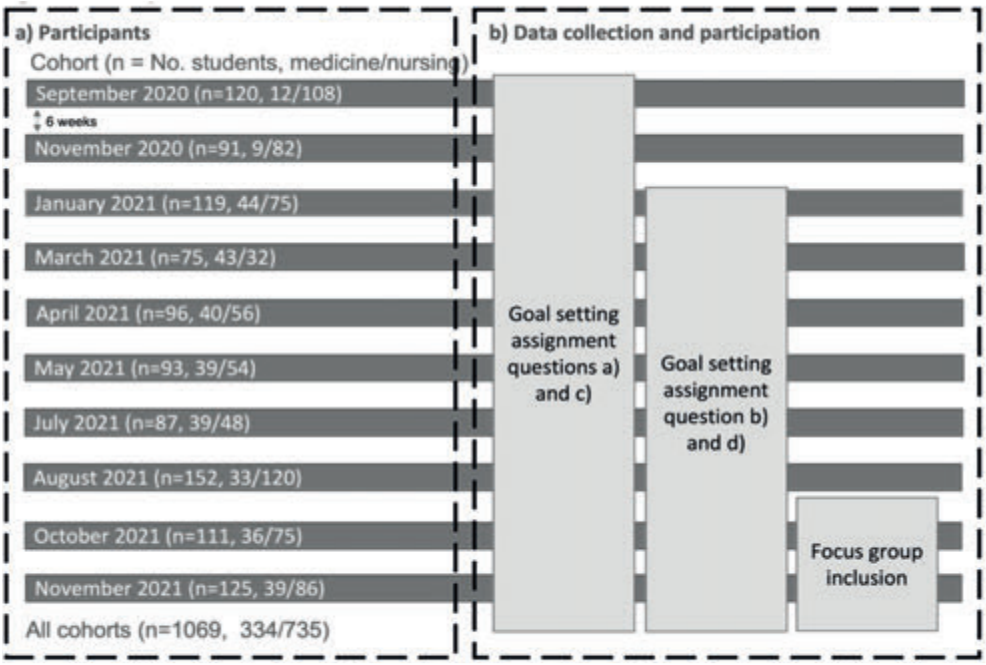
Figure 2: WIFI: Timeline, context, elements and learning goals (Additional information on WIFI available upon request)



Interactive lectures

The interactive lectures were held with approximately 50 mixed medical and nursing students. In the first lecture, the students familiarized themselves with the Westerveld framework. Students discussed written feedback dialogue examples based on real scenarios from practice, using the framework. Reflective prompts were: On what criteria does this example do well? Why? On what criteria could it improve? How? Which example do you prefer? Why?

Figure 3: a) Participants of all cohorts of WIFI between September 2020 and December 2021. (Varying student numbers per cohort are due to logistical reasons and COVID-19 measures.) b) Data collection for all types of data collection.



In the second lecture, students watched video-examples in which unsought interprofessional feedback information had to be given. In plenary discussions they then used the interprofessional additions of the Westerveld framework to address interprofessional context barriers. Reflective prompts were: Would you speak up? Why? Would speaking up be easier in the same situation with a monoprofessional colleague? How could you approach such a situation?

Small group sessions

The small group sessions consisted of eight medical and nursing students. Divided over the two sessions, students worked on three cases, which were designed to help students discover each other's perspectives, based on real scenarios from practice. Medical and nursing students mainly received the same information, with a different nuance based on their professional perspective. E.g., medical students received information about a medically discharge-ready patient and the ward's need to empty beds for new patients, whilst nursing students received information about the home-situation and impaired mobility of that patient.

In the second session, the third case was followed by a feedback simulation exercise. Two students role-played a feedback dialogue based on a complex interprofessional workplace-situation. The other students observed using the Westerveld framework, and, guided by the teacher, provided peer-feedback information on the simulated dialogue on 1 or 2 criteria per observing student.

At the end of WIFI, students were asked to individually articulate their learning goals for feedback dialogues in their next rotation. Three guiding questions in this goal-setting assignment were: a) In which feedback role can you still learn the most: as feedback information giver or receiver? b) On what Westerveld criterion do you aim to improve in the next rotation? c) Please set a goal for your next rotation regarding interprofessional feedback. Students could voluntarily enter their answers in a digital form for research purposes.

Ethical approval was gained from the Dutch Association for Medical Education (NVMO), file number 2021.7.1. Goal-setting assignments were anonymously abstracted from the ELO and all focus group participants signed informed consents prior to participation.

RESULTS - Outcomes of Innovation

Goal-setting assignment

To understand students' intention when returning to clinical practice, we analyzed their goal-setting assignments in the 2020-2021 academic year cohorts. 288 out of 1069 students volunteered their answers to the goal setting assignment anonymously (figure 3b). This response rate of 27%, is lower than our generally encountered 30-35%. First, we looked at the frequencies of students' answers to: the Feedback role they wanted to improve in, and the Westerveld criterion they wanted to improve on (questions a and b of the goal-setting assignment). Second, we coded the goals students subsequently set (question c) deductively on the seven criteria of the Westerveld framework. For example, "To ask for clarification where necessary" was coded as Dialogical, and "To express my own opinion and experience" was coded as Adaptive. Third, using a rating scheme adapted from Hanley et al. (2014), we coded the goals on level of specificity as Good, Fair, or Poor. Goals were coded independently by EB and CT. Discrepancies were resolved by consensus discussion. For representative examples for all goal codes, see appendix 1. Table 1 shows the results of this analysis.

Table 1. Students' goal setting assignment answers and goal content

Question a) In which feedback role can you still learn the most?			
Answer	**All students n (%)**	**Nursing n (%)**	**Medicine n (%)**
As feedback information giver	198 (69%)	100 (76%)	44 (56%)
As feedback information receiver	84 (29%)	28 (21%)	32 (41%)
Missing	6 (2%)	4 (3%)	2 (3%)
Total	**288 (100%)**	**132* (100%)**	**78*(100%)**

Question b) On what Westerveld criterion do you aim to improve in the next rotation?

Answer	All students n (%)	Nursing n (%)	Medicine n (%)
Open and Respectful	11 (5%)	7 (5%)	4 (5%)
Relevant	8 (4%)	6 (5%)	2 (3%)
Timely	32 (15%)	20 (15%)	11 (14%)
Dialogical	26 (12%)	20 (15%)	6 (8%)
Responsive	27 (13%)	12 (9%)	14 (18%)
Sense making	16 (8%)	11 (8%)	5 (6%)
Actionable	56 (26%)	34 (26%)	22 (28%)
Missing	36 (17%)	22 (17%)	14 (18%)
Total	**212** (100%)**	**132* (100%)**	**78* (100%)**

Question c) Please set a learning goal for your next rotation regarding interprofessional feedback.

Goal code	All students n (%)	Nursing n (%)	Medicine n (%)
criterion			
Open and Respectvol	75 (26%)	32 (24%)	14 (18%)
Relevant	17 (6%)	7 (5%)	6 (8%)
Timely	25 (9%)	10 (8%)	10 (13%)
Dialogical	11 (4%)	5 (4%)	4 (5%)
Responsive	15 (5%)	8 (6%)	3 (4%)
Sense making	6 (2%)	0 (0%)	1 (1%)
Actionable	12 (4%)	6 (5%)	4 (5%)
No feedback goal	24 (8%)	10 (8%)	10 (13%)
Missing	103 (36%)	54 (41%)	26 (33%)
Total	**288 (100%)**	**132* (100%)**	**78* (100%)**
specificity			
Poor	134 (46%)	58 (44%)	35 (45%)
Fair	47 (16%)	18 (14%)	15 (19%)
Good	4 (1%)	2 (2%)	2 (3%)
Missing	103 (36%)	54 (41%)	26 (33%)
Total	**288 (100%)**	**132* (100%)**	**78* (100%)**

** Study program (Nursing/Medicine) was not asked in the first two cohorts (n=76) (see figure 3b) and was missing for two more students (n=2)*

*** Question b was not asked in the first two cohorts (n=76) (see figure 3b)*

Lastly, we used Pearson's Chi-Square analysis to estimate associations between Profession and: Feedback role, Westerveld criterion intended to improve on, and Westerveld criterion most addressed by goal. The data on Specificity were too skewed to analyze. To determine effect sizes, we calculated Phi for Feedback role, and Cramer's V for the other two variables. IBM® SPSS® Statistics (Version 26.0) was used for statistical analyses. The Feedback role in which students wanted to improve was statistically significantly associated with profession (medicine or nursing), c^2 (1,N=204)=9.40, p<0.01. Indicating, with a small-moderate effect size, Phi was 0.22, that nursing students were more likely to want to improve as feedback information givers than medical students. The criterion on which students wanted to improve was not statistically significantly associated with profession, c^2 (7,N=204)=6.30, p=0.51, Cramer's V was 0.18, as was the criterion addressed by students' goals, c^2 (8,N=204)=7.26, p=0.51, Cramer's V was 0.19.

As we found that most goals were coded as Open and Respectful (n= 75), we inductively created six sub-codes for this criterion: *giving* feedback information (36%), being *assertive* (28% e.g., "*To stand up for myself and to dare to start dialogues with doctors"*), being *open* (20%), *asking* for feedback information (11% e.g., "*I am going to ask more feedback from other professionals"*), being *respectful* (3%), and *receiving* feedback information (3%). Except for being more respectful, all these categories addressed the initiation of a feedback dialogue.

Focus Groups

To further understand students' goal-setting, in October-November 2021, EB and CT held three hybrid focus groups. At the end of the second small group session, EB invited all students to voluntarily sign up for a focus group (figure 3b). In each group, two medical and one or two nursing students took part (N=11), two-six weeks after participating in WIFI. Focus groups started with a reminder of the goal-setting assignment and the Westerveld criteria. Then, students were asked to describe the processes of setting their goals and prompted to elaborate on the sources of information they used. Discussion between students was stimulated to elicit interprofessional and interpersonal differences and similarities in the availability and use of these sources. For the complete focus group guide, see appendix 2.

With four authors (EB, CT, RK, and SB), we analyzed focus group data using a three-step deductive approach. For the coding scheme used, see appendix 3. We found four main groups of sources of information that informed students' goal-setting process:

(1) Experience in clinical rotations, including experiences with feedback, collaboration, patients, observations, or having no experience at all.

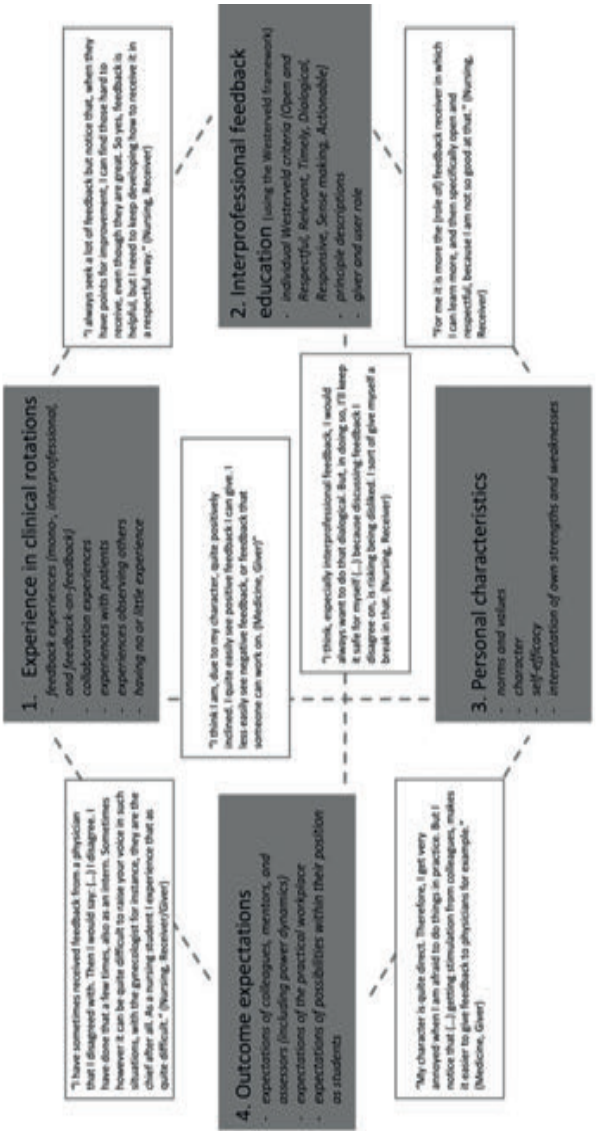
(2) WIFI, including the WVF criteria, the principle descriptions, the giver and user roles.

(3) Personal characteristics, including norms and values, character, self-efficacy, and interpretation of own strengths and weaknesses.

(4) Outcome expectations, including expectations of colleagues, mentors, and assessors (power dynamics), of the practical workplaces, and of possibilities within their position as students.

Frequently, these sources were combined in students' goal setting process (see figure 4 for examples of sources and of how they were combined). All groups of sources were mentioned in the open, first 30 minutes of discussion by students in each focus group.

Figure 4: Sources of information combined in students' goal setting, including a representative quote (with study program and feedback role for each combination)



DISCUSSION - Critical Reflection on Process

We implemented an interprofessional feedback intervention for medical and nursing students, based on the Westerveld framework (Tielemans et. al., 2023). At the end of the intervention students set goals to improve their feedback dialogue skills in their next rotations, which we analyzed to understand their learning outcomes.

Regarding the submitted goals, students expressed intentions to improve as feedback information *givers* and mainly improve on feedback *actionability,* followed by *timely, responsiveness*, or *dialogical* form of their feedback dialogues. In contrast, their written goals mainly addressed the criterion *open and respectful*, particularly in terms of *giving* feedback information, and *assertiveness*. This emphasis on initiating feedback dialogues aligns with both our focus group finding, that students' aims to overcome expected barriers to feedback were a main source in their goal-setting, and the literature, which widely reports students' challenges in initiating dialogues (Okuyama et. al., 2014; Bose & Gijselaers, 2013; Anseel et. al., 2013). We see a contrast between initiation goals and students wanting to improve on other aspects of feedback dialogue (giving, actionable feedback information). This might imply that learning to initiate a dialogue, and overcoming contextual and interpersonal barriers to this initiation, is at least prioritized before, and may even be conditional to, the development of other aspects of feedback dialogue. Thus, addressing this initiation aspect should be a priority in future adaptations of interprofessional feedback education.

We also found nursing students were significantly more likely to want to improve as feedback information givers than medical students. This may reflect nursing students' ambitions to overcome the classical interprofessional power dynamics in health care Gergerich et. al., 2019), i.e. for them to feel more comfortable giving feedback information to physicians.

Finally, as students described the process of setting goals for their interprofessional feedback dialogues, they combined four main groups of sources of information in their narratives: *experience in workplace rotations, outcome expectations*, *interprofessional feedback education (using the Westerveld framework),* and *personal characteristics*. These groups resonate with well-known influences on goal setting e.g., problems with current state, traits, and situational constraints (Locke & Latham, 2002; 2006). Having students explicitly discuss and combine these groups of sources in education may support their interprofessional feedback goal setting.

Still, we need to address two important limitations of our evaluation. First, the goal setting assignment had a low response rate (27%). The assignment submission was anonymous and voluntary because the coordinator did not want to force students to submit this personal information. Also, it was observed that more students had written down their personal learning goal, but just did not fill in the digital form. As these assignments were collected anonymously, we could not check to what extent the focus group students were representative of the whole student population. We do think selection bias might have taken place, with students valuing interprofessional feedback dialogues more, being more inclined to join the focus groups.

Second for the student goals that were submitted, we found that these often lacked specificity. As goal-setting theory predicts low task performance when goals are unspecific (Locke & Latham, 2006), we may simply need to encourage specific goal-setting in training. With (medical) students being more focused on summative knowledge assessments, compared to skills education like in this innovation, they might not have seen its value. Still, the lack of specificity could also be attributed to the complexity of the task students were setting goals for. Task novelty and complexity are known to make setting specific goals less helpful as these goals then result in unrealistic tunnel vision (Locke & Latham, 2006; Ogbeiwi 2021). Contrary to our expectations, the focus groups revealed that interprofessional feedback was quite novel to students, who drew from monoprofessional feedback and interprofessional collaboration experience as they set their goals. Furthermore, we may have underestimated the clinical workplace as a complex learning environment. In the clinical workplace, learners often have multiple goals (e.g., wanting to be safe and liked in a learning environment *and* wanting to be an honest interprofessional communicator) (Locke & Latham, 2006; Carver & Scheier, 1998). Such seemingly compatible goals on a higher, more abstract, level can raise conflict on a lower, more specific, level of abstraction (e.g., wanting to keep a low profile or agree with an interprofessional senior colleague *and* wanting to speak up to them) (Carver & Scheier, 1998). Power dynamics can easily be explained as a feedback barrier to overcome, as many students did in the focus groups. However, when understood and explored not as a barrier but as a goal in conflict with another goal (e.g., a feedback goal), students may be more able to deliberately choose to act on one goal or another in practice. Recognizing and incorporating these conflicting goals into interprofessional feedback education can help medical and nursing students navigate the complexities of interprofessional collaboration and address perceived barriers effectively.

In conclusion, our contribution to the improvement of interprofessional feedback education is twofold. First, we have showcased a way to use the Westerveld framework to train students for interprofessional feedback dialogues. Second, we provide a deeper understanding of students' goal setting for their clinical interprofessional feedback dialogues, as they partake in such training: In planning for these complex, often novel dialogues, students struggle to set specific and non-conflicting goals. Furthermore, the challenge to initiate feedback dialogues may be conditional to, and therefore overshadow, other possible goal content. To better support students in interprofessional feedback dialogue education, they must be made aware of these challenges, supported in developing strategies to overcome them, and offered relevant information sources to discuss whilst setting learning goals.

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APPENDIX 1

Representative examples of goals from the goal setting assignment and how they were encoded by the researchers, with study program and feedback role (if reported)

Coding framework with examples of goals	
Code	**Example**
Westerveld criterion most addressed by goal	
Relevant	*Better preparation for a dialogue to think in advance how I would tackle a specific situation differently in the future, this makes it easier/more relevant to discuss with the person with whom you raise the issue. (Medicine; Receiver)*
Timely	*To ask, every moment I give feedback, if it suits the other. (Nursing; Giver)*
Dialogical	*To ask questions even when I get the standard: "it's going fine, keep it up", and get a standard 7 out of 10. (Medicine; Receiver)*
Responsive	*To express my own opinion and experience and to defend the patient. (Nursing; Giver)*
Sense making	*To ask for clarification where necessary in a feedback dialogue. (Medicine; Receiver)*
Actionable	*More action after feedback. (Nursing; Receiver)*
Open and Respectful subcategories	
Asking	*I am going to ask more feedback from other professionals. (Medicine; Receiver)*
Assertive	*To stand up for myself and to dare to start dialogues with doctors. (Nursing; Receiver)*
Giving	*To give feedback to fellow students, fellow nurses, and doctors. (Nursing; Giver)*
Open	*To be open to criticism without being offended, so to ask feedback more often also from critical people. (Medicine; Receiver)*
Receiving	*I am going to start the conversation more, with my colleagues, about receiving and getting feedback. (Nursing; Giver)*
Respectful	*I want to learn to give feedback without being afraid to offend, hurt or demotivate the other person. (Study not reported; Giver)*

Coding framework with examples of goals	
Code	**Example**
Specificity of the goal	
Poor	*To give and receive more feedback (Medicine; Giver)*
Fair	*To say it earlier, when you do not agree with what the doctor says, in a respectful way (Nursing; Giver)*
Good	*To make a feedback action plan, so that I can do more with my feedback. I am going to put this in practice by formulating concrete points of improvement after a feedback moment and report this later. (Medicine; Giver)*
No feedback goal	*Keep communicating with all disciplines (Nursing; Giver)*

APPENDIX 2

Focus group guide

Present:

Moderator (Emy van der Valk Bouman), Observer (Claudia Tielemans), 3-4 Participants (nursing and medical students)

Opening (15 minutes)

- Word of welcome and introduction of moderators
- Explaining focus group procedure (including stimulating students to not simply answer questions but discuss and respond, reminder of audio recording, and stressing of anonymity)
- Background of the study (including definition of interprofessional learning)
- Reminder WIFI (including reminder of the Westerveld framework, and repeating the goal setting assignment on a paper sheet)

Introduction of participants (5 minutes)

- Each student presents:
    a) Their name and profession
    b) A summary of their answers to goal setting assignment

Goal setting discussion (30 minutes)

Moderator asks questions, making sure all students are heard.

Observer writes down key sources mentioned in discussion.

- Central question (make sure to ask all students):

  How did you set this learning goal specifically?

- Alternatives:

  a) How did you determine what goal you wrote down?

  b) What was your thought process like when setting this goal?

  c) What sources did you use to determine what you formulated?

  d) How did you integrate the role and criterion you set out to improve on into a learning goal?

- Follow up prompts to individual students:

  a) Can you elaborate on that?

  b) Can you explain?

  c) Do you have an example of that?

  d) Is that important to you? Why? Why not?

  e) On what sources do you base that?

  f) Did the interprofessional aspect of the education contribute to this? Why? Why not?

  g) Would it have made a difference if you were from a different profession? Why? Why not?

- Follow up prompts to switch between students:

  a) Does someone want to respond to this?

  b) Do others recognize this?

  c) Can a nursing/medical student share if they recognize this/how they think of this?

  d) What do you think of that?

  e) Does someone else have an example of a similar situation? Of does someone have an example where this was different?

- Follow up prompts to get to a conclusion:

a) Does everyone feel their opinion is represented here or does anyone have a different view on what is discussed here?

b) Does anyone have anything to add?

List of possible sources (5 minutes)

Observer summarizes discussion so far, highlighting mentioned sources of information influencing goal setting. Moderator and observer indicate how these sources map onto a list of possible sources underlying goal setting. The list is left out, to inspire students, but not used as a guide.

List of possible sources	
Westerveld Interprofessional Feedback Intervention (WIFI)	
	Interactive lectures
	Westerveld criteria, giving and receiving feedback
	Goal setting assignment (questionnaire)
	Simulated dialogues in smaller interprofessional groups
	Discussions with peers
Experiences during clinical rotations	
	Collaboration experiences (mono-/interprofessional)
	Observing others in practice (mono-/interprofessional)
	Feedback experience (mono-/interprofessional)
	Feedback on feedback
	Feedback of patients
	Experiences with patients
Expectations of the workplace	
	What people around me expect of me
	What I can achieve in my role as an intern
	Expectations of possibilities in the workplace
Personal vision	
	The extent to which I can do this (my confidence)
	My own interpretation of strengths and weaknesses
	My norms and values
	My character
	My learning goals in general
	My wishes for the future
Other (please complement):	
	…
	…
	…

Sources of information discussion (20 minutes)

- Central question (make sure to ask all students):

What sources played a part in setting your learning goal?

- Follow up prompts same as with first discussion.

! Students are ensured that they need not keep to the list. If they feel parts of the list are not applicable, they should say. If they feel important sources are missing, they should complement the list.

Final question: motivation for learning goals (10 minutes)

- Central question (make sure to ask all students):

How motivated are you for your learning goal?

- Alternatives:

Do you feel motivated to act on your goal?

How big is the chance of you acting on this goal?

- Follow up prompts:
  a) Why?
  b) Do you have an example?
  c) Do others recognize this?
  d) Did the interprofessional aspect of the education contribute to you motivation?
  e) What could change this motivation?

Closing the discussion (5 minutes)

APPENDIX 3

Final version of focus group coding scheme

Sources of information used*:

1. *Experience in clinical rotations*
    a. *Feedback experiences*
        i. *Experience with giving feedback (mono- and interprofessional)*
        ii. *Experience with receiving feedback (mono- and interprofessional)*
        iii. *Experience receiving feedback on feedback*
        iv. *Experience with feedback in assessment systems*
    b. *Experience with collaboration*
    c. *Experiences with patients*
    d. *Experiences observing others*
    e. *Having no or little experience*
2. *Interprofessional feedback education (using the Westerveld Framework)*
    a. *Criteria of the Westerveld framework*
    b. *Feedback role (giver or user)*
    c. *Principle descriptions*
3. *Personal characteristics*
    a. *Norms and Values*
    b. *Character*
    c. *Self-efficacy*
    d. *Interpretation of own strengths and weaknesses*
4. *Outcome expectations*
    a. Expectations of colleague's, mentors, and assessors
        i. Interprofessional power dynamics
    b. Expectations of the practical workplace
        i. Internship length
        ii. Organization of internship location (including contact with other profession)
        iii. Work pressure
    c. Expectations of possibilities within their position of students
        i. Position as a learner
        ii. Safe learning environment

iii. Limitations of assessment system

*Sources were frequently combined

Emerging themes:

1. Levels of specificity
2. Motivation and aspirations
3. Strategies
4. Feedback literacy

6

Health Care Student Orientations to Giving and Using Feedback in Workplace Learning: The Dialogic Feedback Orientation Scale

Renske de Kleijn, Claudia Tielemans

Submitted

ABSTRACT

Health professions education should prepare students to engage in feedback dialogues at the workplace. Studies often focus on students either giving or using feedback, and an instrument to address both dialogical roles in an integrated way are not yet available. Therefore, we adapted and extended the Feedback Orientation Scale into the Dialogical Feedback Orientation Scale (DFOS). The DFOS comprised 30 items, with separate User and Giver scales for Utility, Accountability, and Self-efficacy. The questionnaire was completed by 537 4-5th year students. Exploratory factor analyses showed that the User and Giver subscales could be meaningfully and reliably discerned. Students reported remarkably high User Utility scores, thus believe that feedback is indispensable to learn. Their Self-Efficacy as Givers was relatively low. Additional cluster analysis indicated that students had high dialogical feedback orientations overall, low dialogical feedback orientations overall, or seemed to value using feedback but did not feel very accountable or competent either as giver or as user. The findings show that the DFOS is worthwhile using in future research in health professions education. These studies could adopt longitudinal or intervention designs and explore the relations of DFO to other relevant outcome measures.

INTRODUCTION

It is uncontested that feedback is an essential element of health professions education (Bing-You et al., 2017; van der Leeuw & Slootweg, 2013; Ramani et al., 2019a; Tripodi et al., 2021), especially when learning in the clinical workplace is a substantial part of undergraduate education. In the past decade more and more attention has been given to a proactive role of students in feedback processes (e.g., Molloy et al., 2020; Noble et al., 2020). This proactive role can include: students actively processing and using feedback they receive (e.g., Pelgrim et al., 2013; van der Leeuw & Slootweg, 2013), students actively asking for, or seeking feedback (e.g., Crommelinck & Anseel, 2013; de Kleijn, 2023; Ramani et al., 2019b; Tripodi et al., 2021), and students not only being feedback receivers, but also feedback givers for their peers, teachers and/or supervisors (e.g., Fluit et al., 2013; Olvet et al., 2021). As (team)work in an authentic and complex clinical workplace requires flexible, bi-directional, *dialogical* communication, we argue that healthcare education has the task to prepare students for all elements of this proactive role: seeking, processing, and using feedback from a broad range of perspectives, as well as giving it to peers and superiors.

Only few empirical studies address healthcare students as prospective feedback givers to other health professionals. Ramani et al. (2019a), in their 12 tips for a feedback culture, do address the importance of health professionals' roles of feedback provider and feedback recipient. In line with that, Tielemans et al. (2023a) presented their Westerveld feedback framework with seven criteria for interprofessional feedback dialogues, meaning that both the roles of feedback givers and users are described in light of these criteria. Note that they deliberately do not refer to feedback receivers or recipients, but feedback users. In their follow-up study they found that students struggled more with starting (interprofessional) feedback dialogues as a feedback giver, than with receiving or asking for feedback (Tielemans et al., 2023b). Building on the work of Ramani and Tielemans, research would need to explore to what extent attitudes towards giving and using feedback are related, naturally develop over time, and how they are affected by targeted interventions. But for future empirical studies to address student attitudes towards both using, and giving feedback at the workplace, it is essential that there are instruments available to do so. To fit this purpose, the present study aimed to adapt and expand an existing and validated feedback questionnaire: the Feedback Orientation Scale (FOS; Linderbaum & Levy, 2010).

Feedback orientation is defined as "an individual's overall receptivity to feedback" (p.81; London & Smither, 2002). In the context of performance and talent management, feedback orientation has been found to be associated with individual differences as well as organizational criteria like task performance and feedback seeking (Patel et al., 2019). In higher education, feedback orientations are found to be associated with feedback use (Winstone et al., 2021), goal-orientations (Winstone et al., 2021), self-assessment (Yan et al., 2020). Specifically, in health professions education, studies have found positive relations for students' feedback orientations with performance measures (Rasheed et al., 2015; Chen et al., 2022), and with how students experience their supervisor feedback (Nolan & Loubier, 2018); Mills et al.

(2023) found no differences between feedback orientations of medical students and internal medicine residents, and Thornwall and Ikonen (2024) showed that feedback orientations can be affected by educational interventions. They found that after a 7-week course, nursing students had increased feedback orientations, i.e. reported to be more receptive to feedback. In sum, the concept of feedback orientation has a strong conceptual foundation, is found to be related to relevant other concepts, and is applicable to settings of workplace learning, like in health professions education. However, given the current definition, it focuses only on the receiver, or user, role of feedback. Therefore, we propose to extend it to also include an individual's overall orientation towards giving feedback.

Feedback orientation is often measured with the Feedback Orientation Scale (FOS; Linderbaum & Levy, 2010). The FOS contains 20 items divided in 4 subscales: Utility, the belief that using feedback is instrumental in achieving goals /obtaining desired outcomes; Accountability, a sense of obligation to act on feedback; Self-efficacy, confidence in dealing with receiving feedback; Social awareness, the tendency to use feedback as to be aware of others' views of oneself. With respect to Social awareness several educational authors have argued that this is relatively less interesting in educational contexts (Winstone et al., 2021; Kasch et al., 2022). Therefore, it is not included in this study. We do use other scales and extend them to a context of both receiving and giving feedback. We name the new instrument the Dialogical Feedback Orientation Scale (DFOS).

In sum, given the need to study health care students' and professionals' perspectives on feedback user and giver skills in an integrated way, our research question was: *to what extent can the DFOS meaningfully measure and discern giver and user feedback orientations in clinical HPE?*

METHODS

Participants

The participants were 5th year medical and 4th year nursing students at a medical and nursing school in the Netherlands. Every six weeks, a cohort of approximately 100 students, 30 5th year medical and 70 4th year nursing students, enroll in an obligatory two-day course on interprofessional feedback. For this course they return to the classroom, but all participants are in the workplace-learning phase of training and have been working in healthcare teams for at least a year. During this classroom-based course all students were in their workplace-based learning phase in their program. For a more detailed description of the course see Tielemans et al. (2023b).

Procedure

In all cohorts from January 2022 to September 2023, at the start of the course, all students were invited to voluntarily complete an online questionnaire as part of their preparation for the first course day. Participation was voluntary and informed consent was gained before each questionnaire. In total 1159 were invited to participate, and 611 students filled out the questionnaire. 74 students indicated that their data could

not be used for research purposes which led to a final sample of 537 students and an estimated response rate of 46%. Ethical approval of this study was provided by the Dutch Association for Medical Education (NVMO), ERB file number: 2022.1.6.

Instrumentation

In the Dialogical Feedback Orientation Scale, we include User Feedback Orientation and Giver Feedback Orientation. To measure User Feedback Orientation (UFO), we used the Utility, Accountability, and Self-efficacy items of the original Feedback Orientation Scale (Linderbaum & Levy, 2010). Small adaptations were done to fit the situation of teamwork in the clinical workplace; “at work” and “in a company” were replaced by “in health care practice” (item 1, 2, and 4). For two items “supervisor” was replaced with “team members” (item 4 and 9) and in three items we explicitly added the word “received” to feedback, so that the contrast with feedback given would be clearer (item 11, 12, and 13). Lastly, to better fit the context of students as opposed to graduated professionals, for item 12 we changed the word “others” to “peers”.

To measure Giver Feedback Orientation (GFO), the fifteen UFO items were mirrored to address the same topic from the perspective of a feedback giver (see Supplementary). First, the initial English items for GFO were formulated in a group meeting with a communication teacher with a PhD in medical education and a full professor in medical education. Second, after this meeting all four team members individually finetuned the items in a shared document. Third, these items were discussed in a PhD meeting with approximately twelve PhD students in (bio)medical education. Both authors decided on the final items, with the aim to stay as closely as possible to the formulation of the User items. For instance, the first item “Feedback contributes to my success in health care practice”, was mirrored to “Me giving feedback to team members contributes to their success in health care practice”. Fourth, two medical students filled out all thirty items while thinking aloud. This led to a few small changes in wording, but mainly resulted in not using the word “feedback user”, but “feedback receiver.” And even though that does not match the current ideas about proactivity in feedback (e.g., Tielemans et al., 2023a), this did match better to the students’ ideas and jargon with respect to feedback. Fifth, after the items were finalized in English, CT translated them to Dutch. Using backward translation, a fellow PhD student translated the Dutch items back to English and based on that process, small changes were made to the wording of the items in Dutch.

Analysis

First, we checked the data on missingness to see whether there were items that were left open substantially more often than others. Second, we explored to what extent user and giver feedback orientations could be meaningfully discerned. Therefore, as did Linderbaum and Levy (2010), several exploratory factor analyses (EFA) were run on the 30 questionnaire items. Following the recommendations of Costello and Osborne (2005) we used a maximum likelihood (ML) estimation and oblique rotation (Oblimin). We considered all factors with an eigenvalue of >1.00 and constrained the number of factors to six. Third, we conducted reliability analysis on the scales to see whether the scales would meet the criterium of Cronbach’s alpha being >.70.

Fourth, to see to what extend the factors differed within students, scale means were computed and compared using repeated measures ANOVA, with Bonferoni posthoc tests. Lastly, to investigate the relations between the scales Pearson's correlation coefficients were computed. We interpreted correlations of .10 to .30 as small, .30 to .50 as medium, .50 to .70 as large and >.70 as so high that the scales might not be measuring meaningfully different variables. Lastly, to explore patterns between individuals, we performed a two-step cluster analysis on the scale scores and inspected the cluster quality. In case of cluster quality being fair or good, the results are presented and interpreted.

RESULTS

Missingness

Within the 537 completed questionnaires, missingness ranged from one to six missing values per item. This indicates that none of the items was omitted substantially more often than others. We interpret this to mean that none of the items were incomprehensible or not applicable to a lot of students.

Exploratory factor analysis and Reliability analysis

Table 1 presents the means and standard deviations for all thirty items. An exploratory factor analysis including all factors with eigenvalues of >1.00 yielded seven factors. When constraining the factor solution to six factors, the factors clearly represented the intended subscales. Therefore, we decided to continue with the six-factor solution (see Table 1 for the factor loadings and item descriptives). The subscales User Utility, Giver Utility, User Self-efficacy, and Giver Self-efficacy are clearly represented by factor 3, 5, 1, and 2 respectively. For both Accountability scales, some cross loadings were found. More specifically for the User items, number 6 ("It is my responsibility to apply feedback to improve my performance") and 7 ("I hold myself accountable to respond to feedback appropriately") loaded higher on Utility than on Accountability. However, as this scale originated from an existing and validated questionnaire, and as Cronbach's alpha of Accountability would not increase when leaving out item 6 and 7, we decided to retain the items in the User Accountability scale. For the Giver Accountability items, in line with the User items, item 21 ("It is my responsibility to give feedback to team members to help them improve their performance") loaded higher on Giver Utility. Item 23 ("I don't feel a sense of closure until feedback I have given has been responded to") loaded higher on User Accountability and, interestingly, was the only Giver item that loaded on a User factor. As removing these items from the Giver Accountability scale would not yield a substantially better reliability and to keep the comparability between the User and Giver scales as good as possible, we decided to continue with the Giver Accountability scale as intended, including the five items (21-25).

The estimated reliabilities of six subscale in terms of Cronbach's alphas ranged from .66 (User Accountability) to .88 (Giver Utility; see Table 2). For none of the items, removing them would lead to a substantial increase in estimated reliability of the scale.

Table 1. Factor loadings of DFOS items for the 6-factor solution.

		M (SD)	1	2	3	4	5	6
1.	Feedback contributes to my success in health care practice.	4.59 (0.57)	.090	-.007	**.705**	-.043	.035	-.061
2.	To develop my skills in health care practice, I rely on feedback.	4.67 (0.53)	-.062	.026	**.788**	.046	-.004	-.017
3.	Feedback is critical for improving performance.	4.61 (0.58)	.054	.032	**.773**	-.040	-.009	-.011
4.	Feedback from team members can help me advance in health care practice.	4.58 (0.57)	.025	.011	**.829**	.046	-.001	-.034
5.	I find that feedback is critical for reaching my goals.	4.35 (0.73)	.151	.004	**.665**	-.104	-.003	.182
6.	It is my responsibility to apply feedback to improve my performance.	4.32 (0.73)	.064	-.073	.251	.169	.147	.180
7.	I hold myself accountable to respond to feedback appropriately.	4.38 (0.61)	-.047	-.058	**.305**	.140	.195	.244
8.	I don't feel a sense of closure until I respond to feedback.	3.16 (0.91)	.027	.032	.126	.021	-.060	**.629**
9.	If my team member gives me feedback, it is my responsibility to respond to it.	3.85 (0.84)	-.003	.038	.187	.197	.030	**.437**
10.	I feel obligated to make changes based on feedback.	2.89 (0.98)	.094	-.109	-.041	.028	.009	**.452**
11.	I feel self-assured when dealing with received feedback.	3.76 (0.75)	-.023	.041	.021	-.052	**.726**	-.040
12.	Compared to my peers, I am more competent at handling received feedback.	3.03 (0.71)	.019	.198	-.101	-.194	**.301**	.228
13.	I believe that I have the ability to deal with received feedback effectively.	4.06 (0.56)	.034	.017	.111	.150	**.505**	-.090

		M (SD)	1	2	3	4	5	6
14.	I feel confident when responding to both positive and negative feedback.	3.67 (0.77)	-.014	.123	-.028	-.038	**.741**	-.034
15.	I know that I can handle the feedback that I receive.	3.94 (0.66)	.040	-.053	.005	.041	**.818**	-.011
16.	Me giving feedback to team members contributes to their success in health care practice.	4.02 (0.67)	**.554**	.052	.194	.056	.020	-.014
17.	To develop their skills in health care practice, team members rely on my feedback.	3.70 (0.75)	**.792**	.016	.043	-.021	-.023	-.027
18.	Me giving feedback is critical for the performance improvement of team members.	3.65 (0.79)	**.847**	.001	.041	-.062	-.017	-.019
19.	My feedback can help team members advance in health care practice.	3.96 (0.67)	**.701**	.043	.083	.084	.064	-.105
20.	Me giving feedback is critical for team members reaching their goals.	3.39 (0.86)	**.791**	-.002	.004	-.148	-.038	.210
21.	It is my responsibility to give feedback to team members to help them improve their performance.	3.51 (0.84)	**.500**	-.026	-.162	**.339**	.107	.090
22.	I hold myself accountable to give feedback to a team member that can be responded to.	3.65 (0.83)	.285	.018	-.053	**.488**	.071	.146
23.	I don't feel a sense of closure until feedback I have given has been responded to.	2.98 (0.97)	.075	.125	-.058	**.244**	-.160	**.414**
24.	If I give feedback to a team member, it is my responsibility to give feedback that can be responded to.	3.86 (0.82)	-.013	.078	.011	**.625**	.016	.163

	M (SD)	1	2	3	4	5	6
25. I feel obligated to give feedback in a way that supports the receiver to make changes based on it.	4.00 (0.83)	.004	.031	.090	**.604**	.021	.009
26. I feel self-assured when giving feedback.	3.25 (0.83)	.005	**.729**	.018	-.002	.025	-.057
27. Compared to peers, I am more competent at giving feedback.	2.90 (0.77)	.038	**.654**	-.040	-.140	-.048	.230
28. I believe that I have the ability to give feedback effectively.	3.51 (0.74)	.002	**.714**	.058	.087	.093	-.098
29. I feel confident that both the positive and negative feedback I give will be responded to.	3.42 (0.77)	-.032	**.736**	.021	.099	.104	-.089
30. I know the feedback that I give can be handled.	3.76 (0.71)	.210	**.403**	.004	.278	.034	-.095

Differences and relations between DFOS scales

In terms of the scale means, the repeated measures ANOVA showed significant differences between the scales ($F(5,527.000) = 404.203$, $p<.001$, partial $\eta^2=0.99$). Bonferoni posthoc tests indicated that User Utility was significantly higher than all other scales and that Giver Self-efficacy was significantly lower than all other scales ($p<.001$). For User Utility 38% of the participants gave the maximum score of 5 on all five scale items.

Table 2. Scale descriptions, reliabilities, and descriptive statistics.

Dialogical Feedback Orientation Scale	An individual's tendency to…	Cronbach's alpha	n	M (SD)	Min	Max
User FO (from L&L, 2010)	… be open to receiving feedback					
Utility	… believe that using feedback is instrumental in achieving goals or obtaining desired outcomes at work	.87	535	4.56 (0.49)	2.00	5.00
Accountability	…. feel a sense of obligation to act on feedback	.66	534	3.72 (0.54)	1.40	5.00
Self-efficacy	… have confidence in dealing with receiving feedback	.77	536	3.70 (0.51)	2.00	5.00
Giver FO (new)	… be open to giving feedback					
Utility	… believe that giving feedback is instrumental in achieving goals or obtaining desired outcomes at work	.87	534	3.74 (0.61)	1.80	5.00
Accountability	…. feel a sense of obligation to give feedback	.74	534	3.60 (0.60)	1.00	5.00
Self-efficacy	… have confidence in dealing with giving feedback	.81	536	3.37 (0.58)	1.60	5.00

Relations between DFOS scales

Table 3 presents the correlations between the six DFOS scales. The correlations between the User scales ranged from .15 to .39 and the correlations between Giver scales ranged from .27 to .50. Correlations between the corresponding User and Giver scales were .40, .46, and .44 respectively (bold in Table 3), indicating a range of 16-21% explained variance. This means that even though we see correlations between the corresponding User and Giver scales, the scales do not measure one and the same variable, but more likely represent different constructs.

Table 3. Pearson Correlation Coefficients between DFOS scales.

	User FO			Giver FO		
	Accountability	Self-efficacy	Utility	Accountability	Self-efficacy
User FO					
Utility	.39**	.23**	**.40****	.26**	.07
Accountability	---	.15**	.39**	**.46****	.12**
Self-efficacy		---	.18**	.16**	**.44****
Giver FO					
Utility			---	.50**	.30**
Accountability				---	.27**
Self-efficacy					---

*Note. *P<.05, **p<.01, ***P<.001.*

Clusters of students

The two-step cluster analysis had a fair cluster quality and yielded three clusters (see Table 4). By far, User Utility was found to have the largest predictor importance. Cluster 1 contained 36% of the participants and can be characterized as relatively high on User Utility and low on all other scales and was therefore labeled "User Utility focused FO". Cluster 2 contained 35% of the participants and can be characterized by low scores on all scales and was therefore labeled "Low Dialogical FO". Cluster 3 contained 29% of the participants and can be characterized by relatively high scores on all subscales and was therefore labeled as "High Dialogical FO". In other words, two clusters have overall low and overall high means on all scales and a third cluster distinguished about a third of the participants having high User Utility, but lower scores on all other scales.

Table 4. Cluster means on subscales from the two-step cluster analysis.

	Cluster 1 (36%)	Cluster 2 (35%)	Cluster 3 (29%)
User FO			
Utility	4.86	4.00	4.89
Accountability	3.62	3.44	4.20
Self-efficacy	3.61	3.56	3.97
Giver FO			
Utility	3.59	3.45	4.30
Accountability	3.39	3.39	4.14
Self-efficacy	3.13	3.33	3.71
Label	User Utility focused FO	Low Dialogical FO	High Dialogical FO

DISCUSSION

In this study we argued that health professions education should support students' development as both feedback givers and users. In order to properly address this in research, an instrument is needed to investigate students' orientations towards receiving and giving feedback. Therefore, we extended the definition of feedback orientation to not only include receptivity to feedback, but also orientation to giving feedback. We mirrored three scales of the Feedback Orientation Scale (Linderbaum & Levy, 2010) and presented and analyzed the Dialogical Feedback Orientation Scale (DFOS) addressing the research question: *to what extent can the DFOS meaningfully measure and discern giver and user feedback orientations in clinical HPE?*

Based on our sample of 537 students, we found that the Giver Feedback Orientation subscales could be meaningfully and reliably discerned from the User subscales. Nearly all subscales were moderately correlated with other scales. Correlations

between the mirrored scales were highest: students that valued using feedback, also reported to value giving feedback; students that felt more accountable for using feedback, also felt more accountable for giving feedback; and students that felt confident they can use feedback, were also more confident that they can give feedback. Overall, the results showed very high scores on *user utility*: students strongly believe their use of the feedback they receive contributes to their professional performance. This might be an open door and is in line with two studies in medical education (Chen et al., 2022; Mills et al., 2023), but differs from the original findings of Linderbaum and Levy (2010) and two other studies in medical education, who found lower means for students (Rasheed et al., 2015; Thornwall & Ikonen, 2024). Though students valued receiving feedback, they did not feel very confident in being able to use it. Regarding giver feedback orientation, we also found that students rated the value of giving feedback (Giver Utility) higher than their confidence to actually do so. The difference between utility and self-efficacy for both using and giving feedback might indicate a need for additional training in these skills, not only in classroom settings, but also in the complex clinical and interprofessional context. Our cluster analysis showed that one third of the students might not feel the need for such training as they reported high value and high self-efficacy for using and giving feedback. Acknowledging that giving and receiving feedback is not easy or straightforward (Tielemans et al., 2023c; Palaganas & Edwards, 2021), it would be interesting to see whether such training would not only affect students' self-efficacy but also their utility and accountability.

Limitations and Future Research

This study presented a redesigned instrument to address healthcare students' orientations towards giving and using feedback at the workplace. Future research will need to show whether the instrument yields comparably valid and reliable results. Also, future studies can now also address the relation between the subscales and other relevant variables such as psychological safety, feedback culture, and educational and patient outcomes. Furthermore, longitudinal studies to explore the extent to which dialogical feedback orientations are a rather stable trait or can be affected by experiences and education would be highly relevant. With respect to this, Linderbaum and Levy themselves indicated that they would expect feedback orientations to be rather stable over time, without targeted interventions. Lastly, the relatively low reliability of the user accountability scale is a relevant thing to bear in mind, as well as some items that strictly do not load highest on the intended subscale. Transparently reporting about this in future studies, can aid our understanding of whether specific items can be further improved.

Conclusion

For (future) health care professionals it is indispensable to recognize the importance of, and practice, both using and giving feedback in the clinical context. The Dialogical Feedback Orientation Scales can be used to reliably and meaningfully distinguish and measure these. Ultimately, this will create opportunities to further sustain and improve students dialogical feedback orientations.

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APPENDIX 1

DFOS items per scale.

	Feedback User	Feedback giver
Utility	1. Feedback contributes to my success in health care practice. 2. To develop my skills in health care practice, I rely on feedback. 3. Feedback is critical for improving performance. 4. Feedback from team members can help me advance in health care practice. 5. I find that feedback is critical for reaching my goals.	6. Me giving feedback to team members contributes to their success in health care practice. 7. To develop their skills in health care practice, team members rely on my feedback. 8. Me giving feedback is critical for the performance improvement of team members. 9. My feedback can help team members advance in health care practice. 10. Me giving feedback is critical for team members reaching their goals.
Accountability	11. It is my responsibility to apply feedback to improve my performance. 12. I hold myself accountable to respond to feedback appropriately. 13. I don't feel a sense of closure until I respond to feedback. 14. If my team member gives me feedback, it is my responsibility to respond to it. 15. I feel obligated to make changes based on feedback.	16. It is my responsibility to give feedback to team members to help them improve their performance. 17. I hold myself accountable to give feedback to a team member that can be responded to. 18. I don't feel a sense of closure until feedback I have given has been responded to. 19. If I give feedback to a team member, it is my responsibility to give feedback that can be responded to. 20. I feel obligated to give feedback in a way that supports the receiver to make changes based on it.

	Feedback User	Feedback giver
Self-efficacy	21. I feel self-assured when dealing with received feedback. 22. Compared to my peers, I am more competent at handling received feedback. 23. I believe that I have the ability to deal with received feedback effectively. 24. I feel confident when responding to both positive and negative feedback. 25. I know that I can handle the feedback that I receive.	26. I feel self-assured when giving feedback. 27. Compared to peers, I am more competent at giving feedback. 28. I believe that I have the ability to give feedback effectively. 29. I feel confident that both the positive and negative feedback I give will be responded to. 30. I know the feedback that I give can be handled.

7

Medical and Nursing Students' Perceptions of Interprofessional Feedback while transitioning from Classroom to Workplace learning

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Submitted

ABSTRACT

Education, aiming to teach students to value teamwork and to give and use feedback in interprofessional dialogues, often combines formal classroom settings with informal workplace learning. However, transitioning between these two settings is challenging for students, and *unlearning* can take place. This study aims to understand how medical and nursing students' perceptions of interprofessional teamwork and their feedback orientations change during this transition, providing valuable insights to improve education. Participants were 5th-year medical and 4th-year nursing students, both in the workplace phase of training, enrolled in an Interprofessional Feedback Intervention. At three time points (week 1 and 2, classroom, week 14, workplace) we measured: Dialogic Feedback Orientation, Interprofessional Teamwork Valuing, and students' definition of the Interprofessional Team. We used analyses of variance to identify changes over time. 538 students responded (46%) in week 1, 65 of them followed up at the next two time points. Students' perceptions of interprofessional teamwork were consistently high across training, as was their belief that using interprofessional feedback is useful for their development as healthcare professionals- their *user* utility-. Their utility as feedback *givers* showed a significant drop in the workplace. Students' self-efficacy to use and give feedback was somewhat lower than other variables but consistent over training phases. Their sense of accountability to give and use feedback increased in the classroom, which was maintained in the workplace. Interprofessional feedback training can positively contribute to developing and maintaining positive interprofessional teamwork perceptions and feedback orientations. However, the drop in students' feedback *giver* utility suggests a negative effect of the workplace, possibly caused by a lack of opportunities for students to practice giving feedback in the workplace. Future work must focus on helping students' maintain the gains of their interprofessional feedback training, as they make the transition from classroom to workplace.

INTRODUCTION

Training future healthcare professionals includes teaching them to use interprofessional feedback to collaborate in the complex everchanging clinical workplace (WHO, 2010; van der Leeuw et. al., 2018; Tielemans et. al. 2023a). This aim is pursued through interprofessional education, where healthcare students from different professions learn to give and use feedback (IPEC, 2016; O'Keefe et. al., 2017; Tielemans et. al., 2023b). In this study, we frame interprofessional feedback as a process, embedded in an interactive dialogue, i.e., an ongoing exchange, clarification, and altering of ideas, between a feedback giver and user with different professional backgrounds (Ajjawi & Regehr, 2019; Nicol, 2010). Consequently, interprofessional feedback training for healthcare students must include the role of feedback giver and user (Tielemans et. al., 2023a). Conditional to such education is a readiness for, and valuing of, *interprofessional teamwork* (Visser et. al., 2018; van Duin et. al., 2022). This refers to care performed by a (changeable) composition of individuals with different professional backgrounds. As valuing of teamwork can fluctuate over time and training phases (Visser et. al., 2017), fostering such values among healthcare students is a secondary objective of interprofessional feedback education.

Most interprofessional feedback education takes place formally, in classrooms, where healthcare students are prepared for participation in the clinical workplace. It is widely known that this transition from classroom to practice, can be challenging for students (Peters et. al., 2017; O'Brien et. al., 2007). A proposed reason for this is that education in the formal, more controllable classroom setting can create unrealistic expectations that are not met in the informal, sometimes hierarchical, clinical workplace (Paradis & Whitehead, 2018). Examples are: being confronted with interprofessional and feedback behavior of team members diverging from the strategies and values that are communicated in the classroom (Thistletwaithe, 2012), and/or the presence of conflicts that urge supervisors to prioritize other tasks, like urgent patient care, over interprofessional and feedback education (Lingard, 2016; Noble et. al., 2023). Students can therefore be left with a sense of disillusionment when transitioning to learning in the workplace, sometimes even leading to their unlearning of interprofessional feedback skills and attitudes (Fluit et. al., 2021). For instance, Eijkelboom et al. (2024), found senior medical students' positive perceptions of patient feedback decreasing after practicing in the clinical workplace, and Makino et al. (2013), showed medical trainees' team attitudes dropping when exposed to practice post-licensing. A deeper understanding of students' development across this transition can help health professions educators design classroom and workplace learning environments that support (the maintenance) of learning from interprofessional feedback. This is especially relevant in the pre-licensing educational context, where educators can still impact training (environments) relatively easy. In this study, we therefore followed healthcare students as they transitioned from classroom to clinical workplace, to explore the following research question:

How do medical and nursing students' perceptions of interprofessional teamwork and their interprofessional feedback orientations change as they transition from classroom to clinical workplace education?

METHOD

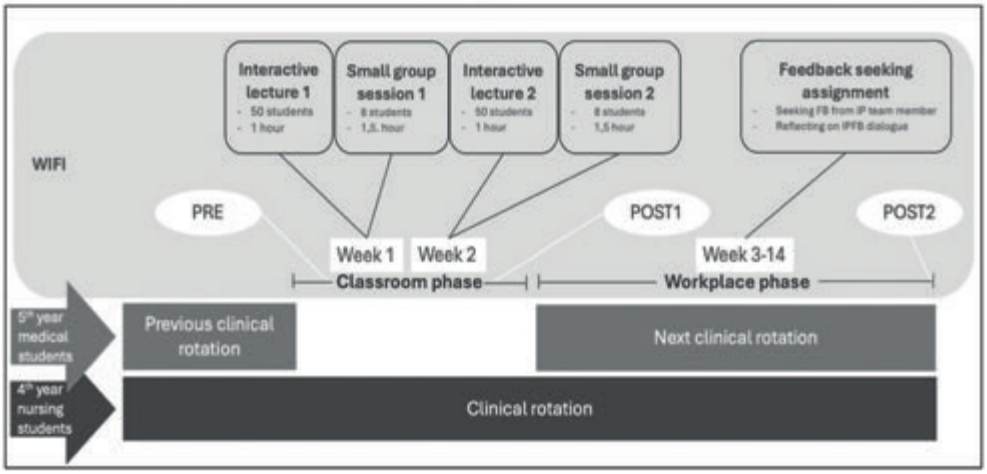
Design

We used an exploratory, longitudinal study design, at a nursing and medical school in the center of the Netherlands. Between January 2022 and September 2023, we collected quantitative questionnaire data at three time points in medical and nursing students' interprofessional feedback education.

Context

All participants took part in the Westerveld Interprofessional Feedback Intervention (WIFI) (Tielemans et. al., 2023b). WIFI is based on the Westerveld Framework of Principles for Interprofessional Feedback Dialogue (Tielemans et. al., 2023a). It's content is based on a critical review of both feedback and interprofessional literature and is validated by an international expert panel. The framework indicates what a feedback giver and a user can do to contribute to a users' feedback process, and how to overcome feedback barriers in an interprofessional health care context. WIFI's design incorporates a classroom and workplace phase (figure 1). In the classroom phase, internship students (with significant interprofessional workplace experience) take part in two half-day lessons consisting of interactive lectures and small group sessions aimed at interprofessional feedback dialogue attitude and skill development. After the classroom phase, students return to the clinical workplace with a specific feedback learning goal and an assignment to seek interprofessional feedback and reflect on the dialogue that follows (Tielemans et. al., 2023b)

Figure 1: Westerveld Interprofessional Feedback Intervention (WIFI), participant contexts, and data collection time points (PRE, POST1, POST2)



Participants

Every six weeks a cohort of approximately 100 students (30% Medicine, 70% Nursing), took part in the mandatory WIFI. The 1159 4th year nursing and 5th year medical students (in the 13 cohorts between January 2022 and September 2023) were invited to take part in this study. They were all in the workplace-learning phase of their training, pre-licensing (figure 1), which they interrupted for classroom interprofessional feedback education. Nursing students interrupted their 24-week final, elective internship, which took place in hospitals, psychiatric, elderly-, or home-care settings. Medical students interposed two following clinical internships to join WIFI as part of a 6-week theoretical course. After WIFI, medical students had a 12-week hospital-based internship in anesthetics, internal medicine, and surgery.

Instruments

A survey was composed, including validated scales, specified to the interprofessional team students had been a part of in their last 12 weeks of workplace internship. For the full survey used, see supplement 1.

Perceptions of interprofessional teamwork was operationalized in three ways:

1. *Students' definition of their interprofessional team*, using a multiple-choice question based on van den Broek et al. (2020), where the answering options represented three levels of extensiveness of defining the interprofessional team.
2. *Students' Interprofessional Valuing* (IPV) of teamwork, using a 11-item scale adapted from the Interprofessional socialization and valuing scale (ISVS) (King et. al., 2010), by Cantaert et. al. (in preparation, see supplement 1) to specifically measure valuing of teamwork in students with relevant interprofessional clinical experience.
3. *Students' identification with the interprofessional team* (only measured at the third time point), using the 12-item Strength of Social Identity (SSI) scale (Obst & White, 2005), which measures the degree to which students have internalized the interprofessional team, as a social group, into their self-image.

Interprofessional feedback orientation was operationalized using the Dialogic Feedback Orientation Scale (DFOS) (De Kleijn & Tielemans, 2024). The DFOS was developed based on the validated Feedback Orientation Scale (FOS) (Linderbaum & Levi, 2010) which measures receptivity to feedback from the perspective of the feedback receiver, or user, as a predictor of feedback behavior in practice. The DFO scale takes a dialogic perspective on feedback, including the roles of feedback user and feedback giver in the feedback process. It has therefore extended the FOS with mirrored versions of three of its original 5-item subscales, from the perspective of the feedback giver:

- *User Utility (UU):* The student's belief that using feedback is instrumental in (their) achieving goals or obtaining desired outcomes at work.
- *User Accountability (UA):* The student's sense of obligation to act on feedback.
- *User Self-efficacy (USE):* The student's confidence in dealing with

receiving and using feedback.
- *Giver Utility (GU):* The student's belief that giving feedback is instrumental in (others) achieving goals or obtaining desired outcomes.
- *Giver Accountability (GA):* The student's sense of obligation to give feedback.
- *Giver Self-efficacy (GSE):* The student's confidence in dealing with giving feedback.

Procedure

At three measurement points during WIFI, students were asked to complete the questionnaire: (1) during the preparatory (home)work phase via the course manual (PRE), (2) two weeks later, at the end of the classroom phase via email (POST1), and (3) after the workplace phase, i.e., after 12 weeks of clinical internship, also via email (POST2) (figure 1). Participation was voluntary and informed consent was gained. Ethical approval of this study was provided by the Dutch Association for Medical Education (NVMO), ERB file number: 2022.1.6.

Analysis

Preliminary analyses. First, the datasets from the three time-in-training points were merged, matching cases by identifier. Means and standard deviations were calculated for all scales. Scales were checked for normality using histograms. All scales showed good estimated internal consistency in terms of Cronbach's alpha (UU .87; UA .66; USE .77; GU .87; GA .74; GSE .81; IPV .82; SSI .80). Next, missingness due to loss to follow up was assessed through comparing the means of IPV and DFO subscales for the total sample and the continuous subsample (respondents at PRE+POST1+POST2). No meaningful systematic differences were found (supplement 2), suggesting that loss of follow up was not problematic for exploratory analysis.

Analysis of interprofessional team definition and interprofessional identification.

To determine changes in students' interprofessional team definitions across time points in training, frequency distributions of students' definitions were calculated at all time points in training. Next, using the subsample of respondents at the third time point in training (POST2), means of SSI with the interprofessional team were calculated for nursing and medical students. An independent T-test was performed to determine professional differences.

Analysis of interprofessional teamwork valuing and feedback orientation.

To determine changes over time in IPV, we used a mixed-design ANOVA with time point in training (PRE, POST1, POST2) as a within-subjects factor and profession (nursing/medicine) as a between-subjects factor, analyzing the main effect of time point in training and the interaction effect of time point in training with profession. For DFO, we conducted a series of one-way repeated-measures ANOVAs, analyzing the effect of time point in training on each of the six subscales (UU, UA, USE, GU, GA, GSE). Because we were interested in changes on any of the subscales, we

used a Bonferroni correction to avoid Type-I error inflation (a<.05/6 = <.0083). We checked equality of variance and sphericity using Levene's test and Mauchly's test, respectively. When a significant effect of time point in training was found on a subscale, we conducted two post-hoc comparisons to determine whether the change occurred between PRE and POST1 or between POST1 and POST2. Post-hoc comparisons were again Bonferroni-corrected (a<.0083/2 = a<.00415). For exploratory purposes, a graphic representation of changes in means across time point in training was made to further interpret trends.

RESULTS

In total, 1159 students participated in WIFI. 538 students (538/1159, 46%) participated at time point PRE (week 1, classroom), 225 (225/538, 41,8%) at time point POST1 (week 2, classroom), and 126 (126/538, 23,4%) at time point POST2 (week 14, workplace). 65 students participated at all three time points (65/538, 12,2%). Table 1 shows the response at the first and follow up time points, including the proportions of medical and nursing students.

Table 1. Response at PRE and follow up time points, and proportions of medical and nursing students

Time point in training	Response		
	Total (%)	Nursing (%)	Medicine (%)
PRE (week 1; classroom)	**538 (100)**	274 (100)	264 (100)
POST1 (week 2; classroom)	**225 (41,8)**	101 (36,9)	124 (47)
POST2 (week 14; workplace)	**126 (23,4)**	56 (20,4)	70 (26,5)
PRE + POST1 + POST2	**65 (12,1)**	22 (8)	43 (16,3)

Perceptions of interprofessional teamwork over time

Changes in definitions of interprofessional team

Table 2 shows the frequencies of interprofessional team definition across time points in training for the continuous sample. Though most students already held broad definitions of their interprofessional teams at the starting point of training, those students who held narrow team definitions at the start of training, seemed to broaden this definition during training.

Table 2. Students' perceptions of interprofessional teams over time (n=64)

The interprofessional team I have in mind consists of:	n PRE	n POST1	n POST2
1. Physicians and nurses	4	6	0
2. Physicians, nurses, and paramedical professionals	23	15	22
3. Physicians, nurses, paramedical professionals, and supportive personnel.	37	43	42
Total	64	64	64

Interprofessional team identity

On a scale of 1 (no identification) to 5 (strong identification), medical students had a mean identification with the interprofessional team of M=3.01, SD=0.23, and nursing students of M=3.14, SD=0.54. The mean difference, 0.13, 95% CI [-0.01, 0.27], in experienced SSI between medical and nursing students was not significant t_{124}=1.66, p=.10.

Changes in interprofessional teamwork valuing

There was no significant main effect of time point in training on IPV $F_{1.6,102}$=0.171, p=.80, nor a significant interaction effect of profession on development of IPV over time $F_{1.6,102}$=1.394, p=.25, indicating no evidence for changes in IPV over phases of training or for differences in changes between medical and nursing students. Mauchly's test of sphericity was violated, so the Greenhouse-Geisser correction was used.

Changes in interprofessional feedback orientation

The analysis of changes in DFO (table 3) showed significant effects of time point in training on *feedback user accountability*, *giver utility,* and *giver accountability* with medium to large effect sizes. No significant changes were observed on the other subscales. Post-hoc analysis showed a significant increase in both *user* and *giver accountability* across the classroom phase of training (PRE-POST1), but no significant change across the workplace learning phase (POST1-POST2). *Giver utility* decreased significantly across the workplace learning phase of training (POST1-POST2), with no significant change across the classroom phase.

Table 3. Changes during training in DFO of continuous subsample PRE+POST1+POST2

		PRE (week 1, classroom)	POST1 (week 2, classroom)	POST2 (week 14, workplace)	ANOVA[a]			Post-hoc Pairwise comparisons[b]	
	n	M (SD)	M(SD)	M(SD)	F (df)	p	ηp²	p PRE-POST1	p POST1-POST2
FO User									
Utility	65	4.49 (0.47)	4.44 (0.62)	4.44 (0.54)	0.505 (2,128)	.61			
Accountability	65	3.60 (0.55)	3.90 (0.56)	3.75 (0.50)	6.865 (2,128)	.001[#]	.10	.001[$]	.11
Self-efficacy	65	3.73 (0.52)	3.84 (0.66)	3.81 (0.60)	1.236 (2,128)	.29			
FO Giver									
Utility	62	3.65 (0.60)	3.81 (0.57)	3.52 (0.73)	5.809 (2,122)	.004[#]	.09	.04	.001[$]
Accountability	64	3.50 (0.65)	3.94 (0.47)	3.78 (0.59)	16.109 (2,126)	<.001[#]	.21	<.001[$]	.086
Self-efficacy	65	3.43 (0.54)	3.57 (0.60)	3.38 (0.63)	2.402 (1.7,109)[c]	.10[a]			

[a]Because we were interested in changes on any of the subscales when analyzing the effect of time point in training, we used a Bonferroni correction to avoid Type-I error inflation (a<.05/6 = a<.0083). [#] = used to indicate significant results of ANOVA analysis (a<.0083).

[b]Posthoc comparisons were again Bonferroni-corrected (a<.0083/2 = a<.00415). [$]= used to indicate significant results of the post-hoc pairwise comparison analysis (a<.00415).

[a]Mauchly's test of sphericity was violated, so the Greenhouse-Geisser correction was used

Figure 2: Graphical representation of DFO changes for continuous sample (medical and nursing students) and full sample

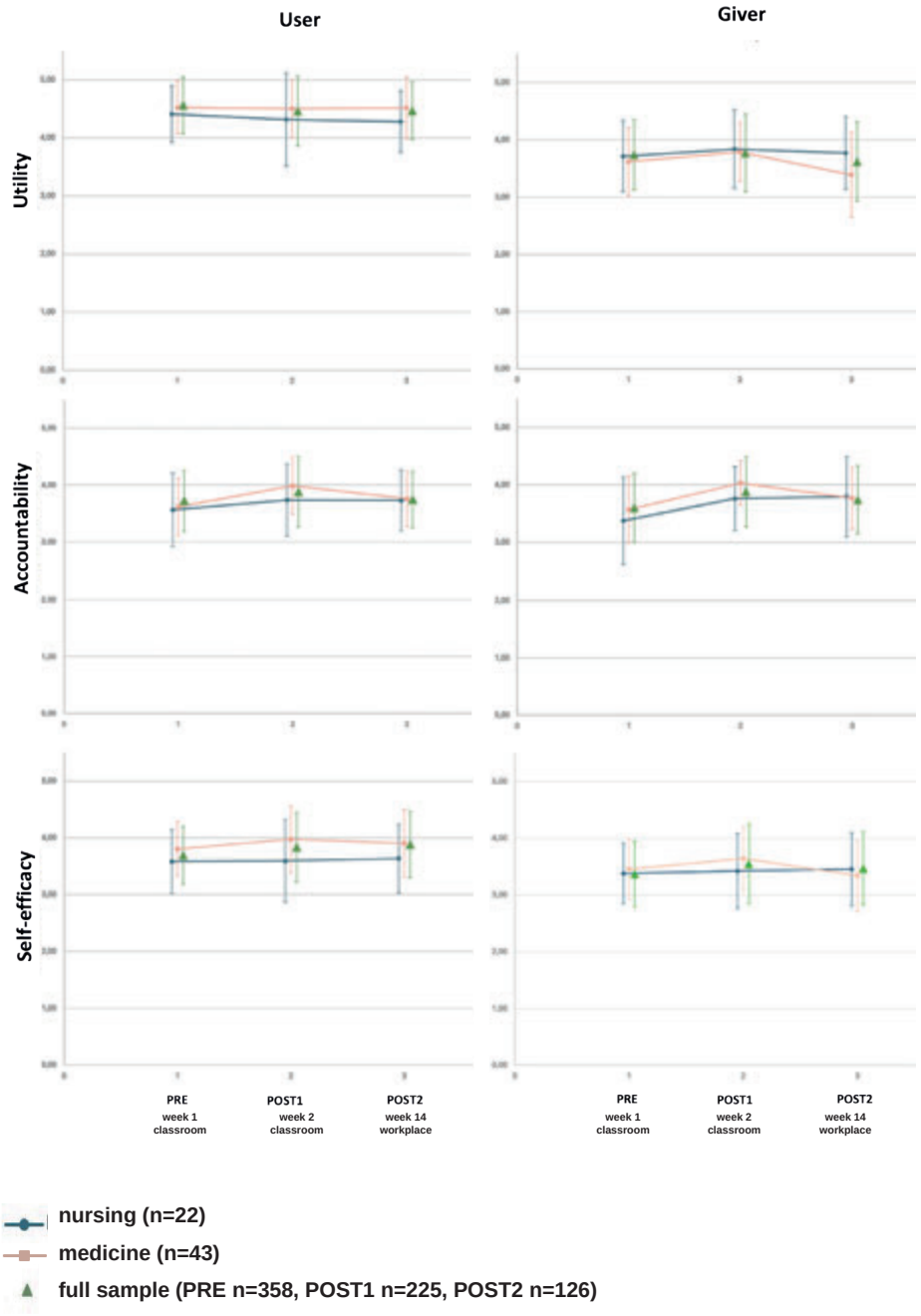


Figure 2 depicts DFO means for the full sample and the continuous sample of 65 students that participated at all three time points. The figure shows that DFO was generally high and relatively stable throughout the study period. Qualitatively, the scores of medicine students appeared to vary somewhat more than those of nursing students and decreased in the workplace learning phase of training (POST1-POST2) for all subscales except *user utility*. However, given the small size of the student subgroups and the exploratory nature of the analysis, these observations should be interpreted with caution.

DISCUSSION

This study explored changes in medical and nursing students' *perceptions of interprofessional teamwork* and *interprofessional feedback orientations* as they transitioned from classroom to workplace learning.

Students mean valuing of interprofessional teamwork at the start of training was high, and this valuing was maintained across their training. Students varied in their definitions of the interprofessional team. For the group of students that held narrow definitions of what members belong to an interprofessional team at the start of training, definitions broadened across training. These findings indicate students had and retained positive *perceptions of interprofessional teamwork* across training phases. We did not find differences between medical and nursing students regarding their teamwork valuing, or their identification with the interprofessional team, which confirms findings of other studies in this area (van den Broek et. al., 2020; Curran, 2007; Ko et. al., 2014). These reassuring results imply that the current training of medical and nursing students in this context, including WIFI (Tielemans et. al., 2023b), adequately fosters and maintains the value of interprofessional teamwork.

Regarding their interprofessional feedback orientation, students showed a consistently strong belief that using interprofessional feedback is useful for their development as healthcare professionals (user utility). Furthermore, their sense of accountability to give and use feedback increased in the classroom phase of training and remained stable during the workplace phase. Simultaneously, students' self-efficacy to actually give or use feedback showed no significant changes over time. Especially, their self-efficacy to give interprofessional feedback was rated lower than other subscale means and didn't change over training phases. Moreover, students' belief in the usefulness of their giving feedback to others (giver utility), *dropped* in the workplace phase of training. These findings suggest students are less oriented to their roles as feedback givers as opposed to their roles as users, which is in line with literature where, especially in interprofessionally, giving feedback is seen as a challenging activity for students (Tielemans et. al., 2023b; Mandal et. al., 2016; Olvet et. al., 2021).

The significant drop in students' giver utility could indicate a negative effect of the workplace on students' perceptions of the usefulness of their own feedback giving, for others' professional development. A possible explanation for this finding lies in the training assignment in the workplace phase of WIFI. Participating students

had an assignment to seek interprofessional feedback in the workplace. They were, however, not asked to give feedback to an interprofessional team member. Consequently, it is possible that the lack of formal opportunity to practice giving feedback impeded students to maintain their sense of utility as feedback givers. After all, it is known that *opportunities to use* learning, is one of the main predictors of transfer of training to the work environment (Peters et. al., 2017; Blume et. al., 2019). Therefore, especially when considering the high accountability of these students in their role as feedback givers, adding formalized opportunities to practice interprofessional feedback giving in their internships should be considered. Aside from *opportunities to use* feedback, and *perceived supervisor support* is well known as a second predictive factor of transfer (Peters et. al., 2017; Blume et. al., 2019). So, another possible explanation for the drop in students' sense of utility as feedback givers could be that the supervisors at the workplace lacked readiness for seeking, accepting, and using feedback from (interprofessional) students. This implies a need for awareness, and training, of supervisors in interprofessional feedback skills (Noble et. al., 2023; Olvet et. al., 2021; Ramani & Krackov, 2012). Further research should confirm whether supervisor support and opportunities to use learning indeed relate to students' sense of utility as feedback givers and how we can use this relation to benefit students' development as feedback givers.

Though nursing and medical students' changes in dialogic feedback orientation were not statistically significant different, a trend stood out. Across all subscales, except for user utility, medicine students' means dropped in the workplace phase of training whilst the means of nursing students remained stable. This finding requires further research as it may lead to valuable insights for medical educators. It is worthwhile considering the differences between the workplace learning environment of medical and nursing students in this study. First, whilst nursing students joined WIFI coming from *and returning to* the same internship placement, the medical students started a new internship after the classroom phase. Second, medical students' internships in this study context are consistently shorter (generally 12 weeks) than those of nursing students (generally 24 weeks). Within this, already shorter, internship length, medical students transfer wards and teams much more frequently (up to 6 times). Switches in supervision are often indicated as limiting to developing feedback skills (McGinnes et. al., 2019; Al-haddad & Musse, 2021). And, in a broader sense, continuity in learning environments has often proven to better afford students' participation and learning in healthcare teams (Hauer et. al., 2012; Hudson et. al., 2017). Though further research is needed to confirm and better understand these findings, medical students' dialogic feedback orientations might benefit from the stable learning environment offered by internships that keep them in the same ward longer.

Limitations

Several limitations of this study need to be considered when interpreting its findings. First, the response rate of the continouous subset of participants was low, limiting the power of our longitudinal analyses. Though we assessed that this smaller sample did not diverge in a meaningful way from the larger samples at each separate time point, this missingness *not* being random cannot be ruled out. Furthermore, the small sample may have caused us to miss smaller effects or relations in the data. Second,

the single educational context used for data collection may limit the generalizability of our findings, especially as clinical feedback cultures can vary internationally and between institutes (Winstone & Boud, 2019; MacDonald et. al., 2013; Suhoyo et. al., 2014). Similarly, we specifically gathered data in an interprofessional feedback context. If and how our results relate to monoprofessional feedback or feedback in other contexts remains unknown. Follow-up research with a larger sample and in multiple settings and feedback contexts would help further clarify students' development of feedback orientations.

Conclusion

This study explored interprofessional and feedback learning of medical and nursing students in an interprofessional feedback intervention including a classroom and workplace phase. The results showed that students' perceptions of interprofessional teamwork and their user utility were consistently high over phases of training. In the classroom phase, students' accountability to give and use feedback increased, which was maintained in the workplace. In the workplace, a significant drop was seen in students' belief that their giving interprofessional feedback is useful for others' development as healthcare professionals. These results show that interprofessional feedback training can positively contribute to developing and maintaining positive interprofessional feedback orientations. However, in the complex transition from classroom to workplace, unlearning of (parts of) students' dialogic feedback orientation can take place. Future work must focus on helping students' maintain the gains of their interprofessional feedback training, as they make this transition.

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APPENDIX 1

Survey guide

All questionnaires (PRE, POST1, and POST2) included:

1. **General questions**
    a. Informed consent (yes/no)
    b. Identifyer (open)
    c. Profession (medicine/nursing)

Please answer all following questions about the interprofessional team you've been working with most in your previous 12 weeks of internship.

2. **Definition of interprofessional team**

    Source: van den Broek, S., Tielemans, C., Cate, O. ten, Kruitwagen, C., & Westerveld, T. (2020). Professional and interprofessional group identities of final year medical and nursing students. Journal of Interprofessional Education & Practice, 22, 100392.

    The interprofessional team you now have in mind consists of:

    Multiple choice options:

    i. Physicians and nurses
    ii. Physicians, nurses, and paramedical professionals (e.g., physical therapist, speech therapist, psychologist etc.)
    iii. Physicians, nurses, paramedical professionals, and support staff (e.g. management, administration, cleaning staff)

3. **Dialogic Feedback Orientation Scale**

    See chapter 6

4. **Interprofessional Valuing Scale**

Source: In work that is being prepared for publication, Cantaert et.al. have translated, redesigned, and validated the Interprofessional Socialization and Valuing Scale (ISVS) (King, 2010). The ISVS measures the beliefs, behaviors, and attitudes that underlie interprofessional socialization and collaborative practice in health care settings and uses the three subscales 1) Self-perceived ability to work with others, 2) Value in working with others, and 3) Comfort in working with others.

In the translation, redesign, and validation, Cantaert et. al., used a cross-sectional sample of 3311 students from, 11 training programs in 1 medical faculty. The

details of this sample are published in this 2023 preprint: https://doi.org/10.21203/rs.3.rs-3293701/v1 *. Their exploratory factor analysis resulted in two one-component models, specifically for students with relevant interprofessional clinical experience, containing 11 and 10 items which explain 60,28% and 52,06% of variance with eigenvalues of 6,03 and 4.16, respectively. Among the two factors was Interprofessional Valuing (IPV). IPV, or valuing of interprofessional teamwork, measured using an 11-item scale, with an original Cronbach's alpha of 0.93 (the alpha in this study was 0.82).*

IPV scale example items are: "I appreciate the benefits in interprofessional teamwork", and "I believe that interprofessional practice is not a waste of time". All statements were rated on a 5-point Likert scale (1 Strongly disagree – 5 Strongly agree). For more information on the redesign, validation, translation, or to request the specific items, contact dr. Gabriël Cantaert at Gent University via: gabriel.cantaert@ugent.be.

Questionnaire POST 2 also included:

5. **Strength of Social Identification (with interprofessional team)**

   Source: Obst, P. L., & White, K. M. (2005). Three-Dimensional Strength of Identification Across Group Memberships: A Confirmatory Factor Analysis. Self and Identity, 4, 69–80.

   Subscales (and items):

   a. Cognitive centrality
      i. I often think about being an (ingroup member).
      ii. Being an (ingroup member) has little to do with how I feel about myself in general.
      iii. Being an (ingroup member) is an important part of my self-image.
      iv. The fact I am an (ingroup member) rarely enters my mind.
   b. In-group affect
      i. In general I'm glad to be an (ingroup member).
      ii. I often regret being an (ingroup member).
      iii. Generally, I feel good about myself when I think about being an (ingroup member).
      iv. I don't feel good about being an (ingroup member).
   c. In-group ties
      i. I have a lot in common with other (ingroup members).
      ii. I feel strong ties to other (ingroup members).
      iii. I find it difficult to form a bond with other (ingroup members).
      iv. I don't feel a strong sense of being connected to (ingroup members).

   All statements were rated on a 5-point Likert scale (1 Strongly disagree – 5 Strongly agree)

Means of DFOS for full sample and continuous sample of respondents

	PRE (n=538)	PRE Subsample A+B+C (n=65)	POST1 (n=225)	POST1 Subsample A+B+C (n=65)	POST2 (n=126)	POST2 Subsample A+B+C (n=65)
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
FO total User	**3.99 (.36)**	**3.93 (.33)**	**4.06 (.50)**	**4.06 (.49)**	**4.03 (.40)**	**4.01 (.43)**
Utility	4.56 (.49)	4.48 (.47)	4.46 (.60)	4.43 (.62)	4.47 (.49)	4.44 (.54)
Accountability	3.72 (.54)	3.60 (.55)	3.88 (.62)	3.88 (.55)	3.74 (.50)	3.76 (.50)
Self-efficacy	3.69 (.51)	3.73 (.52)	3.83 (.61)	3.86 (.65)	3.88 (.58)	3.82 (.60)
FO total Giver	**3.57 (.45)**	**3.52 (.46)**	**3.73 (.56)**	**3.76 (.43)**	**3.61 (.52)**	**3.56 (.51)**
Utility	3.74 (.61)	3.63 (.61)	3.77 (.68)	3.78 (.62)	3.62 (.69)	3.50 (.73)
Accountability	3.60 (.60)	3.50 (.65)	3.88 (.61)	3.95 (.46)	3.74 (.59)	3.78 (.59)
Self-efficacy	3.37 (.58)	3.43 (.54)	3.55 (.70)	3.58 (.60)	3.47 (.64)	3.39 (.63)
IP Valuing	**4.11 (.38)**	**4.15 (.33)**	**4.17 (.50)**	**4.20 (.51)**	**4.17 (.38)**	**4.17 (.36)**

8

Beyond Feedback Comments: Exploring Internal Feedback Processes in Interprofessional Workplace Learning

Claudia Tielemans, Renske de Kleijn, Diane Mak, Marieke van der Schaaf, David Nicol

ABSTRACT

Though feedback dialogues are an important contributor to interprofessional workplace learning, solely relying on them can impede agency and efficiency of students' learning. In this study, we use the internal feedback model to better understand students' learning from information sources, other than feedback comments. This model identifies comparison as a key process underlying students learning. We asked seven medical students to make their comparisons explicit by writing down what they learned in the context of a patient discharge conversation. We explored students' learning by coding the information used in, and the reported learning from, their explicated comparisons. We then used a matrix approach to explore themes and patterns within and across students. Our results showed that students in the workplace indeed learned by comparing their performance, prior experience, and goals, against observations of-, and comments from-, physicians, nurses, and patients. Students' learning from comments and observations often overlapped, implying some commenting can be replaced by written comparing against observations, leaving room for more relevant dialogue content. Furthermore, in some cases, learning from comments or observations was perceived as unhelpful, resulting in students writing down critical statements. As they did not express these out loud, aside from raising questions about safety, learning opportunities for both students and supervisors were missed. Finally, students self-set goals were key determinants in, as well as outcomes of students' learning from comparisons, implying students already enact some agency over their internal feedback process. Though further research is needed, and feasibility must be considered carefully, this study yields interesting implications for educational practice and could help students be more agentic, safe, and efficient in their interprofessional workplace learning.

INTRODUCTION

As quality patient healthcare calls on inputs from multiple and diverse professionals (Frenk et al., 2010; Lingard, 2012), learning to collaborate and communicate interprofessionally is central to health professional training (CAIPE, 2016; WHO, 2010). For undergraduate medical students, such training largely occurs in the workplace where they participate as members of interprofessional teams (Paradis & Whitehead, 2018; Stalmeijer & Varpio, 2021; Van Der Leeuw et al., 2018) and engage in feedback dialogue with the members of these teams: both their supervisors and others (Bing-You et al., 2017; Ramani & Krackov, 2012; Tielemans et al., 2023). In this article, feedback dialogue is defined as an ongoing exchange, clarification, and alteration of ideas through asking and responding to questions. A part of this, is the exchange of comments, mostly verbal and sometimes written. While formal feedback dialogues are essential to improving students' interprofessional performance, a sole reliance on them limits possibilities for learning (Van Der Leeuw et al., 2018), and for the development of students' agency, i.e., their ability to "exert influence on their educational trajectories" (Klemenčič, 2015, p2). In this study, we therefore adopt the wider view of feedback as proposed by Nicol (2021) as an internal process in which students learn not just by comparing comments received, against their own performance but also by comparing their performance against information from a wide array of other sources. Many of these comparisons occur below conscious awareness. So far there is little research in health professions education on what students learn from internal feedback processes. Hence, in the study reported here we explore this in a workplace context in which a medical student carries out a patient discharge conversation under the supervision of a physician or nurse. The findings provide new insights into interprofessional workplace learning that can be used to promote teamwork practice, improve patient care, and advance research in this domain.

Practical challenges of feedback dialogues

The dominant feedback approach in clinical contexts is dialogue with supervisors and other professionals, observing the student's performance and providing suggestions for improvement (Bearman et al., 2021). However, relying on these dialogues as a main source of learning, presents several practical challenges. First, when dialogue with supervisors and other senior professionals is the primary feedback method, students may rely too much on the judgements of these experts to drive their learning, rather than learning to make their own judgements of performance and relevance (Nicol & Kushwah, 2023; Van Der Leeuw et al., 2018). Second, even if students are given opportunities take more agency in feedback dialogues, for example by requesting advice, uneven power relations between students and experts will inhibit some from taking up or profiting from these opportunities (Gergerich et al., 2019; Paradis & Whitehead, 2015). Third, supervisors in the clinical workplace are under significant pressure. They must manage clinical duties, ensure patient care, as well as teach students. These competing demands limit the quality and extent of the formal feedback opportunities they can provide (Lingard, 2016; Thistlethwaite, 2012; Vesel et al., 2016).

Sources of information in feedback processes

These challenges have led educators to look beyond formal feedback dialogues to other sources of information that might support students' workplace learning in clinical contexts. Van der Leeuw et al. (2018), for example, in addressing the issues above, argue that feedback has been too narrowly defined, and that this has led to missed learning opportunities, and a failure to capitalize on students' own feedback agency. They propose that medical educators broaden the scope of feedback to include the use of "information for learning that might naturally or more implicitly emerge from interactions in the workplace" (p556). Such 'performance relevant information' might include "patient outcomes after treatment, the performance of other professionals and responses of colleagues and peers in communication" (p557). They suggest that supervisors bring these other sources of relevant information to the attention of their students during dialogical feedback encounters with them (Telio et al., 2015). While such enriched dialogue will help students use a broader scope of performance information, it is difficult to envisage how this approach alone would address the agency tension and workload issues mentioned above. Equally important, Van der Leeuw et al (2018) do not elaborate what students learn from different types of performance information and (as far as we know) there is no research on this in health professions education literature. For this reason, we draw on the internal feedback model of Nicol (2021) and the learning categorization from van Ravenswaaij et al. (2022) to frame our study.

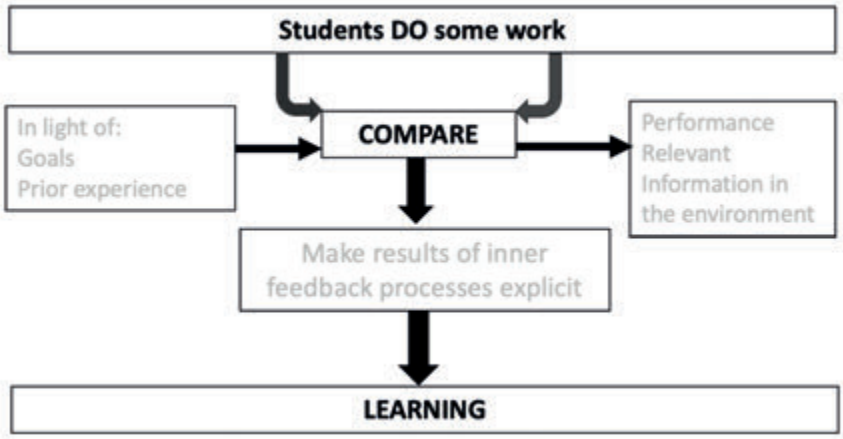
Internal feedback model

Nicol (2021) starts from the premise that students generate inner feedback implicitly during learning, using both internal information (e.g., feelings, memories of prior performance, internal goals) and external information derived from interactions with the environment (e.g. from exemplars, videos, observations of the behaviors of others). He defines inner feedback as: "*the new knowledge that students generate when they compare their current knowledge against some reference information, guided by their goals"* (Nicol, 2022). A core assumption of Nicol's model is that the main mechanism underpinning internal feedback generation is 'comparison'. Whenever students self-assess their performance, reflect on it, or evaluate it, they must use some reference information to do this, and this calls on them to make comparisons. The information used for comparison need not only be comments. It can be information of any kind, in any format, so long as its use by students moves their performance or learning forward.

While Nicol's model (as depicted in Figure 1) is consistent with the 'performance information' framing of Van der Leeuw et al (2018), there is an important difference. Nicol offers an approach to enhancing student agency in feedback processes that does not rely on using dialogue as the main vehicle to bring performance relevant information to the attention of students. Instead, his approach is to design tasks where students are prompted to make deliberate comparisons of their own performance against other relevant information and to make the results of those comparisons explicit, for example, by writing self-feedback comments, by discussing self- feedback with peers, or by updating their work (e.g, Nicol

& Kushwah, 2023; Nicol & Selvaretnam, 2021). Prompting of students can be minimal, leaving it to students to determine what to attend to when making comparisons (e.g., Compare your own performance to that of the nurse. What do you learn from this?). On the other hand, when more tightly formulated, prompts can give more focus to learning (How does the nurse show empathy? (How) did you? What do you learn from this?) (Nicol, 2022; Trimbos, Nicol, Gulikers, in press).

Figure 1: Internal feedback model (adapted from Nicol, 2022).



There is growing research showing the value of having students make such performance comparisons. One finding is that students can produce considerable self-feedback comments without any teacher commenting, with this feedback complementing and depending on circumstances (e.g. number of comparisons) replacing teacher commenting (Berg & Moon, 2022; Nicol & McCallum, 2021; Tomazin et al., 2023). Another finding is that students invariably write self-feedback in relation to their own perceived needs (Nicol & Kushwah, 2023). Evidence also exists of performance and grade improvements after students make comparisons (Lipnevich & Smith, 2022). Despite the growing research, Nicol's model has not been applied in medical education or in a workplace context setting. Furthermore, even though students' own goals and prior knowledge and feelings have always been part of the model (see Figure 1) as a source of (internal) comparison information, these aspects have received little attention in research to date. Hence, they are considered in this study.

A categorization for skills learning

To explore what students learn from different information sources in the workplace, it is also important to consider how we define and evidence learning. Nicol (2021; 2022), for example, broadly defines learning as *new knowledge* while others

(Carless & Boud, 2018; Molloy & Boud, 2013) define learning as changes in performance. In the context of interprofessional healthcare, these definitions are problematic as workplace learning is mainly about the development of skills, and this is a gradual process that takes time. It is unlikely therefore that only a few feedback encounters would result in demonstrable changes in knowledge or performance. Van Ravenswaaij et. al. (2022), acknowledge this and propose a categorization of skills learning that, aside from just focusing on *progress* (i.e. changes in performance), takes more nuanced changes in students' *values*, *understandings*, *self-level* insights, and *intentions*, into account as indicators of learning. Using van Ravenswaaij et. al.'s categorization (2022), allows us to identify skill development in progress in this study.

Study design

In this study, we use the internal feedback model to better understand students' learning from different information sources - internal (goals, prior knowledge) and external (observations, comments) - in interprofessional workplace learning in a healthcare context. To investigate these processes of learning, we asked medical students to make these sources explicit by writing down what they learned in the context of a patient discharge conversation. This was an exploratory study with the aim of understanding learning with as little direction as possible. Therefore, we used minimal prompting to allow learners to determine what they consider relevant to their learning. Based on this the research question of interest was: *What do medical students learn from the comparisons they make using different information sources in the interprofessional workplace?*

METHODS

Participants & Context

This study was conducted in a Dutch university medical centre. Eligible for participation were all 6th-year medical students, in the second half of 12-week senior workplace internship, students' final internship before graduating in the time period April 2021-April 2022. This internship takes place in a self-elected clinical ward where students' tasks resemble those of a junior physician but are performed under heavier supervision. We collected data in the second half of the internship to ensure students had time to first get comfortable in their chosen ward, and they could get acquainted with the interprofessional team.

The context of learning was a *discharge conversation* (DC). In a DC, a healthcare professional (or multiple professionals) sits down with a patient who is about to be discharged from hospital care and they discuss the hospitalization, follow-up care, warn about future risks, and ask and answer any patient questions. It is a complex professional activity for medical students as it requires them to exhibit clear patient communication and to coordinate their care with that of other professionals, and to possess sound knowledge of the patients' disorder. Performing DC's is a common activity for the students in this context. A DC can be performed with others in the same profession or with those from different professions. In this study, students

prepared a discharge plan, discussed their plan with a nurse, performed a DC with a nurse and sought feedback comments on that DC from the nurse. Additionally, students observed a physician perform a DC and sought feedback comments from a physician. This ensured that all participating students encountered and could describe what they learned in relation to the same DC-related situations. (figure 2).

Data Collection

There were three data collection points (figure 2): a survey at baseline, journals during the second half of their internship, and a semi-structured interview after their internship.

Baseline survey

Before participation, in a survey, we used two open-ended questions to ask students what their prior experience was, and what their learning goals were in the domains of performing a DC (figure 2).

Journals

Next, in a journal assignment, we asked students to make their learning explicit in four DC-related situations (figure 2).

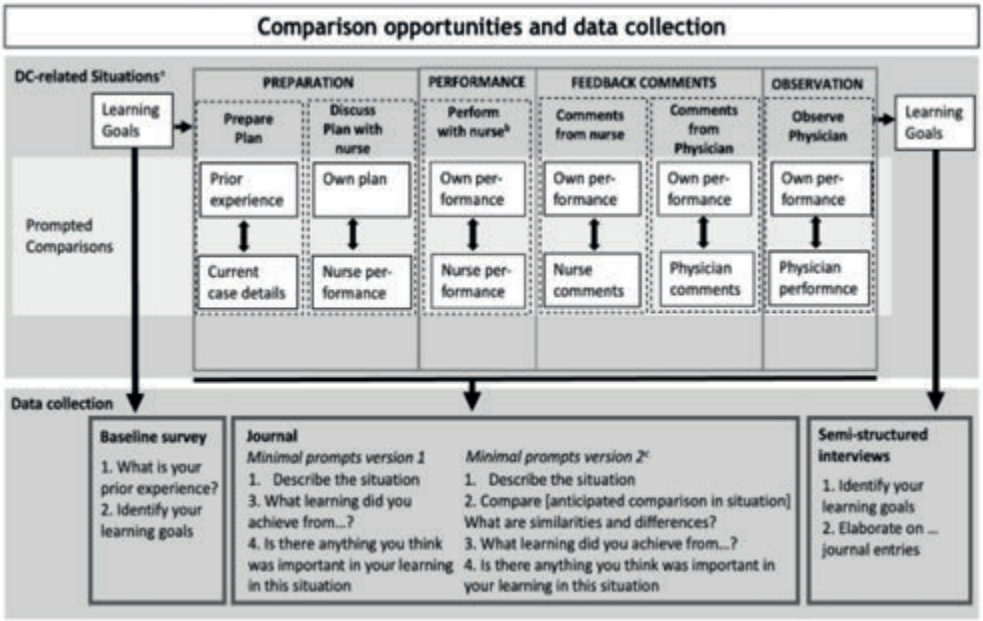
- Preparation, including preparing on paper and pre-discussing with nurse;
- Performance with a nurse, also offering the opportunity to observe the nurse;
- Feedback comments, from a physician and a nurse;
- Observation of a physician.

We chose journals to collect the data as this form of open-ended self-report (van Kesteren, 1989) allows students to identify a larger variety of more nuanced changes beyond simply reporting performance improvement, in line with our view on learning (van Ravenswaaij et al., 2022). In the journals, we prompted students to make their learning explicit in writing (Nicol, 2021). However, the prompts were minimal to the extent that we gave no information about which aspect of their performance students should focus on. To explore whether using the word 'comparison' in the prompts (e.g. *describe the situation, compare the physician performance against yours, what did you learn?*) was more directive than merely asking students what they learned (e.g. *describe the situation, what did you learn?*) we trialed both approaches (figure 2). This revealed that the two types of prompts did not lead to differences in the journals entries. Hence, we used data from both cohorts in the analysis.

Semi-structured interviews

In the post participation semi-structured interviews, we again asked students to make their DC goals explicit. Furthermore, we asked them to elaborate on specific passages of their journals where descriptions of the comparisons were unclear, incomplete, or seemed conflicting or contradictory (figure 2).

Figure 2. Comparison opportunities and data-collection instruments.



[a] situations could occur in any order
[b] with opportunity to observe nurse
[c] trial question (2) added for half of participants

Procedure

Both the baseline survey and interview protocol were piloted twice (n=4) to clarify prompts and definitions (e.g., what is meant by the term interprofessional team), and to restructure the journal assignment in a more feasible way for students (e.g., the situations could happen in any order and concern multiple separate discharge conversations). Students were invited and informed via email. Participants were alternately appointed to either version of the journal. They received the baseline and journal prompts digitally using *formdesk*Ó. After completing their journals, CT interviewed students using *Microsoft Teams*Ó. Interviews were audio-recorded and transcribed verbatim. The research proposal was approved by the ethical review board of the Dutch Association for Medical Education (NVMO), file number 2021.2.10. Participation was voluntary and informed consent was obtained.

Analysis

In the first analysis phase, all the comparisons reported by students in their journals were identified by two researchers (CT & DM), and the information used in these comparisons was coded. A coding scheme for sources of comparison information was developed inductively (see Table 1). Next, using the van Ravenswaaij et al. categorization (2023), what learning students' reported from each comparison was coded as *value, understanding, self-level, intention*, or *progress* (see Table 2).

In the second analysis phase the data were organized to enable analysis at the individual student level, using a matrix approach (Miles et al., 2014). More specifically *case-ordered descriptive meta-matrices* were created: A table in which the data of a case (student) is represented and ordered in summarized form to help find meaning and facilitate analysis at student level. In other words, for each student a matrix was constructed, including the selected comparisons (using direct quotes) and the coding of those, and the reported learning and their coding. These student matrices were organized into the DC-related situations used in journal data collection (see Figure 2). The quotes in these student matrices were extended using the interview data where there were additional explanations about specific comparisons. Then the learning goals from the baseline survey were added to the matrices, as well as the learning goals from the semi-structured interview after participation. See supplement 1 one for an example case-ordered descriptive meta-matrix.

In the third analysis phase, student matrices were analyzed within and across students using the strategies as proposed by Miles et al. (2014): “noting patterns, themes; making contrasts; comparisons; clustering; counting” (p.113). In line with our research aim, three researchers (CT, RdK, & DN) explicitly explored the relation between comparisons and learning from feedback comments, versus comparisons and learning that did not involve feedback comments as a source of information. This led to two themes: *overlapping,* and *supplementing.* These relations are described in the results section. Next, students’ learning from comparing external information to their prior experience or performance was explored. Two further themes were identified: *misalignment* and *lacking advice*. Finally, the journal data were related to the goals that were reported in the baseline survey and interview data. Even though, goals were not mentioned explicitly by students in their journals, when looking at their comparisons this way, two themes were identified: *goals influencing comparisons*, and *comparisons influencing goals.*

The identified themes are described in the results section. Representative quotes are selected to illustrate the findings. The learning outcomes, in terms of types of change, as per Ravenswaaij et al (2022), are italicized in the narration of the results to promote transparency in how the coding informed interpretation of the data.

Table 1: coding internal and external sources of information used in students' comparisons (inductively created codes)

	Code group	Code	Description *The student compares against…*	Example	Frequency occurrence in total (in x/7 students)
		Current performance	Their own current or recent performance of the task	*I said what I thought needed to be discussed medically in the DC, I asked the nurse if she knew if the family had any questions. (S02)*	**47** (7/7)
Internal	Prior experience	Different prior experience	prior experience performing or observing this activity in a different way	*The physician did not explicitly discuss alarm symptoms, which I have always learned. (S01)*	**8** (4/7)
		New experience	the absence of prior experience with this (way to approach the) activity	*Planning and scheduling a DC like this, inviting the nurse, is not something I've done before. Previously, it was just a short conversation in the morning rounds, without the nurse there. (S07)*	**15** (5/7)
		Difficulty in prior experience	prior experience having difficulty with this activity	*In previous DC's I've struggled with being complete and extensive, but only sticking to essential information because the patient won't remember everything. (S03)*	**3** (2/7)
		Previous comments	feedback comments from prior experience	*In my interim assessment, I had gotten the feedback that I could be more assertive/take charge more, in my patient contact. I had to think of that in this DC. (S05)*	**2** (1/7)

	Code group	Code	Description *The student compares against…*	Example	Frequency occurrence in total (in x/7 students)
External	Feedback comments	Physician comments	feedback comments from a physician	*The physician said I could work on being calmer and more relaxed in the following ways: talk less fast, give less information in one go, reduce the number of affirmative responses to the patient. (S06)*	**10** (7/7)
		Nurse comments	feedback comments from a nurse	*The nurse said I performed a good DC, was mindful of the patient, said the right things. I did say a lot of things twice, which wasn't problematic. I was nice to work with. (S01)*	**8** (5/7)
	Observations	Physician performance	observations of a physician's performance	*The physician didn't set the agenda before the DC, their DC was a little shorter, and they mentioned informing the general practitioner. (S07)*	**10** (6/7)
		Nurse performance	observations of a nurse's performance	*The nurse had a better answer than I did at some questions, like when bottle feeding could be started up again. The nurse also asked the mother about their transport plan to get home. (S04)*	**15** (7/7)
		Patient observation	observations of a patient	*When the nurse mentioned that going home could be arranged for that very day, the patient was shocked and had to cry. (S05)*	**8** (5/7)

Table 2: coding students' learning statements for type of change (based on van Ravenswaaij et al., 2022)

Code *(italicised in results section)*	**Description** *When learning concerned…*	**Example**	**Frequency occurrence in total** (in x/7 students)
Value	a positive change in perception of value, importance, or significance	*I've learned how important it is to take time to discuss how someone has experienced everything and how important it is to go through the follow-up appointments and medications. (S05)*	**15** (7/7)
Understanding	a gained insight or understanding of how a skill works	*When patients have questions, they don't always ask those when you inquire if there are any questions; it is better to really take your time with things you discuss and, in between, ask if everything is clear. (S02)*	**38** (7/7)
Intention	the intent to work on or change a skill level	*I will pay more attention to this in the future. (S06)*	**13** (5/7)
Self-level	a gained insight or understanding of own performance	*I realize I come across as young and, aside from that, because I do not have an answer to each practical question, I come across as less confident and provide the patient with less certainty. (S05)*	**3** (2/7)
Progress	having improved a skill	*[I have taken care of a dehydrated patient before and ...] I therefore do not now need as much time to prepare for this. (S04)*	**1** (1/7)

Participation

Seven students (six female) completed data collection. Initially, sixteen students were recruited but seven decided not to participate after receiving the instructions, and two quitted after the baseline survey. These students indicated they were too busy in their senior internship to take part in the study.

RESULTS

Types of learning and sources used

For all students, comparisons led to new *understandings, valuing*, or *intentions* (table 2). Notably students reported few instances of learning at the *self-* or *progress level*. Frequencies of the information sources used, and types of change explicated in the data can be found in the final columns of tables 1 and 2.

Learning from receiving feedback comments versus learning from observing

While feedback comments were a source of learning for students, other sources of information - prior experience and observations - were also activators of learning. When exploring students' learning across situations, without knowing their particular order, similarities, and differences in learning from these sources could be discerned. Specifically, regarding comments and observations: learning from comparing against these sources could *overlap* with, or *supplement,* each other. Examples of these themes are presented below.

Learning from receiving feedback comments overlapping with learning from observing

When receiving feedback comments from the physician, student 06 wrote:

> *"The physician said I should: talk less fast, give less information in one go, reduce the number of affirmative responses to the patient. Try to respond more to what is being said, instead of saying the things you've prepared to say. I agree with the feedback from the physician. I've learned talk less, reduce my non-verbal responses, give more room for the patient, and respond more to their needs instead of going through my own agenda." Student 06, journal*

When observing the physician, student 06 wrote:

> *"The physician gave a lot less information to the patient [than I did]. They didn't address follow up meetings for instance. A lot more time was spent discussing how the patient had experienced the hospitalization. It taught me that, when someone is limited cognitively, I need to keep information limited and be concise. I can trust that all the important information can reach the patient via the discharge letter." Student 06, journal*

This student compares the feedback comments from the physician against their own knowledge and gains an *understanding* of how to be more concise and how to prioritize the needs of the patient over their planned agenda for the discharge conversation. With respect to the observation, the student compares the physician's performance to their own, and gains an *understanding* about how to adapt their conversation style to be more concise in relation to the patient's needs, and about the conditions when this conciseness is non-problematic (when information will reach the patient via another route).

While there are subtle differences, the learning in the quotes above exhibit notable overlap: both lead to *understandings* about adapting conversation style (being more concise) to the specific needs of the patient. The learning from the observation arguably includes and even exceeds that from the feedback comments (as it includes conditions when conciseness is not problematic). The only learning that the student explicates from the feedback comments that is *not* encompassed by the explicit learning from the observation is an *understanding* about *how* to be more concise (talk less, give less information, reduce non-verbal responses). However, in their observation, the student explicitly notes how the physician 'gave

a lot less information', suggesting the observation could replace, at least part, the learning from the feedback comments.

Learning from receiving feedback comments more elaborate than learning from observing.

When observing the nurse, student 05 wrote:

> *"I noticed the nurse was much older/more senior than I was. She had a lot of experience and knew all the case options that were possible at home. The combination of her attitude and practical knowledge enabled her to create a calm atmosphere in the conversation with the patient. Despite this, we encountered the same problem, which was that we were unable to get the patient to discuss her unrest. I realize I look young and, because I don't have an answer to each practical question, I come across as less confident and can offer less clarity to the patient. The experienced nurse was good at this. This is something to grow into." Student 05, journal*

When getting feedback comments from this nurse student 05 writes:

> "*The nurse emphasized the importance of close contact with the general practitioner during discharge. This changed my view – instead of 'failing' to perform a DC, not everything needs to be addressed in the hospital. The general practitioner can play a role in this. I learned that not everything can be done during a hospitalization, in those cases it's best to organize and discuss things well with the general practitioner." Student 05. journal*

In the first quote, student 05 starts by making a social comparison, comparing the seniority and expertise of the nurse to their own, deriving from this a *self-level* insight that she 'looks young' and 'comes across less confident', and a identifies a vague *intention* to 'grow into it' that is, to gain more experience over time. Student 05 also compares the nurse and herself and notes a problem 'not getting the patient to discuss her unrest' that they both encountered. No learning or solution was made explicit from this comparison. In the second quote, the feedback from the nurse helps student 05 move forward in her learning. She uses the nurse's feedback to reassure herself and to build on her initial *self-level* interpretation by changing her view from a 'failed DC' to the DC as a part of a care trajectory in which others (the general practitioner) also play a role. Student 05 goes on to report now *understanding* that coordinating care with a general practitioner can help a physician better perform complex DC's.

Occurrence in the data, and implications

Table 3 provides a summary of how often the students' learning from feedback comments and from observations overlapped or supplemented each other. The table shows that students' learning (especially from physician) feedback comments, often had a notable overlap with learning from observing (physicians). This suggests deliberate comparisons against observations could possibly replace some commenting in workplace learning settings thereby putting more agency in students' hands.

Table 3. Students' learning from dialogues vs. observations

Student	Feedback from nurse vs. observing nurse	Feedback from physician vs. observing physician
01	_	FB > OBS
02	FB > OBS	FB » OBS
03	_	FB » OBS
04	OBS > FB	OBS > FB
05	FB > OBS	.
06	FB » OBS	FB » OBS
07	FB > OBS	OBS > FB

>Learning was more elaborate, it supplemented the other source.
»Learning overlapped notably.
_no supplementing or overlapping
. missing.

Information sources that students don't perceive as helpful

When exploring students' learning from comparing comments *or* observations to their prior experience or performance two themes were identified. First, *learning not aligned with prior experience and own performance:* Sometimes, the effects of comparing on learning were not perceived by students as something additive. By this we mean that students identified differences in which the comparison information was misaligned with, and impoverished relative to, their own performance and prior experience. Second, *learning lacking advice relative to prior experience and own performance:* In these cases, the comparison information was impoverished to the extent that the student felt disappointment that there was little to learn from it. Examples of both themes are presented below.

Learning misaligned with prior experience and own performance

The sources of information being compared by students would raise conflict as they were not in line with each other. An example of this can be seen in, student 04, who, when observing the physician, wrote:

> *"I personally thought that the physician kept repeating things a little too much. I think this was a bit overwhelming for the parents [of the patient]. The parents were very intelligent so being a bit more concise would have worked, I think. I would have tested to see how much explanation parents wanted first, instead of just giving it. That way you leave parents in the lead more. I learned it is important to play into the needs of the parents." Student 04, journal*

When comparing the performance of the physician to the students' own observation of this pediatric patients' parent's needs, a conflict arises. The student observes that the needs of these parents, is not met by the physician (who keeps

repeating things too much), and the physician performance could be improved. The student would perform the DC otherwise. From this, student 04 gains a *valuing* of playing into the needs of the parents.

Learning lacking advice relative to prior experience and own performance

Some students made explicit their disappointment with certain information sources. For example, student 01, when receiving nurse feedback, writes:

> *"The nurse didn't really have any tips. I felt some tips would've been nice and useful, but, in this case, it was nice to hear the nurse experienced the collaboration as good. So, far I've not really gotten any concrete improvement suggestions from nurses, I doubt if they would give those directly. But I will try to get those in my remaining internship." Student 01 journal*

> *"I think because they [nurses] are on a different layer, historically speaking a little lower, making it harder for them to give feedback to physicians, or one in training." Student 01, interview*

Here, the student perceives the feedback comments from the nurse as un-useful as it lacked tips. Though not explicitly stated, the student is likely triggered by comparing the current feedback comments to their prior experience with other feedback partners. Despite their disappointment the student gains an *understanding* about the limitations to nurse's feedback from a cultural, hierarchical point of view, as well as an *intention* to get improvement suggestions from nurses in the future to advance their learning.

Occurrence in the data, and implications

Table 4 shows the occurrence of *misalignment* and *lacking advice* in students learning. Notably, misalignment was only observed when students compared their performance or prior experience against physician-derived information, mostly observations of physicians. This finding exposes an interprofessional difference as students did not explicate any misalignment when comparing against nurse comments or information. Possibly this is due to students being more familiar with the physician role. As this is the role they themselves will be performing, thus, they are better able to be critical in their comparisons it. A similar interprofessional difference is seen in the other theme. Learning from information sources lacking advice was only described by students when comparing against feedback comments: mostly nurse comments which lacked improvement suggestions and were described as not useful by students. Possibly, the nurses (in turn) were less familiar with medical students' performance and/or feedback culture and were therefore less able to provide them with useful perspectives. This seems to be in line with the finding that physician feedback comments were seen as disappointing only once. Another explanation could be that, like student 01 suggests, interprofessional power dynamics prevented the provision of 'useful' comments by nurses. For most students, these 'disappointing' nurse feedback comments did lead to learning in the form of *understandings* about feedback seeking, or

intentions to seek feedback differently (with a more specific question, in a different case, or from a different person). This optimistically shows how students can use comparisons to make interprofessional differences and power conflicts explicit and set intentions to deliberately deal with them.

Table 4 conflicting or disappointing information sources

	Observations		Feedback comments	
Student	Physician	Nurse	physician	nurse
01	M	_	M	L
02	_	.	_	_
03	M	_	_	L
04	M	_	_	L
05	.	_	_	_
06	_	_	_	_
07	M	_	L	_

M = learning misaligned with prior experience and own performance
L = learning lacking advice relative to prior experience and own performance
_ = no misalignment or lacking advice
. missing

A question raised by this finding is whether students may be generating 'invalid' learning from their comparisons. Especially in the clinical workplace, students are going to observe and get feedback from a large variety of team members, not all perhaps performing according to the highest standards. This is further complicated by the fact that what the best standards are, is context and situation-dependent. Invalid understandings and values about performing in healthcare may result either from accepting the misaligned views from supervisors, or by rejecting them. As students who wrote down such critical statements regarding their supervisors performance or comments did not express these out loud, the opportunity for dialogue and learning about standards - either by the students or the supervisors - is missed. Students choosing to not express out loud the critical perspectives they wrote down, could also implicate a lack of safety in dialogues with their (interprofessional and monoprofessional) supervisors, conforming the need for agentic feedback processes in the workplace. However, students were able to learn from writing down these critiques. Thus, individual, written, comparing perhaps offers a safe and effective space for learning when none can be found in dialogues.

Goal use in students' comparison processes

When exploring students' comparisons through the lens of the goals they set at baseline and after participation, two themes were identified: baseline *goals influencing comparisons*, and *comparisons influencing goals* after participation. Examples of both are presented below.

Goals influencing comparisons

An example of the first is seen in the case of student 03. At baseline, based on their prior experience, they formulate their DC-goal:

> *"I've performed DC's in almost every previous internship. I've gotten feedback that I am kind and complete […] What I would like to improve is that I want to be more concise." Student 03, baseline survey*

When observing the physician, student 03 writes:

> *"In previous DC's I've struggled with being complete and extensive, but only sticking to essential information because the patient won't remember everything. This physician was so logically sticking to the essentials keeping the DC short but not skipping any important info." Student 03, interview*

> *"It was understandable for the patient because this way only essential things about the follow up were discussed. What I learned from this is that this can be a lot of new information for the patient and keeping it concise is keeping it doable for the patient." Student 03 journal*

In this quote we see student 03 comparing their observation of a physician ('sticking to the essentials' while 'not skipping any important info') to their previous experience (struggling with this). They gain an *understanding* how and why being concise helps them adapt to the patients' needs. The students' own goal to be more concise determines what they choose to focus on when observing the physician and what to recall from prior experience to compare against.

Comparisons influencing goals

An example of change in goals as the outcome of comparisons was seen in the case of student 02. At baseline, based on their prior experience, they formulate their DC-goal:

> *"My goal is to improve getting a thorough and full understanding of the medical aspects of a case." Student 02, baseline survey*

When observing the physician student 02 wrote:

> *"The physician discussed the important things and focused on the planned follow up after discharge. I learned everyone has a different approach." Student 02, journal*

> *"I mean: You observe many different physicians in DC's and some very much emphasize: what do you want to know? and what can you expect? Others are more focused on what happened during hospitalization. Again others, are just very brief and you notice they really don't feel like extensively discussing things at all. […]" Student 02, interview*

> *"I also learned it is important to have a clear picture of what I want to say and what patient and family want to know." Student 02, journal*

When getting feedback comments from the nurse the student wrote:

> *"The nurse's tip was to leave more room for 'feedback' from the family; I should keep the conversation on certain topics a little longer." Student 02, journal*

> *"After getting that tip, when journaling, I was thinking: what I've planned to say and why, is only one side of it. You also need to adapt to: what does someone want to hear and why? I think that may even be more important. I got that from that tip specifically because this was something I only gave a little attention in my DC because I thought it wasn't that important." Student 02, interview*

> *"I learned that when people have questions, they don't always ask those when you explicitly ask; if they have questions, it is better to linger on discussion topic a little longer and ask if that came across clearly in between conversation points." Student 02, journal*

When getting feedback comments from physician, student 02 wrote:

> *"The physician's tip was to be less extensive in addressing medical details because these were beyond the patient and family's understanding. Aside from that the physician felt I was good at assessing what family wanted to know and what they didn't. I learned that there are different ways to approach a DC. […]" Student 02, journal*

> *"Right now, I have all the time in the world, compared to a physician. So right now, I think I can do it. But I can imagine, when I would be very busy, I wouldn't be able to have a DC the way I would want. So, if I then prioritize what the patient feels is important to know, and indeed let go of discussing the hospitalization's details, I think that is very valuable feedback." Student 02, interview*

In the post-DC interview, this student stated that a future DC-goal, in line with the comparisons made in these individual situations, was:

> *"I want to work on being able to adjust to what a patient wants to get out of a DC. Sometimes it's better to adapt to needs of the specific patient sitting in front of me." Student 02, interview*

In all three journal quotes you see student 02 encountering external information that leads them to learn about adapting to the needs of the patient. From the physician observation, the student gains a *valuing* of 'having a clear picture of what patient and family want to know.' From the nurse feedback comments they additionally gain an *understanding* of how to do so, by 'leaving more room' and 'lingering on topics' longer. From the physician feedback comments student 02 gains an *understanding* of how time pressure can complicate this adaptivity in the future. All comparisons made in these situations contribute to the changed goal of student 02 to 'adapt better to needs of the specific patient sitting in front of me.'

Occurrence in the data, and implications

Table 5 shows the occurrence of both forms of goal use among participating students. Most students used one or both forms. These results show that on the one hand students' own goals are a key determinant of what they choose to focus on when they make comparisons against external information. On the other hand, they use the learning from comparisons against external information to change their goals for the future. Making their goals explicit helped students strengthen their role as internal comparison information. This implies they naturally self-regulate their learning to deal with the complex unpredictable learning environment of

healthcare, and thus already enact some agency over their learning process.

Table 5. Goal use by students

Student	Goals as a starting point for comparisons	Goals as an outcome of comparisons
01	Yes	Yes
02	No	Yes
03	Yes	Yes
04	Yes	No
05	No	No
06	Yes	Yes
07	Yes	Yes

DISCUSSION

In this study we aimed to explore and understand interprofessional workplace learning from a broad variety of information sources, including but exceeding feedback comments. The research question was: *What do medical students learn from the comparisons they make using different information sources in the interprofessional workplace?* The results showed that students learned by making comparisons using various sources of information including prior experience, goals, nurse comments, physician comments, nurse observations, physician observations, and patient observations. Our findings are in line with the suggestions made by van der Leeuw et. al., (2018), that students can learn from a broad variety of performance relevant information in the clinical workplace. Yet, in line with Nicol (2021, our results also prove that students learning from-, and identification of-, performance relevant information need not rely on supervisor dialogue alone. Some of this can be achieved by prompting students to make explicit, individual, written comparisons (Nicol, 2021).

Furthermore, our results showed that students' learning from feedback comments and observations often overlapped notably. This finding suggests students' comparisons against observations could possibly efficiently replace some

supervisor commenting, thereby putting more agency in students hands. This is in line with previous studies showing how self-feedback can complement and sometimes replace teacher comments (Berg & Moon, 2022; Nicol & McCallum, 2021; Tomazin et al., 2023). We also saw how students perceives some information sources as unhelpful as these sources were misaligned or lacking advice. Specifically, students' observations of physicians most often misaligned with current performance and prior experience whereas feedback comments from nurses often lacked advice, leading to disappointment. Despite the potential value of making these different perspectives and concerns accessible to their interprofessional supervisors, students did not share them. In line with findings in other interprofessional feedback studies (e.g., Miles et. al, 2021, van Schaik et. al., 2015), this implies a lack of safety and/or opportunity for students to provide feedback information to interprofessional supervisors during dialogues with them. Finally, students self-set goals were key determinants of what they chose to focus on when they made comparisons. This is in line with a study by Nicol and Kushwah (2023), where students' self-feedback related to their own perceived needs. On the other hand, they also used the learning from comparisons against external information to change their goals for the future, implying students naturally self-regulate their learning to deal with the complex unpredictable learning environment of healthcare, and thus already enact some agency over their feedback process.

Limitations

The results of this study must be interpreted in light of its limitations. First, the large drop-out rate among included participants, due to data collection being too much work, implies the assignment may have been a burden to some students. Perhaps even *most* students, as this drop out could have led to a selection bias for our sample, were the 'excellent' students, comfortable enough in their workplace learning to take on an extra assignment, were the ones included. This needs to be seriously considered when interpreting the findings. For instance, the finding that goals were a key determinant in students' comparison processes may have been overrepresented. This is supported by the finding that student 05, as the only student who showed no explicit goal use in their comparison process, (despite being asked to set goals) explained how they struggled with reflection and goal setting: *"Generally, I notice- We have to write a lot of reflection reports. And, for me, it usually stays, kind of superficial. I struggle with that. I find determining concrete learning goals pretty difficult."* Student 05 may represent the dropped-out portion of students and therewith a potentially significant portion of the student body, who do not (or cannot) explicitly use goals in this way. Furthermore, as indicated in the methods section, we do not know in which order students encountered the situations in data collection. However, students' learning from these situations, and our conclusions based on that learning, may be impacted based on the order of them encountering these situations. For instance, overlap in learning from feedback comments and observing, may be different if feedback comments are received before or after observation: observing after receiving comments can lead to confirmation bias and limit unexpected and critical learning that might happen when observing takes place first. Future research can compare different orders of students encountering these situations and confirm whether

this influences learning. On the other hand, while in classroom contexts, the order of students' encountering sources of information can be carefully planned (Nicol & Selvaretnam, 2021; Swingler et al., n.d.), in the unpredictable and complex workplace it may not be feasible to plan the order of practice situations to suit educational purposes.

Recommendations for practice and research

Based on our results, we make several recommendations for future practice and research. First, our results showed that students, in their learning, used a broad array of information sources beyond feedback comments, including observations, prior experience, and goals. However, there were also (potentially valuable) sources of information not used by students. One example of these sources are material resources (textbooks, protocols, or the electronic patient environment). Studies have shown these are an, often overlooked, important part of the information available for learning in the workplace (Gravett, 2022; Nicol, 2021). Another example is patient feedback, increasingly suggested as an important means to healthcare students learning (Barr et al., 2021; Eijkelboom et al., 2023; Finch et al., 2018). In our design we did not instruct the use of feedback comments from patients, however students also did not spontaneously report doing so, though they did use their observations of patients. These sources of information *not* used by students, offer opportunities for the future design of interventions to instruct students to compare against an even broader variety of sources. Research should investigate how prompting can help students use these sources and could build on the evidence already available on designing comparison instructions (e.g., Nicol & McCallum, 2021; Nicol & Selvaretnam, 2021; Swingler et al., n.d.).

Our results suggested how students' learning from feedback comments from physicians could also be obtained through physician observations, as there was often a notable overlap in students' learning from them. Furthermore, when comparing individually in journals, students were (safely) able to be more critical of the physician performance than they were in dialogues. For the future design of interventions, we should consider using two-stage educational designs (e.g., Nicol & McCallum, 2021; Nicol & Selvaretnam, 2021). For instance, students could be instructed to, first, independently and in written form (thus safely), learn from information gained from observations (and/or material sources). This would allow them to, next, share their current development as they seek comments to further this development (de Kleijn, 2021; Vygotsky, 1987) helping them make more efficient use of workplace dialogues. Research should help confirm whether and how the use of such designs can indeed help optimize safe and efficient use of students' interprofessional feedback dialogues. Moreover, students not expressing their critical points of view towards supervisors in dialogues, means useful observations for professionals' own learning are missed. Educational designs promoting openness and perceptiveness of supervisors for student feedback could benefit their life-long learning (Olvet et al., 2021; Ramani & Krackov, 2012), whilst at the same time offering students opportunities to practice their role as feedback givers. Such practice could help them prepare for the authentic dialogical process of feedback in the clinical workplace.

Students' goal-oriented use of comparison showed that most participating students naturally use and update goals as they regulate their workplace learning. For the future design of interventions this suggests, to some extent retaining the freedom in prompts, like we offered by not over-instructing students, is useful. Especially in the complex and unpredictable learning environment of clinical practice, where learning opportunities and needs shift situationally, allowing students freedom to select sources to compare against is practical. However, when left too general, prompts may generate a lack in focus for the unknown proportion of students who are not reflectively strong. Furthermore, leaving prompts too open would mean retaining missed opportunities to direct students to a broader array of sources of information and/or to blind spots in their learning. Future instructional design thus faces a balancing act of supporting students agentic, goal-oriented, situationally reactive comparisons, whilst instructing deliberately enough to meet the specific needs of students and curricula. Possibly, introducing junior students, early on, with extensive prompting, getting them used to comparison processes throughout their training while gradually decreasing prompting to minimal prompts would help scaffold the less reflectively able students benefit from this method. Furthermore, the activity of asking students to state their own goals (in this study at the beginning of the DC assignment) is a critical and often overlooked preparation for internal feedback generation by students. Using goal-setting like we did as an instructional component may help individualize prompting and capitalize on students' own feedback agency. Additional research is needed to understand where this balance should lie and what type of prompting is efficient.

Finally, in our results we observed interprofessional differences limiting medical students' ability to critically compare against nurse performance, and nurses' ability to offer useful, critical perspectives to medical students. Possibly these differences were the result of a lack of familiarity with the other's perspective and professional tasks, possibly they were caused by differences in status amongst professions. The latter is confirmed by research in other settings (Gergerich et al., 2019; Miles et al., 2021; Paradis & Whitehead, 2015; van Schaik et al., 2015). Interestingly, students' comparisons made explicit these interprofessional differences and the potential power conflicts underpinning them, which helped them develop understandings and intentions to deal with them. This suggests that deliberate prompting of this sort, could be used as a catalyzer for overcoming interprofessional barriers and moving the development of an interprofessional feedback culture forward.

Conclusion

This study provides new understandings of interprofessional workplace learning and how it occurs through comparing against different kinds of information derived from different sources in the workplace. Despite its exploratory nature, this study provides some deep insights into how to improve interprofessional learning and what further research is required to advance it, and to capitalize on its hidden processes to benefit patient care. By designing tasks that prompt students to: (1) use an even broader array of information sources, (2) compare individually against observations *before* engaging in dialogues, (3) set their own goals, and (4) explicate interprofessional differences and conflicts, we can use our

understanding of these comparison processes to create safer, more agentic, and more efficient interprofessional workplace learning experiences for students in the workplace. Future research can contribute to developing interventions based on the internal feedback model. However, such interventions must be conscious of their practical feasibly.

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APPENDIX 1

Example case-ordered meta-matrix

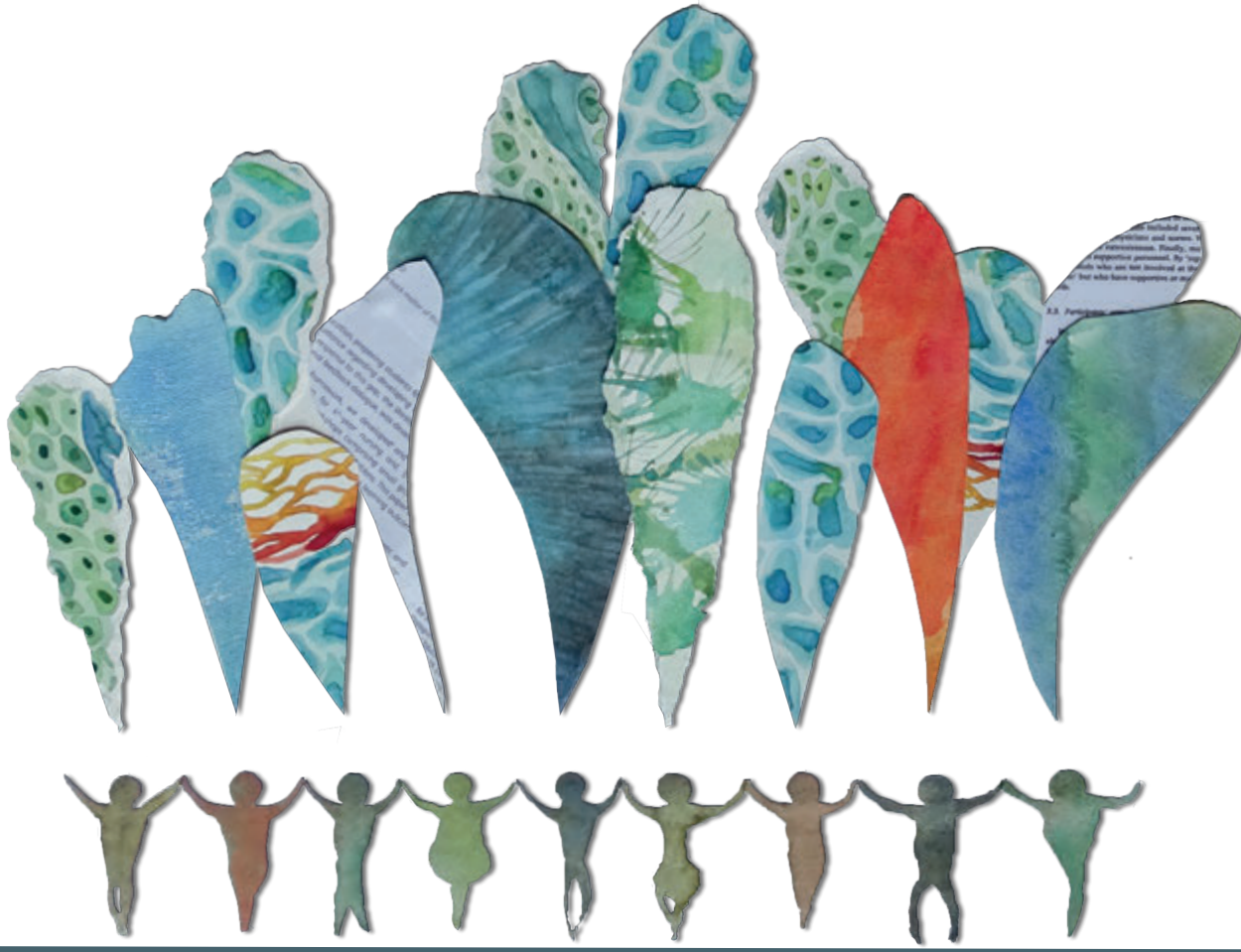
Case-ordered descriptive meta-matrix - Student 03			
Phase 1 Analysis on comparison level: "Quotes from Journal data" *"Quotes from Interview data"* (CODES)		**Phase 3 Analysis on student level:** Insights on goal use Insights on comparison Insights on learning	
Baseline survey	**Learning goal** (on what domain of DC's can I improve?): I want to learn to make it more of an ongoing story. I want to be more concise.		
DC-related situation	**Comparisons identified in data** - quotes from journals (*from interviews*)	**Coding sources of information** (CODES)	**Coding of reported learning** (CODES)
Preparation *Prepare plan*	"I plan to discuss the operation, hospitalization, and follow up." *"I was preparing my DC on aper and whilst doing that I thought back to the DC's I observed in the ward: How did those go? And If I were to imagine the ideal DC, what would be different? If this patient would have been discharged last week, by someone else I think the DC would have been less extensive than what I've prepared to do now."* "I learned that we, as physicians can be a little blunt when we send a patient home. But for the patient it is very important to hear a short summary of what happened during the hospitalization, and what to expect at home. I think just sitting down calmly with the patient and giving them advice on when to contact us can be very reassuring."	The students' preparation on paper, including extensive summarizing (CURRENT PERFORMANCE), is compared to the DC's they've seen others performing in the ward, shorter and blunter (PHYSICIAN PERFORMANCE).	An understanding of why and how to adapt the DC to the patient's needs is gained. – "I learned that we, as physicians can be a little blunt when we send a patient home. (…) just sitting down calmly with the patient and giving them advice on when to contact us can be very reassuring" - (UNDERSTANDING). Without the interview data, the comparison underlying the learning would not have been clear.

DC-related situation	Comparisons identified in data - quotes from journals (*from interviews*)	Coding sources of information (CODES)	Coding of reported learning (CODES)
Preparation *Discuss plan with nurse*	"We discussed the nurse's expectations. I learned that the nurse has certain expectations of the physician (discussing hospitalization, when to contact the hospital, what to pay attention to regarding the wound etc.) but this wasn't really anything more than what I expected. The nurse didn't have anything to add to what I had already planned to discuss in the DC."	The nurse's expressed expectations from a physician (NURSE PERFORMANCE) are compared to the students' plan (CURRENT PERFORMACNE). The students' baseline goal of pre-discussing more and better with the nurse was the **starting point** of this comparison.	The student gains an understanding of the IP collaboration regarding a DC. – "I learned that the nurse has certain expectations of the physician (...) but this wasn't really anything more than what I expected" -(UNDERSTANDING)
Performance *Perform with nurse*	"What went well is that I gave a summary of the hospitalization, which the patient appreciated, the patient had space to ask questions (I asked after each discussion point if they had questions), and we were calm and extensive in the DC. I learned how important it is to take a moment to sit down calmly, and not just discuss follow up, but to also summarize the past hospitalization. Frankly, I didn't always do so with other patients because I assumed they knew this. Now I believe it is of great value to do so. Additionally, sitting down, instead of standing, gives the patient the impression you are really tanking the time for them."	The students' current performance in the DC (CURRENT PERFORMANCE), sitting down summarizing past hospitalization, is compared to their performance in prior experience standing and just discussing follow up (DIFFERENT PRIOR EXPERIENCE).	A valuing and an understanding what this new way of acting means to the patient is gained. - "I learned how important it is to take a moment to sit down calmly, and (…) sitting down, instead of standing, gives the patient the impression you are really tanking the time for them" - (VALUE, UNDERSTANDING)

DC-related situation	Comparisons identified in data - quotes from journals (*from interviews*)	Coding sources of information (CODES)	Coding of reported learning (CODES)
Performance *Observe nurse*	"The nurse gave instructions regarding mobilization and picking up medication. I learned that it is always useful, when I go to a new ward, to observe a nurse in a DC, to hear what exactly, they discuss with the patient. This not only provides you with insight into what you need to discuss with the patient yourself, but you learn the DC policy of a specific ward." *"I learned what the nurse says in a DC on that ward. In that aspect it was valuable to perform the DC together, because that's important info. For my own performance, it didn't make a difference the nurse was there. I would have not performed any differently without the nurse there."*	Observing the nurse's DC performance in this ward, what they discuss, (NURSE PERFORMANCE) is compared to nurses in DC's in other wards the students had interned in (DIFFERENT PRIOR EXPERIENCE).	The value of observing a nurse for interprofessional collaboration is gained. – "I learned that it is always useful, when I go to a new ward, to observe a nurse in a DC, to hear what exactly, they discuss with the patient" - (VALUE). The student explains in the interview their learning focus was on the process of IPC, as personally, she didn't learn anything from the observation that helped her own performance.

DC-related situation	Comparisons identified in data - quotes from journals (*from interviews*)	Coding sources of information (CODES)	Coding of reported learning (CODES)
Feedback comments *Comments from nurse*	"The nurse gave the feedback that I was extensive but not too much so. She didn't have any other comments." *"That was way too short. I had clearly asked her to give me feedback on beforehand. (What do you expect from me? Are there things missing? Things I can do differently?) and then, at the end of the DC she said: "very good, you were extensive." Then I really had to follow up with things like: "Are there things I could have done differently? Was it not too long? Do you think the patient understood everything?" And after asking all those questions, she still only said: "nope, it went well." I think this nurse may not have been as extensive in giving feedback as another would have been."*	In the journal there is no comparison made explicit. In the interview reflecting on the **disappointing** comments (despite extensive feedback seeking from the student) the student compares the feedback from this nurse to potential others and expects others may give more extensive feedback.	In the journal there is no explicit learning from the nurse feedback comments. In the interview however, an understanding is gained about different nursed being able to give more or less extensive in their feedback giving. - *." I think this nurse may not have been as extensive in giving feedback as another would have been."*- (UNDERSTANDING) The students learning from the nurse observation was on efficient collaboration. The (ultimate learning was on feedback seeking. The different topics allowed **no relation** to be found.
Feedback comments *Comments from physician*	"The physician praised my: sitting down, summarization, clarity, conciseness, and the way I left room for questions. I could improve adapting the explanations I give to the background of the patient. The highly educated patient I was talking to now is probably interested in more information than say a lower educated or very old patient. I learned that adjusting to the level of the patient is always important, especially when you are talking about medication (changes)."	The feedback comments of the physician (PHYSICIAN COMMENTS) are compared to the performance of the student explaining medication changes (CURRENT PERFORMANCE).	A valuing of adjusting to the patient's needs is *gained.* - "adjusting to the level of the patient is always important, especially when you are talking about medication (changes)" - (VALUE)

DC-related situation	Comparisons identified in data - quotes from journals (*from interviews*)	Coding sources of information (CODES)	Coding of reported learning (CODES)
Observation *Observing physician performing DC*	"The physician didn't summarize the hospitalization. Aside from that it was a complete DC, though concise. It was understandable for the patient, because this way only essential things about the follow up were discussed." *"In previous DC's I've struggled with being complete and extensive, but only sticking to essential information because the patient won't remember everything. This physician was so logically sticking to the essentials keeping the DC short but not skipping any important info. However, the physician could have spent two sentences to summarize the hospitalization. That, combined with what he did say, would have made it a perfect DC."* "What I learned from this is that this can be a lot of new information for the patient and keeping it concise is keeping it doable for the patient."	The conciseness of the Physician in the DC (PHYSICIAN PERFORMANCE) is compared to the student's own performance in prior DC's (DIFFICULTY IN PRIOR EXPERIENCE) The student's baseline goal of being concise was the **starting point** of this comparison. Again, without the interview the underlying comparison would not have been clear.	An understanding of adjusting to the patient's needs is gained. – "What I learned from this is that this can be a lot of new information for the patient and keeping it concise is keeping it doable for the patient" - (UNDERSTANDING) Here, the student observation of the physicians behaviour **conflicts** with their own view of how a DC ought to be performed (could have taken the time to discuss hospitalization). The students' learning from the physicians' feedback comments is about the value of adjusting to the needs of the patient. The learning from observing the physician notably **overlaps** as it is also about adjusting to the needs of the patient, however this focuses on a way of adjusting (by being more concise).
Interview after participation	**Learning goal** (on what domain of DC's can I improve?): I want to learn to make it more of an ongoing story (-). I want to be more concise (=). I want to learn to discuss the role of the nurse (+), I want to involve the nurse more (+).? This goal is **an outcome** of many of the comparisons made.		
Legend: DC = discharge conversation IPC = interprofessional collaboration = goal maintained ≈ goal slightly adjusted + new goal developed - goal not repeated			



9

General Discussion

Interprofessional feedback helps health professions trainees to collaborate and learn in the complex everchanging clinical workplace (IPEC, 2016; Van Der Leeuw et al., 2018). Fostering interprofessional feedback processes is thus a key aim of interprofessional education, where students from different professions learn 'with from and about each other' (CAIPE, 2016). To better understand and support interprofessional feedback education in health professions education, in this thesis we drew from the broader field of higher education research. In the last decade, the focus of feedback research in this broader field has shifted from giving feedback (Hattie & Timperley, 2007; Sadler, 1989; Wisniewski et al., 2020), i.e., supporting teachers and supervisors to provide learners with the best possible information in the best possible way, to supporting learners in receiving (or using) feedback, i.e., supporting learners to seek, make sense of, and use feedback information (Carless & Boud, 2018; Molloy & Boud, 2013). Both giving and using feedback are essential in healthcare, where team members must constantly learn from and support each other in order to be adaptive and provide safe care. In this thesis we therefore used a *dialogic* perspective on feedback (Ajjawi & Regehr, 2019; Nicol, 2010), integrating the giver and user roles and approaching feedback as an ongoing exchange, clarification, and alteration of ideas through asking and responding to questions. Our aim was to advance insights into the design of interprofessional feedback education from this perspective, and investigate how, when, and why undergraduate students in this education develop their interprofessional feedback dialogues. The overarching research question was:

How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?

In this chapter we first summarize our context, approach, and the findings of the studies in this thesis. Second, we draw general conclusions based on an integration of the thesis' findings. Then, taking the strengths and limitations of this research into account, we discuss the theoretical contributions of this thesis as a whole. Finally, we critically discuss the meaning of our findings, offering practical implications and suggestions for future research.

Summary of findings

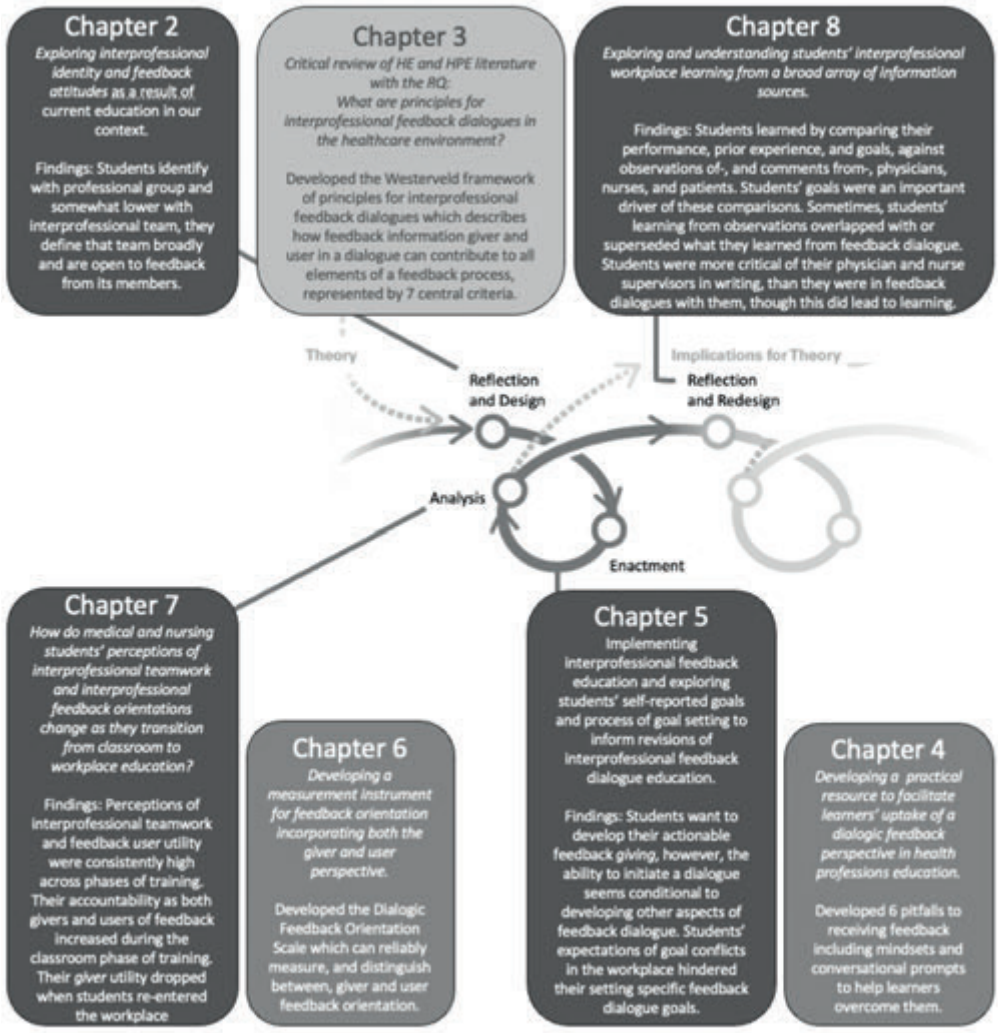
Context and approach

The data for the empirical studies were collected at the medical school of the University Medical Centre Utrecht, and the nursing school of Utrecht University of Applied Sciences. Our studies were set in the pre-licensing, undergraduate, workplace-oriented learning phase in the final year of undergraduate nursing education and the final two years of undergraduate medical education. Participating students were thus senior undergraduate students, who had at least one year of experience with working in interprofessional teams in the workplace (the nursing students from their third year of undergraduate training, medical students from their fourth). The research design we used was inspired by the design-based research approach (Baumgartner et al., 2003), which structures the research of educational design in cycles. One cycle consists of three phases 1. Reflection and Design, 2. Enactment, and 3. Analysis (Bakker & van Eerde, 2015; Scott et al., 2020). In this

thesis, we conducted one full cycle of design (figure 1), and ended with a reflection and thoughts on redesign, which can be used as the first step in a new cycle.

Figure 1. Research design and findings of this thesis (Figure adapted from Fraefel, 2014) Chapters in green represent empirical studies directly contributing to answering our research question:

How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?



Reflection and design phase

In this phase, we first critically reflected on existing tools and current implementation of feedback theory in health professions education practice. In **chapter 2** our aim was: *to explore interprofessional identity and feedback attitudes as a result of current education in our context*. As developing a professional identity (with an individual focus) may hinder simultaneous development of an interprofessional identity (with a collective focus), we explored the relative strengths of both the mono- and interprofessional identities of our students. Using a validated questionnaire, we found that senior medical and nursing students only identified somewhat less strongly with theinterprofessional team than they did with their monoprofessional group.

Furthermore, using open-ended questions, we found they had a broad perspective on who were members of that team, and they showed an openness to receiving interprofessional feedback. This implied that intergroup processes (Burford et al., 2012) would probably not hinder the development of inclusive, interprofessional attitudes in our study context. These results suggested a readiness for interprofessional feedback education initiatives. Students did however seem to hold an information-transmission perspective on feedback, indicating their current feedback education was not in line with state-of-the-art findings in feedback literature.

Next, to support more dialogue-centered design of interprofessional feedback education, we developed design principles. In **chapter 3,** our research question was: *What are principles for interprofessional feedback dialogues in the healthcare environment?* We critically reviewed higher education and health professions education feedback literature and validated the results in an international expert panel of feedback and interprofessional experts. Through this, we developed a framework of principles for interprofessional feedback dialogues: the Westerveld framework. In this framework, using seven central criteria relevant for feedback dialogues: Open and respectful; Relevant; Timely; Dialogical; Responsive; Sense making; and Actionable, we outlined how the giver and user of feedback information can contribute to an effective feedback dialogue. Next, the framework contains interprofessional additions to these criteria: statements on how to address and deal with the barriers and facilitators encountered specifically in the interprofessional feedback context (i.e., power dynamics, credibility issues, team identity, and structural work processes). The framework is designed in a symmetrical format, to represent the bi-directional nature of feedback dialogues, and the shared responsibility of giver and user to contribute to the feedback process of the user in that dialogue.

Enactment phase

In this phase we developed and implemented practical tools based on the outcomes of the reflection phase. In **chapter 4** we developed a practical resource to facilitate learners' uptake of a dialogic feedback perspective in health professions education, specifically to help them understand and develop their receiver, or user, role. This resource entailed a compact, visual overview of six common pitfalls of receiving feedback: waiting passively for feedback; asking feedback (solely) for a good assessment; only seeking feedback from your (monoprofessional) supervisor; reacting defensively; not thoroughly analyzing feedback; not acting on feedback.

The results include mindsets, reflective questions and conversational prompts to help students avoid these pitfalls. In **chapter 5**, we described the development of the Westerveld Interprofessional Feedback intervention, a workplace-oriented training for medical and nursing students. The main goals of this training were to develop students' interprofessional-, and feedback dialogue attitudes and skills. Next, we monitored the implementation of this intervention, supported by an analysis of students' intentions for their subsequent internship, using the goals students set at the end of the intervention, and focus groups on their goal setting and motivation. Our aim was: *to explore students' self-reported goals and process of goal setting to inform future interprofessional feedback dialogue education*. We found that, though students wanted to develop many aspects of their dialogic feedback processes (giving feedback, being more actionable), their actual goals concerned overcoming barriers in practice to *initiating* dialogues (like power dynamics, or practical issues). This implied that the ability to initiate dialogues in the workplace was somehow conditional to developing other feedback dialogue aspects. Furthermore, students' expectations of goal conflicts in the workplace (e.g., wanting to seek feedback vs. wanting to appear competent, or, wanting to speak up vs. wanting to keep a low profile) hindered their setting specific feedback dialogue goals. Finally, nursing students wanted to develop their *feedback giving*, significantly more than their medical peers. Based on these implementation insights we revised the Westerveld Interprofessional Feedback intervention: the subject of initiating dialogues was emphasized and moved to the start of the training. Also, students were encouraged to set specific goals by discussing their expectations of the workplace.

Analysis phase

In this phase we analyzed students' learning in the revised learning environment. A condition for this analysis was that we could reliably assess students' uptake of the principles of interprofessional feedback dialogues. Thus, in **chapter 6** we developed an instrument to measure students' orientations towards receiving and giving feedback. As most interprofessional feedback education in healthcare takes place in preparation for, or in a workplace learning context, the frequently used classroom-oriented scales of feedback receptiveness (Lipnevich & Lopera-Oquendo, 2024), or literacy (Zhan, 2021), did not match this workplace learning context sufficiently. Furthermore, most scales were user focused, and therefore not suited to empirical work from a feedback dialogue perspective. Instead, in this chapter we extended the definition of feedback orientation to not only include receptivity to feedback, but also orientation to giving feedback. We mirrored three scales of the Feedback Orientation Scale (Linderbaum & Levy, 2010), to develop the Dialogical Feedback Orientation Scale (DFOS), which we analyzed using the research question: *To what extent can the DFOS meaningfully measure and discern giver and user feedback orientations in clinical health professions education?* Based on our sample of 537 students, we found that the giver feedback orientation subscales could be meaningfully and reliably discerned from the user subscales. In **chapter 7** we explored healthcare students' perceptions of interprofessional teamwork as well as their dialogic feedback orientations in the revised design of the Westerveld Interprofessional Feedback intervention. Our aim was to see if and how students' perceptions and orientations changed when they transitioned from classroom to workplace learning.

Our research question was: *How do medical and nursing students' perceptions of interprofessional teamwork and interprofessional feedback orientations change as they transition from classroom to workplace education?* We found that perceptions of interprofessional teamwork were high throughout training, i.e., students defined their team broadly and valued interprofessional teamwork. Similarly, their belief that using feedback from team members contributed to their professional development, was consistently high across phases of training. Their self-efficacy, both to give and to use feedback was, in absolute terms, somewhat lower, but also consistent across training. Their accountability as both givers and users of feedback increased during the classroom phase of training. Their belief that their own feedback was important for others' development as professionals, dropped when students re-entered the workplace. These results implied that, while students are ready for, and learn from, interprofessional feedback education in the classroom, in the workplace, unlearning of a part of their feedback orientation takes place. Furthermore, though not significant, the results suggested professional differences in this unlearning, with multiple elements of medical students' dialogic feedback orientations dropping in the workplace, where nursing students' didn't. Though these results must be interpreted with care, further hypothesizing and reflection on professional differences seems warranted.

Reflection and redesign phase

In this phase, inspired by the outcomes of the enactment and analysis phases, we commenced a new phase of reflection and design. As the enactment and analysis phase both showed students struggling to apply feedback processes in the interprofessional workplace, in **chapter 8** we explored ways of understanding and redesigning clinical feedback education processes. Using the internal feedback model (Nicol, 2021, 2022), we broadened the scope of feedback beyond the dialogic exchange and clarification of information, to include students' perceived learning from other sources of information in the interprofessional workplace, such as observation of others. Nicol points out comparison as a key process underlying students' learning and as a mechanism through which we can better understand that learning. Our research question was: *What do medical students learn from the comparisons they make using different information sources in the interprofessional workplace?* Our results showed that students in the workplace learned (gained intentions, understandings, and values) by comparing their performance, prior experience, and goals, against observations of-, and comments from-, physicians, nurses, and patients. Students' goals were an important driver of these comparisons. Sometimes, students' learning from observations overlapped with or superseded what they learned from feedback dialogue, implying some commenting can be replaced by written comparing against observations, putting more agency in students' hands, and leaving room for more relevant dialogue content. The results also showed how students were more critical of their physician supervisors when observing, than they were (able to be) in feedback dialogues with them. This implied that individual, written, comparisons provided a safe place for students' workplace learning. Finally, when comparing nurses' feedback to previous feedback experiences, students sometimes noted a lack of improvement suggestions. Still, these critical comparisons led to students' developing understandings of interprofessional differences and hierarchical conflicts,

and them setting intentions to deal with those in future collaborations. This suggests that instructing deliberate comparisons, could be used as a catalyzer for overcoming interprofessional conflicts and moving the development of an interprofessional feedback culture forward.

General conclusions

The overarching research question in this thesis was: *How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?* Drawing from the results in this thesis, general conclusions can be drawn in three domains. (1) conditions for fostering students for interprofessional feedback dialogues, (2) fostering students' interprofessional feedback dialogues in (workplace oriented) classroom education, (3) fostering students' interprofessional feedback dialogues in workplace-based education.

Conditions for fostering healthcare students for interprofessional feedback dialogues

As there is still relatively little empirical research in the domain of interprofessional feedback education, a big part of this thesis entailed meeting conditions for answering our main research question. The conclusions we draw regarding meeting these conditions answer three questions: a) What principles do we need to teach about interprofessional feedback dialogues? b) To what extent are our students open to learning these principles? c) How can we reliably assess students' uptake of these principles?

a) *Interprofessional feedback dialogue education must include both the giver and user perspective and their shared responsibility for the feedback process.*

In **chapter 3** we determined principles for interprofessional feedback dialogue in health professions education. The resulting Westerveld Framework centers around seven central criteria that represent the feedback process: Open and respectful; Relevant; Timely; Dialogical; Responsive; Sense making; and Actionable. The framework integrates the giver and user perspectives on each of these criteria, representing the dialogical nature of the feedback process and the shared responsibility of giver and user in the feedback process. In **chapter 4** we outlined mindsets and reflective questions that can help (future) professionals understand and develop their receiver-, or user-role. A practical and necessary tool as healthcare professionals often still hold traditional, transmission-based, giver focused views on feedback (chapters 2 and 3).

b) *Students are ready for, realize the value of, and want to develop, their interprofessional feedback dialogues.*

Chapters 2 and 7 showed how students identify with the interprofessional team, without meaningful differences between medical and nursing students and without this interprofessional identification being meaningfully inferior to their identification

with their (mono)professional group. This suggests that strong monoprofessional identifications are not likely to hinder interprofessional teamwork and communication. Furthermore, in **chapter 2** students from both professions indicated an openness to feedback from interprofessional colleagues. **Chapter 7** showed how students consistently realized the value of using interprofessional feedback information from dialogues for their professional development. Finally, in **chapter 5** both medical and nursing students wanted to develop certain aspects of their dialogic feedback processes, for instance they wanted to develop themselves in the role of feedback givers, and they wanted to be more actionable in their feedback processes.

> *I'd be very interested [to receive interprofessional feedback], I'm very curious to see what they would notice, and I think that would be very educational. (Nursing student, chapter 2)*
>
> *You start seeing things from a different perspective [when you receive interprofessional feedback]. You get different feedback from what a physician would give you, but very valuable for your learning. (Medical student, chapter 5)*

c) *The Dialogic Feedback Orientation Scale can reliably measure giver and user feedback orientation and meaningfully distinguish between the two.*

In **chapter 6**, based on the principles developed in **chapter 3**, we extended the definition of feedback orientation to not only include receptivity to feedback, but also orientation to giving feedback. In this chapter, we developed the Dialogic Feedback Orientation scale, to measure both giver and user feedback orientation. In our analysis of this scale, we found that the giver feedback orientation subscales could be meaningfully and reliably discerned from the user subscales. In **chapter 7** we showed that this scale can be used to assess students uptake of interprofessional feedback dialogue principles and investigate how their dialogic feedback orientations change over time and training phases.

Fostering healthcare students' interprofessional feedback dialogues in classroom education

Even in the workplace phase of undergraduate healthcare programs, students often return to the classroom for (workplace oriented) education. In this thesis we developed such education for interprofessional feedback dialogues, based on the abovementioned conclusions regarding the conditions for fostering students for interprofessional feedback dialogues (e.g., based on the Westerveld principles, and in a student population that shows readiness for, valuing of, and intention to develop their interprofessional feedback dialogues). From the empirical work in this classroom context, the following conclusion is drawn.

Interprofessional classroom feedback education can contribute to students' openness for interprofessional feedback dialogues, increase their accountability to engage in these dialogues as givers and users, and foster their intentions to develop themselves in the role of feedback givers.

Chapter 5 showed how students use the Westerveld framework (from **chapter 3**) to set goals regarding the improvement of specific aspects of their feedback dialogues, like overcoming barriers in practice to *initiating* interprofessional dialogues. **Chapter 5** also showed how both medical and nursing students wanted to develop themselves in the role of feedback givers, though nursing students wanted this significantly more often than their medical peers. **Chapter 7** showed how students' accountability to give and use interprofessional feedback, as an essential part of healthcare practice, increased when educated using the framework.

> *My goal is to be open, and to dare to start conversations with physicians. (Nursing student, chapter 5)*
>
> *My goal is to start more conversations with nurses and seek their feedback to provide more efficient care. (Medical student, chapter 5)*

Preparing healthcare students for interprofessional feedback dialogues in workplace-based education

As a large part of interprofessional feedback education takes place in the workplace, where students learn to become part of healthcare teams, we followed our students as they transitioned into the clinical workplace. From our empirical work on this transition, the following conclusions could be drawn:

a) *Conflicting goals can impede students' expectations of engaging in interprofessional feedback dialogues in the clinical workplace.*

Chapter 5 showed how students' expectations of the workplace (mainly expecting their own inability to initiate dialogues), based on their previous experience (including power dynamics and structural issues), prevent their setting goals in line with their stated intentions. This seems to be confirmed by the results in **chapter 8**, where a large portion of included students dropped out due to the assignment being too much pressure, possibly because workload and other goals conflicted with students making time for data collection. Perhaps conflicting goals also played a role in students' showing 'unlearning' of aspects of their feedback orientations in **chapter 7**.

> *I am very good at giving feedback to some people, and with others – I think daring is a good word – it feels like I struggle to give them feedback. […] Then, some sort of blockage arises, and I end up not saying what I actually wanted to say. (Nursing student, chapter 5)*

b) *Though students are able to formulate critical perspectives as feedback givers to their (interprofessional) supervisors, transitioning to the clinical workplace negatively affects students' belief in that the feedback information they give is essential for interprofessional team members' professional development.*

Chapter 8 showed students comparing their own performance and/or prior experience to observations of their monoprofessional and interprofessional supervisors lead to them developing critical points of view on team members performance. Points of view they did not share in dialogues with these supervisors. **Chapter 7** showed how transitioning to the workplace had a negative effect on medical and nursing students' feedback 'giver utility', their sense that the interprofessional feedback information they give is essential to others' professional development. For medical students specifically, such 'unlearning' was potentially a problem on more aspects of their feedback orientations.

> *The physician gave me the main tip to first answer the patients questions, before mentioning alarm symptoms or other things you're supposed to discuss in a DC. I don't know if I agree with that. Because it is nice to have control over a DC. I think you also answer a lot of the patients questions along the way when you are telling your prepared things. I realized later that I didn't say that to the physician. (Medical student, chapter 8)*

c) *Aside from feedback dialogues, students can use other relevant sources of information to learn safely, efficiently, and with agency, in the interprofessional workplace, by explicitly comparing these against their performance, goals, and prior experience.*

Chapter 8 showed how students can use explicit, written, comparison processes to learn from various sources of information in the workplace. This process can be used to: create safe opportunities for interprofessional learning in situations of power conflicts, to let students enact more agency over their workplace learning, and to make their use of feedback dialogues more efficient by letting them first learn independently from observations and material resources, and based on this, develop more targeted questions to seek feedback with from interprofessional supervisors.

> *I mainly mentioned the medical side of things, including the medication changes. The nurse knew more practical matters such as providing the patient with the medication and what will happen practically at discharge. […] I now know better what the role of a nurse is in a DC and how we can complement each other. (Medical student, chapter 8)*

Strengths and limitations

Before discussing the contributions and implications of this thesis, we discuss its main strengths and limitations.

First, as studies often use monoprofessional samples to study interprofessional education (e.g., determining readiness of a single profession for interprofessional education, or perceptiveness of a single profession to the feedback of other professionals, like we do in chapter 8) including both medical *and* nursing student populations in chapters 2, 5, 6, and 7 is a strength. However, the same sample can be seen as quite limited when compared to the possible members of an interprofessional team, as proposed by our own students in chapters 2 and 7 (including paramedical professionals and support staff). The definitions of 'what members belong to the interprofessional team' held by our students, though generally including more than just medicine and nursing, can still be seen as quite narrow as they solely contain team members working with a curative goal for healthcare (helping the patient get better). To meet goals beyond curing patients, such as prevention of disease, development of healthcare techniques, and global health (Geelen & Milota, 2022), teams should include employees of social institutions, scientists, or governments. If and how our findings extend to feedback dialogues of other professions, beyond medicine and nursing, remains unclear. Another limitation of our inclusion of solely medicine and nursing students is the absence of the key perspectives of the teachers and supervisors in our education. For instance, the extent to which classroom teachers are able to use the Westerveld framework to inform their teaching was not studied. Or, whether clinical supervisors, as educators or role models, play a role in students unlearning of certain elements of their feedback orientations and remains to be investigated. Interprofessional teacher training both as supporters of students interprofessional feedback development (in the classroom), and as dialogue partners (in the workplace) is currently under-researched.

Second, focusing on a single educational setting allowed us to get an in-depth, nuanced, and contextualized view of the elements relevant to fostering interprofessional feedback dialogues. Thus, focusing on the single setting of Utrecht University and Utrecht University of Applied Sciences was beneficial to, and even necessary for, the situated type of research we wanted to do, inspired by the design-based research approach (Baumgartner et al., 2003). At the same time, all our research being performed in one institution, may limit the generalization of our findings and conclusions to other contexts, especially as feedback cultures strongly differ across contexts (MacDonald et al., 2013; Suhoyo et al., 2014; N. Winstone & Boud, 2019). Interpreting our findings for use in other contexts should be done with careful consideration of the similarities and differences between settings.

Third, in this thesis we used a mix of data sources, including literature and expert opinion (Chapters 3 and 4), quantitative questionnaires (Chapters 2, 6, and 7), qualitative questionnaires (Chapters 2, 5, and 8), focus groups (Chapter 5), semi-structured interviews (chapter 8), and reflective journals (Chapter 8). As findings from these different data sources led to similar and well-aligned findings, within and across studies, this strengthens the power of the conclusions and recommendations

we base on them. However, the data sources used in our empirical work (interviews, questionnaires, and journals) do all rely on students' self-reported data. As the research aim in this thesis was to foster students' interprofessional feedback dialogues. One may say, an obvious outcome measure would be whether students actually perform better interprofessional feedback dialogues in the workplace. However, in a recent study, van Ravenswaaij et al. (2022), explain how skill development is a slow process, and by solely looking at skill development as an outcome of educational interventions, more nuanced, yet valuable, changes in students are missed, leading to disappointing research outcomes. They state that "intentions towards behavior and the underlying beliefs (i.e., cognitions) are important predictors of past and future behavior" (p3) and thus they propose additionally taking small changes – *value, understanding, intention, self-level changes* - into account when studying skill development. As 'to foster' means to help grow and develop, these small steps in the trajectory towards skill progression and performance improvement, these nuanced changes, very much suit as outcome measures for our research question. Based on this view, in this thesis, we were able to understand students' skills development respectful of the pace of that development: Changes in *intentions* in chapter 5. In chapter 7, changes in *values (utility), understandings and intentions (accountability),* and *self-level insights (self-efficacy)*. And in chapter 8, changes in *values, understandings, intentions*, and (minimal) changes on the *self*- and *progress*-level.

Finally, as most interprofessional feedback research investigates either classroom, or (postgraduate) workplace learning (Rees et al., 2018), this thesis following our sample of undergraduate medical and nursing students across the transition from classroom to workplace learning is a strength. However, with a maximum of 14 weeks following the same student, the longitudinal element of our data collection was limited. Longitudinal data, following students across years of training and professional development (e.g., Curran et al., 2010; King & Violato, 2021), would provide much needed further insight into the development of their feedback dialogues.

Theoretical contributions

In this thesis, we make several theoretical contributions to the fields of feedback in higher education and in interprofessional healthcare education.

Maturing the feedback dialogue perspective

Throughout this thesis we used a dialogue perspective on feedback, where we viewed feedback as an ongoing exchange, clarification, and alteration of ideas through asking and responding to questions. In this perspective, the feedback giver and user roles are not separate but interconnected as they both contribute to, and share responsibility for, the feedback process. When we embarked on the research project in this thesis, frameworks and instruments in educational feedback literature, mostly focused on *either* the giver role in a feedback encounter (usually the teacher) (Hattie & Timperley, 2007; Wisniewski et al., 2020), or on the user role (usually the student) (Molloy & Boud, 2013; N. E. Winstone & Carless, 2019). At that point, some studies in *peer feedback* literature had included both roles, as in peer feedback the teacher and student roles are not pre-determined. However, these studies limited the use of both roles by one person to a 'means', usually to improve written products

in classroom settings (e.g., Lundstrom & Baker, 2009; Patchan et al., 2016). Dialogic feedback as an 'end', e.g., being able to navigate the exchange of ideas from *both roles* as part of professional performance, was proposed by some feedback scholars before (Ajjawi & Regehr, 2019; Nicol, 2010), but its theorizing was still in a relatively early stage. As this dialogical perspective on professional feedback performance was deemed especially relevant in interprofessional (workplace) learning in healthcare, we contributed to the further development of this perspective in three chapters. First, by developing the Westerveld Framework of Principles for Interprofessional Feedback Dialogues (chapter 3). The scientific and practical value of the framework is in the integration of the roles of giver and user into *one* overarching framework. In chapter 4, to show how this perspective can be translated to healthcare practice, we mirrored an existing giver- focused publication (Palaganas & Edwards, 2021), with its user-focused counterpart. Furthermore, to enable empirical work from this dialogue perspective, we developed a measurement instrument, the Dialogic Feedback Orientation Scale (DFOS). We based the DFOS on the Feedback Orientation Scale (FOS) (Linderbaum & Levy, 2010), a workplace-oriented feedback receptiveness scale that suits the workplace learning environment of healthcare education. The FOS, however, uses a one-sided user perspective on feedback, prompting us to redevelop it to match our dialogic perspective. Inspired by symmetry of the Westerveld framework, we extended three existing FOS-scales (feedback utility, accountability, and self-efficacy from a user perspective), with mirrored items representing *giver feedback orientation*. This thesis showed that the DFOS could meaningfully discern between, and reliably measure, giver and user feedback orientation (chapter 6), and it can be successfully used to research changes in students' interprofessional feedback orientation over time and training phases (chapter 7). Our contribution of this scale to the literature, provides opportunities for other future empirical work from a dialogic feedback perspective.

From barriers to conflicting goals

In the literature review of interprofessional feedback research in chapter 3, several contextual barriers (i.e., power dynamics, credibility issues, team identity, and structural work processes) came to the foreground as broadly encountered challenges to students' engagement in interprofessional feedback dialogues in the workplace. These barriers were also found in the empirical work in our context (chapter 5). In chapter 5, students explained how the expectation of these barriers made them adjust their interprofessional feedback goals for the workplace phase of training, letting go of their actual aims and instead setting goals to overcome these barriers. In this thesis, in chapter 5, we extended and nuanced the understanding of these 'interprofessional feedback dialogue barriers' through the use of theory on goal hierarchies' (Carver & Scheier, 1998). Carver and Scheier, explain how higher-level (abstract) goals, consist of lower-level (specific) goals, *e.g., the higher-level goal of 'being successful in training' can consist of the lower-level goals of 'getting good grades' and 'registering positive feedback in their portfolio'.* These levels of abstraction were mirrored in the data of our focus groups in chapter 5. The problem is that compatible goals on a higher level can raise conflict on a lower, more specific, level of abstraction (Carver & Scheier, 1998). Consider for instance a students' higher-level goal to be more assertive in interprofessional communication. This

may prompt a specific goal to give unsought feedback to an interprofessional senior colleague. A simultaneous higher-level goal to feel safe in the learning environment may, conflictingly, require this student to keep a low profile especially regarding those higher up in hierarchy. Especially in complex, realistic learning environments, such as the clinical workplace, learners usually have multiple higher-level goals simultaneously, that can conflict with one another on lower levels (Carver & Scheier, 1998; Locke et al., 2006). Power dynamics, reasoned from one goal, can easily be explained as a barrier to overcome, as many students did in the focus groups, and many scholars do in the literature (van Schaik et al., 2015; Yama et al., 2018). However, when recognized and understood not as a barrier, but as an underlying conflicting goal, students may be more able to deliberately choose to act on one goal or another in practice. Integrating this theoretical perspective in interprofessional feedback dialogue education may help learners deal with and reconstruct the structural 'barriers' to interprofessional teamwork.

Beyond feedback dialogues

Feedback dialogues are valued by students (chapter 2) and scholars (chapter 3) as important contributors to interprofessional learning. However, empirical studies in this thesis (chapter 5 and 7), and the literature on interprofessional feedback (chapter 3), also show how barriers, or conflicting goals, can hinder this kind of learning in the workplace setting: students feedback dialogues can be hindered by interprofessional power dynamics leading to a lack of safety, by a lack of agency due to their overly depending on dialogues for learning, and by workload and time pressure in the workplace requiring more efficient use of dialogues. In chapter 8 we used the internal feedback model by Nicol (2020), to explore ways of safer, more agentic, and efficient use of feedback dialogues. The model broadens the scope of feedback, to include the internal implicit comparison processes of students as they learn from a broad array of information sources in the workplace. Examples of information sources are observations of others, material resources, and internal sources such as goals of prior experience, sources the interprofessional healthcare context offers in abundance. In this thesis, in chapter 8, we propose that if students can first generate feedback by making explicit comparisons against these sources, safely and individually, and next use that internal feedback to formulate information-rich feedback questions (de Kleijn, 2021), to their interprofessional supervisors, this may greatly improve the relevance and efficiency of their interprofessional feedback dialogues. An added value of this thesis is to bridge the internal feedback model to the (interprofessional) healthcare context.

Practical implications

In this section, we suggest practical implications based on this thesis. To do so, we again draw from the phases of the design-based research approach and suggest a redesign of the educational intervention in this research project.

Designing a trajectory of feedback dialogue education

The educational intervention at the center of this thesis concerned a solitary cluster of two workshops and one workplace assignment, spread out over 14 weeks within a 4-year nursing and 6-year medical curriculum. Furthermore, other formalized and mandatory incentives, generating opportunities to practice interprofessional feedback dialogues were scarce across students training within and beyond those 14 weeks. To strengthen the uptake of the principles of interprofessional feedback dialogue, we recommend redesigning training into a longitudinal trajectory. This trajectory would contain more frequent course elements spread out across training years, gradually transitioning from classroom education into workplace learning. This would offer several benefits. First, such a trajectory would create the opportunity to establish thinking, early on, about feedback as a dialogical process including interprofessional team members as natural partners. Second, it would help consolidate this thinking by having students retrieve elements of this learning and build on it across their training. Third, it would offer more opportunities to practice feedback dialogues, both in the classroom and the workplace, thus helping to make the transition between these two phases of training more gradually. In the following section we describe the structure, content, and supervisory conditions we imagine for such a trajectory.

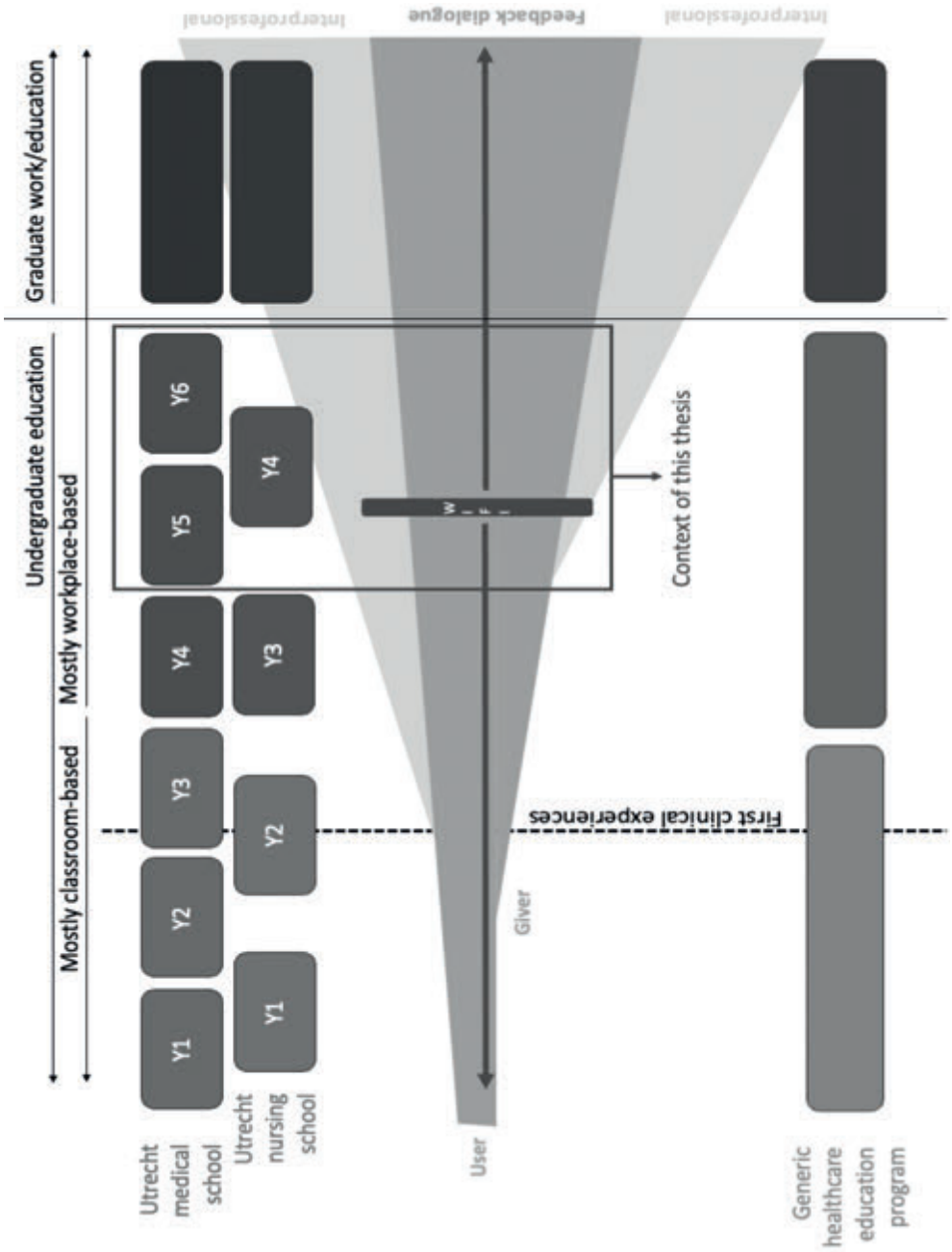
Trajectory structure

Figure 2 outlines the structure of a trajectory of interprofessional feedback dialogue education as we imagine it. The grey elements of figure 2 represent the gradual introduction of (interprofessional) feedback principles over the years of training. The points of introduction are based on key structural points of the medical and nursing curriculum in Utrecht (blue and green in figure 2) but can be adapted to suit other healthcare curricula (orange in figure 2).

Starting early

We propose starting with classroom-based feedback training in the first year of training (start of grey cone, figure 2). Starting in the first year of training may raise concerns as scholars have proposed that interprofessional feedback is something to be postponed to more senior phases of training, sometimes even until far along in residency training (Miles et al., 2021; Paradis & Whitehead, 2018). This postponing is needed, they argue, because students must first learn to be comfortable in their own profession before relating themselves to, and interacting with, members of other professions. The argument against early introduction of interprofessional feedback training is further consolidated as strong evidence is lacking for the effectiveness of organizing early, faculty-wide, large-scale interprofessional education initiatives (Paradis & Whitehead, 2018; Reeves et al., 2013), which is moreover a difficult and costly task.

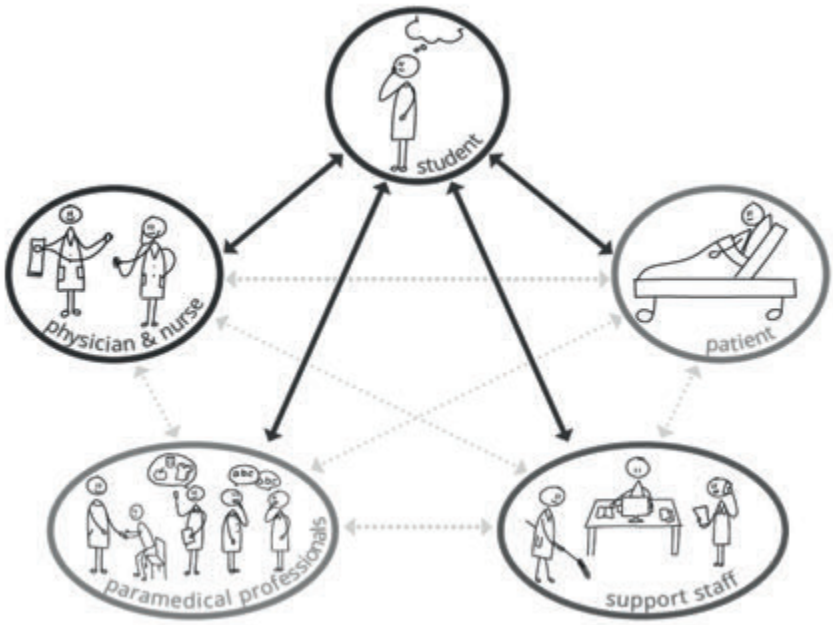
Figure 2. Redesign of interprofessional feedback dialogue education



Though these arguments make sense, we argue that waiting too long to introduce interprofessional teamwork and communication into healthcare curricula has its own risks. Postponed introduction to the perspectives of other health professions can contribute to establishing and consolidating stereotypes and (faulty) credibility

judgements about members other professions, often indicated as problematic in interprofessional (feedback) education (Burford, 2012; Miles et al., 2021; Yama et al., 2018). Therefore, we propose a compromise to the arguments above: Feedback training in the first year could *refer* to interprofessional team members as natural partners of these dialogues (figure 3) establishing the thinking early on. However, we suggest introducing the *actual* first experiences of skill training with interprofessional partners later on, in line with recommendations from interprofessional scholars (Paradis & Whitehead, 2018). As figure 3 shows, we suggest presenting the patient as a natural feedback partner in health professions education, inspired by recent studies representing the value of the patient perspective in medical education (Barr et al., 2021; Eijkelboom et al., 2023; Finch et al., 2018).

Figure 3. Natural partners for feedback dialogues to refer to in classroom education



Introducing interprofessional dialogue partners

From the moment students enter the workplace for their first clinical experience (dotted line, figure 2), natural and authentic opportunities for interprofessional dialogues are abundant, as students will start to participate in teams. This offers a logical and feasible point in time to start introducing them to learning *with* (instead of just about) interprofessional partners, through formalized feedback dialogue assignments.

Introducing students to interprofessional dialogues as soon as their first clinical experience, would introduce students with interprofessional feedback practice opportunities far before licensing. It can therefore be seen as early introduction of interprofessional feedback experience, when compared to scholars' suggestions of

introduction in late residency. However, one may still worry that the lack of contact with their future interprofessional team members in the first 2-3 years of training, may contribute to students developing unwanted stereotypes and credibility judgements. It would therefore be beneficial to have simultaneous interprofessional education initiatives in the first years of the curriculum to ensure students are acquainted with their interprofessional peers. However, other, more general, content (e.g., healthcare structure, teamwork goals, ethical principles) might suit these initial initiatives better than specific skills training.

Gradually increasing complexity

As the grey coned shape in figure 2 outlines, the feedback training in the classroom phase could start with teaching feedback principles from a user perspective (more natural to students in classroom education) and gradually introduce the giver perspective, to prepare them for the workplace reality where everyone has both roles. Similarly to the classroom phase, once students are engaging in actual interprofessional feedback dialogues in the workplace, they could first do so as users, and later extending this as givers of feedback information. To enable such a gradual build-up and extension of the elements of the trajectory students would need the opportunity to practice several times in each stage (before another giver/user/interprofessional perspective is added in their training). This means the trajectory would require several assignments each semester, especially for the shorter healthcare education programs, with a curriculum spanning 3 years or less. To facilitate this, again in a feasible way, we should explore integrating these practice opportunities with existing education. In the classroom phase they could be integrated with existing communications and teamwork training (to prevent the overload, one or two criteria of the Westerveld framework could be handled in each educational encounter). In the workplace phase of training, we could integrate practice opportunities with existing assessment and/or portfolio-systems. This also ensures the additional workload for students in the busy workplace (with goal conflicts in abundance) is minimized.

Trajectory content

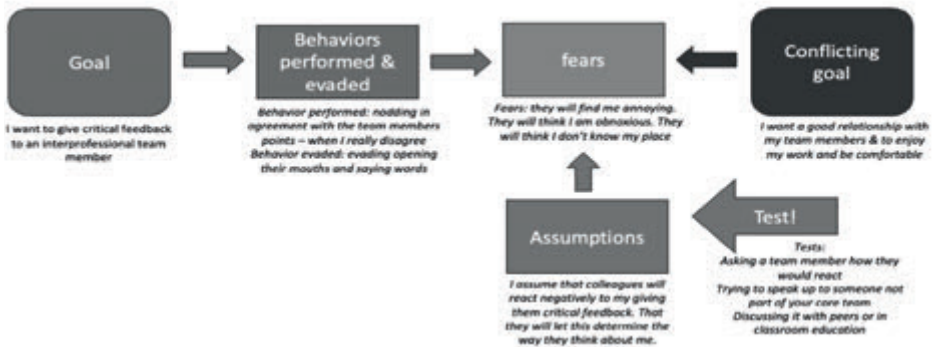
As we posed earlier, the educational encounters in the classroom could address one or two criteria of the Westerveld framework each time. Discussing the principles and interprofessional additions, applying them to (real-life) examples, using them to reflect on simulations, and using them to set interprofessional feedback goals (like we did in chapter 5) would be ways to design educational encounters based on the criteria. Based on the results in this thesis, we would suggest including two additional content elements into the (classroom) educational encounters: *conflicting goals*, and *comparisons.*

Conflicting goals

In chapter 5 we found how students' feedback goal setting is limited by their expectations of conflicting goals in the workplace, i.e., they expect other priorities will prevent them from enacting their feedback goals. Such goal conflicts are typical of the workplace where, in contrast to the classroom, the learning environment

is unpredictable and numerous goals, besides students reaching their training objectives, become paramount (such as patient care, or students' socialization). Investing in students' ability to recognize and deal with these conflicts may help them enact their feedback goals and maintain their feedback orientations and/or their intentions to work on their feedback dialogue skills in the workplace setting. One way to do this is by showing students how to expose the conflicting goals that are underlying the inhibitions or barriers they encounter. This can be done safely in a classroom setting, individually or in groups. Figure 4 outlines an educational model, based on the work of Bowe et al. (2003), that can be used to guide this, including a simple, worked example of each step. In short: Say a student feels a barrier to a certain feedback goal (in figure 4, *giving critical feedback to an interprofessional team member*). By exposing the specific and objective behaviors they perform, or evade, that get in the way of them giving critical feedback, students can be led to discover the *fears* underlying these evasions. Once clarified, these fears can help students to see other goals that they are committed to but that conflict -on a deeper level- with the primary goal. This, in turn, will allow students to clearly see assumptions that they are, usually unconsciously, making that lead to their fears. Once an unconscious assumption is exposed, students can then be guided in thinking of ways to safely test these assumptions. By doing so students will be able to understand their conflicting goals and be able to choose between them in a much more informed way. Allowing them agency in enacting their goals.

Figure 4. Model to expose conflicting goals and unconscious assumptions. (Based on Bowe et al., 2003)



Comparisons

In chapter 8 we found that teaching students to explicate the naturally implicit comparison processes that are part of their learning, helped them to generate learning from a broad variety of information sources in the workplace, broader than just from feedback dialogues. As it helped them learn individually, safely, and agentically, it could help students make more efficient use of the interprofessional dialogues they *do* have. For instance, a student could choose to observe a nurse, compare their own performance and prior knowledge to what they observe the nurse

doing in light of their individual learning goals, and make explicit what they could learn from this nurse. This could help them formulate a very specific and relevant feedback question for a subsequent dialogue with this nurse. E.g., I want to learn to approach a patient with a delirium better (goal). I Struggled with this in the past (prior experience). I saw you speaking to the patient in a much clearer way than I did (comparison). Could you help me understand how you decide to speak to a specific patient and give me tips on how to improve (relevant question)? Such an informative feedback question would not only help the student get more relevant feedback, by sharing goals and prior experience it would enable the nurse to adapt the feedback they give to the zone of proximal development of the student (Vygotsky, 1987). Such feedback dialogues would greatly improve the efficiency of feedback dialogues,

which currently often lacks in workplace learning. We thus strongly recommend including explicit comparison skills (Nicol, 2021), and guidelines to ask informative feedback questions (de Kleijn, 2021), when (re)designing interprofessional feedback education. Including these comparison and feedback seeking skills in redesigns of interprofessional feedback would, however, have to start early on.

A finding in chapter 8 was that a large portion of the students initially included dropped out due to the data collection (an assignment to make comparisons explicit) being too much work for them. Introducing comparisons skills in the workplace phase of training may thus, in itself, present a conflicting goal to battle with others (*safeguarding workload, maintaining a work-life balance, prioritizing helping patients*). The mechanism of making implicit comparisons explicit must therefore be an automatized thought process by the time they are learning in the clinical workplace. Then it can be a tool easily used in practice. To make it an automatized thought process, early classroom encounters in the feedback trajectory could include practicing with making these comparison processes explicit, using simple classroom assignments such as writing papers or giving presentations. Students could make comparisons against peer products, rubrics, observations of others etc. This could prepare students to use the same comparison process later on in workplace learning.

Supervisory conditions

Finally, beyond implications at the curriculum and student level, implications for supervision can be drawn from the results in this thesis. These can be seen as conditions to support the overall trajectory we've presented in this section. Two supervisory conditions are described: trained supervisors, and continuity of supervision.

Trained supervisors

Chapter 7 showed students' unlearning elements of their training when entering the workplace. Aside from this finding yielding implications for our curriculum and the way we prepare students, this finding could also indicate that interprofessional clinical supervisors are not ready for our students. We hypothesize that they are not ready to engage in feedback dialogues with students who are trained with dialogical interprofessional feedback skills. This could be caused by them retaining transmission-based views on feedback, as seen in other studies (Molloy et al.,

2020; Noble et al., 2020), or by them struggling to see students as anything other than feedback receivers (Olvet et al., 2021). Another reasoning could be that professionals in the workplace do not yet see and accept their roles as supervisors for students of other professions (Jansen et al., 2022). Finally, it could be that profession-based or experience-based power dynamics hinder interprofessional student-supervisor feedback practice (van Schaik et al., 2015; Yama et al., 2018). The outcomes of such research can inform the design and implementation of dialogic feedback training for supervisors. All of the abovementioned causes could be helped by training supervisors using the same theoretical principles we use for student education and establishing their roles as feedback dialogue partners for all students in a team, not just those from their own profession. Furthermore, in such training, they could be encouraged to seek feedback from students, both to provide practice opportunities for students as givers, and for their own learning as life-long learners. A recent example of an education program for workplace-supervision, which included feedback dialogue training, showed promise (Booij et. al., 2024). As Booij et. al. state, long term sustainability of such programs should be considered with care and take the work pressure on professionals in the workplace into account. Thus, exploring ways to reach a large number of supervisors and to provide this training in a way that doesn't add on a huge extra workload is paramount. For instance, by making training available online in e-modules and e-portfolio's training is accessible when and where convenient for supervisors. Another way to facilitate supervisor training is by making the training hours accredited, so it can be done in training time they are already committed to. A third way to incentivize professionals is to include their feedback conversations with students in their professional performance review. Exploring the needs of supervisors (in literature and empirically), and feasible ways to accommodate their training could be the start of a new cycle of design-based research.

Continuity of supervision

Finally, to support students' transfer of interprofessional feedback learning to the workplace, continuity of supervision needs to be considered. Though not statistically significant, the results in chapter 7 implied that specifically medical students might be more likely to unlearn elements of their feedback orientation in the workplace. When comparing medical and nursing students' internships in the context of this research project, clear differences regarding continuity of supervision stand out. The internships of medical students were shorter (generally 12 weeks) than those of nursing students (generally 24 weeks). Furthermore, medical students switch wards and teams much more frequently (up to 6 times in 12 weeks). Their nursing peers are usually in the same ward for 24 weeks, allowing them much more time and opportunity to become a team member, and to engage in feedback dialogues with team members. Other researchers have also pointed to switches in supervision as a hinderance for the development of feedback skills (Al-haddad & Musse, 2021; McGinness et al., 2019). Though further research is needed to confirm and better understand these findings, medical students' maintenance of dialogic feedback orientations as they transfer to the workplace may require them to remain in the same ward, in the same team, under the same supervisors, much longer than they currently do.

Suggestions for future research

In this final section, we propose directions for future research, based on the findings of this research.

Broad team involvement

In this thesis we researched dialogical feedback processes between nursing and medical students. As students defined the types of stakeholders in teams much broader than solely mentioning nurses and physicians (Chapters 2 and 7) future research may benefit from including a broader scope of team members. A suggestion for future research is to further our understanding of what types of interprofessional collaborative relationships occur and/or need attention in education. This could be done by interviewing professionals or by observing authentic and diverse teams in practice. Needs-assessment studies to determine the readiness of (students of) those other types of professionals for interprofessional feedback dialogues and their specific educational needs could follow. Finally, experimental, or design-based studies, could be designed to implement and test educational interventions to foster the feedback dialogues of this broader variety of team-members.

Longitudinal designs

The longest period of time one subject was followed in this thesis, was 14 weeks. Longitudinal designs with longer time-spans are needed to further our understanding the development of students interprofessional feedback dialogues. Such studies could follow the development of students' perceptions of interprofessional teamwork and feedback orientation across both the classroom, and workplace phases of training, and across the divide between pre- and post-licensing (e.g., Makino et al., 2013). These designs would allow us to see if-, and understand how-, the outcomes of interprofessional teamwork valuing (chapter 7), interprofessional feedback intentions (chapter 5), and dialogic feedback orientation (chapter 6), ultimately lead to altered behavior in the workplace. Research on skills development (e.g., van Ravenswaaij et al., 2022), could help inform such research designs.

Exploring 'unlearning' in training transfer

A main finding in this thesis was that, once they entered the workplace, or even just considered entering it, students' feedback goals altered and their sense of usefulness of their giving feedback to others decreased. This decrease could be seen as 'unlearning'. Unlearning has been linked to concepts like informal, or hidden, learning (Fluit et al., 2021), and, in interprofessional education, has been explained as students adjusting their viewpoints or behaviors to the reality they see role-modeled in the workplace (Thistlethwaite, 2012). The loss, or unlearning, of training gains while transitioning to the workplace for which training was intended, is a commonly known issue researched in the field of *transfer* (Blume et al., 2019, p1). Future interprofessional feedback education research would benefit from a better understanding of the unlearning that takes place in this training transfer. To do so, studies could take predictive factors known from transfer literature (Blume et al., 2019; Cheng & Hampson, 2008; Peters et al., 2017*)*, and investigate if

learner characteristics, training design, or *work environment* factors indeed relate to this unlearning. If so, when determining and researching the effectiveness of educational solutions, studies could again draw on the rich transfer literature. Such research could help further our understanding of when and how severely unlearning takes place, and whether, perhaps, after an initial drop, under specific circumstances training gains may be restored. Furthermore, studies could further explore differences between medical and nursing students, or other professional groups, in their development of perceptions of interprofessional teamwork and feedback orientations (differences which the results in chapter 7 suggested but did not prove). This, along with determining and understanding explanatory mechanisms for these differences could help inform targeted interventions. Finally, combining the theories of transfer and goal hierarchies (Carver & Scheier, 1998), and investigating the relation between known work environment factors and goal conflicts in the workplace may provide valuable insights into unlearning, and ways to prevent this.

Role of interprofessional supervisors

In this thesis, we researched students' interprofessional feedback processes in the workplace phase of their training. However, in practice, the dialogue partners of students are very often graduated team members with a (formal or informal) supervisory role. This requires them to have some didactic, or at least dialogical, skill, as well as a certain readiness for and acceptance of their interprofessional teacher-role (e.g., Jansen et al., 2022), meaning they do not solely feel responsible to engage in dialogues with the students form their own profession. Future research in interprofessional feedback dialogue education should extend its focus to include these (formal and informal) supervisors. First, we could determine if interprofessional team members accept their interprofessional teacher-role. If they do not accept this role, studies should explore how we can effectively promote this acceptance. Next, studies could explore supervisors' readiness for-, and ability to-, guide, or engage in, feedback dialogues with (all) students, and furthermore, to explore if and how them retaining transmission-based views (e.Molloy et al., 2020; Noble et al., 2020), and interprofessional power dynamics (e.g., Gergerich et al., 2019; Paradis & Whitehead, 2018), relate to their (in)ability to do so. Finally, studies could design, implement and evaluate interprofessional teacher-training based in the Westerveld framework.

Beyond feedback comments

In chapter 8, we explored students learning, defined as their *internal* feedback processes, from a broad array of interprofessional information sources in the workplace, beyond feedback solely from comments. This exploration led to some promising insights, namely that prompting students to explicitly compare against information sources in the workplace can help them learn safely and agentically. Furthermore, we hypothesize that these comparisons could help make students interprofessional feedback dialogues more efficient as students' individual learning, made explicit, can inform their asking well-informed feedback questions. To test this hypothesis future research should design and test the implementation of two-stage educational designs (e.g., Nicol & McCallum, 2021; Nicol & Selvaretnam, 2021): For instance, students could be instructed to, first, independently and in written

form (thus safely), learn from information gained from observations (and/or material sources). This would allow them to, next, share their current development as they seek comments to further this development (de Kleijn, 2021; Vygotsky, 1987). Also, studies should help distinguish what type of prompting is efficient and where the balance should lie between on the one hand prompting to direct students' learning to certain sources, i.e., patient feedback (e.g., Eijkelboom et al., 2023; Finch et al., 2018), and material recourses (e.g., Gravett, 2022), and to certain outcomes, i.e., intentions, progress (van Ravenswaaij et al., 2022), and, on the other hand, not obstructing agency of students self-regulated, goal-oriented learning, by intervening in this with too narrow prompts or strict instructions. Research could build on the evidence already available on designing comparison instructions (e.g., Nicol & McCallum, 2021; Nicol & Selvaretnam, 2021; Swingler et al., n.d.). Finally, studies could explore interprofessional differences in learning from information sources in the workplace. Students in chapter 8 showed differences in learning from physician vs nurse observations and physician vs. nurse feedback. A deeper understanding of the cause of these differences, e.g., due to unfamiliarity with the criteria for professional performance between professions, or due to interprofessional power relations, could help design interprofessional comparison instructions that guides students to better realize and overcome these differences in their workplace learning.

Final notes by the author

When I look back at the speech I gave as a medical student, six years ago (preface), I still largely agree with what I said: I still see rapidly changing demands on healthcare professionals, and still think that interprofessionalism plays a big part in helping professionals meet these demands. In the past years I've seen the training we provide students with, change accordingly. Increasingly we are training future professionals to be adaptive, communicative, creative problem solvers. I was able to contribute a small piece in this development by working on the design, implementation, and investigation of interprofessional feedback education described in this thesis.

Though I still agree with my views from six years ago, I do feel I've gained a deeper understanding of what is required to help future healthcare professionals, and of what healthcare would look like if I was in charge.

In 'my UMC'.

In my UMC, all students in a ward are supervised by all team members from different professionals in that ward. In my UMC, students know how to learn from the various perspectives offered by these team members and patients, and they know when and how to seek additional help by starting dialogues with them. They've learned how to do this this from day *one* in their education and therefore feel safe and comfortable while entering the workplace. In my UMC, acknowledging weaknesses while seeking feedback information, is not shied away from, and is never considered weak by others. In my UMC, feedback dialogues are so naturally part of practice that students and supervisors almost forget writing some of it down on 'those assessment forms'. In my UMC, supervisors take students seriously as feedback givers in their own learning processes. In my UMC, supervisors role model open interprofessional attitudes by constantly giving and seeking feedback information from their team members and patients.

I sincerely hope that the work in this thesis can somehow contribute to getting a little closer to making my UMC, *our* UMC.

Claudia Tielemans

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Appendices

SUMMARY

Interprofessional feedback helps health profession trainees collaborate and learn in the complex, ever-changing clinical workplace. Fostering interprofessional feedback processes is thus a key aim of interprofessional education, where students from different professions learn 'with, from, and about each other'. To better understand and support interprofessional feedback education in health professions education, in this thesis, we drew from the broader field of higher education research. In the last decade, scholars in the higher education research field have been moving away from traditional definitions of feedback as information transmission, increasingly defining feedback as a process in which learners seek, make sense of, and use feedback information. Moving away from transmission-based views on feedback has led some scholars to advocate for feedback dialogue—the ongoing exchange, clarification, and alteration of ideas through asking and responding to questions—as a means to construct feedback processes. In **Chapter 1** of this thesis, we argued that this dialogue perspective is especially relevant and necessary in health professions education. Drawing from contemporary insights in feedback literature, we investigated how, when, and why feedback dialogue training in the interprofessional setting works. Through this, we aimed to gain insight into how to foster students' interprofessional feedback dialogues through educational design. The overarching research question was: *How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?*

The data for the empirical studies in this thesis were collected at the medical school of the University Medical Centre Utrecht and the nursing school of Utrecht University of Applied Sciences. Our studies were set in the pre-licensing, undergraduate, workplace-oriented learning phase in the final year of undergraduate nursing education and the final two years of undergraduate medical education.

We started our research by determining the readiness of the students in this context for interprofessional feedback education. As positive attitudes towards interprofessionalism are a prerequisite for interprofessional learning, and similarly, a strong interprofessional team identity facilitates interprofessional feedback receptivity, **Chapter 2** focused on exploring interprofessional identity and feedback attitudes in our context. We first explored the relative strengths of both the mono- and interprofessional identities of 53 medical and nursing students. We measured both, as developing a monoprofessional identity (with an individual focus) may hinder the simultaneous development of an interprofessional identity (with a collective focus). However, using a validated questionnaire, we found only small differences in senior medical and nursing students' identification with the interprofessional team versus the monoprofessional group. Furthermore, using open-ended questions, we found that they had a broad perspective on who were members of that team, and they showed openness to receiving interprofessional feedback. This implied that intergroup processes would probably not hinder the development of inclusive, interprofessional attitudes in our study context. These results suggested readiness for interprofessional feedback education initiatives. However, students did seem to hold an information-transmission perspective on feedback.

Having concluded that the students in our context showed readiness for and positive attitudes towards interprofessionalism, in **Chapter 3** we developed principles for the design of interprofessional feedback education. We critically reviewed higher education and health professions education feedback literature and validated the results with an international expert panel of five feedback and five interprofessional experts. Through this, we developed a framework of principles for interprofessional feedback dialogue: the Westerveld framework. In this framework, using seven central criteria relevant to feedback dialogues—open and respectful, relevant, timely, dialogical, responsive, sense-making, and actionable—we outlined how the giver and user of feedback information can contribute to an effective feedback dialogue. Next, we developed interprofessional additions to these criteria: statements on how to address and deal with the barriers and facilitators encountered specifically in the interprofessional feedback context (e.g., power dynamics, credibility issues, team identity, and structural work processes). We designed the framework in a symmetrical format to represent the bidirectional nature of feedback dialogues and the shared responsibility of both the giver and user to contribute to the feedback process.

In addition to developing theoretical design principles, we also developed practical tools to promote the uptake of these principles in educational practice. In **Chapter 4**, we developed a practical resource to facilitate learners' uptake of a dialogic feedback perspective in health professions education, specifically to help them understand and develop their receiver, or user, role. This resource included a compact, visual overview of six common pitfalls of receiving feedback: waiting passively for feedback, asking for feedback (solely) for a good assessment, only seeking feedback from a (monoprofessional) supervisor, reacting defensively, not thoroughly analyzing feedback, and not acting on feedback. The resource includes mindsets, reflective questions, and conversational prompts to help students avoid these pitfalls. In **Chapter 5**, we developed the Westerveld Interprofessional Feedback intervention, a workplace-oriented training for medical and nursing students. The main goals of this training were to develop students' interprofessional and feedback dialogue attitudes and skills. Furthermore, in Chapter 5, we monitored the implementation of this intervention, supported by an analysis of students' intentions for their subsequent internships, using the goals set by 288 students at the end of the intervention and focus groups with 11 students on their goal-setting and motivation. We found that, although students wanted to develop many aspects of their dialogic feedback processes (giving feedback, being more actionable), their actual goals concerned overcoming barriers in practice to initiating dialogues (such as power dynamics or practical issues). This implied that the ability to initiate dialogues in the workplace was somehow conditional to developing other feedback dialogue aspects. Furthermore, students' expectations of goal conflicts in the workplace (e.g., wanting to seek feedback versus wanting to appear competent, or wanting to speak up versus wanting to keep a low profile) hindered their ability to set specific feedback dialogue goals. Finally, nursing students wanted to develop their feedback-giving skills significantly more than their medical peers. Based on these implementation insights, we revised the Westerveld Interprofessional Feedback intervention, emphasizing the subject of initiating dialogues and moving it to the start of the training. We also encouraged students to set specific goals by discussing their expectations of the workplace.

As a next step, we wanted to analyze the learning of students who participated in the revised design of the Westerveld Interprofessional Feedback intervention. To enable this analysis, in **Chapter 6** we developed an instrument to measure students' orientations towards receiving and giving feedback. Most interprofessional feedback education in healthcare takes place in preparation for, or within a workplace learning context. Thus, frequently used classroom-oriented or user-focused scales of feedback receptiveness or literacy did not suit our study context. Instead, we used the workplace-oriented Feedback Orientation Scale. We extended the user-focused definition of Feedback Orientation to include orientation to giving feedback and mirrored three scales of the Feedback Orientation Scale accordingly to create the new Dialogical Feedback Orientation Scale. Based on a sample of 537 students, we found that the giver Feedback Orientation subscales could be meaningfully and reliably distinguished from the user subscales.

In **Chapter 7**, we explored healthcare students' perceptions of interprofessional teamwork, as well as their dialogic feedback orientations, to see if and how students' perceptions and orientations changed as they transitioned from classroom to workplace learning. Following a continuous sample of 65 students across three time points in training, we found that perceptions of interprofessional teamwork were high throughout training—i.e., students defined their team broadly and valued interprofessional teamwork. Similarly, their belief that using feedback information from team members contributed to their professional development remained consistently high across the phases of training. Their accountability as both givers and users of feedback increased during the classroom phase of training. However, their belief that their own feedback information was important for others' development as professionals dropped when students re-entered the workplace. These results implied that while students are ready for and learn from interprofessional feedback education in the classroom, some unlearning of their feedback orientation occurs when they transition to the workplace.

Both Chapters 5 and 7 showed that students struggled to apply feedback processes in the interprofessional workplace. Therefore, in **Chapter 8**, we explored ways of understanding and redesigning clinical feedback education processes. We broadened the scope of feedback beyond the dialogic exchange and clarification of information to include students' perceived learning from other sources of information in the workplace, such as observation of others. In this chapter, we based our work on the assumption that comparison is a key process underlying students' learning and a mechanism through which we can better understand that learning. We explored what medical students learned from the comparisons they made in their interprofessional workplace learning. Our results showed that students learned by comparing their performance, prior experience, and goals against observations of, and comments from, physicians, nurses, and patients. Sometimes, students' learning from observations overlapped with or superseded what they learned from feedback dialogues, implying that some commenting could be replaced by written comparisons against observations, putting more agency in students' hands and leaving room for more relevant dialogue content. The results also showed that when students compared nurses' feedback to previous feedback experiences, they sometimes noted a lack of improvement suggestions. Still, these critical comparisons

led to students developing understandings of interprofessional differences and hierarchical conflicts, and setting intentions to address those in future collaborations. This suggests that instructing deliberate comparisons could be used as a catalyst for overcoming interprofessional conflicts.

In **Chapter 9**, we returned to our main research question to draw overarching conclusions. Our research question was: *How can healthcare students' interprofessional feedback dialogues be fostered in health professions education?* We drew overarching conclusions in three domains.

In the first domain—*conditions for fostering students' interprofessional feedback dialogues*—we concluded that: a) Interprofessional feedback dialogue education must include both the giver and user perspectives, and their shared responsibility for the feedback process. b) Students are ready for, realize the value of, and want to develop their interprofessional feedback dialogues. c) The Dialogic Feedback Orientation Scale can reliably measure giver and user feedback orientations and meaningfully distinguish between the two.

In the second domain—*fostering students' interprofessional feedback dialogues in classroom education*—we concluded that interprofessional classroom feedback education can contribute to maintaining students' openness to interprofessional feedback dialogues, increase their accountability to engage in these dialogues as givers and users, and foster their intentions to develop themselves in the role of feedback givers.

In the third domain—*fostering students' interprofessional feedback dialogues in workplace-based education*—we concluded that: a) Conflicting goals can impede students' expectations of engaging in interprofessional feedback dialogues in the clinical workplace. b) Though students are able to formulate critical perspectives as feedback givers to their (interprofessional) supervisors, transitioning to the clinical workplace negatively affects students' belief that the feedback information they give is essential for interprofessional team members' professional development. c) Aside from feedback dialogues, students can use other relevant sources of information to learn safely, efficiently, and with agency in the interprofessional workplace, by explicitly comparing these against their performance, goals, and prior experience.

NEDERLANDSE SAMENVATTING

Interprofessionele feedback helpt zorgstudenten om samen te werken en te leren in de complexe en veranderlijke klinische werkplek. Het bevorderen van interprofessionele feedbackprocessen is daarom een kerndoel van interprofessioneel onderwijs, waarbij studenten van verschillende zorgberoepen 'met, van en over elkaar' leren. Om interprofessioneel feedbackonderwijs beter te begrijpen en te ondersteunen, putten we in dit proefschrift uit het bredere onderzoeksveld van het hoger onderwijs. In de laatste jaren zijn onderzoekers in dit bredere veld anders gaan kijken naar het begrip feedback in onderwijs en onderzoek. Steeds minder definiëren ze feedback als informatietransmissie, een traditionele blik op het begrip, en steeds vaker als een proces waarin een student informatie vergaart, begrijpt en gebruikt. Met het loslaten van de traditionele 'informatietransmissie-definitie' pleiten sommige onderzoekers ook voor feedbackdialoog – de voortdurende uitwisseling, verheldering en verandering van ideeën door het stellen van en reageren op vragen – als manier om een feedbackproces vorm te geven. In **hoofdstuk 1** van dit proefschrift stellen wij dat dit dialoogperspectief bijzonder relevant en nodig is in het gezondheidszorgonderwijs. Gebaseerd op moderne inzichten uit feedbackonderzoek hebben we onderzocht hoe, wanneer en waarom feedbackdialoogonderwijs in de interprofessionele setting werkt. Ons doel was om inzicht te krijgen in hoe we interprofessionele feedbackdialogen kunnen bevorderen via onderwijsontwerp. Onze overkoepelende onderzoeksvraag was: *Hoe kunnen we de interprofessionele feedbackdialogen bevorderen van studenten in het gezondheidszorgonderwijs?*

De data voor de empirische studies in dit proefschrift zijn verzameld in de geneeskundeopleiding van het Universitair Medisch Centrum Utrecht en de verpleegkundeopleiding van de Hogeschool Utrecht. Ons onderzoek vond plaats tijdens de werkplekleerfase van die opleidingen, voordat studenten afstudeerden: in de laatste twee jaar van de geneeskundeopleiding en in het laatste jaar van de verpleegkundeopleiding.

Het onderzoek in dit proefschrift begon met het vaststellen van de gereedheid van de studenten in deze setting voor interprofessioneel feedbackonderwijs. Een positieve houding ten opzichte van interprofessionaliteit is een voorwaarde voor interprofessioneel leren en, vergelijkbaar, een sterke interprofessionele teamidentiteit kan de ontvankelijkheid voor interprofessionele feedback faciliteren. Daarom was ons doel in **hoofdstuk 2** om interprofessionele teamidentiteit en feedbackattitudes in onze context te verkennen. Eerst verkenden we de relatieve sterktes van de mono- en interprofessionele identiteit van 53 geneeskunde- en verpleegkundestudenten. We onderzochten beide, omdat het ontwikkelen van een sterke monoprofessionele identiteit (met een individuele focus) mogelijk het tegelijkertijd ontwikkelen van een interprofessionele identiteit (met collectieve focus) in de weg zou kunnen zitten. Echter, met een gevalideerde vragenlijst toonden we aan dat er slechts kleine verschillen zaten tussen de identificaties van onze (senior) studenten met de monoprofessionele beroepsgroep en het interprofessionele team. Daarnaast ontdekten we, middels open vragen, dat de studenten een brede blik hadden op wie er lid waren van dat interprofessionele team en dat ze openstonden voor feedback van die teamleden. Dit gaf ons de indruk dat groepsprocessen de ontwikkeling

van een inclusieve, interprofessionele houding onder onze studenten niet in de weg zouden zitten en suggereerde dat ze gereed waren voor interprofessioneel feedbackonderwijs. Echter, studenten leken wel een traditioneel, transmissiegericht begrip van het concept feedback te hebben.

In **hoofdstuk 3** zijn we aan de slag gegaan met het ontwikkelen van ontwerpprincipes voor interprofessioneel feedbackonderwijs. We evalueerden de feedbackliteratuur van het zorgonderwijs en hoger onderwijs kritisch en valideerden de resultaten daarvan in een internationaal expertpanel met vijf feedback- en vijf interprofessionele experts. Met deze resultaten ontwikkelden we een raamwerk met principes voor interprofessionele feedbackdialoog in het gezondheidszorgonderwijs: het Westerveldraamwerk. In dit raamwerk zetten we uiteen hoe de gever en gebruiker van feedbackinformatie kunnen bijdragen aan een effectief feedbackproces, rondom zeven centrale kenmerken van feedbackdialoog: open en respectvol; relevant; timing; dialoogvorm; adaptief; gericht op begrip; en gericht op actie. Vervolgens voegden we hier interprofessionele toevoegingen aan toe: beschrijvingen van manieren om om te gaan met hinderende en bevorderende factoren, specifiek voor de interprofessionele setting (namelijk, machtsdynamieken, geloofwaardigheid, teamidentiteit en structurele werkprocessen). We ontwierpen het raamwerk in een symmetrisch format om zo de bi-directionele aard van feedbackdialoog en de gedeelde verantwoordelijkheid van gever en gebruiker in die dialoog te weergeven.

Naast het ontwikkelen van theoretische ontwerpprincipes hebben we ook praktische hulpmiddelen vervaardigd om het overbrengen van deze principes op studenten te bevorderen. In **hoofdstuk 4** maakten we een praktisch hulpmiddel om studenten te helpen hun ontvanger- of gebruikerrol te begrijpen en ontwikkelen. Dit hulpmiddel betreft een compact, visueel overzicht van zes veelvoorkomende valkuilen bij het ontvangen van feedback: passief afwachten; feedback vragen (alleen) voor een goede beoordeling; alleen feedback vragen aan je (monoprofessionele) supervisor; defensief reageren; feedback niet grondig analyseren; en feedback niet omzetten in actie. Het overzicht bevat per valkuil mindsets, reflectieve vragen en gesprekstarters om studenten te helpen deze valkuilen te voorkomen. In **hoofdstuk 5** ontwikkelden we de Westerveld Interprofessionele Feedbackinterventie, een op de werkplek georiënteerde training voor geneeskunde- en verpleegkundestudenten. De hoofddoelen van deze training waren om de interprofessionele- en feedbackattitudes en -vaardigheden van studenten te bevorderen. Gezien onze eerdere conclusie dat de studenten in onze setting positief gestemd en gereed leken voor interprofessioneel onderwijs, hebben we deze training geïmplementeerd. We monitorden, ook in hoofdstuk 5, deze implementatie, onderbouwd door een analyse van de intenties van studenten voor hun eerstvolgende stage na het onderwijs. Hierbij gebruikten we de doelen die 288 studenten stelden aan het einde van de training en hielden we groepsgesprekken met 11 studenten over hun doelen en de motivaties daarvoor. We ontdekten dat, hoewel studenten veel aspecten van hun feedbackdialoog wilden ontwikkelen (bijvoorbeeld feedback geven en meer gericht zijn op actie), hun daadwerkelijke doelen zich grotendeels richtten op het beginnen van feedbackdialogen en het daarbij omgaan met de hindernissen daarvoor in de praktijk (zoals machtsdynamieken en praktische problemen). Dit impliceerde dat het vermogen om feedbackdialogen te beginnen en ze te initiëren

op de een of andere manier een voorwaarde was voor het ontwikkelen van andere aspecten van feedbackdialoog. Daarnaast vonden we dat de verwachting van doelconflicten op de werkplek (bijvoorbeeld, feedback willen vragen vs. competent willen overkomen, of, iemand ergens op willen aanspreken vs. niet willen opvallen) studenten hinderde in het stellen van specifieke, concrete doelen voor de praktijk. Een laatste bevinding was dat verpleegkundestudenten significant vaker het feedback geven wilden ontwikkelen dan geneeskundemedestudenten. Gebaseerd op deze implementatiebevindingen hebben we de Westerveld Interprofessionele Feedbackinterventie aangepast: het initiëren van feedbackdialogen in de praktijk is als onderwerp extra benadrukt en naar voren gehaald in het onderwijsprogramma. Ook worden studenten nu aangemoedigd om specifieke doelen te stellen en daarbij hun verwachtingen van de praktijk te bespreken.

Als volgende stap wilden we het leren analyseren van studenten die deelnamen aan de aangepaste Westerveld Interprofessionele Feedbackinterventie. Om deze analyse mogelijk te maken, hebben we in **hoofdstuk 6** een vragenlijst ontwikkeld om de oriëntatie van studenten op het geven en gebruiken van feedback te kunnen meten. Aangezien veel feedbacktraining in het gezondheidszorgonderwijs plaatsvindt in, of ter voorbereiding op, de werkpleksetting, waren veel bestaande vragenlijsten die gericht zijn op klaslokaalonderwijs ongeschikt voor ons onderzoek. In plaats daarvan hebben we de Feedback Orientation Scale gebruikt, die is ontwikkeld voor onderzoek naar werkplektraining. We hebben de bestaande, op de ontvanger gefocuste, definitie van feedbackoriëntatie uitgebreid om ook feedback geven te omvatten, en we hebben de schalen van de Feedback Orientation Scale gespiegeld om de nieuwe Dialogic Feedback Orientation Scale te maken. Met de data van 537 studenten hebben we aangetoond dat de gever-feedbackoriëntatie-vragenlijstitems betekenisvol onderscheiden kunnen worden van de gebruiker-feedbackoriëntatie-vragenlijstitems.

In **hoofdstuk 7** hebben we vervolgens de percepties van interprofessioneel teamwerk van studenten en hun dialogische feedbackoriëntaties geëxploreerd. We onderzochten daarbij of en hoe de percepties en oriëntaties van studenten veranderden wanneer ze de overgang maakten van klaslokaal- naar werkplekleren. We volgden 65 geneeskunde- en verpleegkundestudenten op drie momenten in hun training en zagen dat hun percepties van interprofessioneel teamwerk consistent hoog waren (namelijk, ze definieerden hun teams breed en waardeerden interprofessioneel samenwerken). Ook hun vertrouwen dat het gebruiken van de feedbackinformatie van teamleden bijdroeg aan hun professionele ontwikkeling was consistent hoog gedurende de verschillende trainingsfasen. Hun verantwoordelijkheidsgevoel als zowel feedbackgevers als feedbackgebruikers steeg in de klaslokaalfase en bleef hoog in de werkplekfase van de training. Echter, hun vertrouwen dat hun eigen feedbackinformatie belangrijk was voor de professionele ontwikkeling van anderen daalde wanneer ze de overgang maakten naar de werkplek. Deze resultaten impliceerden dat, hoewel studenten klaar zijn voor, en leren van interprofessioneel feedbackonderwijs in het klaslokaal, ze in de overgang naar de werkplek een stuk van hun feedbackoriëntatie weer afleren.

Zowel hoofdstuk 5 als hoofdstuk 7 lieten zien hoe studenten moeite hadden met het deelnemen aan feedbackdialogen op de werkplek. Daarom hebben we in **hoofdstuk 8** verkend hoe we klinische feedbackprocessen beter kunnen begrijpen en, eventueel, herontwerpen. We verbreedden onze blik op het begrip feedback, om naast de uitwisseling en verheldering van informatie via dialoog ook leren van andere bronnen van informatie in de werkplek te omvatten, zoals het observeren van anderen. We werkten in dit hoofdstuk vanuit de aanname dat vergelijking een kernproces is dat aan het leren van studenten ten grondslag ligt en dat ons kan helpen om dat leren beter te begrijpen. We onderzochten wat studenten leerden van de vergelijkingen die ze maakten in hun interprofessioneel werkplekleren. Onze resultaten lieten zien dat studenten leerden via het maken van vergelijkingen tussen aan de ene kant hun eigen functioneren, doelen, of eerdere ervaringen, en aan de andere kant feedbackopmerkingen of observaties van artsen, verpleegkundigen en patiënten. In sommige gevallen overlapte of overtrof het leren op basis van observeren dat van feedbackopmerkingen, wat impliceerde dat dialoog soms (gedeeltelijk) vervangen kan worden door expliciete vergelijkingen met de observaties van teamleden. Dit zou studenten meer zeggenschap over hun leren kunnen geven en in hun feedbackdialogen mogelijk meer ruimte overlaten voor relevantere inhoud. De resultaten lieten ook zien hoe studenten, als ze feedbackopmerkingen van verpleegkundigen vergeleken met eerdere feedbackervaringen, soms verbetersuggesties tekortkwamen. Deze interacties leidden echter alsnog tot leren: studenten begrepen interprofessionele verschillen en hiërarchische conflicten hierdoor beter en ontwikkelden intenties om in toekomstige interprofessionele interacties anders te handelen. Dit suggereert dat expliciet vergelijken mogelijk kan helpen bij het omgaan met interprofessionele conflicten.

In **hoofdstuk 9** trokken we overkoepelende conclusies met betrekking tot onze onderzoeksvraag: *Hoe kunnen we de interprofessionele feedbackdialogen bevorderen van studenten in gezondheidszorgonderwijs?* We trokken conclusies in drie domeinen.

In het eerste domein – *voorwaarden voor het bevorderen van interprofessionele feedbackdialogen* – concludeerden we dat: a) interprofessioneel feedbackonderwijs het perspectief van de feedbackgever en -gebruiker moet bevatten, evenals hun gedeelde verantwoordelijkheid voor het feedbackproces. b) Studenten klaar zijn voor, en de waarde zien van, interprofessionele feedbackdialogen en zich hierin willen ontwikkelen. c) De Dialogic Feedback Orientation Scale gebruikt kan worden om betrouwbaar gever- en gebruikeroriëntatie te meten en kan betekenisvol onderscheid maken tussen de twee.

In het tweede domein – *het bevorderen van interprofessionele feedbackdialogen in klaslokaalonderwijs* – concludeerden we dat interprofessioneel feedbackonderwijs in het klaslokaal kan bijdragen aan het onderhouden van gereedheid voor interprofessionele feedbackdialogen, het de verantwoordelijkheid van studenten om aan deze dialogen deel te nemen kan doen toenemen, en het hen kan stimuleren om zich te willen ontwikkelen als feedbackgevers.

In het derde domein – *het bevorderen van interprofessionele feedbackdialogen in werkplekonderwijs* – concludeerden we dat: a) Conflicerende doelen de verwachtingen van studenten dat ze zullen deelnemen aan interprofessionele feedbackdialogen kan verhinderen. b) Hoewel studenten kritische perspectieven op hun (interprofessionele) supervisors kunnen formuleren, heeft de overgang naar de klinische werkplek een negatief effect op hun vertrouwen dat de feedback die ze geven nuttig is voor de professionele ontwikkeling van teamleden. c) Naast feedbackdialogen kunnen studenten ook van andere informatiebronnen in de werkplek, efficiënt, veilig en met zeggenschap, interprofessioneel leren door de informatie uit deze bronnen expliciet te vergelijken met hun eigen functioneren, hun doelen en hun eerdere ervaringen.

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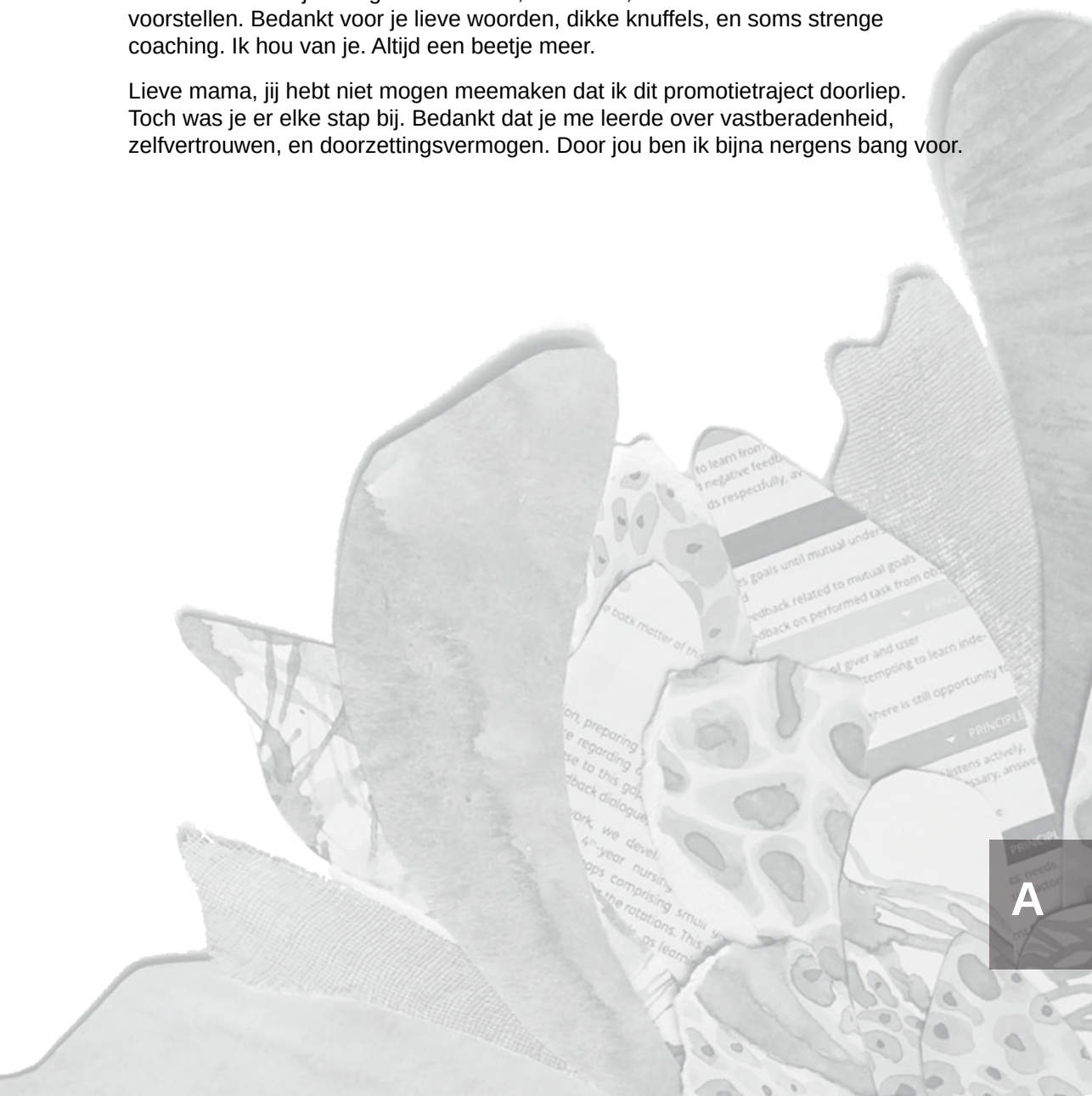
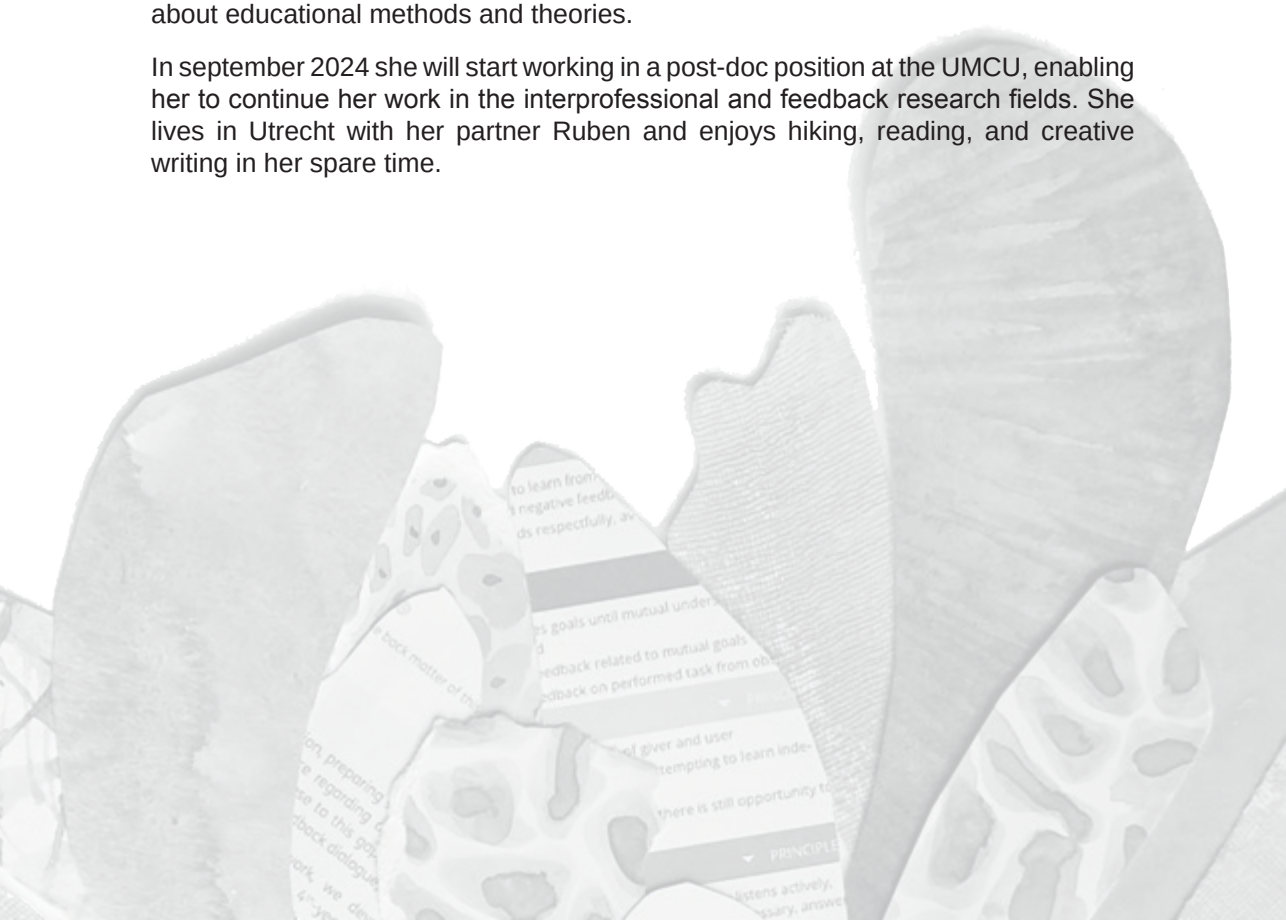


CURRICULUM VITAE

Claudia Jeanne Maria Tielemans (1992) attended medical school at Utrecht University from 2011-2019. She interrupted her studies for a year (2014-2015) to work full-time as president of the medical students association, MSFU “Sams”. In the final phase of her medical training, she was introduced to educational scholarship through a teaching elective and two educational research projects: one at the education centre of the Royal College of Surgeons Ireland, in Dublin, and one at the education centre of the University Medical Centre, in Utrecht (UMCU).

After graduating medical school, she continued the work of this final research project and started her PhD at the UMCU. The focus of her PhD project was on dialogic interprofessional feedback processes in health professions education. As part of this project she worked on the development and implementation of large-scale mandatory interprofessional (feedback) education for 5th-year medical and 4th-year nursing students of Utrecht Universit and Utrecht University of Applied Sciences respectively. During the COVID-19 pandemic she worked on digitalizing and hybridizing the training program. In 2022-2023, using a grant received from the Harmen Tiddens Society, she followed the Medical Educators Course at the Harvard Macy Institute where she learned about leardership, change management and educational theory in health professions education. As part of this course, she initiated the development of a trajectory of feeback education based on the theoretical principles developed as part of her PhD project. Finally, throughout her PhD, she took part in the Life Sciences Education Reseach PhD program, learning about educational methods and theories.

In september 2024 she will start working in a post-doc position at the UMCU, enabling her to continue her work in the interprofessional and feedback research fields. She lives in Utrecht with her partner Ruben and enjoys hiking, reading, and creative writing in her spare time.



LIST OF LSER DISSERTATIONS

The Life Sciences Education Research PhD program was founded in 2021 at Utrecht University. The program is dedicated to prepare and support (care)professionals in (bio)medical sciences and health professions education (HPE) for providing outstanding (bio)medical quality and safety in collaboration with patients and other stakeholders in the complex environment of health. The programme aim is linked to quality and innovations in education at all academic levels as well as continuous education of professionals by translating research to learning. The program encloses several interconnected themes on research of learning in the Life Sciences from a multidisciplinary perspective, e.g.: diversity and inclusion, interprofessional learning and feedback, teachers' professional development, continuous education, participation of patients in education, digital tools in education, translational science, and more *(www.uu.nl/en/education/graduate-school-of-life-sciences/phd/starting-your-phd/phd-programmes-gsls/life-sciences-education-research).* Claudia Tielemans is the 9th candidate to graduate the program. It's prior graduates are listed below.

1. De Jong, L.H. (Lubberta). Unraveling programmatic assessment: Issues of Validity in high-stakes decision-making. 06-09-2022

2. Kurysheva, A. (Anastasia). Admissions to graduate studies: Selection methods for life and natural sciences masters' programs at a European research university. 15-11-2022

3. Vermond-Engel, D. (Debbie). Towards learning healthcare systems: Collaboration and boundary crossing in research and practice. 02-02-2023

4. Van Dijk, E.E. (Esther). Teacher Expertise of Academics in Research-Intensive Universities: A Task-Based Approach. 02-06-2023

5. Eijkelboom, M.C.L. (Charlotte). Learning from Patients: Understanding student experiences with patient involvement in medical education. 13-09-2023

6. Kools, F.R.W. (Farah). Navigating Translational Medicine in Academia: How Can Translational Scientists Be Rewarded and Supported in Their Careers? 23-04-2024

7. Schellekens, L.H. (Lonneke). Assessment to support student learning in higher education. From theory to practice. 04-09-2024

8. Reincke, C.R. (Cathelijne). Equipping biomedical students for science-society dialogue: Exploring competencies and training strategies. 15-11-2024

9. Tielemans, C.J.M. (Claudia). Fostering students' interprofessional feedback dialogues in health professions education. 03-12-203