The use of feedback and feed-forward action plans on the development of clinical skills in undergraduate medical students

By

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To

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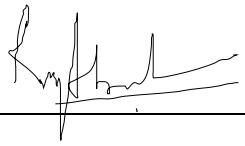
Signed:  Date: 19th December 2019

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ACRONYMS

OSCE - Objective structured clinical examination

MSc – Master of Science

ZPD - Zone of Proximal Development

FIT - Feedback intervention theory

NRMSM - Nelson R. Mandela School of Medicine

UKZN - University of KwaZulu-Natal

HA - High achievers

AA - Average achievers

LA - Low achievers

TGA - Task, Gap and Action

PBL - Problem-based learning

DP - Duly performed

ETT - End of theme test

JVP - Jugular venous pulse

ABSTRACT

Background: Deliberate practice is a concentrated learning strategy aimed at achieving a defined goal and feedback enables skills and behaviours to be corrected or reinforced for improved patient care. Clinical skills are initially taught during the pre-clinical years in a clinical skills laboratory using simulated patients and manikins before applying them on real patients. There is a need to increase medical students' engagement, orientation, acceptance and assimilation of feedback to enhance their clinical competence. To move feedback forward and to encourage a change from a unidirectional teacher-learner dialogue to a co-constructed dialogue, feedback strategies or 'feed-forward action plan interventions' need further investigation.

Aim: To explore the medical students' receptivity to feedback, their engagement with feedback interventions and the role of deliberate practice in tutor and peer clinical skills logbook formative assessment feedback.

Methods: This mixed methods study comprised of both quantitative and qualitative aspects. Five semi-structured focus groups were conducted with twenty-five purposively selected third year medical students. In the first study, data was thematically analysed through a psychological framework, underpinned by four psychological processes: Awareness, Cognizance, Agency and Volition, to understand learner behaviour to feedback reception, interpretation and uptake. In the second study, high and low academic performing students' experiences of self and peer feedback was explored. In the quantitative part of the study we adapted and developed a feedback scoring system based on the deliberate practice framework to assess the quality of the feed forward strategy implemented in the 2nd and 3rd year medical students tutor and peer logbooks to identify deliberate practice components i.e. task, performance gap and action plan. The sample consisted of 1025 feedback responses.

Results: This study found that awareness, understanding, agency and volition revealed facilitators and barriers to feedback receptivity. Feedback aligning with the personal goals of the learner, the reliability of the teacher in delivering feedback and establishing relationships strengthened reception. The depth and timing of feedback utilization varied among students as their self-regulatory focus on the feedback process dominated their active use of feedback. Students with lower performance believed they lacked adequate skills to engage with self and peer feedback interventions. Higher-level students reported that receiving peer input helped them take responsibility for tracking and assessing their learning, suggesting that students require numerous self-evaluation opportunities to improve their judgment over time. Teacher feedback on interventions testing clinical cognition had a positive impact on feedback engagement and self-regulating learning. Analysis of the 2nd and 3rd year written feedback revealed all three deliberate practice components with a higher peer than tutor frequency in both classes respectively. Decreased student achievement was associated with increase in tutor gap

and action feedback scores and vice versa in peer scores. The overall quality of feedback provided by tutors and peers was moderate and less specific (average score < or =2).

Conclusion: Using the deliberate practice framework improved the feed-forward quality of feedback as comments contained elements facilitating deliberate practice. Providing constructive feed-forward feedback linked to tasks learning objectives and assessment outcomes has the potential to promote self-regulation by stimulating self-awareness and self-directed monitoring through reflection-in-action. The less competent learners received and used feedback differently and the above effects were either immediate or undeveloped. To motivate immediate feedback engagement due to their self-regulatory focus of postponing feedback use closer to exams, this study recommends the novelty of integrating the logbook sessions with a feedback design that makes learners actors in the feedback process after receiving feedback. Newer feedback initiatives that target a feedback intervention for learners to scaffold feedback by reflecting and formulating self-generated performance improvement goals based on what they did well and areas that need improvement would serve as a source of coaching to facilitate feedback interpretation and utilisation to feed forward. Goal setting supports learners' active engagement with feedback by stimulating them to read and understand the feedback, identify areas that require development, develop learning goals and then convert these goals into action by adjusting their behaviour. Equipping learners to engage with peer feedback processes through the feed forward intervention enables development of shared responsibility and self-directed learners with greater agency over assessment and feedback process. Responsibility sharing has the potential to ensure sustainability of the educator's effective feedback practices reducing the emotional burden on both students and educators.

This study emphasises the importance of a clinical skills feedback culture as a faculty development programme to strategically direct student learning by reinforcing desirable behaviour change towards professional identity and professionalism. Further, a novel approach based on psychological processes to understand the barriers and facilitators of feedback receptivity is proposed. Using a theoretical framework based on deliberate practice and feedback intervention theories, this study expands our understanding of factors influencing the situational and learners' self-regulatory use of feedback. In addition, a conceptual framework and a feedback-scoring tool are proposed to pave the way for moving feedback forward and to highlight the importance of feedback-feed-forward action plans.

Key words: Clinical Logbook; Feedback; Evaluation; Deliberate practice; Feed-forward; Feedback literacy; Feedback culture; Clinical skills, Formative Assessment

CHAPTER 1: INTRODUCTION

In this introductory chapter, the role of deliberate practice in developing clinical skills in undergraduate medical training is discussed. The concept of feedback as an essential tool in enhancing clinical competencies in medical education is highlighted. The essential elements of giving feedback are outlined. The concept and challenges of receiving, engaging and using feedback in the undergraduate clinical skills training platform, are elaborated upon. We discuss a theoretical framework on integrating the deliberate practice and feedback intervention theories to evaluate the quality of feedback and then explain how the situational and learners' self-regulatory focus influences the use of feedback. We use a conceptual framework to pave the way for moving feedback forward and show the need for a feedback-feed-forward action plan. This is followed by a discussion of the purpose and significance of the research and the aim, objectives and methodology of the overall study.

1.1 Background

Deliberate Practice and several years of experience are essential for the development of clinical expertise (Cate & Caraccio, 2019). Medical education is changing rapidly to establish qualified and reflective professionals who can self-direct their professional development (Frank et al., 2015). Professional competence of medical students, in the long run, improves the overall quality of care experienced by the users of the healthcare system. The professional skills of a doctor are complex and require both clinical skills (technical skills and knowledge, such as the ability to perform and interpret medical procedures) and behavioural skills (interpersonal skills, including the ability to communicate efficiently, use discretion and empathy, and maintain relationships) in their everyday tasks (Isser et al., 2010). Performance assessment of medical students' competence measures the outcomes achieved through the application of both clinical and behavioural skills using a variety of measures. Clinical competencies measured in terms of formative and summative assessments provide formalized feedback to medical students, reflecting their clinical knowledge and technical skills. Both clinical and behavioural competence skills assessed through direct observation during teacher assessment, peer assessment, and self-assessment over a period from different perspectives, are useful methods of providing feedback (Anderson, 2012). In medical education, regulating performance through external assessment feedback, as well as encouraging self-assessment feedback, are crucial to the advancement of independent practice (Ramani et al., 2018). A systematic review of the impacts of feedback on clinical performance by Jamtvedt et al. (2006) showed that positive feedback effect among inexperienced students is perhaps more apparent than it is among experienced practitioners. These findings indicate that the ideal stage to provide feedback would be during the formative phase when behaviours are still relatively malleable, as in the early phase of clinical training. However, processes used to provide this type of performance feedback in the medical profession are less formalized and are used less frequently (Vorster, 2011). This warrants further investigation particularly in preclinical medical training.

1.2 The Role of Deliberate Practice in Developing Clinical Skills

The primary goal of medical education is to train medical graduates for clinical competence (Duvivier et al., 2011). Competency has been defined as "an observable ability of a health care professional that develops through stages of expertise from novice to master clinician" (Frank et al., 2015, p.7). It includes basic knowledge of the skill (for example, the indications, contra-indications, and complications), and the ability to perform the skill in the clinical setting. Clinical competence involves developing a complex thought system involving the ability to remember, understand, imagine and practice (Mattingly & Fleming, 1994; Sternberg, 2002). One way to acquire these skills is through deliberate practice, which involves baseline clinical performance assessment (formative

evaluation), accompanied by feedback, and subsequent clinical performance analysis (summative evaluation) (Veloski et al., 2006; Ericsson, 2007).

Ericsson proposed the idea of 'deliberate practice' by describing education as organised tasks specifically oriented to improve performance in a certain sector (Ericsson, 1993, p.368). Deliberate practice is a concentrated learning strategy aimed at achieving a defined goal (Duvivier et al., 2011). The practical implementation of the theoretical construct of Ericsson (2004) requires practices aimed at improving the quality of skills. These include repetitive and organized psychomotor and cognitive performance, continuous rigorous evaluation of abilities, constructive feedback, and opportunities for improvement through repetition (Ericsson, 2007; Krackov & Pohl, 2011). Such deliberate practice strategies that were used in the coaching of learners in non-medical fields are useful in developing medical students' clinical skills from novices to experts (Gauthier et al., 2015). Clinical performance has been shown to be enhanced by deliberate practice using medical simulators (Issenberg et al., 2005) with simple specific tasks such as simulation-based training for laparoscopic procedures (McGaghie et al., 2011). It can be hypothesized that the deliberative learning concept, and the evidence available for its effectiveness, will effectively impact undergraduate medical students' clinical performance, and encourage their professional growth through deliberate practice-based training involving assessment and feedback experiences (van de Wiel et al., 2011).

In line with the deliberate learning framework, the Doctor Coach model (Figure 1) developed by Gifford et al. (2014) has shown that a one-to-one coach-learner relationship is key to improving skill performances. It subsequently helps a learner apply deliberative techniques to enhance his performance over time, and with less reliance on the coach. Gifford et al. (2014) explained further, how the framework explains all the steps necessary to be an active coach. It involves setting up a coaching atmosphere through building skills milestones i.e. knowledge, attitude and practice, by actively monitoring the progress of a learner, promoting a learners' self-assessment, synthesizing the learners' performance evaluation, encouraging reflection, establishing a formative feedback process, goal-setting, and fostering training. The process repeats several times until a skill is established, and ends with a summative assessment (Figure 1). The dotted line in figure 1 between milestones/learner self-assessment and summative evaluation emphasises that at appropriate intervals during the couching process, the coach and learner should review and evaluate how the student is progressing according to the students implemented action plan and whether features of the plan should be revised.

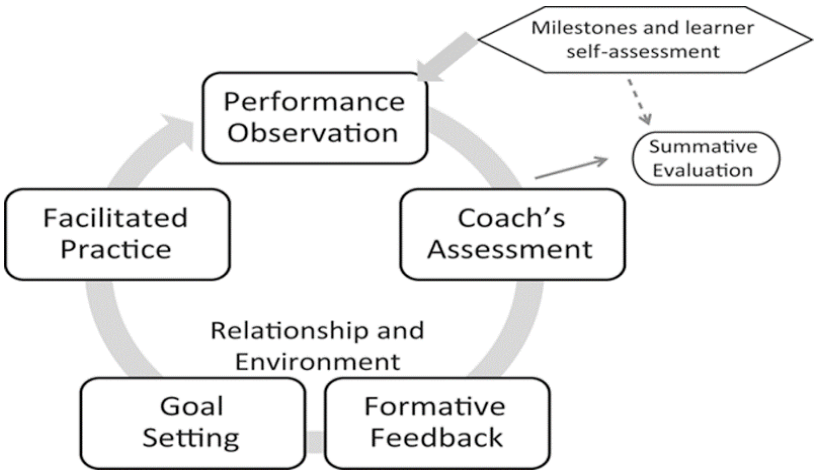

Figure 1: The Doctor Coach framework (Gifford et.al., 2014)

The cultivation of deliberate practice is known to change the learning process in a number of areas, including the attitude, knowledge and skills required to become a competent professional (Heiman et al., 2012). These changes in the learning process are continuous and hence to ensure that this change is developmental, fair and purposeful feedback which helps students identify their abilities and strengths, as well as areas that needs improvement, is integral to the deliberate practice learning process. Deliberate practice with an effect on acquiring skills such as oral presentations (Heiman et al., 2012) and OSCE (objective structured clinical examination) has been related to positive outcomes (Duvivier et al., 2011). Such data show that the encouragement of deliberate practice increases medical efficiency and relies on the reliability of the feedback received (van de Wiel et al., 2011; Gauthier et al., 2015).

1.3 Feedback in Medical Education

Feedback, considered the 'lifeblood of learning' is a key component of undergraduate medical education (Rowntree, 1987, p.27). In medical education, feedback is defined as "specific information about the comparison between trainees' observed performance and a standard, given with the intent to improve the trainees' performance" (Van de Ridder, 2008, p.93). Therefore, an important requirement for successful feedback in medical education is that performance must be monitored by clinical instructors who closely supervise the clinical practices of the trainee over a period, in order, to provide real examples of beneficial and inappropriate behaviours to the learner (Anderson, 2012).

Hence, one of the key steps in acquiring clinical skills and the cornerstone of effective clinical teaching in medical education is feedback (Ende, 1983; Cantillon & Sargeant, 2008). According to Vorster (2011), feedback on a students' clinical performance occurs in a shared understanding process through which teachers provide students with knowledge of their clinical performance, and students have the option of responding to the feedback. Students' confidence that feedback can be used in

future tests, to strengthen their training and direct their behaviour is linked to the feed-forward concept (Hattie & Timperley, 2007). Students' often seek feedback when they see it as a measure of their improvement and a tool that provides insight into the areas that still require work (Wright, 2012).

A fundamental component of effective teaching in the era of competence-based medical training and assessment is the development of an environment in which feedback is required, valued and comes from multiple sources, including instructors, colleagues and other members of the team (Archer, 2010). The formative performance-based feedback acts as a bridge between the learners' expected learning goals and achievement of outcomes, and hence is critical to informing learners whether their performance is at the expected level. It is essential that learners are provided with frequent, specific, non-judgmental and detailed information about their clinical performance as close as possible to the observed performance. Feedback should focus on specific issues relating to the performance standards and it should be clear and objective, informing students about their strengths and areas for development, including whether they are meeting the required standards (Koen et al., 2012). Feedback should be forward-looking, aimed at the intended outcome, and hence related to the task's learning objectives to help learners evaluate their progress (Koen et al., 2012). Learners' should then generate action items or performance improvement plans to achieve their objectives, thus closing the performance gaps to complete the feedback loop (Jackson et al., 2016; Ramani et al., 2018).

As a catalyst to drive learning, medical learner competence development is associated with the number of daily assessments combined with the quality of observation-based formative feedback, they receive from their clinical tutors (Norcini et al., 2011; Griffitts et al., 2016). Feedback described by Egan (2002) as confirmatory or corrective. Confirmatory feedback provides information to students on whether clinical performance is effective. Corrective feedback provides information to students in the form of an action plan, asking them if they are moving off course and how their learning can be strengthened. With the lack of constructive guidance student learning takes place by trial and error, leaving them believing they are doing what should be done (Chur-Hansen & McLean, 2006). Corrective action will hence, not be supported in the absence of feedback and has a negative implication for student learning and professional development (Vorster, 2011).

Medical educators often aim to provide trainees with high-quality feedback, but sadly, students often receive poor quality and inconsistent or insufficient feedback (Schartel, 2012; Al-Mously et al., 2014; Abraham & Singaram, 2016). There is further difference between the amount of feedback students think they are getting and the quality of feedback educators feel they are offering (Abraham & Singaram, 2016).

Many educators have suggested best practice for 'giving' feedback, but neither the feedback sandwich model that prioritizes to start and end with positive feedback, with negative feedback in between (Dohrenwend, 2002), nor the Pendleton model which blends learner self-assessment with teacher

feedback (Pendleton, 1984), emphasizes action plans in their execution. Further, these models have not shown improvement in learner performance (Parkes et al., 2013).

While assessment and feedback are thought to have a beneficial impact on future results, it is not well understood how feedback contributes to improved clinical skills (Gauthier et al., 2015). Several researchers described both feedback processes (Bing-You & Trowbridge, 2009; Kluger & Van Dijk, 2010; Milan et al., 2011; Anderson, 2012) and content (Van de Ridder et al., 2008; Archer, 2010; Anderson, 2012) as important factors leading to improved learner performance. Using these feedback process and content factors to assess feedback quality and if feedback influences achievement is still not understood (Veloski et al., 2006; Shelesky et al., 2012; Gauthier et al., 2015), thus warranting further exploration.

1.4 Receiving and Using Feedback to Feed-Forward

Receiving feedback is not as straightforward, compared to giving feedback, because it requires deep reflection and a commitment to developing knowledge and skills (Telio et al., 2015). De Nisi and Kluger (2000) have highlighted a higher feed-forward capacity compared to feedback in their analysis of the paucity of feedback efficacy in their work. Feedback is in fact the most significant aspect of the evaluation process, which improves student learning if it acts as a 'feedback' and shows the difference between a learners' assessed progress and the learning goal to facilitate feed-forward (Evans, 2013; William, 2011). While feedback is given in different clinical settings, surveys indicate discrepancies in the satisfaction of medical students with the feedback obtained (Weinstein, 2015). The findings of the UK National Student Survey recently revealed the discrepancy between the potential advantages of feedback and the current feedback activities, which struggle to influence future learning in a variety of ways (O'Donovan et al., 2016).

Despite the fact that students respect and want good feedback (Higgins et al., 2002) they do not find the feedback beneficial (MacLellan, 2001), as it is too vague (Weaver, 2006), without clear outcomes and guidance on how to change (Burgess, 2015) and that they either do not understand it or misinterpret it (Scoles et al., 2012). Other reasons highlighted are that feedback is, given too late, and is therefore no longer relevant. In addition, emphasis placed only on students' grade or marks generally relates to students' ability rather than a more specific description of their individual piece of work, with poor grades known to damage their self-efficacy (Price et al., 2010). Therefore, higher education is faced with a feedback problem as to why the theoretical potential of feedback and the actual reality of feedback vary.

Askew and Lodge (2000) pointed out that 'expecting' to improve the ability of teachers to provide feedback means that learners will change their practice and improve their performance and learning, but they note that "how learning can result from feedback" is not taken into account (p.6). There is

also, “a growing body of evidence which indicates that the potential learning benefits of providing students with feedback, however well crafted, are often not realised, with many students not valuing or understanding the feedback provided” (King, McGugan and Bunyan, 2008, p. 145). Therefore, both sides of the feedback question i.e. both tutor provision and student use are challenging.

Research by MacLellan (2001) indicates that tutors are working on the premise that the guidance instructions they provide to students helps them learn. Nonetheless, her review of this study shows that several students may not think feedback from the teacher is beneficial. Students mentioned that feedback did not enhance their communication with tutors, nor did it enable them to understand the evaluation process or enhance their learning. This frustration with feedback due to confusion or misunderstanding between students and staff therefore reinforces students’ use of feedback as one of the poor links in the evaluation chain (Carless, 2006).

Besides poor feedback quality or feedback missing in most situations, existing feedback strategies fail despite the argument that feedback on learning is successful (O’Donovan et al., 2016). In addition, students’ failure to take note of feedback often discourages lecturers from giving feedback. Therefore, knowing why students do not always use feedback is crucial (Pitt et al., 2016). O’Donovan et al. (2016) suggested that in spite of the context of student-centered teaching practices being, well established in most higher education institutions, feedback is still transmission-focused and unidirectional. This, he argues, is because the social constructivist processes and evidence-based methods such as assessment literacy are usually, not being implemented. As a result, there continues to be little focus on student activity in the feedback processes. Feedback must, therefore be viewed as a process where students are willing to receive feedback, interact with it and then take action (O’Donovan et al., 2016). It cannot necessarily be presumed that students would decide what to do with the feedback they receive (Sadler, 1989).

For the feedback process to be effective it must be, used by the receiver. Prior research identified numerous reasons that limited students use of feedback, but these obstacles have not been systematically addressed. In a recent focus group study conducted on undergraduate psychology students, Winstone et al. (2017) grouped their analysis of the learners’ reflections on factors that prevented feedback use into four broad kinds of psychological barriers that underpin learner behavior to feedback. These are:

- Awareness - One of the reasons students did not engage with feedback was their lack of comprehension of the feedback message or they did not know what the message was for. There may even be a misalignment in the interpretation of the meaning and intent of feedback by students and educators (Jonsson, 2013).

- Cognizance - The lack of knowledge of opportunities for students to use and apply feedback effectively was another reason they did not engage with feedback (Jonsson, 2013). Often students may recognize that a particular skill may need strengthening, but they may also need to know how to enforce the change in terms of what steps to take and how to ensure that the steps they took or their actions are successful (Nash & Winstone, 2017).

- Agency - Students often feel inadequately prepared to implement feedback or feel like their efforts would be futile even if they try and thus may find it hard to receive feedback. In addition, students may consider that their previous attempts to respond to feedback may have failed to see their performance enhancements over time and may therefore give up (Nash & Winstone, 2017). There may also be a lack of agency as students feel that the skills applied in feedback are static and not transferable between assessments (Orsmond et al., 2005; Jonsson, 2013).

- Volition - Students may actually lack the motivation for feedback for many reasons (Nash & Winstone, 2017). Some are time constraints, or unable to invest time instantly, as engaging with feedback requires a willingness to engage (Handley et al., 2011) and a further "commitment to change" (Bing-You et al., 1997, p. 43).

Since, there is limited published literature on the use of psychological frameworks in medical education there is a need for further exploration of its use to understand feedback in clinical settings.

Feedback in medical education presents additional challenges, especially in the real-life patient care context. When medical students graduate to become professionals, they are the first-line patient care providers and hence their autonomy at work is significant. The importance of feedback lies on its impact on recipients and not only on how it is provided (Boud & Molloy, 2013; Boud, 2015). Only if learners view it as trustworthy and compatible with their own assessment do they embrace feedback (Mann et al., 2011). With the goal of changing learner performance behaviour, knowledge of factors that influence feedback credibility would be beneficial especially for teachers providing feedback (Ramani, 2018). The feedback loop remains incomplete until the students act on the feedback (Boud, 2015). This warrants the need for a more learner-focused model where the learners contribute equally to the feedback process by being active seekers, engagers and users of feedback rather than passive recipients (Krackov, 2011; Krackov & Pohl, 2011).

Exploring how and whether feedback has been received, accepted and assimilated into performance is necessary. To effectively do this, many factors related to feedback provider, feedback receiver and the social context that affect the learners' reception to feedback and methods for using feedback should be evaluated and understood to validate the learners' performance improvement within the feedback

loop. Hence, in light of the several constraints on learner feedback reception, it is essential to shift the focus of the feedback conversation from the teacher to the learner and towards learners' feed-forward strategies placing more emphasis on their engagement with learning goals, their goal orientation, acceptance and assimilation of feedback (Ramani, 2018).

1.5 Engaging Students with Feedback

Educators find it a challenging task to engage students with feedback contained in assessments (Watling, 2016). The first is preparing students for feedback engagement and use, and the second is motivating them to engage with feedback because of its importance and effectiveness (O'Donovan et al., 2016). Although faculty are aware that the goals of feedback sessions are to improve learner performance, providing constructive feedback and engaging students in feedback conversations can be a challenge due to psychosocial factors (Watling et al., 2013). Such factors include tension within the clinical learning environment, time constraints, relationships between feedback receiver and provider, and emotions associated with feedback comments perceived as too critical. This illustrates how the experience with feedback requires a complex exchange of information. This is because teachers do not want to appear harsh when providing feedback, while concurrently maintaining the learners' self-esteem and their relationship with the learner (Watling, 2014; Sargeant et al., 2011). Knowledge of factors that promote an effective feedback culture, enhance feedback engagement, feedback-seeking and influence bidirectional feedback, would further advance our knowledge in this field.

The approach linked to developing academic literacy to improve students' engagement with feedback, as suggested by O'Donovan et al. (2016), implies preparing students ahead to understand the feedback provided to them. This involves assisting learners through learning activities to make the connection between feedback and the characteristics of their work and know what to do with the feedback provided, to improve their future work. This, in turn, could make them more likely to engage with, understand and value the effectiveness of feedback as well as share in the responsibility of making the feedback process effective. Students who are assessment literate are effective learners, as they are more familiar with the assessment and feedback approaches. They will tend to understand the evaluation criteria and performance standards in a similar manner as their tutors, and will be able to evaluate their own work and that of their peers (Price et al., 2012). Engaging students in assessment exercises such as assessing the work of peers (Careless et al., 2011) or through the development of the skill to reflect (Maria et al., 2016) and self-assess (Fisher et al., 2011), develops their self-assessment skills and responsibility for their work and its quality over time. The best way to optimize clinical performance is to combine internal information from reflection and self-assessment with external information from a tutor or peer feedback (Pelgrim et al., 2013). This has the potential for improving

self-regulated learning as well as stimulating personal and academic development (O'Donovan et al., 2016).

Self-regulation refers to the degree to which students may regulate aspects of their thought, motivation and actions while learning (Zimmerman & Schunk, 2001). Self-regulation requires that students have certain targets in mind to measure and assess performance. They generate internal feedback as they monitor their engagement with learning activities and tasks and assess progress towards goals. Therefore students who are more effective at self-regulation will tend to produce better feedback or are more able to use the feedback they generate to feed forward and achieve their desired goals (Butler and Winne, 1995).

Insights obtained from a focus group survey to examine students' use of feedback from a postgraduate Masters level course undertaken by Maria et al. (2016) revealed, that all participants acknowledged that very little feedback had been provided before MSc (Master of Science). It is unclear whether feedback was not appreciated in its various forms, or whether substantial feedback was hindered by ever-increasing class sizes. Nevertheless, having never had the habit of reflecting on feedback, many of them admitted that they did not use the feedback they received at the level of MSc. This suggests that previous training environments have influenced performance aspirations and the need for feedback (Christopher et al., 2016), suggesting that students at all levels need not only support in their studies, but also guidance, to actually use the advice that they receive. A method to encourage students' engagement and use of feedback to improve future work would require training learners to use feedback by getting them to reflect on the feedback provided (Maria et al., 2016). Reflective feedback evaluates students' recognition of received feedback, their understanding of received feedback, their interpretation of feedback comments, and their ability to connect feedback comments, with their work. Hence, learners' capability to identify their strengths and weaknesses, and set learning goals as action points, and their ability to, effectively use this feedback action points to feed-forward into future assessments can be evaluated (Quinton et al., 2010).

As a mechanism for diagnosing learner insight into their performance, teachers need to facilitate self-assessment and reflection as internal feedback to validate what has been done well and discuss areas that need improvement (Epstein et al., 2008). Feedback programmes that include educator skills to promote learning skills in fostering a supportive learning environment such as discussion of learning objectives, self-assessment and learner-improved performance action plans, are likely to have a greater impact on learner behaviour change and professional development (van de Ridder et al., 2015). Nonetheless, in real-life feedback interactions, there is little knowledge about learners' actual behaviour and practices regarding engagement with learning goals and the use of feedback action plans, and this is an area that needs more study (Ramani et al., 2018).

Since the research, involves assessing the quality and impact of engaging with feedback it is important to discuss how the sociocultural theory relates to peer feedback in competency-based assessment. Russian psychologist Lev S. Vygotsky has explained the sociocultural theory that society contributes to individual development and that the people learn in large part through social interactions (Vygotsky, 1978; Wertsch, 1991). He put forward the construct "Zone of Proximal Development" (ZPD) that is enabled when a community of learners works together to build individual development. The ZPD refers to the difference between the actual development of an individual as a result of their autonomous or self-resolution and the potential development of the person by peer-assisted learning. Patient care is part of a team-based system in the clinical environment, where doctors collaborate and learn from their colleagues and other multi-professional personnel. Therefore, team members learn and develop from one another beyond the medical school environment. As transformation and learning occur through participation and collaboration in sociocultural activities, also called a community of practice (Wertsch, 1991), there is the need for institutions to encourage learners in activities such as peer assessment feedback, as a feed-forward initiative to support students' engagement with feedback and learning development. Learners' perspectives regarding institutional cultures that actively promote engagement with feedback through self, teacher and peer feedback in medical education, and how they impact on the quality of the feedback process targeting performance improvement, are under-examined (Winstone et al., 2017). Hence, there is a need to examine in more detail, institutional cultures that support and embeds feedback and feed-forward initiatives to improve its frequency and quality within a given institution.

1.6 Theoretical Framework

1.6.1 Integrating Theory of Deliberate practice with Feedback Intervention Theory to Evaluate Feedback Quality

With clinical skills evolving over time and influenced by many factors, it can be difficult to study feedback's direct influence on learners' clinical performance (Gauthier et al., 2015). Nonetheless, the use of the model of deliberate practice might be a helpful way to evaluate feedback quality, if expertise development is a major objective of the formative assessment. Feedback should include elements that enable deliberate action to make feedback effective and facilitate learning (Griffith et al., 2016). The learner must know the task-related learning goals. To inform them of their specific needs, such as progress, lack of progress, or knowledge gaps, their task performance should be directly observed and compared to this standard. There then needs to be a prompt action plan to motivate and engage learners in appropriate cognitive and psychomotor learning activities to reduce the learning gap. Feedback should, therefore be clear and objective informing learners about strengths and areas for development focusing on specific task issues and if they are meeting the required

standards. Finally, action needs to be taken by the learner to close the learning gap to improve future performances.

Ericsson (2007) explained that the concept of deliberate practice suggests that growth in competence requires the incorporation of self-reflection in the cycle of skill creation and not just repetitive task performance, until it is, mastered. To ensure efficiency, Ericsson (2007) suggested that time for self-reflection and instant feedback is crucial to allow the learner to self-adjust or self-regulate and make adjustments to complete the feedback loop before the next task performance. Through repetitive cycles of focused training and self-editing, stressing one or more aspects of the desired skill in each cycle, mastery is achieved. Individuals can build expertise in targeted areas with adequate time and dedication to deliberate practice principles (Ericsson, 2007). As a lifelong learning process to gain knowledge, this self-aware form of training and assessment coupled with feedback improvement plans is necessary (Ericsson et al., 1996). It is therefore important to promote a learning goal orientation among clinical learners as they develop into reflective and independent practitioners.

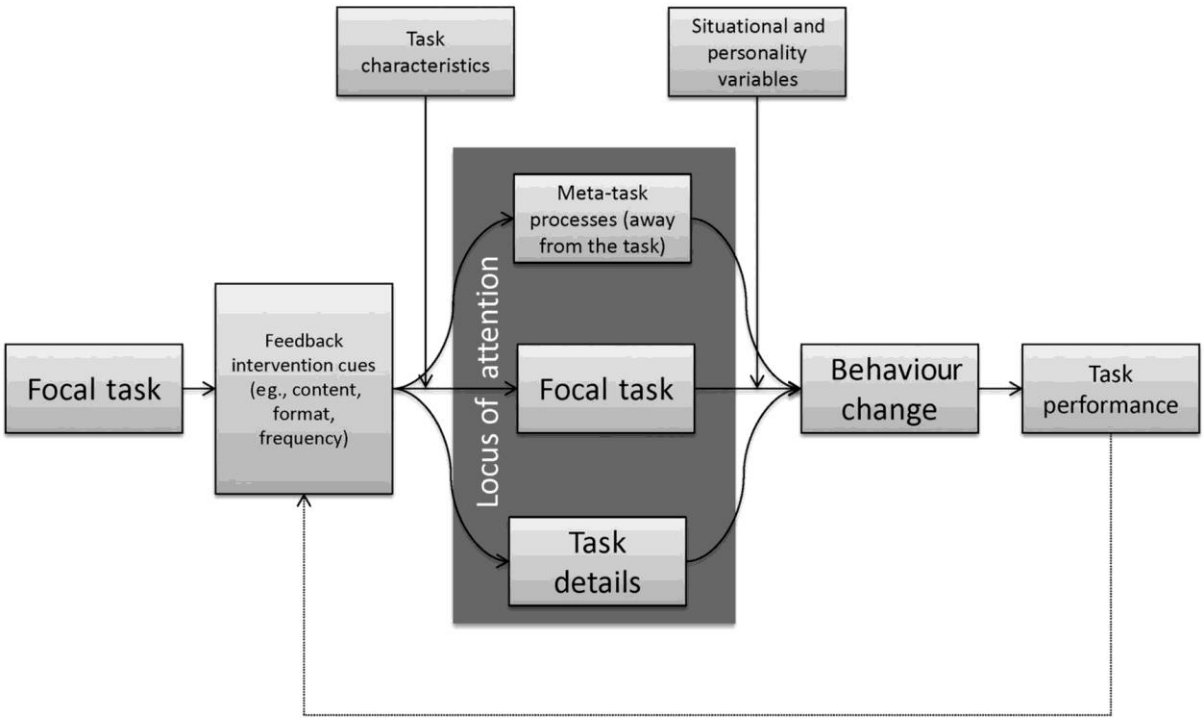

Figure 2: Kluger & DeNisi's Feedback Intervention Theory (Kluger & DeNisi, 1996)

In a systematic study and meta-analysis of research defining 600 effect sizes, Kluger and DeNisi (1996) suggested that the impact of feedback on performance might be highly variable in that feedback may not always improve performance, but may also decrease performance. Based on their work, the Feedback Intervention Theory (FIT) they developed explains the feedback operating

mechanisms (Figure 2). The mechanism through which feedback works is based on the theories of cognition and motivation. It suggests how feedback works and what indications are likely to improve efficiency of feedback as an essential pre-requisite to designing better feedback interventions. People control their actions by trying to compare it with standards or committed goals according to the FIT (Locke et al., 1990). When a discrepancy is found between their actual behaviour and the norm, they attempt to solve this difference by changing their level of effort to match the predicted behaviour. The level of attempt that an individual undertakes to meet the benchmark behaviour can be changed by providing feedback on their performance.

Feedback strategies operate by providing new feedback information that either distracts the user from the task and towards them or directs their focus towards reflecting on the task. Kluger and DeNisi (1996) have suggested three factors that determine the success of this change. These factors include the features of the feedback comments, the nature of the characteristics of the task, and the variables of personality and situation. They indicated that the nature of the feedback comments determine which direction the attention will likely shift. The characteristics of the task decide how sensitive the task is to the change in attention. The variables of personality and situation determine how the recipient of feedback chooses to change once the shift of attention occurs. Feedback comments, which focus attention on the focal task enhances motivational processes and reinforces the feedback effects on task performance to foster a performance goal orientation. On the other hand, feedback signals that focus attention at task details facilitate learning as well as reinforces feedback effects on the performance of the task. This encourages a learning goal orientation in the learner, focusing on improving their knowledge and skills with the goal of developing clinical skills and becoming a professional. Feedback, however that leads us away from the task and towards ourselves, distracts cognitive resources from attempting to improve. This thereby weakens the impact of feedback on task performance.

The FIT further discusses how to combine and differentiate the three control stages of the feedback system. As indicated in Figure 2, the self or the meta-task processes at the top of the hierarchy affect the task-motivation processes in the middle of the hierarchy that involve performing the focal task and the task-learning processes at the bottom of the hierarchy that include the task details. Meta-task processes can affect task processes (i.e. both task-motivation processes and task-learning processes) by relating higher-order goals (self-directed or self-efficacy goals to engage in one's career) with task goals (i.e. incentive to learn and execute the task to enhance clinical performance) (Kluger & DeNisi, 1996). Constructive feedback on the difference between the performance achieved and the expectation, according to the FIT, will direct the learners' attention to the task-motivation processes, resulting in more self-effort (i.e. self-assessment, self-reflection, and self-regulation). Furthermore, if the gap is not minimized, the focal point can be shifted to task execution components or to task-

learning processes that lead to the performance of a task, or focus can be relocated to self-assessment (meta-task) matters.

Therefore, the influence of feedback on performance depends on how feedback, is received and about the processes where feedback is directed. Feedback signals targeted to the task-motivation processes or task-learning processes, combined with corrective information are presumed to improve effects on performance. Nonetheless, feedback signals that affect the meta-task processes or the self can decrease the performance feedback effect, as they seem to detract from the goal (Kluger & DeNisi, 1996).

Feedback, therefore, affects many different phases of the learning cycle. Providing feedback improvement strategies that reduce the gap between the actual performance and the standard as a form of instructional scaffolding allows teachers to help learners identify if their performance meets the standard. Such feedback assists learners to understand the expected steps related to the learning goals to complete the task as a means to motivate feed forward and reach a better performance. This thereby enhances one's self-efficacy beliefs towards bringing behaviour change, performance improvement, and skills development under learner control (Bruning & Horn, 2000).

The core explanatory theme of FIT is therefore not how feedback affects learning and motivation, but how feedback focuses on feed forward to change of behaviour, so that students feel regulated and controlled (Kluger & DeNisi, 1996). The various elements that form part of the FIT are based on the theory of motivation which suggests that people tend to change their actions if there is a perceived difference between their current behaviour and the behavioural target they want to achieve (Annette, 1969; Gardener, 2010). If there is a large discrepancy between the current practice of the learner and the target and there is no guidance scheme on how to solve the difference, the learner will tend to give up and, therefore, feedback would have a negative effect on performance. Furthermore, it is recommended that a consistent articulation of behavioural performance expectations and action plans to achieve those goals accompany feedback dialogues during an assessment session in order for the control theory to be effectively implemented.

Kluger and DeNisi's FIT (1996), in addition to proposing how effectively learners' attentional shift to feedback utilization occurred, suggested that the impact of feedback interventions on learner performance found no evidence that the outcome of feedback was moderated by feedback being either positive (information on success) or negative (information on failure). There are thus no disparity in the feedback effects between positive and negative feedback (Van Dijk & Kluger, 2010). Their meta-analysis further suggests that the influence of feedback interventions on an individual's performance was affected by the situation in which feedback was received as well as the personality of the individual (Figure 2). More clarification will be required for the mechanism by which this happens, along with why neither positive nor negative feedback constantly affects performance.

1.6.2 The Situational and Personal Self-regulatory Focus on The Use of Feedback

While the FIT emphasizes the aspects of learning goals and task difficulty when delivering feedback, the Regulatory Focus Theory speaks about aspects of promotion and prevention focus in relation to feedback. Engagement with and application of effective feedback should include careful consideration of both the intimidation to the self and an individual's situational regulatory focus (Van Dijk & Kluger, 2010; 2004). The benefits of either negative or positive performance feedback depend on the regulatory focus of the person. The feedback that undermines the self is prone to incapacitate the recipients of feedback, with both positive and negative feedback likely to have similar effects on performance (Van Dijk & Kluger, 2010). According to Higgins' self-regulation theory (Higgins, 1997; 1998), an individual has two situational regulatory foci depending on the task to be performed. Some tasks are known to activate the promotion regulatory focus whereas others tend to activate the prevention regulatory focus. The promotion focus is characterized by tasks requiring eagerness and produces a state of mind concerned with rewards. The prevention focus is characterized by tasks requiring vigilance and produces a state of mind concerned with punishment.

According to the theory, when an individual's promotional regulatory focus is triggered, such as in the clinical learning environment when they are asked to consider working on a clinical task because they 'want to' (things they do because they are based on 'we like' or promotion), as they expect satisfaction and reward, positive feedback under a promotional regulatory emphasis would encourage performance more than negative feedback. However, if the regulatory focus of the individual's prevention is activated, such as when learners are asked to imagine working on a clinical task because they 'have to' and therefore want to avoid failure and punishment, negative feedback under the regulatory focus of prevention will motivate the participant's performance more than positive feedback (Kluger & Van Dijk, 2010). Therefore, a relationship exists between a regulatory emphasis of a person and feedback that is positive or negative, in motivation to use feedback (Kluger & Van Dijk, 2010). Positive feedback under the promotion approach will improve motivation to use feedback to feed forward and improve performance, but then the emphasis on prevention will decrease motivation and performance. In addition, the opposite is true with a negative feedback that improves motivation and performance under the focus on prevention, but under the focus on promotion, motivation and performance would be reduced.

The individual's personality, including traits such as self-efficiency and self-confidence, was also observed to anticipate actual performance on all forms of tasks with a focus on promotion or prevention (Kluger & Van Dijk, 2010; Higgins, 1997). To determine which kinds of feedback is best for an individual, we will have to understand which regulatory focus is activated, as well as which motivational aspects (the desire to make decisions or believe in capacity) are greater for each situation to indicate whether positive or negative feedback can be used (Kluger & Van Dijk, 2010). This

demonstrates the complexity of feedback while offering guidance on using feedback (Kluger & Van Dijk, 2010). Since receptivity and acceptance of feedback are necessary for learners to incorporate feedback into their performance and motivate change in practice, it is relevant to include the self-determination theory in this discussion.

The theory of self-determination as defined by Ryan and Deci in line with Higgins's self-regulation theory, states that individuals tend to control their behaviour independently influenced by intrinsic and extrinsic sources of motivation (Ryan, 2013). Extrinsic motivation with the goal of achieving performance outcomes is driven by external factors and leads to controlled motivation. However, intrinsically motivated people perform an activity for their satisfaction rather than achieving a result, which is further amplified by autonomy or self-determination and leads to autonomous or independent motivation (Ryan, 2013). Therefore, intrinsic motivation will have a greater impact on feedback acceptance and assimilation and thus on performance enhancement when applying motivation to performance-based feedback. Ten Cate et al. (2011) therefore suggest that the focus of the feedback process in medical education should be on the implementation of instructional activities during training that facilitates autonomous rather than controlled learner motivation, as medical education needs to provide increasing autonomy to learners. However, learner perspectives regarding institutional culture which promotes learning activities as feed-forward action plans that aim to boost learner intrinsic motivation to engage, receive and incorporate feedback during the feedback process, are less well explored (Ten Cate et al., 2011). Institutional feedback culture regarding learning activities promoting intrinsic motivation such as learner development of assessment literacy, feedback-seeking, the shift of instructional feedback messages to messages that promote self-regulation and the shift of the feedback focus from the perspective of the feedback provider to the recipient, need to be further evaluated.

1.7 The Conceptual Framework - Moving Feedback Forward: The need for a Feedback-Feed-forward Action plan

All the above-mentioned theories overlap and are relevant to research into the role of feedback culture in enhancing the impact of feedback in medical education. Their principles could be incorporated into designing new feedback instructional initiatives that target feedback acceptance, seeking and professional growth. Feedback from academia is an important driver of what, when and how students learn (Bellon et al., 1991). Students', however, have difficulty learning from feedback as teachers often fail to engage students in the feedback process, with minimum focus on preparing them to effectively handle the feedback received in terms of attending to it and acting on it (Price et al., 2010). Our study proposes a coaching approach as an action plan for meaningfully engaging students with formative feedback, allowing them to evaluate their feedback and use it to progress towards their next assessment to complete the learning process (Sargeant et al., 2010; Quinton et al., 2010).

Encouraging students to act on feedback by analysing the feedback received and use it to improve future performance will involve taking several steps. This involves preparing students for feedback, incorporating feedback in a forward-looking way, enhancing student strategies for managing learning activities, promoting feedback follow up, fostering peer review and dialogue, and, ultimately, making students effective participants (O'Donovan & Price, 2016). These strategies and approaches from the teachers' side to develop students' academic literacy, self-assessment, and self-regulatory skills by incorporating students' into the feedback process, are mirrored in Race's text *How to Get a Good Degree* (2007). Race, advises that students "build on feedback" and "systematically use it to continuously improve and refine their work" (Race, 2007, p. 85). Hattie and Timperley (2007) stressed that self-regulation is essential to effective learning, and that the students' ability and desire to use feedback to recognize their strengths, shortcomings and areas for future development, capture the concept of 'feed-forward'.

The action plan calls for a number of actions or tasks to be done properly to achieve success in a strategy (Wilson & Dobson, 2008). Developing an action plan can be incorporated into the framework that Hattie & Timperley (2007) consider useful when providing feedback (Figure 3). Hattie's comprehensive review of more than 500 meta-analyses published in 1999, verified the role of feedback in influencing learning and achievement among learners. In a subsequent analysis, Hattie and Timperley (2007) consider in some depth what makes feedback effective. Figure 3 is a model which Hattie & Timperley (2007) find useful when providing feedback, as the primary objective of constructive criticism is to reduce the difference between present understanding and achievement of students and an objective. Their conceptual analysis of feedback showed that while feedback plays a key part in student performance, the way it is communicated, as well as the form of feedback received, could be helpful and useful in various ways. They then defined the meaning of feedback as an item of knowledge or advice provided by an educator, peer or self, concerning one's success (Hattie & Timperley, 2007, p.82), with the intention of providing the student with answers to the "three major questions": where am I going? (i.e. what are the learning objectives?); how am I going? (i.e. what progress has been made in achieving this goal?), and where to go next? (i.e. what activities should be undertaken to make better progress?) (Hattie & Timperley, 2007, p.86). In seeking answers to "Where am I going?", students should be provided with and made aware of the learning goals relevant to the task (feed-up dimension); for "How am I going?", students should be provided with information on their progress as a forward-looking feedback recognizing weak and strong points, as well as suggestions on how to improve (feedback dimension), and in response to "Where to next?", students should be provided with useful information to help them identify and bridge the learning gap between 'where the students are' and 'where the students intend to be' (feed-forward dimension) (Sadler, 1989).

The review of the literature by Hattie and Timperley (2007, p. 87) also showed the significance of the feedback suggestions to be directed at the relevant level. It was suggested that, depending on the difference between the actual performance of the student and the desired performance, feedback specifically focused on the process, task and self-regulation is likely to be most successful (2007 p. 103). They mentioned that to teachers, effective feedback also means developing activities that offer feedback on the effectiveness of their own teaching and feedback. Therefore, regular evaluation of students' perceptions of teachers' feedback is necessary to ensure if Hattie and Timperley's (2007) three main questions have been answered appropriately with specific regard to the adequacy of the teachers' feedback process.

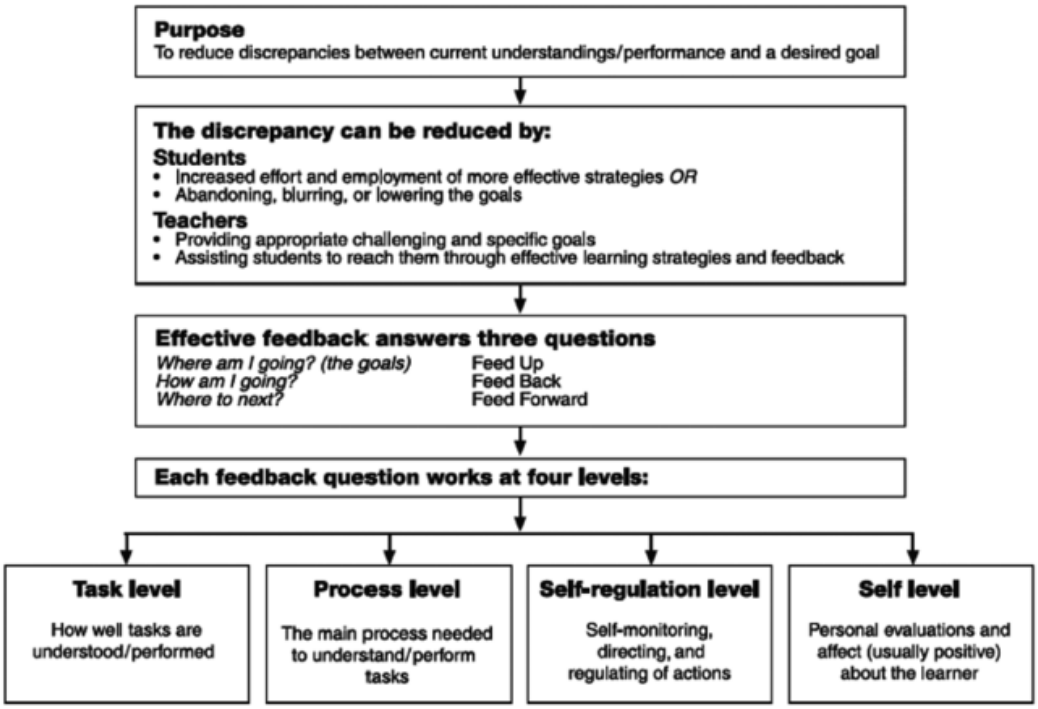

Figure 3: A model of feedback to enhance learning (Hattie & Timperley, 2007, p. 87)

The three questions work together typically so that feedback concerning "How am I going?" leads to more task undertaking, or "Where to next?" as in relation to already stated performance objectives, or "Where am I going?".

Hattie and Timperley's framework (2007) follows Race's (2007) thoughts on the development of an action plan model and describes action planning as a cyclical process that involves four main stages or answers to four questions, after which the cycle is repeated. "Where am I now?" is where achievements and progress are reviewed, and self-assessment or reflection undertook (feed-back dimension). "Where do I want to be?" is where the required learning goals related to performance are reviewed (feed-up dimension). "How do I get there?" is where learning strategies to achieve the

learning goals will be defined, and the goals are then broken down into smaller discrete steps needed to take to achieve the target. "Taking action" is where the plan is implemented by defining the steps to take them closer to achieving their goal (both 'how do I get there? And 'taking action' combined is the feed-forward dimension) to close the performance gap. Then it starts again with "Where am I now?" The focus for teachers is to introduce effective deliberative learning strategies and provide a forward-looking feedback, connecting assessment tasks with feedback. This should help students use learning resources in a meaningful manner by converting feedback into feed-forward to change or improve future learning (Koen et al., 2012).

The conceptual model used to design this research study is, therefore based on two separate conceptual definitions of feedback complementary to each other. The first definition defines feedback as "specific information related to the task or system of learning in order to reduce the gap between what is known and what is expected to be understood" (Hattie and Timperley, 2007, p.82), thus becoming an external requirement for enhancing learning. In the second definition, feedback is "conceptualized as information provided by an individual (e.g. educators, peers, books, family, self) on aspects of one's performance or understanding" (Hattie & Timperley, 2007, p.81), and thus becomes a conversation between the various practitioners. Based on these principles, Hattie and Timperley (2007) suggested that feedback is a result of previous experience and performance. To better enrich our knowledge of the effects, purposes and forms of feedback, it is necessary to visualise a wide range of teaching and feedback (Hattie & Timperley, 2007). There is teaching/learning at one end of the spectrum and feedback at the other end. Hattie and Timperley (2007, p.89) defined effective teaching as first presenting knowledge information to students and then assessing and evaluating their comprehension of this information. The "second part" as mentioned by Hattie and Timperley (2007, p.89), is the feedback which emerges because of the performance of the students. Therefore, a teaching context or learning background must be clarified by feedback in order for feedback to have the maximum impact.

Looking through these various lenses, this study hypothesises that providing useful and effective clinical skills logbook formative assessment feedback, with a feed-forward strategy from multiple sources to medical students on their clinical performance, is essential for their development into competent clinicians.

1.8 Purpose and significance of the study

Giving effective formative feedback to learners on their clinical performance, whether confirmatory or corrective, is recurrently, identified as a significant approach to academic instruction in clinical education. Poorly structured formative assessment feedback processes that inadequately engages students with feedback often results in academically weak students being unaware of their limited competence; they usually do not seek assistance and ultimately perform poorly in the end of semester

summative assessments (O'Donovan & Price, 2016). Despite feedback regarded as important in higher education, its impact on the development of students' feedback literacy, and implications for teaching and curricula design, has, not been considered sufficiently (Careless & Boud, 2018).

Knowing that feedback influences the learning process (Burgess et al., 2015) raises the question of how the feedback process between tutor, peer and student affects the clinical performance of student in the clinical training programme (Marianne et al., 2015). Due to the potential for variance in the delivery of feedback as well as poor quality of feedback, feedback received may not always result in an action plan (Abraham & Singaram, 2016; Burgess et al., 2015 and Holmboe et al., 2004). Medical schools will therefore need to track the feedback clinical teachers give to students during their practice. Additionally, students' experiences with receiving feedback, their actual use of feedback and its impact on their clinical performance, can provide important diagnostic evidence for teachers, particularly so that they are aware of what to do next. With teaching by non-trained practitioners in the clinical setting, it is not unusual that their translation from theory to practical teaching, assessment and feedback is limited (Burgess et al., 2015). Most of the time, the lack of a systematic approach to delivering appropriate clinical performance feedback may also result mainly from the lack of a feedback framework, providing clinicians and students with an easily accessible structure to use (Burgess et al., 2015).

The peer review process requires individuals with a similar status who analyse their peers' performance and provide feedback. Such processes of socialization are necessary for the creation of a common understanding among students and for the development of students in terms of shared responsibility (Pronovost et al., 2012). According to the AACP (American Association of Pharmacy Colleges) study 2009-2010, today's learner appreciates programmes that offer opportunities for peer interaction (Oderda et al., 2010). A study by Sluijsmans (2003) found that students of higher education, trained to focus objectively on the performance of their peers, are simultaneously developing self-assessment skills that can help them guide their learning process. The self-evaluation alone does not seem to be a credible information source in order to recognize skills abilities, since students frequently over- or under-evaluate their level of competence (Eva et al., 2008). For establishing appropriate self-perceptions, detailed information from multiple sources comparing current performance with a performance standard is required (Epstein, 2008). Similar to other studies, it was found to be a good idea to have different assessors such as clinicians, educators or peers examining different encounters as each examiner brings with him a distinct viewpoint and a different way of thinking (Holmboe et al., 2008).

Effective feedback processes that facilitate deliberate practice helps students narrow the performance gap and directs learning by reinforcing desirable learning behaviours (Nicol, 2010; Nicol & Macfarlane-Dick, 2006). Measuring elements in feedback that promotes deliberate practice, helps

educators know about the quality of the feedback (Gauthier et al., 2015). It also provides clinical teachers, and peers with guidance for giving feedback. It is less common to use these factors to evaluate the quality of feedback. According to Marianne et al. (2015), the influence of confirmative and corrective feedback on students' learning experience and motivation, has not been evaluated in depth and research in this field is sparse. There is, therefore, a need for deeper analysis of the quality of confirmative and corrective feedback provided towards students' learning experience and clinical performance, as this will contribute much needed knowledge.

While the literature suggests positive effects of learning by reflection, little evidence is available to support this concept (Pelgrim et al., 2013). Feedback and reflection must be explored in order to assess the likelihood that feedback is used to guide action plans which could eventually lead to self-regulatory learning skills (Asela et al., 2014; Jackson et al., 2016). Finding ways for students to reflect and use feedback by extracting the real essence of what feedback comments mean when developing an action plan, would provide a systematic approach for students to make optimal use of feedback by setting concrete and achievable goals and then taking steps to achieve them (Race, 2015). Therefore, it is important that we assess student's awareness and understanding of the feedback they have received and if the feedback has been interpreted and utilized effectively to feed-forward.

Although there have been many global studies reviewing tutor feedback (Duffy, 2013; M'Kumbuzi et al., 2009; McKimm, 2009; Bernard et al., 2004), the quality of the clinical tutors and peer feedback are little established. In addition, there is lack of knowledge on the influence of feedback on the growth of clinical competence (Marianne, 2015) and more so on the extent to which pre-clinical undergraduate medical students, particularly in the South African context, engage with and act on the feedback to feed-forward and close the feedback loop (Du Toit., 2012). Therefore, it becomes even more important to understand the relationship between feedback provided and its subsequent use by students (Pitt et al., 2016). Jonsson (2013) indicates that many studies have examined feedback and feed-forward in the field of higher education based only on the views and statements of students that they receive feedback, but have seldom recognized the actual use of feedback by students. There is, therefore, the need to investigate medical students' strategies for using feedback to facilitate the feed-forward process using the feedback action plan provided. Exploring whether the clinical skills feedback enhances student reflection on and engagement with feedback, including engagement with learning goals and assessment criteria, ultimately making them more responsible and literate in the feedback and assessment process, would be valuable.

The response of medical students to feedback often depends on their interests, characteristics and culture of learning. The way these influences interact is inadequately understood, making it quite challenging to know what exactly influences their response to feedback (Lefroy et al., 2015). The clinical skills learning environment at Nelson R Mandela School of Medicine (NRMSM), University

of KwaZulu-Natal (UKZN), South Africa, offers a range of opportunities to learn but at the same time, an individual learner must also exercise agency to engage with these learning opportunities. The challenges with the use of feedback can be either with the learning environment, i.e. are students given good feedback?; or with agency i.e. is engagement with feedback an option for learners?, or both. There is the need, therefore, to understand how these factors interact as they have implications for where and how medical educators and institutions must focus their energies to improve feedback.

This study is significant within an undergraduate medical education programme, as it is expected to highlight a number of strengths and weaknesses in our own practice. Conducting this study would give us an opportunity to test out some innovations and add to research conducted by previous researchers in the area of feedback and feed-forward. Since there is little knowledge of students' use of feedback in the clinical environment, we aimed to examine whether the feedback quality influenced student's learning through their actual use of feedback to convert feedback statements into actions for improvement. For the study, we selected the clinical skills laboratory as it is the only environment in which teachers include more directly observed performance evaluations than teachers in other specialties, and where it is more focused on learners in their feedback approach. In addition, within the setting, longitudinal relationships between clinical tutors and students exist, and the tutors are invested in the learners' on-going performance improvement and growth.

The research project was conducted in two parts: (1) exploration of students' opinions regarding their receptivity to and use of feedback, perceptions of self, peer and tutor feedback interventions and factors that could influence the quality and impact of feedback and serve as facilitators and barriers, and (2) analysis of the nature and quality of tutor and peer feedback provided in the clinical skills logbooks by measuring the quality of feed-forward in the feedback, using a feedback scoring tool as a measure to determine the impact feedback had on students' clinical skills performance during their clinical skills training.

1.9 Research Context and Setting

As part of a multidisciplinary thematic based module, the medical curriculum at Nelson R Mandela School of Medicine (NRMSM), University of KwaZulu-Natal (UKZN), adopted a spiral integrated hybrid PBL (problem-based learning) curriculum consisting of multidisciplinary themes. Each system-based theme in the pre-clinical undergraduate clinical skills programme runs for a period of six weeks. Each theme covers the theory and practical skills related to a body system allowing the student at the end of the theme to be able to have a good understanding of the pathophysiology of symptoms and signs related to the pathology of each system. They are able to demonstrate competence in conducting history taking, physical examination and basic procedural skills using standardized patients and mannequins or models in the clinical skills laboratory. The skills laboratory is an existing and dynamic learning environment for all pre-clinical undergraduate medical students at

the medical school. It provides a foundation for developing students' clinical competency, for example history taking and examining a patient, and then critically reasoning, synthesizing and presenting the information, which involves a collection of multiple cognitive and psychomotor competences (Burgess et al., 2015).

The medical teachers play the same role during each session of clinical skills teaching as indicated by Barr (1987). As the student listens, the tutor shows the skill or technique. The tutor then discusses the results of the learning or procedure with the students, the students perform the skill while the tutor observes and guides the students, the tutor gives the students feedback on their clinical performance, and finally the student is allowed to work independently after mastering the clinical performance and reasoning skills.

In a nutshell, the clinical skills training at the clinical skills laboratory, NRMSM, UKZN during each system-based theme includes initial teaching and demonstration of practical skills such as communication, physical examination and investigational procedures linked to each body system, followed by planned directly observed formative clinical skills logbook assessment sessions with immediate verbal and written feedback and corrective critique. Based on the literature, competency-based medical education necessitates that deliberate practice along with baseline clinical performance assessment, followed by feedback and subsequent clinical performance measurement, students are expected to progressively develop (Gauthier et al., 2015; Heiman et al., 2012; Veloski et al., 2006). Meaningful data fed back to students about their performance allows them to progress towards expected performance and independent practice by the end of their training.

1.9.1 The clinical skills logbook

In order to achieve clinical expertise, medical students must receive integrated learning experiences of a variety of clinical skills and be able to practice these skills repeatedly in the clinical setting (Regehr & Norman, 1996; Ericsson, 2007). Taking into account the variation in the level of academic achievement between medical students, logbooks were introduced to facilitate consistent learning and education. As Schuttpelz-Brauns et al. (2016) mentioned, logbooks set clear learning objectives, help structure the learning process, and enhance the sharing of information in clinical environments between the trainee and the clinical teacher. Logbooks provide a list of educational goals and data on a particular study period to help trainees and teachers get an overview of the training needs and an understanding of the learning progress that should eventually lead to the development of a learning plan (Schuttpelz-Brauns et al., 2016). They are especially useful in our clinical skills setting where learners are required to develop numerous skills during their training through multiple theme-based modules that run across an academic curriculum. Standardization of the logbooks allows multiple skills to be performed (Helenius et al., 2002).

The logbook provides a space for the students' personal identity i.e. name and student number, it consists of a list of skills to be examined during the course of the year and instructions to the students on how and when they will be assessed. The logbook is divided into themes and each page consists of an examination skill to be assessed with a section that allows the teacher to rate the students' skills performance and provide general feedback. At the beginning of the academic year, each student in the clinical skills setting is handed a clinical skills mini-logbook (Appendix 6) with theme-specific tasks to be assessed formatively. Along with the logbook, students are provided with clear instructions on the purpose and use of the logbook. During an end of theme formative assessment session, every student is given 8 minutes to consistently demonstrate an exam skill on a simulated patient. The clinical instructor observes each pupil and a performance rating is provided based on the minimum skill requirements deemed satisfactory. Performances are graded as 'exceeded expectations', 'satisfactory' or 'inadequate' and both written and verbal feedback given. Students are informed that a mark will not be given being a formative assessment but the ratings will assist them in understanding their level of skill mastery. The students are informed through the logbook instructions what each rating meant in terms of their competence at performing the skill. A student who fails to perform the examination successfully is asked to repeat the session, at least a week later, to ensure that s/he revises and practises adequately in preparation. A space is also provided on the same page of the logbook for a repeat assessment.

As mentioned by Raghoebar-Krieger et al. (2001b) documentation in logbooks is not reliable and can be incomplete and flawed when not supervised or evaluated on a regular basis. To ensure adequate documentation of logbooks, completion of the logbooks is made a DP (duly performed) requirement, and the logbooks are to be handed in by an agreed date for evaluation of completion of learning outcomes and identification of potential learning gaps of the trainees. Logbooks can be analysed over time to assess whether trainees (Tschudi et al., 2003) have met the minimum training requirements and to reveal weaknesses in training (Chu et al., 2008).

1.9.2 Modifications to logbook to include a feed-forward strategy

Based on the inconsistencies of the nature and quality of feedback found in a previous study (Abraham and Singaram, 2016) the logbook was modified to include a feedback instrument that was developed in 2015 to enhance the process of delivering constructive feedback to medical students in the clinical skills laboratory.

To be successful, students need to know what and how they will be assessed (Harris, 2007). At the start of the academic year, along with the updated clinical skills logbook (Appendix 7) students are provided with a written protocol that included task-specific learning goals, clear instructions on the purpose and use of the logbook, and general requirements on the systematic approach to performing the theme-specific physical examination skill linked to the assessment criteria. The changes that were

incorporated into the new logbook feedback space allowed the clinician to provide the student with answers to the following questions following direct observation of a skills performance - 1) What was done well 2) What was not done well and 3) What can be improved in a similar situation in the future. This focuses on the process used to complete a task and incorporates a feedback action plan as a feed-forward strategy in the logbook. Changes were also made to the performance rating. The logbook tasks were rated on three zones and students were informed through the logbook instructions what each zone entails. Zone of failure (approximately <48%, if core competencies are missing or unreliable), zone of weak pass (50-59%), competence (approximately 60%, core competences are demonstrated and reliable) or superior performance (approximately 80%, core competences demonstrated using confident and appropriate technique with good knowledge and understanding of the skill) to align their skills mastery with their competence level.

Initially, only the educators provided individualised, timely written and verbal feedback following implementation of the clinical skills logbook and feedback instrument. The logbook assessment and feedback process was then extended to include peer assessment and feedback. During the theme and after learning an examination or procedural skill, students come into the skills laboratory during their self-directed learning time to conduct the skills while their peers observed their performance. They assess each other and provide verbal and written comments for their peers based on the three comments in the logbook for the skill conducted on what was done well, what was not done well and what can be improved, modelling the educators' feedback provision.

1.10 Aim of the study and research questions

This research study aims to explore the clinical skills tutor and peer feedback quality and perceptions of medical students about their engagement with the clinical skills logbook feedback and feedback interventions to feed-forward by bridging the gap between their actual and desired clinical performance.

The research questions of the study are:

1. What are medical students' receptivity to and utilisation of formative feedback given by the clinical tutors during the clinical skills training sessions?

2. How do medical students of different academic levels perceive self and peer-to-peer feedback interventions?

3. How does the addition of a feed-forward strategy to the clinical skills logbook influence the quality of the feedback given by both tutors and peers?

1.11 Methodology

Different authors have classified multiple types of mixed methods research. For this study, one of the typologies of mixed methods approaches by Creswell et al. (2003) is used. Their design clearly delineates the phases of the research sequence. The typology is (Creswell et al., 2003) described as a mixed convergent dominant layout as "qualitative and quantitative phases take place one by one, and mix at the stage of the data interpretation." The research study using mixed method was considered appropriate to address the research questions as it allowed an expanded scope and variety of study findings highlighting various aspects of the same complex issue. This offered a practical viewpoint that concentrated on adapting the research findings to the real world by actively using the advantages of integrating the methodology with its varied research approaches, resulting in a more rigorous and thorough research piece (Creswell, 2013a, b; Creswell & Plano Clark, 2011; Lavelle et al., 2013). The enriching information collected allowed us to understand more thoroughly the study question, which could not have been solved, if either qualitative or quantitative data alone had been used (Halcomb & Hickman, 2015; Ozawa & Pongpirul, 2014).

A mixed methods study was therefore adopted i.e. qualitative and quantitative approaches. The sources used to collect data included focus group discussions (Qualitative) and evaluation of the clinical skills logbooks (Quantitative). The advantage of this mixed method study as described by Creswell (2014), is that it incorporates a quantitative component into an otherwise qualitative study, and when the two methods are applied in one study, they tend to complement each other, making the study more valid and rigorous (Chi, 1997; Bryman, 2012).

During the research study, qualitative data from focus group discussions with a sub-group of medical students from each of the three achievement categories (HA-high achievers, AA-average achievers, LA-low achievers) was, collected first. The students were categorised by the researcher and randomly selected from each category of high achievers (HA) (>70%), average achievers (AA) (50-69%) and low achievers (LA) (<50%) based on their end of year summative OSCE (objective structured clinical examination) assessment performance. The qualitative data identified a wide range of relevant responses from the perspective of clinical skills feedback, identifying various factors that contributed towards medical students' reception and use of feedback and feed-forward action plans provided in the clinical skills laboratory during the clinical skills training. Subsequently, quantitative data on the analysis of the quality of tutor and peer written feedback recorded in the clinical skills logbook in the three achievement categories was done. The data from the two studies were analysed separately and the resulting findings from each of the data sets provided answers to the sub-questions mentioned. The quantitative and qualitative data and findings have then, been combined and interpreted, requiring innovative thinking to switch between the various data types and make meaningful relations between

them. The interpretation of this mixed methods data highlighted in the discussion chapter of this thesis gives a more complete multi-faceted insight into the broader research question about medical students' responses to the use of feedback and feed-forward action plans in the clinical skills laboratory.

1.11.1 Data collection and Analysis – Qualitative Data

Focus group studies of purposively selected 3rd year students based on their academic achievement (HA, AA, and LA) and who had at least one-year exposure to the clinical skills formative logbook assessment feedback was conducted with the aim of exploring their in-depth views of the clinical skills logbook feedback so as to discover their value and purpose of receiving feedback, strategies for using feedback, and facilitators and barriers to feedback use. Students' experiences with using the self, peer and teacher feedback as feed-forward initiatives provided in the clinical skills laboratory to support their engagement with feedback, was also explored.

The 3rd year medical student cohort's perception on their engagement with clinical skills written feedback, self and peer feedback, and conditions that encourage useful feedback at various points in their study, have been created through a semi-structured approach based on open-ended questions. Discussions of the focus group allowed clarity and responses to be reviewed as needed, to ensure that the research questions are answered by the content of the discussions. Questioning evolved according to the participants' responses with discussions continuing until saturation was reached with no new content emerging. The focus groups allowed the interviewers to research the students in a more natural way, to explore a variety of views and to develop shared ideas through communication between all participants (Christopher, 2016). The purposive sampling created groups in which reticent individuals felt able to express their views which they might normally hide. By hearing the thoughts of others, individuals became more aware of and were able to express their own ideas. The additional benefit of the focus group discussions was that participants had the opportunity to learn from each other as they shared ideas and thoughts on the subject while building on each other's perspectives to enrich the study (Marshall, 1999 and Fife, 2007).

The thematic analysis of the response of the study participants was conducted through Winstone et al. (2017) psychological framework underlying barriers to receptivity related to awareness, cognizance, agency and volition among learners. We explored how our findings aligned with or challenged the different aspects of these psychological processes. Different aspects of the feedback processes relating to feedback receptivity which emerged from the data concerning receiving and using feedback, either directly or indirectly during the analysis of statements referring to good practices or suggestions for improvement, were identified and coded using keywords and text chunks. In addition to barriers, our data analysis identified sub-themes that related to facilitators of feedback receptivity and utilisation to

feed forward thereby expanding the use of the framework to include both facilitators and barriers of feedback reception and use.

Qualitative studies offered insights into the underlying reasons of the study participants for their reactions to receiving and participating in feedback. The qualitative research findings and unexpected mechanisms have been identified (Bryman, 2012; Pasick et al., 2009; Scott et al., 2011). Semi-structured focus group discussions suited this type of enquiry in which students are involved in explaining their preferences, their actions and the impact of educational interventions. It enables a greater depth of understanding than a questionnaire-based survey, as responses can be further explored. Nonetheless, qualitative studies are subject to both participant and researcher bias, as the results reflects the perceptions of the participants of the underlying phenomena that have not been tested themselves, also, if the participants' perceptions are biased, then so will our findings be (Malterud, 2001). Reflexivity is required during data analysis as it is also open to researcher bias (Malterud, 2001).

1.11.2 Data collection and Analysis – Quantitative Data

Analysing the nature and quality of both the peer and tutor feedback as provided in the clinical skills logbooks was achieved by measuring the quality of feed-forward in the tutor and peer feedback using a feedback scoring tool as a measure to determine the impact feedback had on students' clinical skills performance during their clinical skills training.

The written feedback provided by both the tutors and peers through the formative logbook was analysed and assessed using a scoring instrument designed by Gauthier et al. (2015), to determine if it contains the elements that facilitate deliberate practice and to what extent. The tool was adapted and updated for our clinical learning environment to assess written feedback from the second and third year logbook.

The main study measures were the frequency distribution of task, gap and action (TGA) represented as a percentage, and, the average TGA written feedback scores of all skills assessed in the three categories (HA, AA and LA) of 2nd and 3rd year medical students. The average percentage for:

- confirmative feedback (the tutor's response to students informing them whether they are effective in demonstrating and applying the task or skill assessed regarding what was done well), or
- corrective feedback (information given to students on whether they are wandering off track or what was not done well), and
- if students have been advised on how to improve their skill (what can be improved),

generally indicated the type of feedback students were typically exposed to at clinical skills.

A two-proportion Z test for each of the variables (task, gap, and action) and adjustments with the year of analysis and source of feedback were performed separately. In order to measure the normality of feedback values, the Kolmogorov Smirnov method was used. To compare the academic performance of the three groups of students (HA, AA and LA) with the average deliberate practice component score, the Kruskal Wallis test was used. The Fischer exact test was used to evaluate the proportions from global ratings and component scores (TGA). A p value below 0.05 was statistically considered significant. The SPSS version 25 was used for all of the statistical analyses.

Quantitative research allowed the collection and analysis of logbook feedback data through statistical methods that provide accurate measurements (Polit & Beck, 2010; Terre et al., 2006). Feedback data were systematically and critically collected and analysed (Ivankova et al., 2010). In general, statistical empirical approaches are related to positivism and truth is assumed to be quantifiable, objective and universal (Darlaston-Jones, 2007). The common experience is defined and interpreted by applying scientific or statistical analysis for all participants (Darlaston-Jones, 2007). Quantitative analysis made it possible for the researcher to assume an impersonal role and use a deductive approach to test theories. The researcher collected variables in a systematic and validated manner and it was possible to generalize and numerically explain the results obtained to predict causal explanations. The quantitative research method in this study allowed the researcher to examine larger samples, and one of its strengths is its ability to reduce uncertainty or confounding and its capacity to produce generalizable findings that may be representative (Darlaston-Jones, 2007).

1.12 Overview of the thesis

Research questions 1 and 2, regarding medical students' perceptions and factors influencing their use of feedback provided in the clinical skills logbook and self and peer feedback as feed-forward action plans, are addressed in Chapters 2 and 3. Research question 3 is addressed in Chapter 4, assessing the quality of the clinical skills teacher and peer written feedback as provided in the clinical skills logbook.

Chapter 2 explores the facilitators and barriers of receiving and using feedback, the factors that influence the quality and the impact of feedback on students' clinical performance. Through semi-structured focus group discussions, students' were prompted to express their opinions freely regarding all aspects of feedback- its value in their training, the quality of teachers' feedback, their perceived abilities to facilitate or impede meaningful feedback and their recommendations through the culture of clinical skills. Themes which emerged from the data concerning receiving and using feedback applicable to a psychological framework based on awareness, cognisance, agency and volition, were identified and derived by generalising descriptions and concepts.

In Chapter 3, perceptions of self, peer and teacher feedback of medical students from different academic performance levels were explored. This study reports on the thematic analysis of focus group discussions related to self-assessment and self-reflection, peer-to-peer feedback, and factors that impact feedback-seeking and receptivity.

In Chapter 4, we conducted a quantitative analysis of the nature and quality of both the teacher and peer feedback as provided in the clinical skills logbooks. A feedback-scoring tool was developed based on the deliberate practice framework to assess the effect of incorporating a feed-forward approach to the clinical skills logbook on the quality of the tutor and peer feedback.

In Chapter 5, the general Discussion and Conclusion, we synthesise the findings from studies 1-3 and summarise our research findings in response to each of the study questions. We describe the limitations of the research and areas for future research, and propose how our findings can be applied to feedback practice by medical educators and in designing feedback initiatives at educational institutions. We suggest balancing responsibility sharing and shared understanding between the teacher and learner to remove barriers to feedback engagement as a new concept to promote a growth-enhancing feedback process.

Ethical clearance and gatekeeper approval for the study was granted by the Humanities and Social Sciences Ethical Committee, UKZN (HSS/2213/017D) (Appendices 2 and 3). Informed consent was obtained from participants (Appendix 4). The focus group questions used in the study are attached as Appendix 5 and the clinical skills logbooks as Appendix 6 and 7.

This thesis structure is based on publications/manuscripts. Each chapter was developed to be read on its own. Consequently, there is bound to be some overlap and repetition between chapters due to the common study setting and sample.

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CHAPTER 2: AN EXPLORATION OF THE PSYCHOLOGICAL PROCESSES UNDERLYING THE BARRIERS AND FACILITATORS TO PRE-CLINICAL STUDENTS' FEEDBACK RECIPIENCE IN SIMULATION BASED CLINICAL TRAINING (Manuscript submitted. Currently under review by journal of: Advances in Health Sciences Education)

This chapter addresses the feedback facilitators and barriers to the quality and impact of feedback, which has bearings on the clinical performance of medical students. Via semi-structured focus group discussions, students were encouraged to openly express their views on all aspects of feedback — its importance in their learning, the consistency of feedback from educators, their perceived ability to promote or hinder meaningful feedback, and their suggestions to improving the feedback culture at the clinical skills laboratory. Using qualitative thematic analysis, themes identified and derived by generalizing descriptions and concepts from data concerning the receipt and use of feedback were specific to a psychological framework focused on awareness, cognition, agency and volition.

Abstract

Many studies have explored feedback effectiveness using interventions focused on feedback delivery. It is equally important to consider how learners actively receive, engage with, and interpret feedback. This study explores how medical students receive and use feedback in pre-clinical skills training. We used semi-structured interviews from five focus groups to gather data from 25 purposively selected third-year medical students. Data were thematically analysed through a psychological framework, underpinned by four psychological processes explaining learner behaviour: Awareness, Cognizance, Agency and Volition. In addition to barriers, the findings of this study suggest expanding the framework to include facilitators to feedback engagement. Students were receptive to feedback when its purpose and content aligned with their personal objectives, when it was consistent between tutors, and when it involved developing longitudinal relationships. The clinical skills formative logbook feedback culture with a learning focus was perceived to be predictive of their future performance and they were likely to take feedback on board emphasizing the role of reflection in this process. The depth and timing of actual feedback use varied among students, and language barriers hindered decoding feedback. The self-regulatory focus on the feedback process had a dominant influence on their active use of feedback. Incorporating the psychological processes underlying feedback use should be considered when designing interventions to promote feedback engagement and feedback literacy skills. Promoting shared responsibility between clinical educators and learners enable learner's greater control over assessment and feedback processes.

Key words: Medical students, Medical education, Feedback, Feedback receptivity, Psychological processes

Background

"Feedback is potentially the most powerful part of the assessment cycle that improves student learning" (O'Donovan et al., 2016, p. 938). Feedback in the field of medical education refers to information that is designed to guide students' future performance in a given activity (Ende, 1983). Though feedback is provided in a variety of clinical settings, studies have found gaps in medical students' satisfaction with the feedback received (Weinstein, 2015). A 2013 General Medical Education Accreditation Council survey indicate that satisfaction with feedback had the third-lowest rating in the United Kingdom (Accreditation Council for Graduate Medical Education, 2013). Similarly, the 2012 Association of American Medical Colleges Medical School Graduation Questionnaire revealed that one-third of responding students felt that faculty provided insufficient feedback on their performance (Association of American Medical Colleges, 2012). The linear transmission view of feedback from the educator to the learner often referred as the consumer model of education implies that learners are passive recipients with relatively little responsibility to make feedback effective. This passive approach may explain the reduced satisfaction with feedback observed by these surveys (Nicol, 2010; Delva et al., 2013).

Despite evidence that the feedback providers can amend the quality of feedback they provide, it would be insufficient to achieve 'quality' (Dunworth & Sanchez, 2016). Studies report decreased student learning following improved lecturer feedback output and even greater challenges with student feedback reception and the failure of learners to read feedback (Jonsson, 2013; Nicol et al., 2014). Other studies reported learners accessing feedback the least when a pass with minimum competence in the summative clinical exams was achieved (Harrison et al., 2013). The limitation of these studies was that they only considered whether students collected their feedback and not whether or how it was used. The feedback paradox emphasized by Withey (2013), stresses how students recognize the importance of feedback and complain about its quality, yet make limited use of it. When messages are conveyed from a sender to a receiver, engaging with and converting the feedback into learning activities that bring about desired change is clearly more important than simply receiving feedback (Harrison et al., 2015). This highlights the dilemma of the disconnect between feedback's theoretical potential and the actual feedback practice. Most feedback delivery may not fulfil the potential to influence future learning (O'Donovan et al., 2016). It is clear that some important steps need to be navigated to influence the use of feedback (Hattie & Timperley, 2007; Archer, 2010).

As medical students graduate to become providers of patient care, their autonomy within the workplace becomes important. Competency-based medical education supports the premise that feedback is a dialog process, where learners understand feedback, and use it to improve the quality of their work training (Boud & Molloy, 2013; Careless, 2006). O'Donovan et al. (2016) highlight that in good quality feedback, the learners must firstly, be receptive to receiving the feedback and secondly,

be able to decode and interpret the feedback. In addition, it is important that students have certain strategies to change their performance using feedback to achieve reasonable goals, and then take action to reach these goals to improve learning (Harrison et al., 2016; Hattie & Timperley, 2007; Kluger & DeNisi, 1996). While this emphasizes the learners' active role in the feedback process, do they actually engage this way? Receiving feedback can be a difficult, impassive act requiring honest and critical self-reflection, with a commitment to improving (Telio et al., 2015). Medical students are often unprepared and untrained in receiving and accepting feedback, and hence fail to use feedback to inform their subsequent clinical skills performance. More needs to be done by students to move learning forward through feedback and to close the feedback loop (Maria & Leah, 2016).

Students may be apathetic or lack motivation to use these feedback opportunities for learning (Abraham & Singaram, 2016; Watling, 2016). Feedback is a "double-edged sword" and the performance effects of feedback can be highly variable in that it does not always improve performance: it can conversely, reduce performance (Kluger & DeNisi, 1996). Kluger and DeNisi's (1996) feedback intervention theory (FIT) explains how an individual responds to feedback. Attentional shifts occur depending on the characteristics of the feedback comments, nature of the task and personality and situational variables. According to FIT, people regulate their behaviour by comparing it to committed goals. Higgins' (1998) self-regulatory theory explains how people have two regulatory foci, prevention and promotion. Both personality and situational variables such as the individual's self-efficacy and task related self-regulatory focus as either a promotion (things people do because they 'want to', which promotes eagerness for rewards) or a prevention (things people do because they 'have to', to prevent failure), determine how the feedback recipient chooses to change (Kluger & Van Dijk, 2010). When an individual's prevention regulatory focus is activated, negative feedback motivates performance more than positive feedback. When their promotion regulatory focus is activated, positive feedback motivates performance more than negative feedback.

Feedback is a complex process and what factors make feedback effective for learning remain considerably uncertain. Feedback effectiveness depends on the quality and timelines of the feedback information provided by the educators. Termed the 'proactive recipience', it critically rests on how the learner proactively receives, engages, and acts upon feedback (Winstone et al., 2017). The importance of feedback therefore lies in its impact on recipients and not only on how it is provided (Boud & Molloy, 2013; Boud, 2015). Learners accept feedback only if they view it as credible and congruent with their own self-assessment, hence the knowledge of factors that influence feedback credibility is beneficial (Mann et al., 2011). Handley et al. (2011) mention how students' motivation and emotional response to receiving feedback, and therefore their 'readiness to engage', are also crucial. Other factors that may contribute to a lack of feedback engagement are weak assessment literacy skills. These skills are needed to interpret and action feedback received (O'Donovan et al., 2016). The need for a more learner-focused model where the learners contribute equally to the

feedback process by being active engagers and users of feedback rather than passive recipients, is warranted (Krackov, 2011; Krackov & Pohl, 2011). If we therefore wish students to be active feedback users it is necessary to ask how feedback has been received accepted and assimilated into performance. To effectively do this, numerous factors that influence learners' reception to feedback and strategies for using feedback, should be analysed to confirm learner performance improvement within the feedback loop.

Winstone et al. (2017) developed a psychological framework that identified four psychological processes or learner behavior that underpin poor engagement with feedback i.e. Awareness, Cognizance, Agency and Volition. The barriers to understanding and implementing feedback in their study resulted from learners' limited Awareness of what the feedback means and its purpose; their lack of Cognizance of strategies by which the feedback could be effectively implemented; their limited Agency to implement strategies and translate feedback into action and finally, their lack of Volition to scrutinize feedback and implement strategies. Establishing a learning culture that actively encourages feedback receptivity promotes a commitment to behaviour change (Ramani et al., 2017). The use of psychological frameworks to assess feedback engagement is rarely used in medical education. As feedback processes are complex interactions, the psychological framework designed by Winstone et al. (2017) could provide further guidance in understanding not only the barriers hindering feedback engagement, but also the psychological processes explaining learner behavior underlying those barriers in medical education.

There is insufficient investigation and research into the different ways medical students receive and use feedback within the context of undergraduate clinical skills assessment activities (Harrison et al., 2016). This is particularly relevant during the crucial and anxious transition phase during clinical training (Prince et al., 2004). Since most educational research studies deal with written feedback on written tasks and mirror higher education practices (Jonsson, 2013), care needs to be taken if extrapolating the findings to other kinds of assessments such as workplace-based clinical skills assessments. Given that competency-based medical education is changing towards constructivism (Boud & Molloy, 2013), investigating medical students' recognition and understanding of feedback as well as their strategies for effectively using feedback to facilitate the feed forward process, needs to be explored. The clinical skills setting was chosen for this study as literature suggests that generalist medical teachers include more direct observations than teachers in other specialities, and are more learner-centred in their approach to feedback (Junod et al., 2016; Rietmeijer et al., 2018). Further, finding optimal ways to support learners' use of feedback may be inadequate with merely understanding the barriers to their feedback implementation (Winstone et al., 2017): we also need to pay attention to what facilitates the use of feedback. This study thus explores medical students' feedback receptivity, the characteristics of feedback that could optimize its use and more specifically,

what they actually did with the formative logbook assessment feedback they received following directly observed clinical skills logbook assessments.

Methodology

Context and Setting

The study was conducted at the clinical skills laboratory at the Nelson R Mandela School of Medicine (NRMSM), University of KwaZulu-Natal (UKZN), Durban, South Africa. The school follows a six-year undergraduate, hybrid, problem-based curriculum, where three pre-clinical years precede three clinical years, reflecting an integration of the basic sciences with the clinical disciplines. At the beginning of the academic year, pre-clinical students are provided with a clinical skills logbook (Appendix 1) and a protocol with task-specific learning outcomes and assessment criteria. Each theme runs for a period of six weeks, covering skills related to a specific body system. Students at the end of a theme are expected to demonstrate competence in conducting physical examination skills using standardized/simulated patients which are specified in the module course as a DP (duly performed) requirement. The purpose of the clinical skills formative logbook assessment is to assess students' competence in performing a skill and to provide structured feedback that answers three questions related to the task learning goals: 1) What was done well; 2) What was not done well, and; 3) What could be improved in a similar situation in the future. This is based on directly observed performance of multiple clinical tasks by multiple supervising tutors and peers throughout the skills training period. Students are informed that instead of marks, a global rating is provided. This rating would be failure (approximately <50%, if core competencies are missing or unreliable); weak pass (50-55%), competence (approximately 56-80%, with core competences demonstrated and reliable), or superior performance (approximately 80%, with core competences demonstrated using confident and appropriate technique, showing good knowledge and understanding of the skill). The rating would be provided to assist them in understanding their level of mastery of the skill. The clinical skills logbook formative assessment runs repeatedly through the 2nd and 3rd pre-clinical years similar to the model of longitudinal integrated clerkships (Bates et al., 2013).

Study population

This study adopted an exploratory qualitative methodology with a purposive sample. Five focus group discussions were conducted with 3rd year medical students, representative of their demographics and academic performance, and who had at least one-year exposure to the clinical skills formative logbook assessment feedback. Each group had five students (n=25). The sample size was determined solely by the number of students who wished to and were able to take part within a specified time-frame, rather than on the number required to achieve saturation. In this study, the number of focus groups was decided based on attaining saturation, with no new material arising. The use of a smaller

group of participants from a common discipline provided a 'bounded environment', which can be useful for producing richer more in-depth emerging discussions and provides a mutual interpretation of ideas, perspectives and terms (Jazvac-Martek 2009).

Data collection

Focus groups were held for approximately 60 minutes with at least one of the researchers and a moderator. The moderator ensured neutrality in the discussion and that the findings were shaped by the participants' perspective, and not through research bias. The moderator ensured that all participants shared their experiences and perspectives. The moderator was a clinician and colleague involved in the educational activities of the clinical skills laboratory and had no direct involvement in the research study. A semi-structured approach underpinned by open-ended questions elicited the perceptions of the student cohort on their engagement with and use of clinical skills feedback, as well as conditions that promoted useful feedback. Clarification and responses were further probed as required, to ensure that the content of the discussions covered the study questions. Questioning evolved according to the participants' responses. Discussions continued until saturation was reached, with no new content emerging.

Data analysis

The audiotaped transcribed focus group discussions were handled anonymously and qualitatively analysed. The authors read the text material several times to get familiar with the data and obtain an overall impression. A Framework thematic analysis using a deductive approach was adopted as an interpretive process (Malterud, 2012; Patton, 2002). We explored how our findings aligned with or expanded the different aspects noted by Winstone et al. (2017) in the psychological processes to feedback receptivity relating to the learner's Awareness, Cognizance, Agency and Volition. Hence the data focusing on the dialogue on participants general perceptions of receiving and using feedback was systematically searched to identify patterns within the data based on already pre-determined themes (Awareness, Cognizance, Agency and Volition) and the raw data had to fit into one of these themes. Different aspects of the processes relating to feedback receptivity and use that emerged from the data were identified and coded using keywords and text chunks. The contents of each of the coded groups were condensed and summarised. With consensus of both authors, key themes and sub-themes, which were applicable and could extend the Winstone framework, were identified and derived by generalising descriptions and concepts. The themes, together with supporting quotations, are described below.

Results and Discussion

Following data analysis through the lens of the Winstone et al. (2017) framework, in addition to participants describing barriers to feedback receptivity, focus was also given to factors that facilitated their understanding and implementation of feedback (Table 1). Hence, we suggest an extension of the use of this framework to include the different psychological processes underpinning both facilitators and barriers of feedback recipience and utilisation. Within each main theme, two subthemes emerged for the facilitators and barriers of feedback use (Table 1).

Table 1: Main themes (psychological processes) and sub-themes (Facilitators and Barriers)

Psychological process	**Facilitators to feedback recipience and utilization**	**Barriers to feedback recipience and utilization**
1. Awareness of what the feedback means, and its purpose	• Adequate 'feedback mental model' • Ability to decode feedback	• Limited 'feedback mental model' • Inability to decode feedback
2. Cognisance of strategies by which the feedback could be implemented	• Adequate knowledge of appropriate strategies • Adequate knowledge of available opportunities	• Poor knowledge of appropriate strategies • Poor knowledge of available opportunities
3. Agency to implement strategies	• Sense of empowerment • Ability to translate feedback into action	• Sense of disempowerment • Disability with translating feedback into action
4. Volition to scrutinise feedback and implement strategies	• Proactivity to feedback • Receptiveness to feedback	• Lack of proactivity • Lack of receptiveness

For each of the psychological processes, Awareness, Cognisance, Agency and Volition in Table 1, we discuss the facilitators and then the barriers to the participants' feedback recipience and utilisation to feed forward. Illustrative quotes were selected to support both sub-themes from the analysis of the focus group discussions.

1. Awareness of what the feedback means, and its purpose

1.1 Facilitator: Adequate 'feedback mental model'

A mental model is a representation of someone's thought process about how something works. Students' awareness and understanding of what feedback meant to them and what feedback is for (Withey, 2013), revealed aspects of their 'feedback mental model'. They described the purpose and feelings of receiving feedback and developing good relationships with their tutors as a means of supporting their clinical skills improvement.

One aspect of this was the capacity of clinical skills feedback to clear the mind and increase their confidence and self-esteem in performing the skills, by supporting the uptake of feedback:

…feedback that you get from skills clears the mind and gives us courage and confidence to apply the skills…and to improve it. [F3]

For the feedback process and feedback literacy to be enhanced, students need to both appreciate how feedback can operate effectively and develop opportunities to use feedback within the curriculum (Carless & Boud, 2018). This was particularly associated with positive comments of satisfaction in using feedback to reflect on their performance, identify their gaps and take action to improve it:

It gives me a better picture on everything…on my last logbook session I saw that I lacked in sensory examination, so it helped me go back, reflect on my work and study and be able to link everything and understand better. [F4]

Maturity plays an important role in students' sense of the value of feedback to self-regulate their learning (Murdoch-Eaton et al., 2012). Participants pointed out that feedback was becoming more relevant and taken more seriously as they progressed through the years; it motivated their situational self-regulatory focus on feedback use:

I think that as we are progressing in years, feedback is becoming more relevant, unlike in first year, second year, you knew that you only had to pass…you take it seriously now…I'll have to go to hospital and do this, so I must really know it. When they say this is the mistake, I must make sure that, immediately, I tackle it. [F2]

Students expressed the need to feel that their tutors cared for them and made an effort to help. Responding to feedback depends on establishing a good and trustful relationship with tutors to facilitate learning (Carless, 2013):

Some tutors are really nice. You see they actually care. I mean they actually watch you and show you where you went wrong and then you actually say, okay, this is why it needs to improve…you want to do better. [F2]

1.2 Barrier: Limited 'feedback mental model'

Students expressed concern about the time constraints and the large groups that tutors had to assess. These factors minimised the amount of feedback provided and the time to review students' gap/s and correct them. With minimal feedback, this can be inadequate to engage effectively, especially to correctly identify gaps in knowledge and to develop learning activities to close the gap and improve performance. This contradicted their purpose and the meaning of feedback, hence their 'feedback mental model':

I would say tutors are rushed for time, because especially when you have a large group and you need everyone to perform the skill... And when you get to the end, when everyone is done, then you don't

have time to review where each person made their error verbally, and to show the skills to each person. [F5]

Participants also mentioned that unfamiliarity with tutors can be intimidating to their self-esteem. This can lead to hesitancy in seeking feedback and hinder motivation to engage with feedback (Sutton, 2012):

I guess some tutors can be threatening, because there are some we only see during the logbook sessions, and we don't really know them that well…you usually won't ask them any further questions. It is also hard to get used to their techniques first, and second, they are new people, so it creates more of a clinical barrier between you and them. [F5]

Students also described how the inconsistency in feedback provision between tutors can be a challenge, with different feedback expectations affecting student's use of feedback:

The feedback is constructive from some, but from some feedback is vague;, sometimes the only comment that they place on our logbook is 'Keep practising', and that is vague in its own sense…And also the thing that gets mentioned about one or two tutors giving feedback, when you go and the next session you go to another tutor…still you are not able to get a superior performance. But with one tutor, he would be able to track your performance and then say that there is an improvement. [F3]

The issue of consistency between educators has often been found to be lacking and is something that has been highlighted in previous studies (Boileau et al., 2018; Dunworth & Sanchez, 2016; Orsmond et al., 2013). Hence, longitudinal relationships with tutors are recommended, as this impact favorably on learning (Esterhazy & Damsa, 2017).

1.3 Facilitator: Ability to decode feedback message

Murdoch-Eaton et al. (2012) highlight the role of learner maturity in decoding terminology and subsequent feedback recognition. Aside from students' awareness of what the feedback is for, to implement feedback, they need to understand it first.

Participants mentioned that the benefits of engaging with the assessment criteria might be influenced by the students' difficulty with understanding the medical terminology used in the skills protocol or how to use it. They further demonstrated how maturity and the longer time spent in clinical skills increased their knowledge and familiarity with the clinical terminology and assessment process, making feedback more acceptable:

Knowing the skills protocol before getting feedback does help with understanding the feedback now. Initially in 2nd year when we started skills, we were not clued up with understanding the protocol and how to use it, but as we got closer to the mid-semester, it became clearer. [F5]

1.4 Barrier: Inability to decode feedback message

In contrast, participants spoke of reasons some students may not use feedback such as difficulties with understanding the tutor's language and accent, which can lead to misunderstanding terminology and meanings of verbal feedback comments. Feedback givers may expect their remarks to be readily decoded and used however learners may need additional intervention to decode complicated texts and language (Carless, 2006; Nicol & Macfarlane-Dick, 2006):

I remember we were doing CNS…Dr X was telling us about the tuning fork. I wrote 128 or something, but when I started reading, it did not make sense, and my friend was lucky because she was in a different group; she said that the doctor was referring to different sizes, so sometimes we hear something and we hear it wrongly. So, I don't know why, maybe…is it me not understanding English or…? [F5]

Similarly, the English language as a medium of learning, while demonstrating and explaining a skill can be a challenge for the multicultural and heterogeneous student population. Language can be a barrier to understanding the feedback as well as engaging with and using feedback:

We actually practise…we just cannot make the four-minute or the eight-minute mark. It's the speed on how you speak…I don't know but if we were doing the OSCE in Zulu…I feel like my speed would be a bit faster…language can become a barrier. [F2]

Another challenge with receiving feedback was the learners' understanding of the feedback providers' handwriting, which may lead to losing the meaning of the feedback comments. This in turn affects their use of the feedback as a means to improve performance and learning:

The illegibility of the handwriting…I struggle to read sometimes…the purpose of the feedback is then pointless. I have sometimes been asked by the tutor if I can read their handwriting or if I understand the comment written, which is helpful. [F4]

Discussing the feedback with the tutor after assessing their skills can also be beneficial to helping learners develop strategies for future improvement (Dunworth & Sanchez, 2016):

There is an opportunity for that with the tutors. You can clarify and go into more depth of what they have written...we can ask them more about the skill, just like [for] clarification to get more detail. [F4]

Difficulties in using feedback can result from either learners' feelings about the feedback received or a lack of understanding about what feedback means to them. Feedback givers have a crucial function to transmit clear messages, avoid or explain medical jargon. The use of feedback by some learners may be restricted by their narrow views of the meaning of feedback. Encouraging learners to

expanding these concepts to better understand their active role in actioning feedback, could lead to stronger commitment.

2. Cognisance of strategies by which the feedback could be implemented

2.1 Facilitator: Adequate knowledge of appropriate strategies

Though students appreciated the role of feedback to improve learning, their responses were more mixed and varied significantly concerning their actual use of feedback to promote their learning and autonomy.

Some participants mentioned a passive engagement with feedback in that they at least read the feedback comments immediately after receiving them, but only acted on them before the OSCE [Objective structured clinical examination]. They, however, recognised that they should adopt better strategies. There was a situational regulatory focus on feedback with exams as the driving force, with no particular strategies mentioned for using feedback:

I do not really go back to it most of the time. But sometimes I do look at it [feedback] immediately after getting the logbook and then you see where you are lacking, and next time when you are studying for OSCE, like you pay more attention to what you didn't do well…ideally I think I should work better on my feedback. [F4]

While others had a mixed response which varied from a passive approach such as *internalizing and making a mental note of gaps noted in the feedback"* [F5], to a more active approach such as "*referring to the lecture notes to identify gaps in performance and adding in comments to the clinical skills protocol"* [F5], to "*taking on board feedback and rearranging things in the mind"* [F1] and to look back and then set targets for themselves in order to feed the comments forward to the next performance. This is similar to findings reported by Pokorny and Picford (2010). One student observed:

I mainly internalize it. I take note of it at that moment because, with things like technique, there is not really anything you can write down; it is just things that you take on board. So, that's why I take mental notes a lot, I don't write down a lot of things, but from there I just try and rearrange things in my mind and say, okay now this is how I should do it. [F1]

Just like Butler and Winnie (1995) confirmed, feedback information can be used by learners to confirm, add to or restructure information in memory with the aim of reducing the discrepancy between current practice and desired practice, to answer Hattie & Timperley's (2007) third fundamental question "where to next?". Feedback literate students are aware of the need to take action in response to feedback information (Carless & Boud, 2018)*:*

Whenever feedback is given, I will read it, and then I'll refer to the lecture notes and emphasise those points where I made my errors in the protocol, and usually before the OSCE, I practise multiple times to perfect it before the next assessment. [F5]

2.1 Barrier: Poor knowledge of appropriate strategies

A participant suggested that the delayed feedback use in some students' behaviour was sometimes due to time constraints or a lack of know-how for the productive use of feedback. Reflection and assessment of performance can be a challenge for students because of time constraints:

...logbooks are usually during the time of the ETTs (end of theme test)...I do not check my work after I get my feedback unless until the second logbook. We don't have any time to prepare for the logbook because we've got a lot of work to do, the lectures and stuff...Sometimes also they don't know what to do with the feedback immediately, that's what I've seen. [F1]

2.3 Facilitator: Adequate knowledge of available opportunities

Participants demonstrated in their discussions that they were cognizant of opportunities to seek further support in the use of feedback, while some participants felt more comfortable seeking peer feedback:

Let's say my skill of auscultation is bad, then I'd go to a friend to ask them how exactly you would do it, where did you place the stethoscope...I will make notes of what I did wrong, sometimes I draw little pictures. Otherwise, when it gets to OSCEs, I am not going to remember a thing that my tutor told me so I have to do it that day, try to see my downfalls and strengths… [F1]

Some students strive to establish the teachers' expectations and are proactive at seeking out feedback (Yang & Carless, 2013):

If you have a tutor that is approachable for your logbook and you can ask them…. [F1]

Students appreciate tutors assessing their self-reflection on their performance before feedback is given. They were conscious of how academics facilitate these possibilities as it helps with their evaluative judgement to refine their internal feedback and to self-regulate their learning (Carless & Boud, 2018):

She [tutor] will always ask you what have you done well after I am done with the skill, and after you respond, she will say what can be improved…then you know where you stand with the particular skill. [F5]

Several participants pointed out that engaging with the clinical skills logbook as a feedback tool had a positive response on learning, as they can see an improvement in performance over time. They used

the clinical skills logbook feedback to track their progress. Feedback motivates and encourages learning and facilitates seeking peer feedback:

It helped me to improve, I can see the improvement when I do the OSCE…when I got the feedback I went back, and I asked the third years [senior students] for those skills to clarify my mistakes. So it really does give us encouragement. [F3]

2.4 Barrier: Poor knowledge of available opportunities

However, while some respondents seemed to understand that there was support, they were conscious that they often failed to take benefit of these possibilities due to the language barrier:

Sometimes it is the language barrier. You cannot actually ask what you want to ask from the tutors. Um…I feel they are just not getting it, what you are asking, and they keep telling you what you already know. Then you are just like - just leave it there. That is when you go and ask your peers. [F2]

In addition to this knowledge of certain possibilities, some respondents expressed relative ignorance of possibilities or demonstrated that they explicitly needed engagement with them, including assistance on how to utilize feedback effectively:

I mean, honestly, if you take the time and read the thing [feedback], you get what they are saying…but sometimes, you find that you just do not read the thing or do not know how to look for assistance. [F2]

Though our participants were conscious of strategies that they could adopt in principle, there were difficulties in appreciating these strategies in practice due to language barriers. They also discussed problems with how to use assistance. Students sometimes need more guidance than simply a request for them to make use of assistance (Price et al., 2010).

3. Students' agency to implement strategies for using feedback

3.1 Facilitator: Sense of empowerment

Participants mentioned that receiving feedback empowered them to implement strategies to use feedback better, which meant spending more time to practise the skills, which facilitated their improvement in future performance:

I always do better on the OSCE than I do on the logbook sessions. So, I feel like the feedback - it does help. When I go to the second logbook, then I know where I lack, it helps me to calculate the time that

I spend in practice. So, I know when I spend this time, I get this rating. So, I add more time so I can get this rating. [F1].

They also indicated that providing feedback to peers was empowering and they learnt from the experience. An opportunity for comparison with the views of others engages students in improving their capacity to make sound judgments (Boud et al., 2013):

Giving feedback to peers shows me my own knowledge, like what I do not know...I cannot critique someone else on something I don't even know. So, that sometimes highlights what I can do… [F1]

3.2 Barrier: Sense of disempowerment

Participants spoke of reasons some students may not use feedback: they perceived that they would never get a better rating with a particular doctor even if s/he put in effort to make changes to his performance. They were likely to ignore feedback due to a sense of learned helplessness, as it was perceived that past experience in implementing feedback had not been beneficial:

Sometimes, students use the feedback to work on a difficult skill, but then they know that Dr So-and-So will never give a superior performance to show changes made from feedback they had before. [F2]

Participants indicated that they experienced a challenge with implementing feedback if there was a clash in knowledge between the tutor and student i.e. the tutor expectation differs from the students' self-assessment of their performance:

…the Abdominal examination, say if you did comment on abdominal mass, shape, consistency, size etc. sometimes, the tutors may have a different approach…then they say you left edge of the mass out, when maybe you actually did say it, but that was according to your step-wise approach, where they may have a different approach. So, they may say you have left it out and it feels more like criticism. [F5]

Boileau et al. (2018); Bing-You and Trowbridge (2009) report that feedback incongruent with learner's self-perceptions could be perceived as a personal attack, and as a result, no improvement in learner performance would occur.

The lack of self-confidence to perform a skill can be a challenge for some lower performing students. One participant commented that feedback was not always realistic and did not reflect what she knew though she acknowledged failing to demonstrate the skill well, due to lack of confidence:

…sometimes the feedback is not so realistic because you find out, for example, sometimes you get like the feedback saying you don't know maybe the procedure, but you find out that you know it. You just failed to apply it. So, it's not realistic in a way because you know that sometimes you just lack confidence. [F2]

Learners often report anxiety with regard to the applicability of feedback to upcoming assessments (Gleaves et al., 2008). They often did not see the connection and relevance of using feedback between logbook assessments with upcoming new themes concerning a different body system perceived as not related to the previous themes in a modularized curriculum. The perception that individual assessments were not related can lead to "behavioural disengagement" (Handley et al., 2011, p.533), as expressed by this participant, who refers to …. (ETTs- End of Theme Test):

The only thing is that it's practically impossible to correct and use feedback immediately, 'cos the OSCEs are viewed as separate from the ETTs, and the logbooks happened just before ETTs, so people are pretty much more focused on ETTs. And they view them as separate entities, even though they are pretty much the same; it's not viewed as one entity. So, people don't focus as much on the feedback once a theme is over but maybe [they do] four months later, close to the OSCE when you will need to revise all the themes. [F1]

Orsmond and Merry (2011) observe that students concentrating on only a particular theme failed to see the bigger picture to their skill development. Price et al. (2010) reiterate that learners do not often realise the potential benefits of feedback to their academic literacy development.

3.3 Facilitator: Ability to translate feedback into action

Participants thought specific feedback was actionable and acted on; however, general feedback was not actionable and can be confusing, as they did not know what to do:

What I do is that when I got specific feedback, I usually go focus on that aspect of the whole chapter or maybe anatomy, physiology or anything, but when the feedback is generalised like 'practise more', I struggle to actually know what to do. [F4]

3.4 Barrier: Disability to transfer feedback into action

Though Burke (2009) in her study notes that students rarely know what and how to achieve development as they are not trained on how to use feedback, our participants however were in fact aware of interventions that could facilitate their engagement with feedback to transform their learning. The lack of agency can arise when students believe that feedback is fixed and based on isolated skills that may not be seen as relevant to their future clinical practice:

... So, we had a patient in the hospital, I think her problem was a tender hepatomegaly. So, then we wanted to check the JVP. We examined the hepatojugular reflux…then they told us no, you do not have to do it here because patient has a problem with the liver…do it in the alternative way. So, for now, we are told if you want to do the JVP, you do it like this. So we go to the logbook, we're only concerned about how we examine the JVP because everything that is related to checking it will be relevant during the logbook and it will be right during the logbook, but when you go to the clinic, it's

not everything that you know will apply. So sometimes, you have to exclude others because of other things…so we need to have feedback integrating [the] normal and abnormal in the way we move forward. [F3]

Burch et al. (2006) and Boileau et al. (2018) confirm that feedback that considered students' objectives such as problem solving significantly improved participation in patient-centered learning activities and supported development of self-regulatory skills. The feedback that represented the basics of moving forward as medical learners to self-regulate their learning, could have a more lasting effect on the students as future doctors (Harrison et al., 2015).

4. Students' volition to scrutinise feedback and implement strategies to use them

4.1 Facilitator: Proactivity to feedback

Students were aware that they needed to be proactive to engage with and put feedback into action (Handley et al., 2011). They were grateful for the formative logbook feedback sessions and used the feedback to revise the skills before the exams to enhance their performance:

I feel more competent…when I get the feedback, because I can see the gaps in my knowledge… thank God we had logbooks. 'Cos it really helps us to think...I always use the lecture notes and protocol that we get for the skills to revise all the work that we've done for the themes, it just puts everything together very nicely. So, I use that as a very good tool to revise, analyze and see where to better my skill. [F1]

4.2 Barrier: Lack of proactivity to feedback

Many participants perceived their lack of intrinsic motivation, as they tried to do the minimum necessary to achieve a certain grade just to pass the OSCE, which they felt was due to the unequal weighting of courses in the curriculum:

…I would not say time is a problem, because you create time for things that are important, but I think it is a medical school thing where there are certain things that are more important than others...for example, anatomy and skills, now you're focussing a lot on the 33% of your paper, anatomy, and you know there's 15% of skills. So, you're going to obviously spend a lot more time on anatomy, but say if you had a test on clinical skills or an examination every week, for example, it would push you more every week to know, like I have to get my skills done. [F5]

As Hounsell (2007) noted, a primary interest in the grades rather than an appreciation of their performance may explain student's apparent lack of input towards feedback. Many participants were aware of the need to be constructive in finding and using feedback, but their lack of volition to use feedback, limits academics from facilitating feedback engagement (Carless, 2006). Bing-You et al.

(1997, p. 43) stressed that students must have a "commitment to change" that requires a state of receptiveness.

4.3 Facilitator: Receptiveness to feedback

Participants' motivation to engage with feedback often depended on the type of feedback comments as either positive or negative feedback. Praise increased their motivation to use feedback to improve performance, as was acknowledged in their comments on the value of feedback. Participants were also aware of the need to use feedback to be purposeful:

The feedback is definitely helpful and motivating, and when they tell you what you did well, it's helpful, very constructive, motivates you to make the changes; I can imagine also that the tutors will not be happy when they put in effort to give feedback and we don't use it. [F5]

To avoid a negative emotional impact from criticism, participants mentioned that this was possible by careful control of the manner in which feedback was presented. Constructive feedback delivered with encouragement coming first to make the subsequent criticism easier to digest and cope, can be useful:

...If a tutor encourages me and then criticizes me in a constructive way, then you feel good about it...But when you have a tutor that just criticizes and shouts at you, then that is not helpful...you are just going to feel nervous and not going to be able to show your skills properly. [F1]

Others commented on the need for tutors to use a respectful tone and that negative things could be said in a polite language so that nobody feels offended. The use of feedback would be easier when received from someone they perceived to be facilitative rather than destructive:

I think it is more the way in which the feedback is relayed than the relationship with the tutor... If they relay it in a way more conducive to learning, in a kinder way, then you want to take it on board and be less defensive...I think…we would learn more from someone who we feel is facilitating learning rather than being destructive. [F1]

Praise alone may not always be helpful since it diminishes the impact on learning by distracting from the task (Kluger & DeNisi, 1996). Participants indicated that a combination of praise and criticism can be carefully managed in a friendly manner, which could be motivating to their learning:

...It does not have to be soft, also because then the encouragement is gone. The feedback should be straightforward: if I did not do very well, they should tell me, but in a good way. [F3]

Higgins et al. (2002) confirm that students often show dramatic improvement in their work after critical rather than positive comments. However, it is known that a combination of grades and narrative feedback influences students' likelihood to engage (Gleaves et al., 2008).

4.4 Barrier: Lack of receptiveness to feedback

While confidence and motivation should be encouraged, criticism with no opportunities for follow-up played an important role in quality feedback that could affect students' use of feedback:

When critical feedback is received, specifically for your technique and there is no other session after that to correct that technique, the feedback just becomes a whole ball of confusion. [F1]

General Discussion and Conclusions

Feedback must be used to encourage learning, although the recipient may have difficulty engaging with it (Jonsson, 2013; Price et al., 2010). We therefore aimed to explore factors that affected students' receptivity to and use of feedback, how their perceptions influenced the contribution feedback made to their learning, and how to promote the productive use of feedback. In this study, medical students' perceptions of the feedback process informed their beliefs and opinions about the nature of a quality feedback process. The data highlighted several insights into key factors beyond the feedback-sender input that influenced students' feedback receptivity behaviour in the clinical skills setting. These were explored through the lens of the four psychological processes: Awareness, Cognisance, Agency and Volition (Winstone et al., 2017). Knowing the factors influencing feedback implementation can assist educators to identify suitable methods towards helping students share in the responsibility for their academic and professional development.

We found that one of the key factors influencing receptivity to feedback was influenced by the students' relationships with their clinical teachers or tutors. The impact of feedback relies on the interpersonal interactions and relationships developed within an institutional culture (Mann, 2011). To avoid tutor inconsistency students advocated for longitudinal tutor-learner relationships as an educational alliance (Telio et al., 2015). Prior knowledge of the students' performance would permit tutors to acknowledge their progress and observe behaviour change. Receiving feedback from a tutor they knew made the mutual trust between them valuable. This enhanced the credibility of the feedback received, as well as their engagement in the feedback process. Participants also relayed certain difficulties with decoding feedback messages due to barriers to understanding feedback, such as tutor pronunciation of terminologies, language differences and illegible handwriting. Further, students felt one-liner feedback comments were limited and viewed as being non-actionable as it did not reassure them if they were on the right track. To address these challenges, educators need to ensure consistency and clarity of feedback presentation, as well as checking students' understanding of the feedback message after relaying messages. However, students also need to take responsibility to seek clarification and to be better prepared to understand common medical terminologies to decode feedback messages (Carless 2006; Nicol & Macfarlane-Dick, 2006).

In this study, nearly all participants recognized that for learning to take place there is the need for students to take responsibility by effectively acting on feedback. This underpins the development of self-regulation (Nicol & Macfarlane Dick, 2006). Winstone et al. (2017) indicated that students often depend on specific feedback that tells them exactly what to do. To promote self-regulation, educators need to develop practices that prevent students' dependence only on instructions but instead to focus on developing their self-reflection and self-assessment. We found that students used a variety of strategies for using feedback. While some of them would usually only address their feedback towards the clinical exams, reflecting a situational self-regulatory focus (Harrison et al., 2015), others showed eagerness for being proactive. There were also students who indicated a passive engagement with feedback, mentioning no particular strategy for acting on feedback constructively, but rather referring to diffuse strategies (Jonsson, 2013; Furnborough & Truman, 2009). Handley et al. (2011) stress the need to be cautious in considering students who superficially read their feedback without taking action, as a form of engagement with feedback similar to the notion of empty talk. However, we found that students felt relieved when they did not fail the formative logbook assessment, and hence had little incentive to engage with feedback and address their weakness immediately.

Our findings show that learners' response to feedback is not uniform and not all participants recognize the immediate need to engage with feedback productively. In particular, Bandura (2001) and Harrison et al. (2015) argue that students are not just passive 'consumers' of the learning and evaluation environment, but are autonomous learners, who strive to actively influence and adjust their learning environment. If students should be responsible for the proactive use of feedback input, why would they choose not to use the feedback they receive? Findings from the study reinforce the situational regulatory notion described by Van Dijk & Kluger, (2010) and Durning and Artino (2011), that learning and the context in which it takes place cannot be dissociated. They indicated the need for educators to not only consider methods of providing information to learners, but also to understand the situations in which information will or will not be used. The challenge in this respect is for educators to support students by incorporating into the curriculum activities to train students in skills of feedback implementation to transform their cognisance into action. Designing curricula that emphasises continuation and transference between assessments and learning objectives, such as feedback incorporating medical knowledge and clinical reasoning, allows feedback to offer a developmental function (Hughes, 2011; Boileau et al., 2018). Students mentioned that they were more likely to use these feedback opportunities to think with larger agencies about their learning. Our students confirmed that self-affirmation alone is not the path to professional improvement and that for longitudinal growth, honest constructive feedback is essential. In applying motivation to performance-based feedback, intrinsic motivation would have a greater influence on feedback acceptance and performance improvement (Ryan & Deci, 2000). For the medical education curriculum to promote increased learner autonomy and to support the development of a mind-set of proactive recipience,

there is a need to focus on approaches that boost learners' intrinsic motivation rather than depending on only externally controlled motivation (Ten Cate et al., 2011). Both educators and students can facilitate this role.

As suggested by Winstone et al. (2017), we support the incorporation of the psychological processes underlying barriers when designing interventions to promote learners' feedback engagement. Further, based on our findings, we recommend that this psychological framework be expanded to also include facilitators or enablers to offer feedback. By identifying and promoting the psychological processes underlying the enablers of feedback engagement and removing the numerous barriers to proactive recipience, we can nurture students as active receivers of feedback and self-regulated learners. This study confirms the need to shift the focus of the feedback conversation from the individual to the learning context, from instructional messages to self-regulation, and from the perspectives of the feedback provider, to the recipient. However, ultimately it is dependent on learners to appreciate the importance and acknowledge their responsibility for acting on feedback.

Limitations and Recommendations

The study identified the students' perceptions of helpful and counter-productive elements that impacted their receptivity to feedback. In this study, there is the possibility that certain perspectives may be over-represented and others under-represented, since only the students' perspectives could be interpreted to construct meaning. Since the feedback process is multifaceted and complex, it would be worthwhile establishing both tutor and students' views about the factors they believed contributed to students' receptivity to feedback. Triangulating both perceptions may identify the extent to which any one is emphasized to move forward our understanding of the phenomenon of feedback. Studying different year groups would also be important in future studies. The possibility of differences between curricula could also impact the findings and may lead to under-representation of certain perceptions. We may not have been able to provide a complete picture of all themes, though the themes that emerged from this study are important and make good sense. Using a similar framework that focuses on the psychological processes that underlie facilitators and barriers to feedback engagement, this study can be replicated in other contexts with more interesting themes regarding feedback uptake, and a combination of such studies would provide a more complete feedback picture.

Compliance with ethical standards

Competing interests: The authors Dr R Abraham and Dr V Singaram declare that they have no competing interests.

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CHAPTER 3: PERCEPTIONS OF SELF AND RECIPROCAL PEER FEEDBACK OF HIGHER AND LOWER PERFORMING JUNIOR MEDICAL STUDENTS IN THE CLINICAL SKILLS LABORATORY (Manuscript submitted. Currently under review by journal of: Education for Health)

In this chapter, we explored feedback of medical students from various academic performance levels on their perceptions of self, peer and teacher feedback interventions in the clinical skills laboratory. The study reports on the thematic interpretation of focus group conversations on self-assessment, self-reflectivity, peer-to-peer reviews, and factors affecting feedback seeking and receptivity. The challenges to current practice and recommendations for improvement were investigated.

ABSTRACT

Background: Direct observation of clinical performance requires learners to receive timely performance feedback from multiple sources. To support the active use of feedback by medical students, several interventions have been developed. Their engagement is interpreted by their self-perceptions of the usefulness of such interventions. This study aims to explore how students receive and interpret self and peer-to-peer feedback in the clinical skills setting.

Method: We adopted an exploratory qualitative study using focus groups with semi-structured interviews to explore how medical students of diverse achievement levels interpret feedback interventions linked to self, and peer feedback activities to enhance learning. We used five focus groups consisting of 25 third year medical students. The emerging themes are discussed.

Results: Students at both high and low performance levels appreciated the importance of feedback. The lower performing students believed they lack appropriate skills to adequately engage with self and peer feedback interventions. Higher performing students confirm that peer feedback assisted them to take responsibility for monitoring and evaluating their own learning over time. The study confirms that students need multiple opportunities for self-evaluation to improve their judgment over time. Learners' emotional maturity to feedback ratings and teacher feedback on interventions testing clinical cognition had a positive impact on self-regulating learning. Empowering learners with skills to seek, receive and handle feedback motivates engagement in the feedback process, shifting the focus from the feedback sender to the receiver and towards self-regulation.

Discussion: The study highlights the importance of training students as proactive feedback receivers and givers. The clinical skills logbook teacher and peer feedback culture influenced self and co-regulated learning. It enhanced feedback literacy through enabling learners' appreciation of feedback, managing emotions constructively, practice in developing evaluative judgment and self-regulatory skills. A combination of these features maximized the potential for fostering the development of an action plan. We offer recommendations on how engaging in participatory design of learning environments, such as redesigning assessment tasks in medical education and tailoring feedback interventions to students' needs with teachers playing a facilitative role, could enable uptake of feedback to support learning.

Keywords: Self-Assessment feedback; Peer Feedback; Feedback engagement; Educational feedback interventions

Background

Kluger & DeNisi's feedback intervention theory (FIT) states that critical feedback on the gap between the observed and the standard performance, directs learners' attention to task-motivation and task-learning processes. This often leads to more self-effort (i.e. self-assessment, self-reflection and self-regulation), enhancing feedback engagement and performance improvement. [1]

One of the challenges with feedback design is conceptualizing a learner's sense-making process of the feedback information. [2] This has two implications: firstly, feedback information provided needs to be constructed in a way that is easily understood and appreciated by the learner; secondly, learners will need support in order to develop the skills and knowledge to make sense of the information. Alongside the feedback information, learners need additional resources that explain key objectives or other learning activities to empower them with "the understandings, capacities and dispositions needed to make sense of feedback information and use it to enhance their learning" (p. 1315)[2], with the ultimate aim of moving feedback forward. This active role and focused planning of a feedback recipient for performance improvement is referred to as feedback literacy.[3,4] Through the theoretical work of Harrison, Boud and Molloy, Carless, Nicol and Macfarlane-Dick, feedback literacy involves practical means of improving the quality of feedback provided, and learner engagement and satisfaction with feedback.[5,6,7,8] This requires a focus on developing feedback interventions as feed forward action plans that target learner feedback literacy for behaviour change, performance improvement and professional growth.[9,10] In this paper, developing self and peer-to-peer feedback interventions to shape learners' feedback engagement, is referred to as 'feed forward strategies.'

Self-monitoring, self-assessment, peer feedback and self-regulation are significant tasks of medical practitioners in developing and maintaining professional competencies. [11] To maintain a level of competency, physicians are required to be able to assess their own strengths, weaknesses and learning needs. [12] By analysing their work and that of others, students develop their reflection and evaluation skills, gaining a better knowledge of the performance criteria.[13] Self-evaluation and peer feedback correspond to the educational paradigm of reflective practice [14] aimed at developing critical thinking, problem-solving, and self-directed learning skills, by gaining new understandings for future performance. [15]

A systematic review of the literature on fostering proactive feedback recipience revealed several initiatives to develop students' feedback literacy to move feedback forward, including training in self-assessment[16] and peer-assessment skills.[17] Others are providing 'feedback without a grade',[18] training students in using and interpreting feedback to put it into action, [19, 20] and interventions to track progress through a feedback portfolio.[21] Although the different activities share the same goal of facilitating students' active engagement with feedback through reflection,[17, 22, 19] feedback seeking[6,] and attentiveness to feedback,[16] authors still reported students' as having weak engagement with

feedback. There is thus a need to understand why students are not engaging with existing interventions, as this would be valuable to determine what motivates them to increase the effectiveness of the feedback process. Studies indicate that perceived barriers to efficient peer feedback involve a lack of clear goals, inadequate training for the provider and recipients, concerns about interpersonal relationships, and a perceived absence of advantage. [23, 24]

To enhance feedback processes, students need appreciation of feedback and how it operates effectively; the opportunities to use feedback productively; to develop capacities in making evaluative judgments, and to appreciate the role of teachers and themselves in these processes.[2] Learners' perspectives regarding self and peer feedback interventions that actively promote feedback engagement require further interrogation. Out of 195 outputs published between 1985 and early 2014, Winstone indicates that only 8% related to medical students.[25] There remains a blind spot in our understanding of how these feed forward initiatives influence medical students' engagement with feedback at different performance levels. Sadler and Carless caution the need to be careful of generalising in feedback research, and for studies to be inclusive and comprehensive regarding disciplines, institutions, year levels and second language learning environments. [9, 7]

While self and peer performance feedback has been the subject of many recent research reports, how they influence feedback engagement in medical students of diverse achievement levels is largely unknown. In this study, we performed a focused in-depth exploration to comprehend the way medical students of diverse academic levels involved in self, and peer-to-peer feedback exchange, perceived formative assessment feedback interventions as enabling activities to enhance their feedback literacy, and subsequently move feedback forward within our clinical skills training setting.

Methods

Context and Setting

The study was conducted at a large medical teaching institution. First- to third-year medical students must demonstrate competence in examination at the end of each six-week hybrid Problem Based Learning themes, using standardized patients. The supervising tutors and peers directly observe their performance and provide immediate structured verbal and written formative feedback in a logbook to facilitate feed forward (Appendix 1). Students are informed that a global rating is provided instead of marks to facilitate their understanding of skill mastery. The tutors and students have opportunities to discuss the feedback and pose questions during and after the skill performance.

Students are provided with instructions at the beginning of each academic year during formal teaching sessions, informing them that they would be receiving and giving feedback during the logbook formative assessment sessions. To facilitate self-assessment, at the beginning students reflect on the

task and their concerns. Once the task goal is identified, the student performs the task while the tutor observes. At the end of the task performance, students reflect on their performance, acknowledging what they felt they did well and what they could have done better. The tutor then reinforces skills the student used to achieve the outcome, and demonstrates and discusses alternative skills towards a better outcome. A peer-to-peer feedback component was added to the existing assessment protocol. Students were informed how to give actionable feedback after observing their peers performing a skill during their informal peer logbook assessment sessions. They modelled the way their tutors provide feedback during the peer logbook sessions, answering three feedback questions: what was done well, what was not done well and what can be improved. Successful completion of logbook skills is a duly performed requirement. Tutors debriefing learners after the experience in order to help them learn, follow this process. Debriefing is "a facilitated reflection in the cycle of experiential learning to help identify and close gaps in knowledge and skills." [26]

Sample

Using a purposive sampling strategy, we invited 3rd year undergraduate medical students for focus group interviews, based on their end of semester summative clinical skills performance i.e. high performers (>70%), average performers (50-69%) and low performers (<50%). All students had at least one year of exposure to the clinical skills formative assessment feedback. An email invitation was sent to prospective participants describing the purpose of the study, emphasising voluntary participation and ensuring confidentiality. Participants' written consent was obtained, with the opportunity to opt out at any point. The university ethics committee granted ethical approval.

Data collection

Adopting an explorative qualitative methodology, [27] medical students' receptivity and utilisation of formative logbook assessment feedback were explored using semi-structured focus groups. Interviews were facilitated by the authors, assisted by a moderator who monitored the discussions to ensure neutrality and that the findings were shaped by the participants' perspective, not through research bias. All five focus groups of five students each were conducted for 60 minutes and audio recorded. Clarification and further responses were sought as required, and data saturation was reached with the five groups.

Data analysis

Recorded interviews were transcribed verbatim and thematically analysed. [27] The authors independently read all the transcripts, coding verbatim passages. The perceptions relating to self and peer feedback exchanges, including attitudes that could influence learners usefulness and application to on-going participation, as well as difficulties were grouped into three components (affective,

orientation and transformation), and are discussed with representative quotes from participants. Affect was emphasised in the purpose and benefits of receiving feedback considered to be the gateway to learning; orientation included perceptions for feedback to orient students within their academic environment, and finally, transformation included perceptions for feedback to support learning and change. [28] Consensus of themes and sub-themes was reached after several re-readings of transcripts and discussions. The themes related to medical students' use of feedback are reported in another paper. [29] In this paper, we analyse the themes relating to self and peer feedback based on the academic achievement levels of the students.

Results

Twenty-five demographically diverse and mixed gender i.e. 15 female (60%) and 10 male (40%) students, participated. These were two groups of five each with >70% (F1&F5) and 50-69% (F3 & F4), and one group of five students with <50% (F2) based on end of year summative OSCE assessment performance. F1&F5 made up the higher-performance category, while F2-4 was combined to make up the lower-performance category.

Self-assessment feedback

a. Affective component (Structure provides meaning and value)

The higher-performing students found self-assessment beneficial to their skills development. They felt comfortable with tutors assessing their self-reflection on their performance before feedback is given:

… it's actually good because she [tutor] will always ask you, what have you done right and what have you done wrong... [F5]

However, the majority of lower-performing students were not confident to self-assess their performance, and first required the tutor to give them feedback. They also recognised that their own self-preservation biases could make the assessment process less useful. There is therefore evidence that students do not recognise the potential benefits of self-assessment to develop their abilities to put feedback into action:

Some of us would not be comfortable, asking us to assess our performance before the tutor gives feedback, because you would be scared to say that it was competent. However, when the teacher gives you the exact feedback, you feel ok, but the truth is you don't know how you did it… [F3]

Considering the issue of difficulty with self-assessment among the lower-performers, the higher-performers mentioned that students would find it useful if feedback was provided using a 'rubric checklist' which they thought would make it easier for them to know where they particularly had a problem with the task and if they had covered everything:

I feel like if the examiner in the logbook gave you the checklist afterwards, it would be a lot more specific; it will help you reflect and you'd know exactly where you fell short. [F1]

b. Orientation component (Create expectations to feed forward as a feedback culture)

The lower-performing students appreciated their prior knowledge of the task's learning objectives, to appraise their work against standard grading criteria:

…going through the protocol then going to skills logbook session helps to assess myself and to understand the feedback we get from our tutors. [F3]

c. Transformation component (Impact of self-assessment to feed forward)

Both categories of students indicated that teachers manipulating the assessment to include an integrated formative assessment feedback with debriefing, had clinical relevance and played a wider role as a critical reflective check on them as learners. Early integration of clinical skills with basic sciences using context-based scenarios, and early clinical exposure with teamwork, aided self-assessment of performance. This represented the basics of moving forward as medical learners:

…integrated formative logbook in a team…made us reflect and understand, interact with our peers…when the doctor started asking questions, to think about the skill and relate it to our findings and then give us feedback…we were able to reflect on our theory knowledge to assess and understand the reasoning behind our performance…That whole integrated skill with feedback actually opens our thinking…[F5]

Peer feedback

a. Affective component (Peer feedback as authentic assessment)

The higher-performing students took peer assessment seriously. Peer assessment also motivated them to be better prepared for their assessments:

When providing peer feedback, I pay more attention on how I'm being assessed…when you are assessing someone, you are very responsible…because…you don't want to give the wrong information…if you're prepared for when you're assessed, then you should be equally as prepared to assess, if you want to do well. [F1]

The lower-performing participants took peer assessment less seriously, did not prepare for the skills, and had difficulties giving feedback.

I am not prepared for it…we do take [peer]assessment lightly…we end up looking down at the protocol as if…how should they do it, and at the end we have to give feedback and it is difficult. [F3]

b. Orientation component (Create expectations to feed forward as a feedback culture)

It was encouraging to note that all participants sought peer feedback on their own. Prior knowledge of the task learning objectives through the clinical skills protocol facilitated seeking feedback:

Last time I was preparing for OSCE, I was with my roommate and he would like have the skills protocol and…a stopwatch to time eight minutes for a long station. And he would tick the things in the protocol that I did and…the things that I didn't do. So in a way, that's like encouraging, and the feedback we get there - it helps you improve in your ways. [F3]

c. Transformation component (Impact of peer feedback to feed forward)

Both groups felt that peer assessment motivated their learning and mutual professional development:

We also use the sessions as learning sessions; we all kind of have our mistakes and we learn from each other. [F1]

…feedback is better; I really don't practise skills alone…so when it comes to peer assessment, I get that learning experience. [F3]

I can see improvement in my skills from 2nd year to now. Like when I get my feedback, I can see where I need to work harder. [F4]

For the lower performing participants, a 'weak pass' stimulated a combination of emotions over a short period of time that led to a positive response to their learning, triggering self-motivation to work harder and prevent low ratings in the future:

You become so excited if you get the feedback rating from your peer as superior performance and then you want to get motivated. But then if it's…a weak pass, then you will be like angry, frustrated…demotivated…but you get motivated to study more, as you know where to improve…and then afterwards you will try to work harder. [F4]

d. Challenges with peer feedback

The lower-performing students thought peer assessment was not constructive, credible or effective, as it is not done genuinely and contentiously:

…it's not as helpful as the logbook sessions with tutors. With peer assessments you can actually just write the thing at residence and come and submit it without doing the actual skill [F2].

Further, they reflected that it was not done sincerely. Interestingly, these practices made them reflect on their professional development as doctors. They also requested monitoring:

…you're giving…Superior Performance, Competent Performance, even if they don't deserve them. At the end of the day, you question your ability to assess and provide feedback and what type of doctor you'll become…we need some sort of controlling factors. [F2].

One of the reasons they thought tutor feedback was more credible was because they felt that peers lacked the necessary expertise to provide useful feedback:

I prefer the feedback from the clinicians…they know what is expected of us…our peers - they only know so much and so [it] can be superficial. [F1]

Further, both categories mentioned that friendship bias controlled how they rated their peers:

I've experienced this personally when you're giving feedback; no one likes a Weak Pass. I mean especially if you're assessing your friend, then they just tell you straight out, you're not giving me a Weak Pass [chuckles], you know. [F2]

They mentioned that friends always wanted to impress you and not let you down, and hence would always give positive feedback, alluding to friendship bias, which questions the credibility of the feedback:

In some ways, the peer feedback can depend on who we work with, I guess, like it can be a bit of nepotism because your friend will always give you a Competent. [F5]

Higher-performers suggested that a rubric checklist would aid their understanding of the assessment criteria and better facilitate peer assessment:

…there's a lot of grey area like what defines competence…maybe a checklist, what is competent, or what is superior performance; that may be a good indication of how we can assess our friends well. [F5]

Teacher vs. Peer feedback

There were varied responses from the higher-performing students with regard to their attitude towards seeking feedback.

Some prefer to seek peer feedback or work on their own rather than approach a tutor:

… not from the tutors.. I [prefer] to work on it by myself or I could also do it with my friend … [a tutor would be] "a last resort" for me. [F1]

One of their concerns may explain their hesitancy in seeking tutor feedback: the judgment they might receive from the tutor during the face-to-face encounter:

…they are a bit too strict or judging you, that makes it harder to approach them. [F1]

A good relationship and rapport with the tutor facilitates learning and feedback seeking:

… with regard to trust and relationship…students…will go to that tutor they like. [F5]

They saw the value of seeking feedback as an intervention that improved their self-assessment and reflection to self-regulate their learning for their future development, and on being mentally prepared:

…you need to ensure that you're prepared…taking time out of your study time to make sure that you learn the techniques so that you're ready to be assessed by that tutor. And ensure that you're mentally stable to listen to the feedback from that tutor as well. [F1]

The lower-performing students, however, indicated preference for seeking tutor feedback over peer feedback:

I think it is better to approach the tutor because sometimes our peers are not sure. [F3]

Discussion and Conclusion

Despite evidence of students' perceived utility of interventions designed to shape their behaviour in response to feedback and suggestions to enhance feed forward, several factors hinder their engagement.

Assessment literacy is known to be the basis for supporting learners' engagement with feedback and empowers learners with the knowledge and expectations required to perform a skill. It develops learners' ability to appraise their work and that of their peers against standard grading criteria. [30] In our study, the higher-performing participants appreciated tutors assessing their self-reflection before giving feedback as an opportunity to critically evaluate their performance. It stimulated a growth mind-set to self-regulate their learning, close the knowledge gap and improve future performance.[31, 17] The lower-performing students, however, saw the limited assessment literacy possessed by both themselves and their peers as a challenge to effectively engage with these interventions. They were hesitant to participate in these interactive activities, as they do not believe they have the competence and ability to self-assess as well as act as an assessor. Boud also found that poorly performing students are often relatively weak at self-evaluating their performance and frequently conflate effort with quality. [32] However, learners can display a great level of learning commitment by making assessment goals clear, fair and transparent. [16] Both categories of students appreciated that prior knowledge of task-specific learning objectives offered opportunities to reflect, improving their understanding and ability to achieve the task. They valued teachers making the assessment expectations clear through the clinical skills protocol to develop their self-assessment, and feedback literacy to facilitate actions for improvement. Further, participants believed that using a rubric checklist to define the feedback ratings would make it easier to know how to self-assess and rate the

peer. Difficulties have been found with using rubrics to reach adequate reliability levels for performance assessment in medical education. [33] Hence, this needs to be explored further.

The extent to which feedback supports the development of self-regulation skills is fundamental to learner development.[8] Both the higher and lower-performing students indicated that case-based multiple integrated skills followed by a tutor debriefing that focused more on a way of thinking, stimulated their reflection on actions undertaken to improve future actions, and facilitated transference of skills to the hospital setting. Lower-performing participants appreciated the value and purpose of peer feedback for learning, though their individual self-regulatory focus of acting on feedback lacked commitment, as they doubted the credibility and trust of peer learning. In addition, giving feedback to peers was found to be challenging since friendship bias often controlled how peers were rated. A previous study also found that peers tend to over-rate the work of their peers so as not to appear too critical. [34] This explains why students doubted the accuracy of peer-generated information and ignored feedback lacking credibility or quality, [35] as the prevailing culture of niceness according to Ramani does not facilitate honest feedback. [36]

All the study participants appreciated the restructuring of the clinical skills formative assessment in the clinical skills setting to include teacher and peer feedback at regular intervals as this would encourage dialogue, timely feedback and engagement with the tasks learning objectives and feedback. They noted how multiple opportunities to engage with feedback, aided self-assessment and reflection to diagnose insights into their performance, creating an opportunity for feedback and learning. Opportunities for developing evaluative judgment empowers learners with the capability to make decisions about the quality of one's work and that of others [37] and students become perfect at judging the standards of their performance over time.[32, 38] Sadler's study confirmed that peer assessment was the most natural way to develop knowledge transfer skills required to "convert feedback statements into actions for improvement" (p.537).[9] For Ericsson, a prerequisite for deliberate practice and development of clinical competence, is giving students the same task to assess each other's skills. [39]

The higher-performing students confirmed that peer assessment and feedback, when done genuinely, had a positive impact on their learning. [40] Peer feedback allowed learners to become confident in feedback provision. They valued the purpose of receiving feedback and appreciated the importance of actively engaging with feedback to facilitate self-assessment. [41] The lower-performers' emotional responses to feedback ratings stimulated engagement by triggering a self-regulated learning response with a prevention focus to avoid failure.[44] This supports Hattie and Timperley's recommendation that feedback should focus on improving self-regulation [42] This is an important skill responsive to the changing clinical environment in preparation for clinical work. The findings confirm that achieving greater impact on learners' behaviour change and professional growth would require teachers to

promote a positive learning environment, involving discussions of learning goals and action plans for performance improvement. Promoting a learning culture that stimulates a learning goal orientation is essential if learners are to themselves act on feedback, as well as actively participate in the feedback process to develop academic achievement for self-improvement. [36]

Study participants appreciated that both peers learning together during the peer assessment process can be transformational: it shifts the focus from the perspective of the feedback provider to the receiver to boost their motivation. Vygotsky's sociocultural theory describes how society contributes to individual development and that humans learn largely through social interactions,[43] with reference to the "zone of proximal development" (ZPD), the distance between an individual's actual development resulting from their independent problem solving and her potential development, resulting from problem solving assisted through peer collaboration. As transformation and learning occurs through participation and collaboration in sociocultural activities or community of practice, [43] learners take more responsibility for monitoring and evaluating their own learning, enabling the development of self-directed learners with learners' greater control over assessment and feedback processes.

Study participants perceived that their engagement with both the teacher and peer clinical skills logbook feedback to produce action plans, promoted their subsequent feedback seeking to clear doubts. The lower-performing students were more receptive to advice from one-on-one feedback sessions with their tutors seen as a safe space to discuss their work similar to a study by Cramp. [44] They preferred seeking tutor feedback as they questioned their peers' knowledge. However, the higher-performing students mentioned seeking tutor feedback as a 'last resort', as they would first prefer to self-assess their skills to work out strategies for improvement before seeking peer feedback, if there is a need to clarify further doubts. This emphasises their personal agency and autonomy, a self-regulatory behaviour to learning that is necessary as providers in the context of real-life patient care. [28, 5] Seeking peer feedback by the lower-achieving students was especially enhanced by their prior knowledge of the learning objectives and assessment criteria through the clinical skills protocol. The credibility and approachability of the tutors and peers, as well as the trust and rapport developed with them, were other factors that facilitated feedback seeking. Participants stated that they felt more exposed to potential criticism if they were not well prepared for a skill, and so the need to seek feedback motivated them to be better prepared.

The study analysis provided evidence that learners valued the contextualised nature of self, and peer-to-peer feedback provided in the clinical skills laboratory, and found it useful to support their learning. However, the student engagement in the lower-performing students can be poor, possibly because of students' low levels of assessment literacy. The findings from this study recommend emphasising the importance of tailoring feedback to student's' needs. Learners identified several

characteristics of a peer-to-peer feedback process that could make giving and accepting feedback easier and more meaningful: clearly defined goals, standardisation and structure, and more case-based oriented encounters assisting learners to take responsibility for their own academic growth.

This study concludes that for the feedback process to be effective and make a difference, it should be dynamic and co-constructed through multiple sources it confirms that social interaction between learners from diverse academic performance backgrounds, can lead to the growth of agency, belonging and competence, three assets that are central to learner development and professionalism.

Limitations of the study include constraints linked to a single undergraduate programme from a single institution, and concentrating only on the views of medical learners as opposed to exploring tutors' views. Further studies could consider integrating the formative logbook assessment sessions with a feedback design that makes learners actors in the feedback process after receiving feedback. Newer feedback initiatives that target a post-feedback action plan intervention for learners to scaffold feedback, by reflecting and formulating self-generated performance improvement goals as concrete targets, would serve as a source of coaching that facilitates feedback interpretation and utilisation to feed forward.

Compliance with ethical standards

Competing interests: The authors Dr R Abraham and Dr V Singaram declare that they have no competing interests.

Ethics approval and consent to participate: Ethical approval for this study was granted (HSS/2213/017D) by University of KwaZulu- Natal's ethics committee.

Consent for publication: The participants in this study gave their written informed consent to take part in this study and for anonymised findings of this study to be published. Both the authors (RA and VS) have given their consent for the manuscript to be published should it be accepted by the journal.

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CHAPTER 4: USING DELIBERATE PRACTICE FRAMEWORK TO ASSESS THE QUALITY OF FEEDBACK IN UNDERGRADUATE CLINICAL SKILLS TRAINING

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In this chapter the quality and nature of the teacher and peer written feedback as presented in the clinical skill logbooks was quantitatively evaluated. We designed a feedback-scoring system based on the deliberate practice framework to assess the effect of integrating a feed-forward approach into the clinical skills formative assessment feedback, on the efficiency of the tutor and peer feedback. The study found that introducing a feedback improvement strategy facilitated tutor and peer written feedback to include elements of deliberate practice, i.e. task, gaps in knowledge and action plans.

ABSTRACT

Background:

In this research paper, we report on the quality of feedback provided in the logbooks of pre-clinical undergraduate students based on a model of 'actionable feedback'. Feedback to clinical learners about their performance is crucial to their learning, which ultimately impacts on their development into competent clinicians. Due to students' concerns with inconsistency in the nature of feedback provided by clinicians a standardized clinical skills logbook feedback instrument, which included a feed-forward improvement strategy, was implemented in the clinical skills laboratory. The instrument was also extended for peer assessment. This study aims to assess the quality of feed-forward in feedback using the deliberate practice framework.

Method:

A feedback scoring system was used to retrospectively assess the quality of feed-forward in tutor and peer logbook feedback provided to second and third year medical students to identify deliberate practice components i.e. task, performance gap and action plan. The sample consisted of 425 second year and 600 third year feedback responses over a year.

Results:

All three deliberate practice components were observed in the majority of the written feedback for both classes. The frequency was higher in peer (83%, 89%) than tutor logbook assessments (51%, 67%) in both classes respectively. Average tutor and peer task, gap and action feedback scores ranged from 1.84 - 2.07 and 1.93 - 2.21 respectively. The overall quality of feed-forward in feedback provided by the tutor and peer was moderate and less specific (average score < or =2). The absence of the three components was noted in only 1% of the feedback responses in both 2nd and 3rd year.

Conclusion:

This study found that adding in a feed-forward strategy to the logbooks increased the overall quality of tutor and peer feedback as the task, gap and action plans were described. Deliberate practice framework provides an objective assessment of tutor and peer feedback quality and can be used for faculty development and training. The findings from our study suggest that the ratings from the tool can also be used as guidelines, to provide feedback providers with feedback on the quality of feedback they provided. This includes specifically describing a task, performance gap and providing a learning plan as feed-forward to enhance feedback given.

KEYWORDS: Medical education; Feedback; Evaluation; Deliberate practice; Feed-forward; Clinical skills

Background

Medical students view feedback as a valuable component for improving their learning [1, 2]. In medical education, feedback is defined as "specific information about the comparison between trainees' observed performance and a standard, given with the intent to improve the trainee's performance" [3]. Without feedback, good performances are not supported and mistakes remain [4]. How feedback translates into improved clinical performance is poorly studied [5]. There is the need to understand the mechanism by which feedback leads to improved performance [3]. A good assessment not just evaluates whether competencies are defined alongside the related learning, it likewise creates new learning and is oriented towards improvement. There is a need for change from an assessment "of" learning to an assessment "for" learning [6]. Apart from developing different assessment tasks to accomplish this shift, there is likewise a need to change the manner in which students are informed about the learning evaluation results (feedback) and how to make decisions from these results (feed-forward) [5, 6, 26]. Studies have described both feedback process [7, 8, 9, 10] and content [3, 11, 10] as important factors for improved clinical performance. The use of these factors to assess the quality of feedback is less common [5].

Student doctor's clinical skills development is affected by many factors making it difficult to directly study the impact of feedback on clinical performance. If expertise development is the goal of formative assessment then using Ericsson's model of deliberate practice to evaluate feedback quality would be useful [12]. Ericsson introduced the concept of 'deliberate practice' characterizing training as "highly structured activities explicitly directed at improvement of performance in a particular domain" with the aim of reaching a well-defined goal to improve skills performance [12]. Deliberate practice, a way of competency-based skills development includes baseline assessment of clinical performance, immediate specific directly observed feedback, opportunities to improve through repetition and subsequent measurement of clinical performance [13, 14, 15]. Deliberate practice with clear specific tasks and feedback following oral presentations [16] and objective structured clinical examination (OSCE) [17] has had a positive effect on the acquisition of skills and improved clinical performance.

Feedback quality was often evaluated in medical education as confirmative or corrective based on the presence or absence of features of an effective feedback [18, 19].To promote learning effective feedback processes should also contain elements that facilitate deliberate practice. Learners need to know the task related learning goals, their performances directly observed and compared with this standard to inform them of their learning needs and knowledge gaps. Prompt action to motivate learners to drive learning forward by reducing this performance gap is also necessary [1, 20].

Despite educators striving to provide high quality feedback, students frequently report poor quality feedback [20, 21, 22]. Providing continuous effective feedback from different sources such as peers can also increase the impact of the logbook as a formative assessment tool and feedback instrument to guide learning, reduce the assessment gap and increase reflection and reliability [23, 24, 25]. It is important for feedback to contain specific comments that facilitate reflection and action plans [26]. Early simulation of deliberate practice in a simulated setting such as the clinical skills laboratory also enhances competency-based skills development and transference of skills to the clinical setting [15, 26].

As described in the literature, logbooks are used globally to "provide a clear setting of learning objectives and give trainees and clinical teachers a quick overview of the requirements of training and an idea of the learning progress" [27]. However, in a previous study on student's perceptions of logbook feedback in our clinical skills setting, comments were found to be vague and inconsistent [22]. To address this, a structured feedback improvement strategy providing students with answers to three questions, what was done well, what was not done well and what can be improved focusing on moving feedback forward with the aim of improving student learning from feedback was added to the logbook [22]. Hence using Ericsson's theory of deliberate practice, a key component of expertise development, this study aims to evaluate the quality of written feedback provided to pre-clinical undergraduate medical students in the clinical skill laboratory during formative logbook assessments following the feed-forward improvement intervention. A modified and adapted feedback-scoring tool based on a deliberate practice framework [5] was used to investigate and provide answers to the following: Can components that facilitate deliberate practice be identified in the feedback provided to medical learners? To what extent does the feedback provided contain elements that facilitate deliberate practice? Is there a difference in the quality of feedback provided by the tutors and peers?

Methods

Context and setting

This study was carried out at the Nelson R Mandela School of Medicine (NRMSM), University of KwaZulu-Natal (UKZN) clinical skills laboratory. The role of the clinical tutors during the clinical skills sessions follows the same teaching stages as proposed by Barr to ensure consistency in the clinical skills teaching: The tutor first demonstrates the skill while the students' observes [28]. The tutor then discusses the outcomes of the skill with the students. The students demonstrate the skill while the tutor observes and coaches the students. The students then receive feedback on their clinical performance from the tutor and finally the student is left to work independently once they have mastered the necessary clinical skills. At the end of a six-week theme students are assessed

formatively and provided with immediate directly observed verbal and written feedback in their logbooks for later reference along with a global rating of superior performance, competent or failure by supervising clinical tutors and peers. Students are informed that a mark will not be given being a formative assessment but the rating will assist in understanding their level of skill mastery. To enhance the logbook feedback a feed-forward strategy on what was done well, what was not done well and what can be improved was incorporated into the logbook which allowed clinicians and peers to provide students with learning goals/action plans. Both the tutors and students are aware of the need to provide constructive feedback based on the three logbook feedback questions and are aware of the performance standards through the clinical skills protocol. Students are often supervised and assessed by more than one clinical tutor and peer and each clinical tutor and peer assesses more than one student during each theme. The clinical skills tutors are the same individuals teaching both 2nd and 3rd year classes and there is continuity of teaching skills practice. The clinical skills logbook formative assessment runs repeatedly through the 2nd and 3rd pre-clinical years similar to the model of longitudinal integrated clerkships.

Study design

Study population, Sample size and Sampling method

This retrospective cross-sectional study analysed the logbooks from twenty five 2nd and thirty 3rd year students that were randomly selected from each category of high achievers (HA) (>70%), average achievers (AA) (50-69%) and low achievers (LA) (<50%) based on their end of year summative OSCE assessment performance. A maximum variation sampling approach ensured the sample included logbooks of students with a wide ranch of achievement in clinical skills and who had at least one year of exposure to the clinical skills logbook formative assessment feedback. Logbook feedback forms (Additional file 1 and 2) for each student category completed over a year were included in the study. A total of 425 second year and 600 third year entries were included in the study sample.

Data collection and Adaptation of the scoring tool

The logbook feedback was analysed using a tool designed by Gauthier et al. based on the deliberate practice framework to determine for the presence and extent of the three components that facilitate deliberate practice [5]. This tool was adapted and modified to our learning environment (Table 1) and used to assess all feedback responses for the presence of deliberate practice components as outlined in Table 1: The modifications included specific description of the following components (1) Task: What was done well with regards to a well-defined goal/task, (2) Gap: What was not done well and identification of a gap between observed current performance and a standard, (3) Action: What can be improved and if a learning or action plan was provided. Each component was scored from 0-3 (0=

absent, 1= alluded to the component or vaguely described, 2= general mention of the component, 3= specific mention of the component) to ensure components could be objectively separated by specificity to warrant rater reliability and to differentiate a good from a poor quality feedback [5].

Two clinician raters independently assessed all written feedback included in the study for the presence of the three components of deliberate practice. The raters included the researcher and one clinician in the faculty with direct involvement in educational activities in the clinical skills laboratory. The raters initially familiarised themselves with the original feedback scoring tool developed by Gauthier et al. [5]. To increase reliability raters independently scored a small selection of the same logbook written feedback responses followed by comparing scores and discussions about difficulties and discrepancies with the descriptions of each scoring element. To enhance the discrimination between scores, specific behavioural anchors for each scoring item was added to the individual descriptions of the deliberate practice elements to further adapt the scoring tool to our clinical skills environment (Table 1) as this has been shown to increase clarity [29] and inter-rater reliability [30]. The feedback responses were then scored separately using the modified task, gap and action grading tool. Inter-rater reliability was analysed by averaging discrepancies between scores and the Cohen's kappa coefficient (k) calculated to measure inter-rater agreement [31].

Table 1: Task, gap and action feedback scoring table adapted from Gauthier et al. (2015)

	0	1	2	3
Task – What was done well? **(A description of the event around which feedback was given)**	**Task not Described**	***Vague*. Lacking either content or value.** **(No specific behaviour was identified with regards to the learning goal for the task e.g 'You did great')**	**Content or value described *generally*** **(A general description of the behaviour was identified with regards to the learning goal for the task e.g 'General examination done, Inspection of the chest done, auscultation done')**	***Specific*. Content or value specifically described.** **(E.g. A good description of the steps to the particular task/skill provided e.g. Positioned the patient correctly to examine the chest, when examining for aortic regurgitation had the patient lean forward and exhale)**
Gap – What was not done well? **(The recognition of a difference between their performance and that of a comparative standard)**	**No gap Described**	**Gap *alluded to*.** **(No suggestions geared toward identified behaviour. E.g. 'Your technique was awful')**	**Gap *generally* described.** **(Concise issue raised but limited suggestions provided to learner. E.g. You looked very uncomfortable examining that chest')**	***Specific* gap identified.** **(Concise issues identified and learner provided with information to close a gap in knowledge. E.g. 'Your exam of the chest was appropriate but percussion technique was inadequate. You may be more comfortable if you position your fingers on the chest this way')**
Action – What can be improved? **(Using the feedback to create a future learning goal or plan)**	**No learning goal or plan.**	**Learning goal or plan *alluded to*.** **(Feedback terminated with no plans for follow-up or re-evaluation. E.g. 'Great job')**	***General* goal or plan described.** **(Broad action plan is suggested but not specific to behaviour or encounter. E.g. 'Read more around your cases')**	***Specific* goal or plan described.** **(Clear plan to modify or reinforce behaviour. E.g. 'Read this article on chest examination, practice the percussion technique and I will watch you examine the next patient with pneumonia')**

Data analysis

Written comments that was evaluated using the adapted scoring system [5] identified and discriminated a low quality feedback (score 0-1) from a moderate quality (score of 2) and a more specific high quality feedback (score of 3). The primary outcome measures for our study included the frequency distribution (the number of comments in each feedback category (TGA) was counted and aggregated on a percentage (frequency) basis) and average scores of task, gap and action (TGA) as indicated in the written feedback of all logbook skills encounters assessed in the three categories (HA, AA and LA) of 2nd (17 skills/student) and 3rd year (20 skills/student) medical students.

Correlations between the global ratings and component scores (TGA) was investigated using the Fisher's test. All statistical analyses were performed using SPSS version 25.

Results

One thousand and twenty five written feedback responses from 55 logbooks were assessed. Table 2 represents characteristics of the feedback entries. Eight evaluations in the 2nd year category and 35 evaluations in the 3rd year category were left blank as the students did not attempt these skills.

The kappa correlation coefficient obtained between ratings assigned by the two raters were all high (r>0.8 for all comparisons) with no significant differences between raters suggesting a near perfect agreement with both raters producing similar scores to the same data item while using the feedback scoring table.

Table 2: Characteristics of the 2nd and 3rd year clinical skills logbook encounters

Time period Jan 2017 – Dec 2017	**2nd year evaluations**	**3rd year evaluations**
Feedback entries, N:	**425**	**600**
Participant/Evaluator characteristics:		
Number of students/logbooks	**25**	**30**
Number of tasks assessed per student (range)	**1- 17**	**1- 20**
Number of clinical tutors	**10**	**10**
Number of tasks assessed per clinical tutor (range)	**1- 12**	**1- 10**
Number of peers (range)	**50-100**	**50-100**
Number of tasks assessed per peer (range)	**1-30**	**1-30**
Encounter focus:		
Physical examination skills (2 tutor and 4 peer assessed)	**7 (40%)**	**6 (30%)**
Procedural skills (all peer assessed)	**10 (60%)**	**14 (70%)**
Category of students assessed based on end of year OSCE marks:		
Low achievers (<50%)	**5 (20%)**	**10 (38%)**
Average achievers (50-69%)	**10 (40%)**	**10 (30%)**
High achievers (>70%)	**10 (40%)**	**10 (31%)**

A. Assessment of proportion of deliberate practice elements identified in the written feedback comments

We measured the frequency with which none, one, two or all three components of deliberate practice (TGA) were identified in the feedback. The frequency with which it was possible to identify these components in the written feedback evaluation is represented in figure 1 and 2.

All Feedback – 2nd and 3rd Year

In this study we found that all three components of deliberate practice were identified in 78% of the 2nd and 82% of the 3rd year logbooks (Figure 1). The absence of three components was noted in only 1% of the feedback responses in both 2nd and 3rd year.

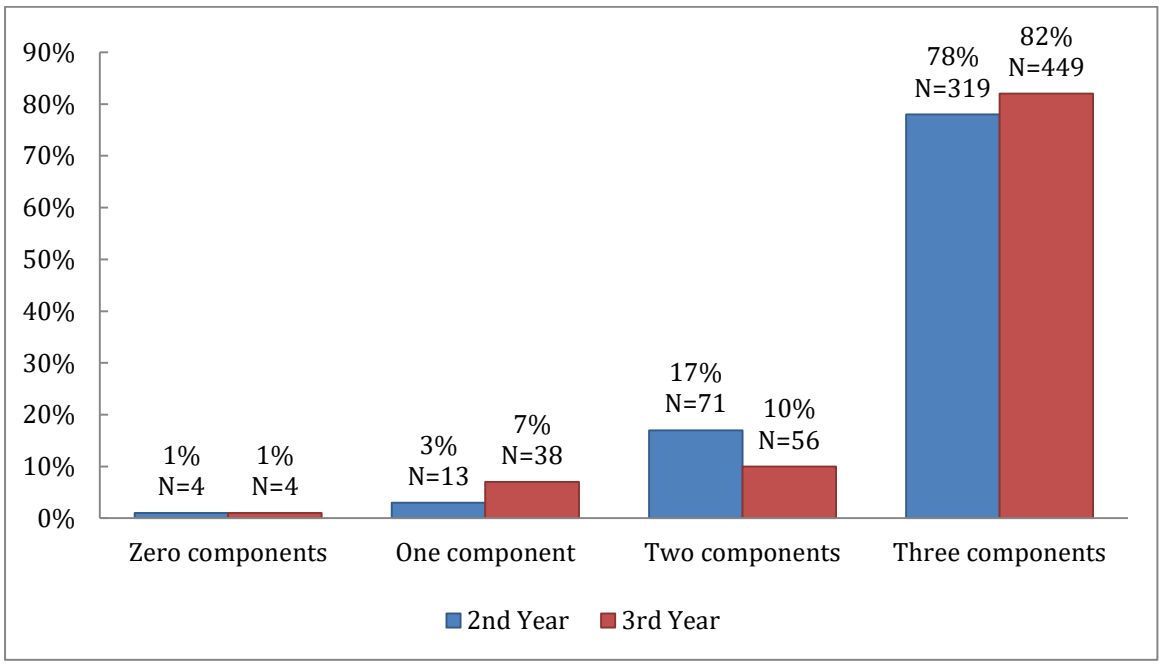

Figure 1: Proportion of components of deliberate practice identified in all written feedback comments in 2nd and 3rd year logbooks

Tutors and Peer Feedback

All three components of deliberate practice were identified in 51% of the tutor and 87% of peer feedback responses in 2nd year logbooks. Similarly 67% of tutor and 89% of peer feedback contained all three components of deliberate practice in the 3rd year logbooks. The absence of the three components were noted in only 4% and 1% of the tutor and peer feedback respectively (figure 2).

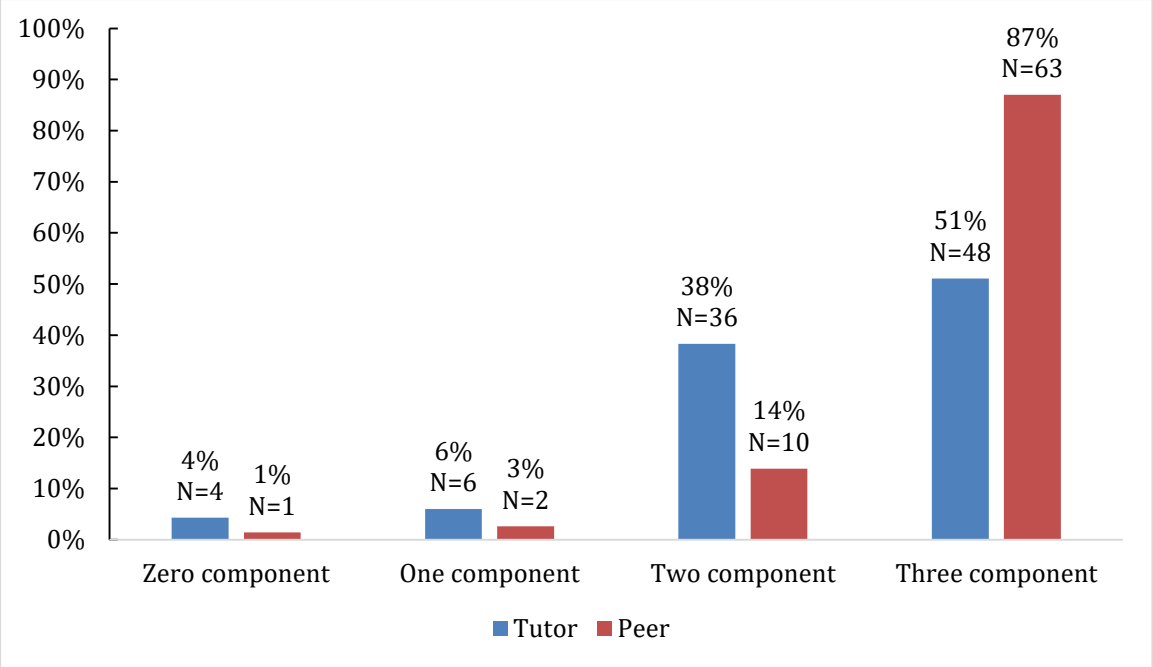

Figure 2: Proportion of components of deliberate practice identified in tutor and peer written feedback comments in the 2nd year logbooks

B. Assessment of the degree of each component of deliberate practice identified in the written feedback comments

We assessed the degree of each component of deliberate practice (TGA) in the feedback comments as follows: 0-3 (0= not described, 1= vaguely described, 2= generally described, 3= specifically described). The results are illustrated in figure 3 and 4.

Tutor Feedback – 2nd and 3rd Year

Figure 3 summarizes the degree of deliberate practice components in tutor feedback in the 2nd and 3rd year logbooks. The tutor feedback on the task, gap and action to the 3rd year students were more specifically described compared to the 2nd year students.

Specific task (40%, 31%), gap (55%, 40%) and action (31%, 19%) were identified more often in the 3rd year feedback compared to the 2nd year feedback comments respectively. General task (33%, 29%) and action (40%, 36%) were identified more frequently in 2nd year compared to the 3rd year feedback respectively. No gap (45%, 31%) was identified more often in the 2nd year compared to the 3rd year feedback responses respectively. When comparing the 2nd and 3rd year feedback responses the correlation between the deliberate practice task, gap and action feedback scores for each skill assessed was statistically significant with a p value <0.05 indicating a significant decrease in the specific description of task, gap and action in the 2nd year feedback compared to the 3rd year feedback responses.

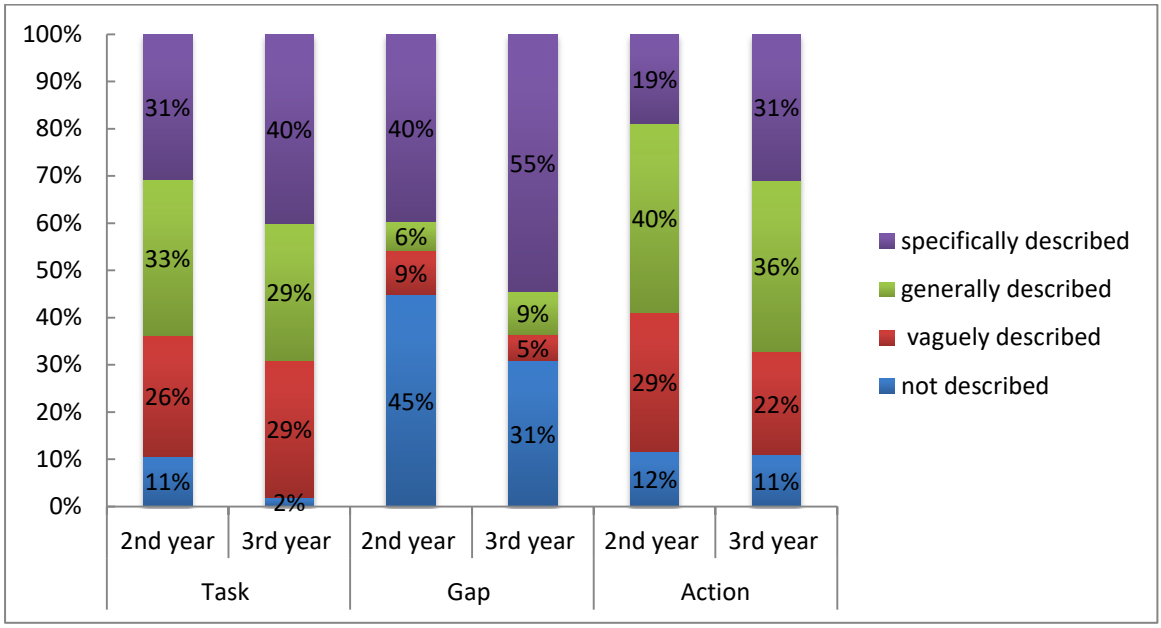

Figure 3: Assessment of degree of each component of deliberate practice in 2nd and 3rd year tutor feedback

Tutor and Peer Feedback

Specific task, gap and action were identified more often in the tutor than the peer feedback as illustrated in figure 4.

Specific task (31%, 25%), gap (40%, 31%) and action (19%, 17%) were identified more often in tutor compared to peer feedback respectively. General task (46%, 33%) and action (44%, 40%) were identified more frequently in peer comments compared to the tutor comments respectively. No gap (45%, 15%) was identified more often in tutor feedback compared to peer feedback respectively. When comparing the tutor and peer feedback responses the correlation between the deliberate practice task, gap and action feedback scores for each skill assessed was statistically significant with a p value <0.05 indicating a significant decrease in the specific description of task, gap and action in the peer feedback compared to the tutor feedback responses.

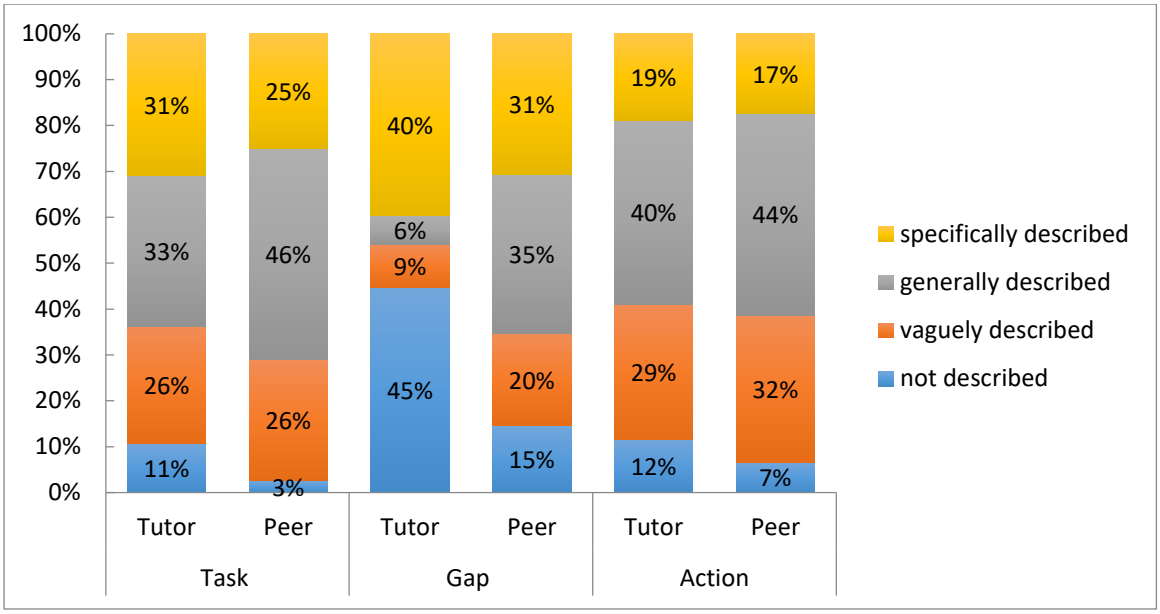

Figure 4: Assessment of degree of each component of deliberate practice in 2nd year tutor and peer feedback

C. Assessment of average deliberate practice component scores based on academic performance

We assessed the average deliberate practice component scores in the feedback for the three categories of students (HA, AA and LA) based on their level of achievement and summative marks. The results are illustrated in figure 5 and 6.

Tutor feedback – 2nd and 3rd Year

Average component scores for skills assessed by the tutors plotted for the three different assessment categories of 2nd and 3rd year students is shown in figure 5. Overall an inverse trend is apparent when comparing the 3rd year student achievement category with the average task gap and action feedback scores – the higher the student marks the lower was the task, gap and action feedback scores.

The average component scores for tutor feedback on the task, gap and action provided to the LA in the 3rd year were higher than in the 2nd year. The overall quality of the feedback provided by the tutors to the 3rd year was better than that provided to the 2nd year students. The overall quality of feedback provided by the tutors was moderate and less specific (average score < or =2).

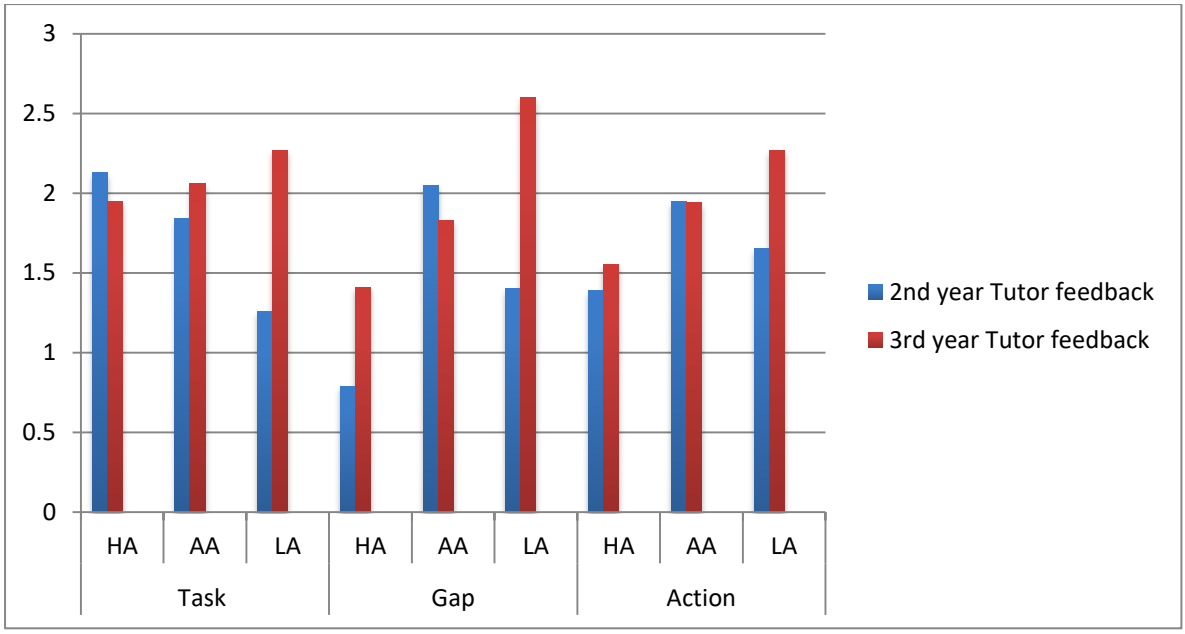

Figure 5: Assessment of average deliberate practice component scores in tutor feedback for the three categories of 2nd and 3rd year students [HA (>70%); AA (50-69%); LA (<50%)]

Peer Feedback – 2nd and 3rd Year

The average 2nd and 3rd year peer feedback component scores for the three categories of students are illustrated in figure 6. Overall an opposite trend to the tutors is found when comparing the student achievement category with the average task gap and action scores – as the level of achievement increases the task gap and action scores increases.

Similarly the average deliberate practice component scores for peer feedback on the task and gap provided to the HA, AA and LA in the 3rd year were higher than in the 2nd year. The overall quality of the feedback provided by the peers to the 3rd year was better than that provided to the 2nd year students. The overall quality of feedback provided by the peers was moderate and less specific (average score < or =2).

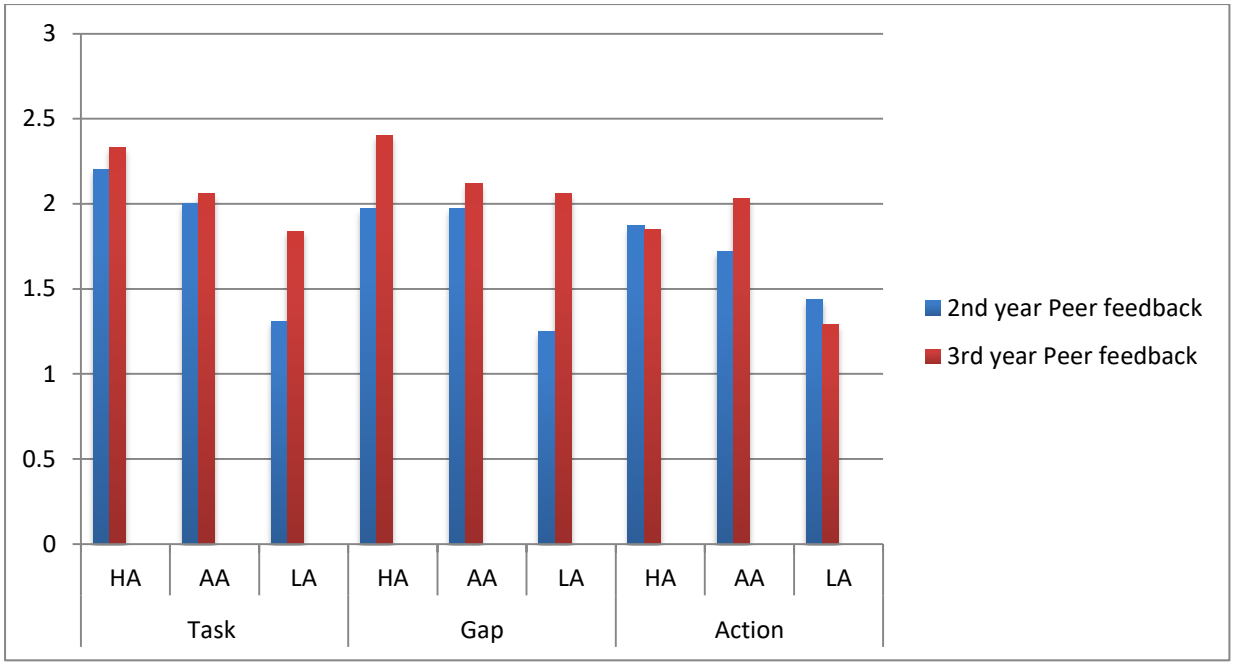

Figure 6: Assessment of average deliberate practice component scores in peer feedback for the three categories of 2nd and 3rd year students [HA (>70%); AA (50-69%); LA (<50%)]

Global rating

A correlation between the global rating of the students clinical skills development as 'failure', 'competent' and 'superior performance' provided by the tutors and peers and each of the components of deliberate practice was assessed statistically using the Fisher's test. All the 2nd and 3rd year students were rated as either 'superior performance' or 'competent'. No student was rated 'failure'. The correlation between global rating for each skill and the deliberate practice task, gap and action feedback score was statistically significant with a p value <0.05 indicating a statistically significant decrease in gap and action scores as global ratings increased.

Discussion

High quality feedback motivates learners and is corrective as it confirms learners are on the right path [1]. Since feedback has been shown to be of variable quality, an objective assessment of feedback identifies competence in feedback provision and features of good quality feedback [32]. This study found that majority of the tutor and peer written logbook feedback provided to the medical students contained all three components likely to facilitate deliberate practice, suggesting an implicit adoption of a deliberate practice framework. They were however found more often in the peer than the tutor feedback. Our findings are similar to a previous study by Falchikov who reported that peers provided more positive feedback as well as more prompts and suggestions for improvement than tutors [33]. Nicol indicated that peers tackling the same skill might be able to write more meaningful and relevant comments in a student-centred discourse and get to see examples of good and poor work

produced by other students [34]. Engaging students to comment on the work of their peers has the advantage of enhancing their ability to evaluate their own work and improve their self-regulatory skills.

In order for feedback to be effective and of good quality it should be specific [35, 3, 11]. Analysis of both the tutor and peer feedback quality in this study found the performance gap component most often specifically described while the task and action component generally described. There was therefore a need for the tutors and peers to provide 'perfectly accurate' feedback as described by Ericsson with clearly described gaps in knowledge and general strategies for improvement in order for students to undertake sustained 'deliberate practice' to progress towards expertise [13].

The overall quality of the tutor feedback provided to the 3rd year students was better than that provided to the 2nd year students. This finding may be influenced by the student-teacher relationship that plays an important role in the delivery and acceptance of feedback. As the time spent between the two increases, the students mature and become more open minded and accepting of the teaching methods and feedback supplied by the teachers. Additionally, with greater time spent, the teachers begin to understand students and adapt their delivery of feedback in a manner that the student receives and accepts the said feedback better. Bok et al. showed that when medical students build a relationship over time with their clinical tutors there is alignment of the tutor's goals with their own and they trust the credibility of the feedback they receive [36]. A study exploring medical student's perceptions of assessment and feedback in a longitudinal integrated clerkship found that a trusting teacher-learner relationship that develops allows "constructive interpretation of critical feedback" with students often supportive of even challenging or corrective feedback [37] making it easier for teachers to provide corrective feedback. The concept of the 'educational alliance' framework further recognises the centrality of teacher-learner relationship in the feedback process and its link to the impact of feedback generated within it [38].

In our study, there were certain factors associated with variation in the identification of feedback components and hence the quality of feedback provided. Feedback components of task, performance gap and action plan provided by tutors were often identified in the low achieving-students compared to the higher achieving-students in both second and third-years. The decreased identification of these deliberate practice elements in the feedback with increasing level of achievement is attributed to students having no or fewer gaps and hence a decreased need for action plans. Tutor's cognitive resources and energy was hence directed to the lower-achieving students who needed more of his/her attention. This is similar to other studies in clinical practice where increasing student achievement better directs supervisor's cognitive resources to patient care instead of

educational assessment on a single skill [5]. Advanced learners require feedback focusing more on higher-order integrated learning tasks such as problem solving and clinical reasoning [1].

Specific task was the most frequent component provided to our second-year higher-achieving students as compared to the gap and action feedback component. A reason that may explain this is that the task is the easiest to describe by simply recording a detailed account of the task performed. While feedback on the gap and action may be low because the students are performing at a competent level to which they are being evaluated and the feedback instrument may be used primarily to identify competency gaps rather than promoting expertise development. In contrast, tutors focus on the knowledge gap and action plan of students who perform poorly, instead of spending time describing the event.

An overall trend is apparent when comparing student achievement category with the average task gap and action scores in peer feedback. With increasing student achievement, the task, gap and action scores increase, opposite to what we found with the tutor feedback. There is the possibility of peers tending to over-rate the work of their peers so as not to appear too critical and may explain why sometimes students' lack confidence in their peer's feedback. Though studies confirm tutor-student feedback dialogue as essential for learning enhancement with tutors perceived as authoritative feedback source and the best person to scaffold student learning [39, 33], Orsmond and Merry in their investigation of high- and low- achieving third-year biology students' perceptions of teacher feedback, indicated potential disadvantages when teachers are the sole source of feedback input [40]. The low-achieving students depended highly on the teacher to make improvements in their work by consistently focusing on the surface features of feedback messages compared to the high-achieving students who try to seek the meaning behind the feedback message [41]. Nicol suggested peer feedback processes be strengthened for weaker students as peers generating and receiving feedback in relation to the same assessment task learn not only about their own work but also about how it compares with the work of other students [34].

The study has demonstrated an improvement in the written feedback provided to students in clinical skills. Tutors previously provided general comments which were vague and inconsistent [22]. The implementation of a structured feedback improvement strategy focusing on feed-forward encouraged both tutors and peers to provide timely and balanced feedback. However despite this intervention there was high variability with regards to specific description of each component as indicated by the low component average scores (2 or <2) affecting the quality of feedback. Part of the improvement is likely due to tutors and peers increasing familiarity with the workplace based assessment and the logbook platform on which feedback is reported. Using the feedback scoring system has also allowed us to identify tutors providing particularly low quality written feedback and

hence the need for individualised faculty feedback and development. In addition developing a learning and action plan should be the responsibility of the feedback receiver. The feedback provider may only facilitate this process as providing too much feedback, may inhibit self-directed learning. Hence, the implicit hypothesis that more feed forward is more effective may be questioned.

An interesting finding in our study was tutor's provision of global rating on student's performance of 'competent' or 'superior performance' with no 'failure' suggesting difficulty giving negative feedback. Possible reasons are either tutors do not want to hurt student's feelings as this can damage their relationship or the fact that remediation may not be available [42]. Previous studies have reported feedback comments failing to distinguish the competence level of learners [43]. However, in this study we found a correlation between the global rating and quality of feedback. Therefore, tutors who tend to put time and thought into providing meaningful comments may also be accurately assessing the performance level of the learner.

Clinical tutors may not be hostile to providing useful feedback but working in an environment that limits their opportunity to do so may explain the low quality of feedback especially in heterogeneous diverse settings. The increasing class population and shortage of tutors necessitated the need to capitalise on peer feedback, which has had significant benefits by having different feedback providers commenting on different clinical skills providing students with multiple perspectives as well as multiple opportunities for scaffolding their learning [33].

Limitations

The study measured the elements of deliberate practice in written feedback, it is however possible that tutors provided more feedback orally to students and this could underestimate the extent of deliberate practice components reported.

Though most of the feedback comments were obvious to score, a distinction between certain components was not always clear such as the gap and action components of deliberate practice. It was sometimes difficult to separate the components from a single comment field. For example, a student received the comment "remember: auscultation of the precordium for heart sounds after palpating the position of the apex beat". This could confirm a gap in the student's knowledge but also using the term "remember" may imply an instruction for changing future behavior. Both raters scored this as a gap of 1 (alluded to the gap) and an action of 3 (specific plan described) though it may not be necessary to separate these two components.

The feedback process depends on various other external factors such as self-assessment, relationship factors, feedback-seeking behavior, self-reflection, feedback source credibility [11, 20] that were not measured as in this study we only focused on the components of deliberate practice described by Ericsson [13].

Conclusion and Recommendations

The introduction of feedback with a feed-forward strategy component to the logbooks increased the feedback quality as the task, gap and action plans were described. Formal feedback quality assessment using the deliberate practice framework fostered reflection on the reliability and validity of the feedback quality provided and hence its usefulness. Based on the findings of this study we suggest that providing clinical tutors and peers with a feedback-scoring tool to review and score their own feedback for the presence of features of high-quality feedback is likely to guide them to give good quality feedback enhancing their feedback skills [44, 1]. Faculty development to improve delivery of quality feedback is important but not sufficient. Possible reasons as to why quality of feedback remains a challenge might be because focus continues to be on how clinical tutors should construct and deliver feedback, rather than how students receive, respond and use feedback along with creating learning environments with individual follow-up feed-forward improvement plans. Based on this recommendation the authors are working on another study to assess medical student's perceptions of feedback reception, engagement and challenge to move feedback forward to improve their learning.

Investing in the development of peer assessment and feedback skills is of valuable resource in resource constrained and diverse educational settings enhancing student's engagement with feedback, self-reflection, self-assessment, development of assessment literacy and self-regulated learning skills that are necessary throughout their clinical career [33]. Hence, to overcome barriers to meaningful feedback both institutional and individual efforts are required.

While poor quality feedback is a common problem, this study was conducted in a simulated clinical environment hence caution needs to be taken while generalizing our results to other specialties. This study will however serve as a useful theoretical guide to the planning and evaluation of feedback interventions that would be useful for educational purposes.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was granted (HSS/2213/017D) by University of KwaZulu- Natal's ethics committee.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed are available from the corresponding author on reasonable request.

Competing interests

The authors Dr R Abraham and Dr V Singaram declare that they have no competing interests.

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Authors' contributions

Both authors have made substantial contribution to the conception, design, data collection, analysis and interpretation of data. They have been involved in drafting the manuscript and critically revising it and have approved the manuscript for publication.

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Additional files

Additional file 1: 2nd year clinical skills logbook

Additional file 2: 3rd year clinical skills logbook

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter addresses the principal findings of the study and its effects, limitations and future research areas.

5.1 Conceptualizing the feedback process to understand factors that can influence learners' engagement with and use of feedback and feed-forward action plans on the development of clinical skills in undergraduate medical students

The overall aim of this study was to explore the clinical skills tutor and peer feedback quality and perceptions of medical students about their engagement with clinical skills logbook feedback and feedback interventions to feed-forward by bridging the gap between their actual clinical performance and performance desired.

In this section, we will present the studies in this thesis, briefly summarised by the following study questions, and followed by an overall synthesis of findings. Chapters Two, Three and Four describe each of the research studies conducted. Specific research questions were:

1. What are the medical students' receptivity to and utilisation of formative feedback given by the clinical tutors during the clinical skills training sessions?

2. How do medical students of different academic levels perceive self and peer-to-peer feedback interventions?

3. How does the addition of a feed-forward strategy to the clinical skills logbook influence the quality of the feedback given by both tutors and peers?

This chapter summarizes the results as a whole based on the research questions. The key findings are discussed in light of recent literature. To close the feedback loop, we link the findings from individual studies and propose a model for educators and institutions to enhance the feedback process and promote a growth-oriented feedback culture. The four theories discussed in the introductory chapter are reviewed once again in relation to the findings and the implications they have for the feedback process in medical education. Suggestions for future research are discussed throughout this chapter, concluding with the limitations and strengths of the research.

5.2 Main findings and Conclusion

Research questions:

5.2.1 Question 1: What are the medical students' receptivity to and utilisation of formative feedback given by the clinical tutors during the clinical skills training sessions?

This question was addressed in Chapter Two. In this chapter, we conducted an exploratory study of the medical students' receptivity and use of formative feedback given by the clinical tutors. The students' perceptions regarding their experiences with receiving and using feedback, and factors that

could influence the quality and impact of feedback on students' clinical performance and serve as facilitators and barriers, are reported.

The clinical skills formative assessment of medical learners appears to be a simple process where the clinical tutor observes the performance and behaviour of the learner in the clinical setting and reports on their strengths, weaknesses, and overall competence. The learners' are then expected to use the feedback information to modify and enhance their learning. In an ideal situation, it is assumed that the feedback receiver (medical learner) should engage with the feedback to unpack the feedback message, set learning goals based on the feedback message, and use the information actively so that the feedback provider (clinical tutor) can assess this message transmission (change of behaviour), during a follow-up session or the next assessment. Nonetheless, Kluger and van Dyke (2010) noted that the traditional models of verbal feedback with performance deficiency information between praise information intended to empower and preserve the learner's self-esteem, do not promote successful feedback exchange. They suggested that these trends appear to strengthen the teachers' status as "expert" and the student as a "passive recipient" of feedback, reducing the learner agency to receive feedback and act on it.

As learning does not always come from simply transmitting information to learners and neither is it easy to determine what feedback a learner might find useful, there is thus still a difference in our understanding between feedback received and feedback given (Evans, 2013). This study emphasizes that providing feedback without first diagnosing the need and receptivity to feedback from our learners may constitute a waste of effort. Learners' perceptions of the feedback need to be shared with teachers in order to develop new learning. Teachers' will need to understand the factors influencing learners' feedback engagement, while re-enforcing feedback to be part of a diagnostic and supportive dialogic process between teachers and learners. Feedback dialogue as a social learning system can be disturbed by various factors influencing the interaction of the learner with the feedback process: transmitting factors (e.g. clarity of speech of the educator), feedback message (feedback format), receiving factors (open-ness of the learner to accept feedback) and situational factors (the atmosphere of receiving feedback) (Kornegay et al., 2017). As learners do little to benefit from being passive feedback recipients, and considering the important role of learners as active participants in the feedback process, we were led to find out what factors might potentially influence our learners' proactive engagement within the feedback process.

Adopting the psychological framework of Winstone et al. (2017), the data from the focus group discussions were analyzed through four psychological processes i.e. awareness, cognizance, agency, and volition. The analysis provided insights into the learners' perceptions of factors that influenced their receptivity to and use of feedback. The students' felt that the credibility of the feedback sender affected their engagement with and the effectiveness of the feedback process. This means that

building confidence and a good relationship with the feedback recipient was just as crucial as formulating the right feedback message (Bing You et al., 1997). Students also reported that feedback characteristics such as lack of specificity of the feedback message, combined with the use of confusing academic terminologies led to anger, frustration or negative emotions and hence can be barriers to learners' engagement with the feedback process, reducing the usefulness of the feedback (Robinson et al., 2013). The study confirms the need for feedback providers to provide good examples as reliable role models by maintaining reliability and transparency in the delivery of feedback, while learners need to take responsibility for seeking clarification and being better prepared to understand common medical terminology.

We also found that deliberately building formalised slots into the clinical skills learning system as platforms for timely delivery of feedback based on direct observation facilitated the active involvement of the learners and clinical educators to the culture of feedback. Over the first three pre-clinical years, extended placements with built-in standards for multiple tutors and peer formative logbook performance feedback, created opportunities for comprehensive instructor-learner and learner-learner partnerships to thrive within the learning environment of clinical skills. Learners were cognisant of these multiple feedback opportunities including feedback-seeking, as strategies to implement feedback towards developing their self-regulatory learning skills. Bates et al. (2013) reported that extended clerkships prompted learners to seek feedback and often led to building trustful relationships. Participants' in the study believed that the relationships developed in the clinical skills setting supported their constructive interpretation of challenging or critical feedback. The learners' appreciated the tutors assessing their self-reflection on performance before feedback was given, and were cognisant of the importance of tutors developing their self-assessment as a means to develop their self-efficacy during the feedback process. The clinical skills feedback culture was perceived as establishing a norm for routine two-way feedback interactions. The tutors defining performance expectations by providing constructive feedback anchored to the task learning goals, allowed learners' to appreciate how they could align their learning goals with the clinical tutors' goals. The clinical skills logbook formative feedback culture with a learning emphasis was viewed as predictive of their future performance and they were likely to receive feedback demonstrating the importance of reflection in the process. Hence, similar to the study by Watling et al. (2014) across different professional disciplines our findings also confirmed that the usefulness of the feedback process varies depending on the learning culture in which feedback took place.

Clinical skills feedback uptake was perceived to be impacted by the study participants' developmental level. Students' noted how maturity played an important role with their receptivity to feedback, similar to findings by Murdoch-Eaton et al. (2012). Participants' indicated that as a junior learner, they had valued feedback that passively informed them of their progress in meeting the standard requirements for the skill performed. Later as a senior learner, they would welcome feedback that

deliberately directed them to improve their learning style, such as problem-solving, considered to promote their transition of skills to the real-life clinical setting. Griffiths et al. (2016) mentioned in their study how junior students were better engaged and responded to positive feedback about a single skill, while senior students were better engaged with negative feedback and, more importantly, feedback focusing more on integrated learning tasks of higher order. There is, therefore, the need for re-enforcing the implementation of multiple integrated tasks with formative feedback that will facilitate students' understanding and critical reflection in the senior years. Archer (2010) confirmed that to support a feedback culture of relevance and credibility an integrated approach must be developed. Therefore, this study suggests the need to customize the types of feedback that we send to students, and particularly if our learners are to benefit completely from feedback. We will also need to train them for a better understanding and interaction with various types of feedback.

Nearly all our study participants recognized the need to take responsibility by effectively acting on feedback, for learning to take place. While learners acted on feedback, they varied in the extent and timing of actual feedback use, with their self-regulatory emphasis on the feedback process having a dominant effect on their successful use of feedback. As Durning and Artino (2011) have pointed out, the principle of situativity states that learning cannot be isolated, from the setting where it occurs. We found that the response of the students to feedback is not consistent and not everyone recognizes the need for feedback engagement immediately. The clinical skills feedback provided within a modular course structure with evaluations of unequal weighting occurring at the end of each module, coupled with evaluation by perceived educators with different expectations, played a crucial role in minimizing their opportunities for engagement and incentive to incorporate feedback immediately. Price et al. (2011) suggested that modularization led students to perceive a restricted need to pass skills learned in one module to the next, thereby benefiting less from feedback engagement. Designing curricula that emphasise continuation and transference between assessments and learning objectives such as feedback incorporating medical knowledge and clinical reasoning using integrated case scenarios, allows feedback to offer a developmental function (Hughes, 2011; Boileau et al., 2018). Students mentioned that their learning with a greater agency could develop from actively taking advantage of such integrated feedback possibilities. This way the medical students understand how the broader learning outcomes are derived from a combination of individual assessments within a module. This would also assist with reducing their assessment stress and barriers to transference of skills, while transiting between the pre-clinical to the clinical years.

In summary, we recommend that the psychological framework developed by Winstone et al. (2017), be expanded to also include facilitators or enablers to offer feedback and advocate for the consideration of the psychological processes when designing interventions to promote learners' feedback engagement. Apart from the context within which feedback was delivered, the failure of medical learners' to engage and use feedback was attributed to many other possible sources, both

external and internal. Some of the external factors included language as a barrier in the multicultural and diverse student population, and learners' perceptions of the feedback process as being timely, relevant, credible, personalized, and constructive. The internal factors were learners' receptivity to constructive feedback, the extent to which tutors' expectations differed from their perceived self-assessment, learned helplessness, lack of self-confidence to demonstrate a skill, overwhelming workload and sometimes, a lack of effective strategies to implement feedback. Engagement with feedback was perceived by our study participants as encompassing a trustful relationship with commitment of both the receiver and sender to the feedback process. To promote motivation and self-regulation, educators will need to develop practices that prevent students' dependence only on how feedback instructions are delivered but also focus on developing their self-reflection and self-assessment through involvement in the feedback process (Lefroy et al., 2015). This study suggests the need for shared responsibility for both the teacher and the learner to identify and overcome the barriers and foster feedback receptivity enablers. The aim is to promote learners' active participation in the feedback process with feedback considered important to encourage behavioural change.

5.2.2 Question 2: How do medical students' of different academic levels perceive self and peer-to-peer feedback interventions?

This question was addressed in Chapter Three. In this chapter, we explored how students' academic performance influenced their experiences with self, peer and teacher feedback interventions and factors that could influence their engagement with feedback.

Though the literature uncovers reasons why learners' engagement with the feedback interventions might be poor (Jonsson, 2013), most studies on feedback reported on the potential relevance of different factors that can influence feedback receptivity. However, the studies did not acknowledge the results of specific feedback interventions to improve the proactive reception of the students' feedback (Winstone et al., 2017). Hence, this study sought to understand learners' perceptions and behaviour towards self, peer- and teacher feedback interventions, as enabling activities provided within the clinical skills laboratory to enhance formative logbook assessment feedback. In addition, the study explored factors that might influence their behaviour towards these interventions such as understanding the recipience processes or outcomes that these interventions are likely to target, such as motivation, engagement, self-efficacy, assessment literacy, goal setting, and self-regulated learning.

Our study found that the different strategies stimulated successful feedback-receiving processes, such as self-evaluation, assessment literacy, learning objective setting and self-regulation, which in turn influenced learners' interaction with feedback and encouragement to use it. Self-appraisal or self-assessment, which is the process of self-judgment, supports proactive feedback engagement. This enables students to effectively assess their strengths and weaknesses by relating performance and

feedback to performance criteria, without relying exclusively on teachers for their authoritative opinion (Quinton & Smallbone, 2010). Higher achieving participants in our study, similar to findings from Srinivasan et al. (2007), valued educators' need to prompt self-assessment as it improved their self-assessment skills. Self-assessment was viewed as encouraging their feedback reflection to establish learning objectives (Bounds et al., 2013), as a way of working to self-regulate their learning and narrow their performance gaps by changing behaviour and improving performance. Self-assessment as internal feedback prompted the learners to question their approaches to learning (Moon, 2002), hence making them assessment literate which supports their transference of learning (Quinton & Smallbone, 2010). The lower performing students, however, saw the limited literacy of the evaluation that they and their peers had as a challenge to engage with these interventions effectively. Similar to other studies (Boud et al., 2013; 2015), multiple self-assessment opportunities through tutor and peer evaluation and feedback processes were perceived to stimulate confidence in the students judging their performance standards over time.

Faculty orienting learners to the learning task was built into the clinical skills environment to develop learner feedback and assessment literacy, by emphasizing essential characteristics of the task through the clinical skills protocol that included performance standards and evaluation criteria. All participants confirmed that this intervention enabled them to develop relevant knowledge, skills and competencies to understand and apply task-based learning goals and make judgments about their own performance and the performance of others. Similar to the findings of Price et al. (2012), knowing the expected performance goals helped learners understand the terminology, concepts and techniques used during peer evaluation and feedback process. Through integrating peer evaluation requiring peers to provide actionable feedback in the contexts of clinical skills, medical educators have used this as a forum to promote continued learner self-assessment, assessment literacy and goal-setting. These are a means to fostering the development of action plans. Winstone et al. (2017) pointed out that the setting of goals involves demonstrating evidence of critical thinking in order to adopt behaviours aimed at achieving the desired results. The study confirms that the culture of clinical skills logbook feedback contributed to the goal setting and enhancement of self-regulation skills by the learners, which is an evolving development of evaluating and monitoring their own progress and learning strategies. It is therefore fair to recognize that goal-setting encouraged students' active engagement with feedback, encouraging them to read and understand feedback, recognizing areas for growth, establishing academic objectives and then translating these goals into practice through behavioural adjustment (Winstone et al., 2017). These interventions encouraged the students' open-ness to receive feedback from the willingness to start engaging with their performance (Handley et al., 2011), by considering feedback, including it, and relating it to their learning process (Price et al., 2011).

This study further highlights the value of peer-peer interactions as a social element of learning to implement feedback to feed-forward, by developing learning evaluation opportunities and behaviour

changes when done genuinely. Student behaviour perceived from this study as improved feedback interactions during the peer assessment and feedback sessions, included activities such as students picking up a time to meet with their peers, meeting individually in a quiet place without interruptions in the skills laboratory and scheduling a time for the next peer feedback session before concluding a meeting. Peer feedback as a dialogue helped learners to understand concepts and apply their understanding of these concepts in learning tasks. The higher achieving students reported the benefits of the peer assessment opportunity as not just giving feedback, but also, the need to challenge their own work in the process of developing feedback. This makes them critical reflective observers of their own learning, which is a step towards becoming a self-regulated learner. This study, however, revealed varied responses to the benefits of giving peer feedback, as learners queried the credibility of the peer feedback such as peers may lack a clear understanding of how to give feedback. They dismissed feedback they perceived as lacking credibility, which was often influenced by the depth of peers' medical knowledge and friendship bias. Following qualitative studies, Bing-You et al. (1997), Sargeant et al. (2005), Sargeant et al. (2007) and Watling et al. (2012) indicated that learners tended to dismiss feedback from sources that they perceived lacked credibility, often influenced by the feedback generated by the process.

This study supports the view that involving students in self-assessment and peer review practices is important in developing the ability of learners to use and seek feedback (Lefroy et al., 2015). Learners' feedback-seeking behaviour in this study highlights a means to enhance the feedback socialisation and exchange of information. We identified factors that learners perceived influenced their feedback-seeking behaviour similar to findings by Delva et al. (2013), such as the development of the feedback exchange culture through peer feedback. The feedback exchange was perceived to be most effective, and promoted engagement following the development of a longitudinal relationship with the feedback provider and when tutors and learners' goals were aligned (Watling et al., 2014). Although our learners desire feedback information on how to improve and would like to make a good impression on their tutors, they often hesitated to seek feedback when they perceived their performances had fallen below the required standard. Other factors that affected their quest for feedback included their emotional response to feedback, such as anxiety or incompetence. Learner confidence and the thought of not having adequate knowledge in performing a skill affected receptivity to feedback and feedback-seeking (Eva et al., 2012), so their need to seek feedback motivated them to be better prepared for the clinical skill.

Strategies have been used in the clinical skills laboratory to improve the quality of students' written feedback comments. Students are told at the start of the module of how much the interaction with their peers may affect their individual learning, while at the same time preparing and encouraging them for daily feedback. They are taught about how they can communicate with their peers. One of the best ways to learn a skill, according to the literature, is to observe a model (Bandura, 1986). The

teachers, when providing feedback to students, use the same guidelines that they expect students to follow when giving peer feedback e.g. What was done well? What was not done well? And what can be improved? This becomes a good model for students to follow in any feedback situation. Also, teachers' providing good quality feedback to students on their work is an excellent model for students to provide feedback. This could explain why the difference between the teachers' feedback rating and the peer written feedback recorded in the third study was minimal (Abraham & Singaram, 2019). At the end of a theme, teachers check logbooks and students are provided feedback on their peers' feedback. Teachers responded to specific peer comments and suggestions made, by commenting on the characteristics of the feedback that looked helpful or useless. Expectations of good feedback are communicated in the logbook, and students who provided constructive feedback, are commended. This has the benefit of shaping the students' feedback-giving skills as well as increasing their motivation to provide feedback next time. The literature indicates that providing multiple opportunities for students to practice feedback is a necessary addition to direct feedback teaching (Svinicki, 2001). Hence, capitalizing on the use of daily peer reviews in the laboratory of clinical skills is an excellent condition for students to practise giving good feedback. The time spent in communicating to students their expectations of constructing feedback during the feedback checks on submission of the skills logbooks, may give students confidence in their ability to handle the peer feedback process effectively. Archer (2010) showed that early training and peer feedback experience in the clinical workplace over time, supports the required cultural change in feedback.

In summary, four inter-related features underpinned the medical students' feedback literacy skills in the clinical skills learning environment. Students appreciated feedback by recognizing the value of feedback to their learning and more so, understood their important role in the feedback process. Their willingness to make sound academic decisions to strengthen their performance was enhanced through both extended self-evaluation opportunities promoted by regular instructor and peer review practises, and engagement with learning objectives in the clinical skills protocol. Their ability to manage their emotional responses to critical feedback and weak feedback ratings constructively, was recognition that teacher and peer feedback facilitated self-regulated learning and progress. Robinson et al. (2013) mentioned that without providing students with skills to interpret and act on the feedback comments received, only a few students will have the ability to act on feedback. As confirmed in the study, peer feedback and use of the clinical skills protocol as learning and enabling activities in the clinical skills laboratory, maximized the potential for students to take action towards improvement. It offered opportunities for students to receive feedback and act on it. The use of the clinical skills protocol clarified and made assessment expectation goals clear to students, further assisting with their self-evaluation and peer feedback. By teachers communicating the rationale of how the peer feedback and how the skills protocol operate as well as addressing their implications to students' learning, standards that students' will have to be constructive in order to benefit from the feedback process were

established. Clinical teachers, therefore, played an important role in facilitating students' feedback literacy through creating suitable environments by providing students with opportunities to use feedback within the curriculum. Through these learning experiences, teachers have played an important role in students understanding of what feedback is, and how effectively it can be managed. They developed the capacity of the student to judge their work and helped to make sense of the feedback information that ultimately encouraged feedback use to inform future work, thus closing the feedback loop.

5.2.3 Question 3: How does the addition of a feed-forward strategy to the clinical skills logbook influence the quality of the feedback given by both tutors and peers?

This question was addressed in Chapter Four. In this chapter, based on the deliberative practice framework we developed a tool to determine the quality of feed-forward in the clinical skills tutor and peer feedback, as a metric for evaluating the effect of feedback on the clinical performance of students' during their clinical skills practice.

As confirmed in the second study, medical teachers play a key role in medical students' competency development by providing mentored deliberate practice to support learning, direct observation of skills performance and observation-based formative assessment feedback. Although the quantity of evaluations offers a detailed picture of learner abilities, the consistency of formative assessment feedback is an important stimulus for learning. If the purpose of formative assessment is to build knowledge and expertise in order to promote learning, the feedback of formative assessment should include elements that facilitate deliberate practice (Ericsson, 2007). This study evaluated the quality of written formative evaluation feedback provided by both the tutors and peers to medical students in their logbook. The objective evaluation of the quality of logbook feedback in this study, compared to a previous analysis on the students' impressions of satisfaction with the clinical skills logbook feedback (Abraham & Singaram, 2016), suggested an improvement in the quality of feedback. From previous feedback that included non-specific and vague statements lacking in a direction as perceived by the students, this study confirmed that the introduction of a feedback improvement strategy facilitated written feedback comments, to include elements of deliberate practice i.e. the task, knowledge gaps and action plans (Abraham & Singaram, 2019).

Most clinical feedback studies rely solely on postgraduate residents and the opinions of their supervisor on the quality of feedback provided in surveys (Jackson & Mark, 2016). In their critical assessment of medical education feedback, Kornegay et al. (2017) cited that no previous study had developed criteria for the objective assessment of the quality of written feedback provided in medical education. To address this gap, this study quantitatively analyzed and determined the usefulness of the written feedback for the medical learner in terms of its feed-forward quality and effectiveness, by developing a modified and adapted feedback-scoring tool to objectively assess the average deliberate

practice component scores of the written feedback comments (Abraham & Singaram, 2019). The study indicated that although the written feedback comments contained all three deliberate practice components, both the tutor and peer feedback comments were of moderate quality. The performance gap was described specifically, while the task and action components generally described in terms of their individual descriptions to help learners clarify things they might not have understood, and the feedback may not always be effective. Giving specific feedback targeting the task level based on the task performance, defining specific learning goals that need enhancement and explaining how the task could be completed in the future, is considered to be most successful (Kluger & DeNisi, 1996).

Poorly informed feedback is known to reduce the value of feedback for learners (Lefroy et al., 2015; Robinson et al., 2013; Weaver, 2006). While high-quality feedback should be accurate, relevant to the learning background, timely, balanced, constructive, and include an improvement plan, it is also critical for educators to remember that the recipient should be responsible for developing a learning and action plan with goals to enhance the student agency. As too much feedback will hinder self-regulated learning, the feedback provider, should only facilitate these processes. In this study, with tutors as well as peers specifically identifying the performance gap in the written feedback, there is evidence that the feedback improvement strategy as a feed-forward intervention had a positive impact on the feedback provision. Constructive feedback that identifies deficiencies in performance can promote self-regulation by stimulating self-awareness and self-directed monitoring by reflecting in action (Lefroy et al., 2015). It thus assists learners in "deep processing and mastery of tasks" (Archer, 2010, p.103) in order to resolve the difference between their actual performance and their desired performance. This actionable feedback can help students create growth strategies by building on their strengths and overcoming performance deficiencies to move beyond their current performance (Sadler, 2010; Watling et al., 2014).

The quality of feedback given to students in the third year was found to be higher than that given to students in the second year. There is a possibility that the longitudinal teacher-learner relationships that had developed over the year, as perceived in our first study, contributed positively to the delivery of feedback. Bok et al. (2013) stated that as medical learners build relationships with teachers' over time, the goals of the teachers and learners' converge, and the learners tend to trust the validity of their feedback. Previous studies have frequently reported feedback not distinguishing the level of learners' competence (Hawkins et al., 1999). Our study findings reported a correlation between the global feedback rating and feedback quality. This explains the fact that tutors and peers spending time and thought on making reasonable observations are evaluating the level of performance of the learner correctly.

This study also found that as students' level of academic performance increased, the performance gap and action feedback scores decreased. This indicates that educators find it difficult to locate a flaw in

the higher achieving students' performance, and instead of concentrating on the academic appraisal of a single skill (Gauthier et al., 2016), they would prefer to test higher-order integrated learning activities that involve application of clinical knowledge such as problem-solving and clinical reasoning (Griffith et al., 2016). This supports the study participants' request in the first study on the need for developing integrated skills assessments using clinical case scenarios, with feedback that was perceived to enable their reflection and self-regulatory learning skills towards promoting clinical competence. Interestingly, no significant difference was found in our study between the quality of the tutor and peer feedback (Abraham & Singaram, 2019). Hence investing in the development of students as peer assessors is a valuable resource, particularly in a resource-constrained educational setting with large groups of students and limited clinical teachers. Training students as peer assessors can also promote learner interaction through feedback, self-reflection, evaluative judgment, clinical skills training and self-regulatory learning skills needed for lifelong learning (Mann et al., 2009). Feedback works better if the feedback culture in the educational environment systematically integrates feedback into the learning process. This enables teachers and peers to provide directly observed verbal and written feedback through several formative assessment sessions. The clinical skills logbook feedback aided medical students' reflection to track their learning purposes and served as a feedback tool to facilitate self-assessment, peer assessment and discussions with tutors and peers. This nurtures an environment that enables performance by providing and seeking feedback.

The study recommends the need to put in more effort into improving the way feedback comments are formulated by providing the feedback provider with the feedback-scoring tool to review and score their own feedback for the presence of features of high-quality feedback. This would guide teachers and peers to give good quality feedback thereby enhancing their feedback skills. As reflection is (always) tied in with feedback, and perhaps faculty also require some training in practising this. After all, if we expect our students to reflect on what they do, faculty should also be able to do the same ("Walk the talk"). The Clinical skills tutors will therefore also require training in the use of the feedback tool that has been developed.

It is however necessary but not sufficient to only build in faculty development programmes to enhance the delivery of performance feedback. Feedback between the teacher and student needs to take into account what the teacher delivers as well as how the student engages and responds to it. Throughout medical education, the emphasis is increasingly on how clinical educators create and provide feedback instead of evaluating how students receive, react and use feedback. This can explain why feedback quality remains a challenge. Based on the findings from the three studies in this research it is therefore vital that assessing quality feedback should examine the whole feedback process instead of any single-stage such as lecturer output to determine the impact feedback has on learners' professional growth (Nicol, 2010; Wiliam, 2011).

In summary, this research study confirms that designing participatory feedback initiatives within the clinical skills setting, such as interventions to improve tutor and peer feedback content delivery through the clinical skills formative logbook peer and teacher assessment that included multiple tasks, nurture learners' active feedback utilization. It shapes learners' behaviour by targeting higher-order skills to develop their feedback literacy skills. The study unfolds the academic journey towards the development of learner feedback literacy. This suggests that the relationship between feedback efficiency and eventual learner achievement depends on the feedback quality received from the feedback providers and the reliability of the self-directed feedback interaction of the learner. These ultimately lead to learner development of reflective and self-evaluative skills, proactive feedback use to feed-forward to future performance, as well as improved quality of the feedback dialogue between the feedback receiver and sender.

5.3 Synthesis from the research

In summary, the core concepts, themes, and categories of determinants that could facilitate or impede the learners' reception, interaction, and use of feedback emerging overall from this doctoral study are shown in Figure 1 below.

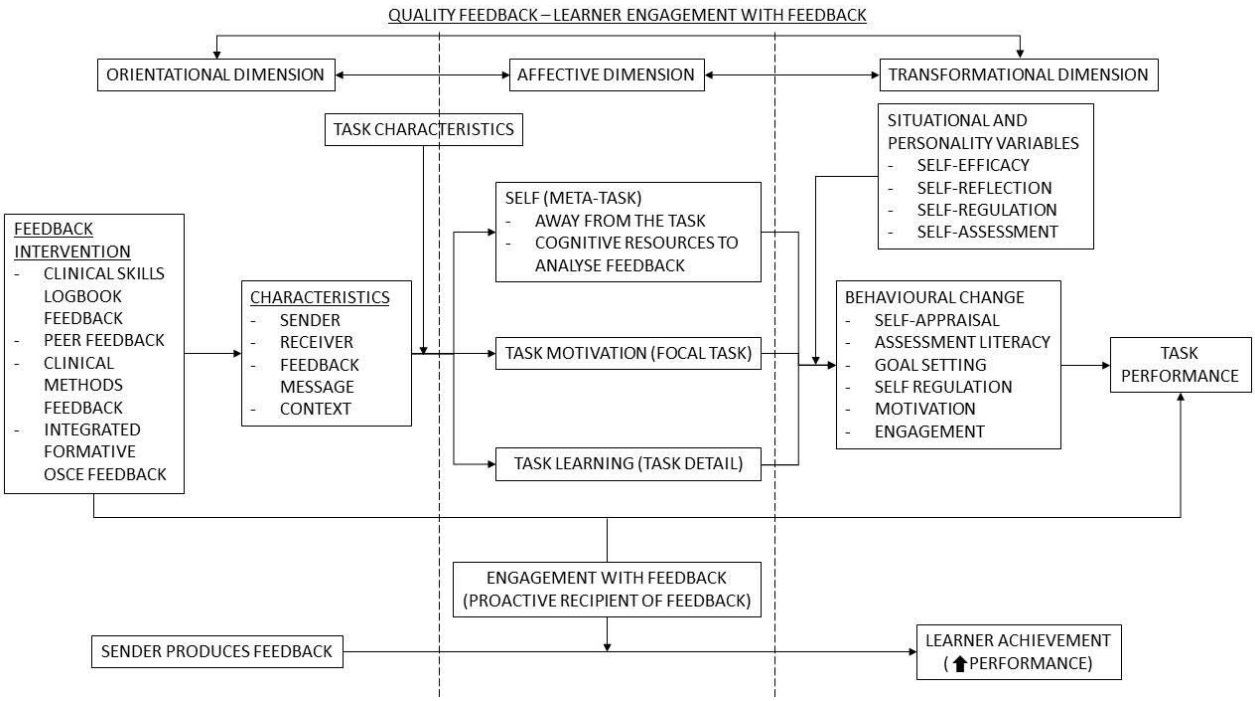

Figure 1: A conceptual framework of the feedback process to understand factors that can influence medical learners' engagement with and use of feedback

This study draws on the framework conceptualizing feedback as an interpersonal communicative process explaining the likely factors that our medical students perceived as influencing their engagement and use of feedback to feed-forward. The interaction between a feedback sender and a

recipient involved the sender, who is often the clinical teacher or the peer generating an actionable feedback response, which is then forwarded on to the recipient who is often the medical learner. The study participants emphasized the role clinical skills feedback process played in building their motivation to learn (affective dimension). This was associated with receiving feedback comments on strengths, along with suggestions for improvement, which stimulated their feedback engagement and its contribution to their development. They also perceived that the feedback process played a role in orienting them within the clinical skills academic environment, as it provided them with a sense of their place, requirements and expectations of their tutors through the clinical skills protocol and assessment criteria (orientation dimension). Further, they recognised the feedback process as a valuable learning activity that had the capacity to support learning through motivation and behaviour change (transformational dimension).

The findings from the three studies as illustrated in Figure 1, therefore suggest that learner motivation to engage with feedback is inter-related, along with bi-directional interpersonal communication within the clinical skills setting. As confirmed in the study, the added benefit of peer evaluation and feedback offers the possibility for learners to enhance their learning processes of self-regulation. This further facilitates learner engagement and implementation of feedback, leading to behaviour change and future performance improvement (Nicol, 2010). This thereby suggests a good cause for believing that each of the variables - sender, message, receiver and context - would both moderate and influence the development of skills by learners' to support their proactive feedback recipience i.e. evaluation literacy, self-assessment or self-judgement, reflective learning, feedback engagement motivation, development of goals and self-regulated learning (Winstone et al., 2017). Learners, therefore, have a responsibility in closing the feedback loop as the benefits of feedback go beyond the feedback delivery guidelines. This requires learners to develop a growth mindset and learning goal orientation that manifests in goal-setting, feedback-seeking, feedback receptivity, and willingness to engage in reflection on performance and self-assessment; the development of performance improvement action plans leading to behaviour change and finally, the need to create further learning opportunities with their teachers. Reviewing the findings from all the studies, we see the common thread that highlights the need for learners and teachers to share responsibilities for meaningful feedback processes that will lead to professional growth. The exchange of feedback will not lead to learners' acceptance of feedback or change in behaviour to increase clinical performance without balancing responsibility optimally among all stakeholders.

5.4 Balancing responsibility sharing to remove barriers to feedback engagement: A new concept to promote a growth-enhancing feedback process

Based on our research findings, we conclude that the impact of the feedback process lies in the balance of responsibility between the teacher and learner. Some obstacles hinder a significant

participation of medical students in the clinical learning environment with feedback. Promoting the learning of students' is often portrayed as lying primarily with their clinical teachers. Competency-based medical education argues that, with a step toward constructivism, successful learning requires students to support and share responsibilities for their educational growth with their teacher. Developing a philosophy of mutual responsibility for feedback is important, as it guarantees that both students benefit entirely from the feedback they receive through their constructive participation, and ensures the continuity of the positive feedback practices of the teacher (Nash & Winstone, 2017).

Our study shows that the responses of students' focused mainly on issues that their teachers could do to facilitate their best use of feedback, such as '*suggestions should be more precise, positive and thorough'* in order to know what to do for their future performance evaluation. They seldom mentioned what they could do and stated vague comments such, as '*they would work hard close to the exams'*. Perceptions of factors preventing students from using feedback as criticized by many educators were students' weak motivation to deal with feedback provided (Housell et al., 2005). The various barriers mentioned in our study frequently come in the way of learners, preventing them from proactively engaging with feedback and thus stopping their development of skills. The blame-game between students and educators for the failings of feedback further prevents breaking down these barriers to make a difference.

Applying the concept of a psychological framework from Winstone et al. (2017) to our clinical skills medical education settings is critical in addressing facilitators and barriers to feedback receptivity. In order to resolve problems, we need to think more specifically about the sharing of responsibilities and the different responsibilities based on this framework.

This sharing of responsibility between educators and students requires that students and teachers understand the different ways in which they can work together to eliminate barriers to evaluation feedback. Nash & Winstone (2017) have argued that educators have the greatest power to bring forward proactive changes to their students, despite the overall focus of responsibility between students and educators. They indicated that increasing students' motivation to engage with feedback would initiate a virtuous cycle that will in turn make it easier for both educators and students to further sort out the barriers. For example, increased motivation might steer students to devote more of their time in analysing the feedback they receive, as well as show more interest in seeking feedback and taking up offers for further dialogue around feedback. Increasing students' willingness to benefit from opportunities of discussions around feedback should in turn, provide educators with better chances of fulfilling their own responsibilities (Nash & Winstone, 2017).

As an example of responsibility-sharing that could improve the validity and acceptance of feedback information, I would like to consider a common situation in our clinical skills laboratory when a student receives directly observed verbal and written feedback after performing an examination skill

during the formative clinical skills logbook assessment. The responsibility of the educator should be to ensure feedback provided on the directly observed skill is clear, balanced and specific. The feedback should be related to the examination skill's learning and assessment objectives to address the challenge of lack of 'awareness' of what feedback means to the student. The student's responsibility, on the other hand, is that they should seek clarification on the importance or the meaning of their feedback.

To address the barrier of 'cognizance' and techniques that students might use to implement feedback, educators must integrate into the curriculum exercises to train students in implementing feedback skills, while avoiding hypothesizing students' knowledge of feedback strategies. This would require developing students' assessment and feedback literacy through initiating their reflection, self-assessment, and peer-assessment as part of the feedback process, which ultimately enhances their self-regulation in learning, and incorporation of feedback. On the other hand, students should be responsible for deciding which approaches they can use to incorporate suggestions, testing new approaches, and deciding where to seek assistance.

In this context, educators could ensure that they develop innovative integrated approaches to make sure that the feedback is relevant to the future practice of the medical student as a doctor in order to overcome 'agency' issues. This requires provision of realistic feedback on integrated clinical skills using an integrated case scenario that involves multiple skills to facilitate learning through clinical reasoning and problem solving. This enhances learners' critical thinking and self-regulated learning. Educators should also avoid too specific feedback to an exam skill, as their transfer can be restricted. Therefore, the feedback statements should be linked to the level of the curriculum rather than to the learning outcomes of the module level. Students, on the other hand, must recognise their responsibility to put in the hard work to develop self-generated action plan goals and draw out common themes across assessments to facilitate feedback transfer from one context to another (Carless, 2015).

In order, to eventually, overcome 'volition' problems, opportunities for frequent dialogue should be implemented through constructive feedback activities organised in a motivational way, such that the learners feel improvement is possible. On the other hand, students need to be open to improving their responses and be able to deal with the feelings resulting from feedback advice (Bing-You et al., 1997). Furnishing learners with feedback recipience skills such as assessment literacy, self-assessment, motivation, goal defining and self-regulated learning (Winstone et al., 2017) along with promoting shared responsibility between clinical educators and learners', enables development of self-directed learners with learners' greater control over assessment and feedback process.

Implementing responsibility sharing in practice will depend on the various disciplines and will vary across different levels of education. In summary, facilitating students' engagement with feedback in the undergraduate pre-clinical medical curriculum will require a variety of interventions:

1. Establishing a positive learning environment through multiple opportunities of directly observed on-going formative assessment feedback that normalises the provision of feedback on strengths, as well as areas for improvement. This is essential if the focus is on promoting continuing performance improvement and professional growth. It requires developing clinical skills protocols with learning and assessment outcomes and using self- and peer-assessment exercises. These interventions facilitate reflection, informed self-assessment and co-regulated learning (Rich, 2017) as a means to create opportunities for learners to incorporate feedback and improve their academic and feedback literacy.

2. Designing feedback interventions based on multiple integrated skills that facilitate self-regulated learning and are relevant to the competencies of becoming a medical doctor.

3. Training medical students to be feedback literate through the use of post-evaluation performance and feedback reflection forms, to coach them on how to analyse and implement feedback by setting self-generated action points that can be used for future performance assessment.

All these different interventions have their strengths and limitations. Nevertheless, the focus of the choice and development of each intervention should be on what feedback receiving mechanisms or skills requires addressing, such as encouraging reflection in practice, self-evaluation, appraisal awareness, and drive for engagement, setting goals and self-regulation (Winstone et al., 2017). The shift in behaviour is likely, if students formulate and calibrate their own goals, and discuss the steps, taken to achieve these objectives. As medical students aim to become future reflective practitioners, for future improvement they should initiate action plans. Autonomy is a phenomenon of growth, so clinical teachers will have to balance supervision with autonomy through a continuum of external guidance, gradually leading through to shared guidance and shared responsibility between teachers and learners and, finally, to internal support, where students are competent to practise independently (Ten Cate et al., 2004). It is equally important to have on-going dialogue with students in order to supply feedback to the faculty about the feedback process and their feedback psychological experiences.

Weaver (2006) and Burke (2009), however, mentioned that higher education students have never received systematic guidelines on how to effectively receive and act on feedback. With the increasing diversity and multi-cultural student body in higher education, these discussions need to be initiated with students about why interacting with feedback is relevant, what the obstacles are to engaging with

feedback, and what kinds of emotional responses can be associated with receiving negative feedback (Nash & Winstone, 2017).

An earlier study showed that although linguistic and cultural differences do not appear to affect the feedback process, the clinical instructor was concerned about stereotypes that could be attributed to giving feedback in a multicultural divide that included different cultural and linguistic backgrounds in our simulated clinical setting (Abraham & Singaram, 2016). A teacher stated, *'For second-language students the delivery of feedback is important. Also, from a cultural perspective, students may see me as a figure of authority and misconstrue my feedback as "scolding"'* (Abraham & Singaram, 2016, p.124). The feedback may not, be interpreted as a way of encouraging future development but as a sign of failure. Such sensitive feedback can limit the students' participation in the feedback process. Therefore, these discussions on feedback barriers confirm that student demographics and cultural background can potentially influence their feedback-receiving experiences. Hence, training students to handle feedback in terms of anticipating feedback and resisting defensive feedback would be beneficial. In light of the increasing diversity in medical education settings, the influence of cultural backgrounds could be explored further, although these influences did not emerge in this study.

Finally, achieving a culture of responsibility sharing would require co-operation from both the students and clinical teachers about this approach. We will have to promote the awareness of medical students that constructive interaction with feedback does more than interpret their skills, but has long-term goals as a sustainable and transferable lifelong ability, which will eventually support them in their career and job prospects. According to McGrath et al. (2015), long-term learning benefits perceived as distal targets as a measure of graduate jobs, go beyond the immediate satisfaction of the student with sharing responsibility. Nevertheless, Nicol (2010) noted that the workload of the teacher is a major factor in her feedback practice and it is labour-intensive to create a culture of responsibility sharing, requiring her to invest more time. There is therefore the need to get clinical educators to recognize that they can maintain their feedback-related workload in the long term by investing time in these efforts to address student feedback barriers. It has the greatest potential to reduce the immense burden of providing more and more feedback by inspiring learners to be involved in recognizing and using feedback, as well as producing and seeking feedback. Achieving these distal goals of proactive engagement is reasonable to imagine, as this is consistent with the institutional goals of promoting supportive shift towards responsibility sharing.

Our study highlights the numerous facilitators and barriers that prevent students from proactively engaging in feedback. The culture of sharing responsibility which we discussed is based on the assumption that both educators and students have similar and distinctive roles in overcoming these barriers with an intrinsic degree of mutual cooperation, and that these barriers cannot be met in isolation by either educators or students. Educators delivering high-quality feedback can never be

successful and impactful unless students are willing to receive and use it, and a cultural shift towards sharing in their responsibilities to the feedback process is therefore necessary.

5.5 Linking key theoretical principles to our research findings and recommendations

In the introduction, we discussed four theories applicable to our research into the use of feedback and feed-forward action plans on the development of clinical skills in undergraduate medical students, through the giving, receiving, acceptance and implementation of feedback into performance: Ericsson's theory of deliberate practice, Feedback intervention theory, Sociocultural theory, and Self-determination theory. We discuss in this section how our research findings relate to these theories and how the principles from these theories would be useful to establish a feedback culture of performance development that will also inform further study. The following principles are not isolated and the ideas of each are in reality connected to each other.

5.5.1 Ericsson's theory of deliberate practice and feedback

Ericsson (2004), informed by the concept of 'deliberate practice', characterized coaching as organised activities aimed specifically at achieving a definite goal and improving performance in a specific field. In the medical field, the goal is to prepare students for clinical competence that requires the creation of expertise by means of basic to advanced levels of education from the beginner to the master clinician (Frank et al., 2015). In the context of clinical skills, it emphasizes activities aimed at improving skills, which include repeated and structured performance of proposed psychomotor and cognitive skills, continuous rigorous assessment of skills, feedback, and repeat opportunities to improve (Ericsson, 2007; Krackov & Pohl, 2011). Feedback must contain elements that facilitate deliberate training for the feedback process to be successful and to promote learning (Griffith et al., 2016). Therefore, for optimal clinical performance in medical education, it is necessary to link feedback in medical training to deliberate practice (General Medical Council & Liaison Committee on Medical Education, 2009). In applying these concepts to feedback and our own research, institutions need to address the wider system in which learning takes place. This involves establishing a coaching environment by developing learner agency and expertise through: (a) intended skills milestones with prior orientation of the learner to the learning goals related to the task; (b) purposefully observing a learner's performance; (c) eliciting a learner's self-assessment on strengths and areas that need improvement; (d) synthesizing a teachers' assessment of the learner's performance by formulating discrete learning goals depending on the task; (e) promoting reflection by attempting to predict the gap between current performance and expected performance, and (f) creating a formative feedback dialogue, setting goals, and facilitating practice by developing action plans to motivate and engage learners in appropriate cognitive and psychomotor learning activities, to narrow the gap between actual and expected performance.

The cycle can be repeated as many times as needed, until a skill is mastered, and should conclude with a summative evaluation to show evidence of learner feedback incorporation to ultimately complete the feedback and learning loop. However, we caution that medical educators will need to be cognisant that excess support by providing too much feedback without challenging learners' thinking, does not promote their growth (Daloz, 2012). The cultivation of deliberate practice should be harnessed to target learner improvement and growth and therefore would require learners to be actively involved in each of the steps mentioned. This involves encouraging learners to initiate feedback conversations, discuss their learning goals, self-assess their strengths and challenges and formulate action plans for improvement. Teachers at the same time should facilitate this process by guiding these narratives, while probing as needed and providing additional information, facilitating learners' self-reflection and checking their understanding of the feedback, while assessing their emotional reaction to feedback. Teachers must continue to provide actionable feedback containing elements that facilitate deliberate practice (task, gap, and action plan), develop congenial educational alliances with learners (Telio et al., 2015) and engage in participatory design of learning environments (Konings et al., 2014). These are known to bring about learner improvement in the learning process within a number of areas, including the development of knowledge, attitudes, and skills required to become a competent medical professional (Heiman et al., 2012). Hence, more in-depth qualitative studies focusing on deliberate practice and actionable feedback from the teacher perspective are recommended.

5.5.2 Feedback intervention theory and feedback

The feedback theory (FIT) of Kluger & DeNisi discusses how feedbacks operating mechanisms can be systematically used to design better feedback interventions to facilitate behavioural changes in clinical learning settings, based on the cognitive and motivational theories. The FIT notes that by comparing actions with committed goals, people regulate their behaviour (Locke et al., 1990). When they sense a discrepancy between their actual behaviour and the standard, they try to address this disparity by adjusting their level of effort to meet the expected standard. By providing performance feedback, the degree of effort an individual undertakes to meet the benchmark behaviour can be altered. If these concepts are applied to feedback and our own research, institutions must understand that feedback interventions work by self, peers and teachers providing new information that redirects the focus of the recipient either from their tasks or to the task. Feedback providers will need to be mindful of variables such as the form of feedback comments provided and the task complexity or task characteristics when implementing feedback approaches in the setting of clinical skills. They should also be aware of the personality and situational variables that can determine how effectively learners' attentional shift occurs to bring about performance improvement (Kluger & Van Dijk, 2010). Feedback on the focal task strengthens motivational processes to enhance task performance in order to promote performance goal orientation. On the other hand, feedback signals directed at the task details

improve learning as well as maximizes feedback on the performance of the task to facilitate a learning goal orientation in the learner. However, to avoid weakening the feedback effect on the task performance, feedback providers will need to be cognisant that feedback information that distracts attention from the task will divert the learners' cognitive resources away from trying to improve (Kluger & DeNisi, 1996).

The stimulation of a learning goal orientation is geared towards improving student skills and knowledge with a view to developing their self-reliance, clinical competence and professional growth. From our study, we discovered that promoting a learning goal orientation through the on-going clinical skills logbook feedback from multiple sources (self, peer and teacher), stimulated a growth mind-set in learners. This was evident from the study participants' keen-ness to acquire new skills, to seek feedback, be receptive to constructive feedback, show interest in continuous improvement, and motivation to incorporate feedback into performance. However, the timing and response to the actual implementation of feedback varied among study participants. While students should be responsible to use feedback input proactively, the findings from the study strengthen the concept that ability to learn and its context cannot be dissociated (Durning & Artino, 2011). As stressed by the FIT, educators need not only recognize methods of supplying learners with feedback information, but also understand the circumstances where feedback will or will not be used and that realistic learning practices will lead to better learning. As competency-based medical education embraces assessment for learning, it is essential that medical institutions promote a growth mind-set among learners and teachers. This can be accomplished by implementing feedback strategies that facilitate continuing learning, participant awareness and intrinsic motivation, feedback-seeking and acceptance, and learner self-efficacy. These are facilitated by sharing feedback addressing learner goals while at the same time creating ways to encourage a learning goal orientation. These essential elements in feedback to feed-forward warrant further investigation in different clinical training settings.

5.5.3 Sociocultural theory and feedback

Russian psychologist Lev S. Vygotsky, describes the sociocultural theory as how society contributes to individual growth and how humans largely acquaint themselves through social interactions (Vygotsky, 1978; Wertsch, 1991). As learning and transformation takes place through involvement and interaction in sociocultural practices, also known as the community of practice (Wertsch, 1991), institutions need to allow students to participate through social activities in their feedback and learning. Patient care is part of a team-based system in the clinical environment, where doctors collaborate and learn from their colleagues and other multi-professional personnel. Therefore, team members learn and develop from one another in a community of practice beyond the medical school environment. Promoting feedback initiatives that encourage discussions of learning goals and action plans for performance improvement, such as peers learning together during the peer assessment

process, facilitates learning. Peer assessment and feedback can be transformational by encouraging the participant to participate in feedback processes of self-regulated learning by shifting the feedback focus from the providers (teachers) perspectives to the recipient (peer). Clinical skills training is a developmental process that occurs within a continuum from complete guidance externally to self-regulation, while developing the knowledge of clinical medicine and technical patient care skills. Learners learn the art of self-regulation of their skills through incorporation of feedback from multiple sources, feedback-seeking and reflection, while engaging in discussions of learning goals, direct observation of their performance, self-assessment and formulating action plans.

Institutions must therefore create a social system in which learners can develop through group interaction and community-based activities, such as peer review and feedback. Setting standards for teachers and students to create a co-regulated learning environment by participatory design of learning environments will improve learning quality (Konings et al., 2014). This requires facilitating learners' reflective and self-evaluative judgement on their performance gaps, depending on the learning task engaging learners in formulating and discussing learning goals, encouraging on-going formative two-way feedback conversations from multiple sources, and fostering shared decision-making towards learner development of action plans for future improvement. When students are involved in each of these activities over time, it helps them establish academic relationships with their teachers and peers and become valuable team members in their social contexts while taking ownership of their learning towards development into independent practitioners (Lav & Wenger, 1991).

5.5.4 Self-determination theory and feedback

The self-determination theory of Ryan and Deci is a motivation and personality theory that discusses three psychological needs: competence, independence and relatedness. It notes that human beings self-regulate their behaviour, taking on challenges and learning through both intrinsic and extrinsic sources of motivation (Ryan and Deci, 2000; Ryan, 2013). Extrinsic motivation to achieve defined results is driven by external factors, with changes in behaviour often based on external values of reward or punishments, hence leading to controlled motivation (Ryan and Deci, 2000). Intrinsically impelled people carry out a self-sustaining and self-efficient operation for intrinsic satisfaction by independence (Ryan and Deci, 2000). By adding motivation to performance-based feedback and our research findings, intrinsic motivation would have a greater influence on receptivity and adoption of feedback, and thus the enhancement of performance.

With the current curriculum in medical education, it is important to focus on growing independence through approaches that increase intrinsic motivation rather than external motivation of learners to give them greater self-sufficiency or autonomy during the training process and to prepare them for independent practice. The fostering of shared responsibility between clinical educators and learners strengthens the intrinsic motivation of students by transferring the subject of feedback conversation to

the context, to self-regulation and towards the viewpoint of the feedback recipient (Ten Cate et al., 2011). As our study participants appreciated strategies to enhance the impact of feedback, we recommend that teachers and peers focus on learners' observed performance, centre the feedback conversations on learners' learning goals and provide learners with learning opportunities to incorporate feedback, within a context where longitudinal relationships between teachers and learners are promoted. These activities would enable learners' awareness, cognisance, and control over the assessment and feedback process. This learner-centered and performance behaviour-focused feedback encourages students to become more independent and motivates them internally to work with a growth mind-set and learning goal orientation to continue development. Learners with a focus on their learning goals frequently look for feedback and are encouraged to incorporate constructive feedback into performance and to master new skills and tasks, which also improve their self-appreciation and professional identity (Ramani, 2018).

5.6 Limitations and strengths

Our research contributed to gaining further insight into the inter-personal teacher-learner communication environment of feedback, and developed a deliberative practice feedback-scoring tool and feed-forward action plan for clinical logbooks. However, several limitations and strengths need discussion.

This study was based out of a single undergraduate programme from a single institution and thus transferability of the results to other educational institutions may be restricted. Our background is, however, common of undergraduate skills laboratory in large medical school programmes, and the results can be applied to specific undergraduate learning environments. The research concentrated only on the views of third-year medical learners, identifying their perceptions of helpful and counter-productive elements that affected their receptivity to feedback. It did not however concentrate on exploring the clinical tutors' views that are likely to represent extra challenges.

In this analysis, some viewpoints may be over-represented and others under-represented, as only the opinions of the study respondents can be viewed to make meaning. Since the feedback process is multifaceted and complex, it would be worthwhile to establish both tutor and students' views about the factors they believed contributed to students' receptivity to feedback. Triangulating both perceptions can identify the extent to which any one is emphasized in order to advance our understanding of the feedback phenomenon. Studying different year groups would also be important in future studies. The possibility of differences between curricula could also influence the findings and may lead to under-representation of certain perceptions. We may not have given a full overview of all themes, although the themes that arose from this study are important and insightful.

Feedback culture, relationship building and length of longitudinal relationships are likely to differ in different clinical departments. Therefore, our results may not be applicable without further exploring these particular contexts. While it is necessary to explore specific facilitators and barriers that impact the feedback and feed-forward processes within a given setting, the key principles of our findings based on a psychological framework and the broad feedback interventions (self-, teacher- and peer-feedback) that influence the quality and impact feedback, will still apply. This study can be replicated in other contexts with more interesting themes regarding feedback uptake, by applying a similar framework that focuses on the psychological processes behind facilitators and barriers to feedback engagement. A combination of such studies from different contexts would provide a more complete feedback picture.

The research respondents created a small, albeit representative sample of a larger faculty and medical student population, and while the research produced a significant amount of narrative information a wide range of views might not have been captured. While discussions of the focus groups lasted 60 minutes, there is the possibility that shy participants might never reveal important insights, or a single persuasive participant might cause other participants to change their original opinions, hence you never learn about their initial reactions. To avoid these problems, the researcher involved everyone to ensure all the participants had equal time and that all points of view were heard. Furthermore, though the objective of focus group studies is to explore the opinions of participants on a particular topic, their perceptions may differ considerably from their actual actions (Stalmeijer et al., 2014). However, purposive sampling and skilfully facilitating focus groups using in-depth open-ended explorations of perceptions of the right participant groups, effectively accomplished this.

The research used a mixed technique to address the research questions, as each study provided scaffolding on to which the next study was based. We started the research with the goal to explore the effectiveness of the clinical skills feedback conversation from the learner perspective. This allowed us to perform in-depth explorations of the clinical skills feedback culture using a qualitative approach from the learner's point of view. The goal was to explore factors they perceived as facilitators and barriers to their proactive engagement with the feedback provided (Chapter Two) as well as their perceptions of self, peer and teacher feedback interventions that supported their engagement with feedback to influence their behaviour, practice and growth (Chapter Three). This constructivist approach allowed co-construction of themes that were established from within the participants' narratives to provide a better understanding of helpful and counter-productive elements that influenced the participants' receptivity and use of the feedback within the clinical skills setting. In addition to learner factors, teacher and institutional factors were perceived as facilitators and barriers to feedback acceptance and incorporation. This led us to develop a feedback-scoring tool to assess the efficacy of the clinical skills feedback process by analysing the tutor and peer logbook written feedback quality using a quantitative methodology. We found that the addition of a feed-forward

approach to the feedback improved the feedback quality by describing the task, gap and action plan as deliberate practice components. Development to enhance the feedback delivery aimed at learning goals is essential in order to improve learner performance (Chapter Four). A quality feedback process takes into account both what the teacher is delivering and how well the student is engaging and responding to it in order to develop into independent and self-directed learners.

Through this mixed-methods study, the in-depth qualitative findings were further clarified through the quantitative analysis of the quality of the written feedback to enhance the validity of our research findings. As described above, while the efficacy of feedback depends still on the reliability and timely delivery of feedback from education providers, the learner's positive receipt of feedback is also important. Therefore, to improve the educational experience of the feedback recipient, we recommend that both educators and learners play a collaborative role in working together to enhance the facilitators and overcome the barriers to promote successful implementation of feedback. As acting on feedback needs an element of objectivity to be established, we conclude that institutions need to strengthen the delivery of quality feedback from educators. Implementation of interventions that can empower and improve learners' feedback literacy through self-assessment, peer assessment feedback, assessment literacy, goal-setting and self-regulatory skills, are necessary as both educators and learners should be invested in the growth and development of the other.

The recommendations for enhancing the feedback culture we have proposed are in line with our research findings, the relevant theories we have highlighted and based on previous research findings on factors influencing receptivity of feedback (Harrison et al., 2015; van de Ridder et al., 2015; Jonsson, 2013; Telio et al., 2016; Sargeant et al., 2007). The study confirms how medical learners' feedback utility influences their self-assessment and peer assessment, and how developing responsibility sharing and a coaching mind-set can result from participatory design of learning environments. The three research studies discussed in this study suggest that when assessing the quality of the feedback, it is vital that it explores the feedback process in its entirety rather than any single stage, such as the output of lecturers (Nicol, 2010; Wiliam, 2011). The focus should be on clinical teachers' feedback providing techniques as well as from the learners' perspectives (Boud, 2015), discussions of learner, teacher and institutional factors as facilitators and barriers to feedback engagement, feedback-seeking, acceptance, utilization and behaviour change.

5.7 Implications for faculty development

Though the study emphasizes the importance of learner engagement with the feedback process as a prerequisite to developing feed-forward, we perceived varied learner feedback engagement levels from learners engaging well to poorly with the clinical skills logbook feedback. Bellon et al. (1991) state that academic feedback, regardless of grade, socio-eco-economic status, race or school environment is linked to achievement more directly and reliably than any other teaching behaviour.

This study emphasized the importance of developing interventions on how feedback can be used to inspire student learning and shape their feedback literacy. To promote self-regulated learning, teachers, while providing feedback, need to start asking themselves forward-looking questions such as: “How do I prepare students for training to demonstrate learning?” The question should not have a backward focus, such as: “Has the student learned the work?” This would then lead to providing learners with forward-looking suggestions, connecting assessment task outcomes with feedback to achieve the desired effects such as helping learners reflect and evaluate their progress towards becoming better learners. The focus of a forward-looking feedback, should be to help students use learning materials productively so as to facilitate their conversion of feedback into feed-forward action plans to enhance future learning. It is therefore the duty of the educator to avoid undermining students with backward-looking feedback, but to use feedback as the connection between the assessment and the learning process. As a means of inspiring learning in learners, this study recommends that the backward feedback that focuses on what happened at the time of evaluation, be replaced by a forward-looking feedback aimed at performance improvement.

With the less competent learners in our study receiving and using feedback differently, there is the need to motivate immediate feedback engagement rather than something they would do themselves due to their self-regulatory focus of postponing feedback use closer to exams. Hence, moving feedback forward would require faculty to introduce coaching strategies, specifically targeting learner growth and behaviour change. Along with designing feedback initiatives recommending techniques for faculty to give feedback to learners, initiatives should target the novelty of integrating assessment sessions with a reflective feedback design that makes learners actors in the feedback process after receiving feedback. Newer feedback initiatives that target a feedback action plan intervention for learners to scaffold feed-forward by reflecting and formulating self-generated performance improvement goals as concrete targets based on what they did well, and areas that need improvement, would serve as a source of coaching to facilitate feedback interpretation and utilization to feed-forward.

Developing educational partnerships and trust with our learners in an environment that facilitates the acceptance and provision of challenging feedback is essential in stimulating learning without damaging learner self-efficacy. As the overall goal of this research was to change the feedback discussion from a unidirectional teacher-learner dialogue to a co-constructed dialogue, faculty has a role to play in initiating and developing programmes through workshops and training that foster dialogue between teachers and learners around sharing responsibility for making feedback effective. Medical students play a role in optimizing an active feedback culture, especially if learning possibilities are to be co-developed in the feedback loop. Through these feedback training workshops students must be made mindful that cultivating a growth mentality involves developing a learning goal orientation towards improving their clinical performance. This would require preparing them

towards engaging in feedback activities such as peer assessment, self-assessment and reflection on performance, feedback-seeking to create learning opportunities with their peers and teachers, goal-setting and developing performance improvement action plans to change behaviour or practice.

5.8 Conclusion

In this thesis, understanding factors influencing learners' proactive feedback receptivity from all perspectives highlights the importance of analyzing feedback holistically. There is a need to consider not only strategies by which teachers can improve their feedback processes, but also factors that may influence feedback responses from students. The students' perceptions of the use of feedback from self, peer and teacher are necessary to support their commitment to feedback within clinical education.

The study emphasises the importance of learner characteristics in feedback interactions and similar to several other studies, reiterates the importance of faculty development that involves on-going feedback delivery to improve feedback giving skills (Junod Perron et al., 2013; Minehart et al., 2014; Matzie et al., 2009; Bernard 2011; Watling et al., 2012). It also reinforces the need for developing feedback interventions to support learners' engagement and use of feedback to enhance feedback effectiveness. We have further demonstrated in this study how four theories have major application as we move feedback forward in medical education. As suggested by Kluger and van Dijk (2010), "a generic best practice feedback model is not appropriate and the effect of feedback in promoting performance change is context-, person- and situation-specific". The creation of a feedback model and culture based on the framework of deliberate practice with multisource feedback provides an opportunity for facilitating the use of feedback by learners' in a variety of settings. Such a feedback culture has the benefit of motivating behaviour change through improved self-assessment, reflection and self-regulated learning (Fluit et al., 2013; Urquhart et al., 2014; van der Loeuw et al., 2013). It promotes the development of students into effective, independent and life-long learners. This delicate endeavour of tailored delivery of feedback that uses several feedback interventions, demands sophisticated skills and hence the need to educate both learners and educators on responsibility sharing for making the feedback process successful. It is crucial to learner development that faculty members act upon learners' feedback perceptions as a means to improve their teaching practice by responding to factors challenging learners' engagement and use of feedback (van der Loeuw et al., 2013).

Awareness of the factors influencing learners' engagement with feedback and the efficacy of individual feedback interventions in terms of the feedback recipience processes targeted, such as assessment and feedback literacy, enhances our understanding of learners' proactive receptivity to feedback to improve clinical skills performance. The incorporation of the learners' viewpoint is, according to Konings et al. (2014), a more effective strategy to model learning environments, as the

learner is central to the exchange of feedback and is responsible for the feedback loop. This finding of the study indicates that no one particular feedback intervention is capable of solving all challenges for proactive feedback recipience. In order to motivate educators and students in co-creating opportunities to learn for behavioural change, organizations need to build a learning environment conducive to incorporating a range of growth-enhancing feedback strategies at all levels. The integration of ongoing clinical skills formative logbook feedback, peer feedback, integrated formative feedback, summative feedback together with a reflective feedback tool, all of which used as a toolkit, fosters the proactive encouragement of learners' in a holistic way rather than in one piece.

To achieve learner proactive feedback reception and development of self-regulated learners, there are recommendations from this study to specific stakeholders. We propose a combination of coaching approaches to develop a participatory design feedback loop, comprising the following: development of longitudinal and trustful relationships between learners and teachers; clinical teachers providing directly observed performance feedback based on deliberate practice that includes specific explanation of learners position relative to learning goals and strategies for attaining the goals; learners' expectation to reflect on performance and feedback, develop learning goals and improvement strategies; enhancing learner feedback-seeking through peer assessment as an innovative method to create learning opportunities to incorporate feedback and behaviour change; feedback follow-up as a method of debriefing new performance, and finally, discussion by educators and learners for new objectives once previous goals have been achieved, to re-enter the feedback loop. This would therefore involve creating feedback adaptive to the needs of the learner and linked to the task goals, while encouraging both teachers and learners to reflect on the ongoing process of feedback-goal-action-feedback within an alliance-centric feedback approach (Telio et al., 2016).

In summary, to promote best practice, effective feedback includes an encouraging tutor-learner and peer-peer dialogue that informs learners of their developing skills, challenges them to set objectives for improvement with a learning goal orientation, and promotes their development of strategies towards improvement, emphasising a growth mind-set. Through the findings from this study, we believe that co-creation of the learning environment that involves responsibility sharing between the teacher and learner is an effective way to achieve this. Hence, for successful training in medical education, merely regarding feedback as 'specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance' (Van de Ridder et al., 2008, p.93), is inadequate. Feedback should therefore also cover the complex ways in which the feedback impact is expressed through the feedback culture, the students' perception of the potential value of feedback, their expectations, their individual regulatory focus and their relationship with tutors and peers.

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APPENDICES

APPENDIX 1: GUIDELINES FOR PRESENTATION OF DISSERTATIONS/THESES FOR HIGHER DEGREES (AMENDED)

Prepared by Prof M.J. Chimbari

1. Purpose

The purpose of this document is to provide guidance to students and supervisors on how to prepare a dissertation/thesis for Masters and PhD degrees.

2. Introduction

These guidelines must be read together with the College of Health Sciences (CHS) Handbook as well as the Jacobs documents on examination policies and procedures for PhD degrees. The rules on thesis format are based on point 1 of the definition of terms section in the Jacobs document. In this section a thesis is defined as *"the supervised research component of all PhD degrees, whether by supervised research only, or coursework and research, or by papers that are either published or in manuscript form (the supervised research component of the PhD degree by paper(s) comprises the introduction, literature review, account of the methodology, selection of manuscripts, and conclusion)."* A dissertation is defined as "*the supervised research component of all Masters degrees, whether by supervised research only, or coursework and research, or by papers that are either published or in manuscript form (the supervised research component of the Master's degree by paper(s) comprises the introduction, literature review, account of the methodology, selection of manuscripts, and conclusion*)."

2.1 PhD thesis

In the CHS Handbook the rules for a PhD thesis are not in one place; they are stated in DR8 a i & ii, DR9 c and CHS 14. DR8 a I & ii directs that a thesis be presented in the standard type format together with one published paper or an unpublished manuscript that has been submitted to an accredited journal, arising from the doctoral research. DR9 c (thesis by publication) states that the thesis may comprise of one or more original papers of which the student is the prime author, published or in press in peer-reviewed journals approved by college academic affairs board, accompanied by introductory and concluding integrative material. The third option of a thesis format (thesis by manuscripts) is specified in CH14 as a submission constituting at least three, first authored published papers or unpublished manuscripts that have been submitted to an accredited journal.

The standard type thesis is being phased out in many African countries in favour of the other options that originate from the Scandinavian countries. While this format ensures that all details of the work done for the doctoral degree are captured and thoroughly interrogated they often remain as grey literature which is mainly useful to other students, usually within the same university. With digitization of thesis such work may become more accessible beyond the source university. Apart from the risk of losing good work because of it not being on the public domain as students rarely publish such work after graduating this approach denies the college additional productivity units (Pus) emanating from publications as only PUs for graduating the student are awarded.

The thesis by publication encourages students to publish key aspects of their doctoral research as they will not graduate if the papers are not published or in press. This approach ensures that the work of

the student enters the public domain before they graduate and almost guarantees them to pass provided their papers constitute a good story line of a thesis. Furthermore the college maximizes on the students' work as PUs are awarded for the papers as well as for graduating. However, this approach may negatively affect throughput and frustrate students as they cannot graduate unless all the papers are published or in press in addition to the synthesis chapter demonstrating a good story line of a thesis.

The option of a thesis by manuscripts ensures that students make efforts to start publishing. The risk of not passing because of failure to publish (as in the thesis by publication) does not exist under this option. However, the PUs emanating from publications from the doctoral work are not guaranteed as the submitted papers may eventually be rejected. Thus there is a possibility of the doctoral work remaining on the source university library shelves as is the case for the standard type thesis. In this case the standard type has an urge over this option as much more details of the doctoral work are usually in the standard type thesis.

In view of the above the best option to ultimately pursue in the college is that of a thesis by publication. However, in the interim the attractive option is that of thesis by manuscripts as it provides an avenue for supervisors to get the doctoral research published without putting the student at risk of delayed graduation which also disadvantages the college in terms of PU earnings. The standard type thesis option should ultimately be phased out for the stated reasons and students are not encouraged to present their theses in that format. Consequently this document does not describe the standard type thesis.

A PhD thesis will be expected to have between 50 000 and 80 000 words. The introduction and synthesis chapters should have at least 10 pages and 5 pages, respectively.

2.3 Intention to submit

A written intention to submit a thesis or dissertation should be submitted to the appropriate postgraduate office with endorsement of the supervisor at least three months before the actual date of submission which should be before November if the student intends to graduate in the following year. The actual submission will under normal circumstances require approval of the supervisor.

3. Format for PhD theses

There is little variation in the actual format of the PhD thesis and Masters dissertation for the various types described above.

4. Details for thesis/dissertation subheadings

This section summarizes what is expected under each subheading shown in Boxes 1 and 2 and indicates where there might be variations between a Masters Dissertation and PhD Thesis.

4.1 Title Page

The officially approved title that is concise (Fewest words that adequately describe the contents of the thesis/dissertation usually15 or less words) is presented at the top. This should be followed by the candidate's name in a new line. At the bottom the thesis statement should be presented. The thesis statement may be stated as "*Submitted in fulfillment of the requirements for the degree of ____ in the School of _____, University of KwaZulu-Natal"* for a PhD thesis.

4.2 Preface and Declaration

The preface and declaration may be presented together. The preface merely states the reason (motivating factors) whey the study was conducted without getting into details of what was investigated. The declaration must state that the work has been done by the candidate and that it has not previously been submitted to UKZN or another tertiary institution for purposes of obtaining a degree or any other academic qualification. It may state the supervisor for the work. The declaration must be signed by the candidate.

4.3 Dedication

This is an optional section. Should it be included it must be very brief merely indicating to whom the work is dedicated.

4.4 Acknowledgements

This section acknowledges all individuals, groups of people or institutions that the candidate feels indebted to for the support they rendered. The funding source for the work should also be acknowledged.

4.5 Table of contents

Table of contents must be inserted after the preliminary sections and must capture all major sections of the thesis at the various levels (primary, secondary, tertiary subheadings). It should be electronically generated and should be able to take the reader to specific headings in the thesis.

4.6 Lists of figures, tables and acronyms

The lists must be presented separately. All titles of figures presented in the thesis/dissertation must be listed indicating on what page they appear. Similarly for tables the titles must be presented indicating on what page they appear. In the case of acronyms, the acronym is stated and all the words describing the acronym are presented. Only key acronyms should be stated. In some cases they may not be listed as long as whenever the acronym is used for the first time full text is presented.

4.7 Abstract

The abstract should summarize the thesis mainly the stating the purpose of the study, highlights of chapters and the new knowledge contributed by the thesis. In the case of a Masters dissertation there major outcome does not necessarily have to be new knowledge.

The abstract must be approved by the supervisor of the thesis and should not be more than 350 words in length.

4.8 Introduction

The introductory chapter for both types of thesis is similar. The section should have at least 8 pages for a Masters dissertation and 10 pages for a PhD thesis inclusive of literature review and should include the following:

i. background and the context of the study

ii. description of the core research problem and its significance

iii. a comprehensive, critical, coherent, overview of the relevant literature leading to clearly defined knowledge gaps *(In the case of a traditional thesis, this should be a stand-alone section)*

iv. a coherent problem statement highlighting the nature and magnitude of the problem, the discrepancy, knowledge gaps therein and possible factors influencing the problem.

v. Clear and smart research questions, objectives and hypothesis and/or theoretical framework

vi. a conceptual framework (optional)

vii. description of the study area and general methodology *(in a standard thesis this should be a standalone section)*

viii. layout of the thesis (thesis structure) indicating what chapters are presented in the thesis and how they address the objectives.

4.9 Literature review

This section is subsumed in the introduction within the 8 and 10 pages specifications for dissertation and thesis, respectively.

4.10 Methodology

In a thesis by manuscripts or publications this section is not needed as the methods are adequately described in each manuscript/publication. However, in the case of a traditional thesis much more details are required including the study area, design, specific methods and description of data analysis.

4.11 References

This section only applies to the thesis by manuscripts or publications. The references cited in the introduction should be listed whereas in the case of the standard thesis the references cited in the introduction, literature review and methodology sections appear with the rest of the references at the end of the thesis.

4.12 Data chapters/manuscripts/publications

In the case of a standard thesis, this section presents the results of the work carried out and a brief discussion of the findings with no reference list presented. However, in the case of thesis by manuscripts or publications, the full paper is presented as published or submitted to the journal. The actual published paper should be scanned and inserted in the chapter. Between chapters there should be a separator page that states the chapter number and details of the manuscript indicating publication status.

4.13 General discussion/Synthesis chapter

The section should be at least 4 pages (dissertation) or 5 pages (thesis) and should provide a general discussion that demonstrates the logical thread that runs across the various manuscripts/publications. There should be no doubt that the manuscripts/publications complement each other and address the original objectives stated in the general introduction of the thesis. The general discussion/synthesis chapter should end with a conclusion and recommendations where necessary.

4.14 References

In the case of the standard thesis all references cited in the data chapters should be listed in this section. However, for a thesis by manuscripts or publication only references cited in the synthesis chapter should be listed, as all other references should be within the manuscripts presented under data chapters.

4.15 Annexes

All information (questionnaires, diagrams, ethics certificates etc) considered important but not essential for inclusion in the actual thesis is put in this section as reference material.

5. Thesis formatting

For standardization of thesis the following formatting specifications must be followed.

5.1 Font

Times New Roman 11pt should be used throughout the thesis. However, major headings may be made bigger (12pt) but using the same font type

5.2 Paper size and margins

A4 (297 x 210 mm) should be used and in the final thesis all sides of the paper should be used. However, the loose bound copy and electronic version submitted for examination should be printed on only one side. The recommended margins are 30mm for all the left, right, top and bottom margins.

5.3 Line spacing

The copy submitted for examination should have 1.5 line spacing but the final copy should have single line spacing. Published or submitted manuscripts should remain in their original format in all aspects as they are scanned and placed in appropriate places. Paragraphs should be separated by a blank line.

5.4 Headings

A consistent numbering system and captions should be maintained with first level being in CAPS and centred, second level being normal bold font and third level being italics bold. If there is need for 4th level it should be normal italics.

5.7 Pagination

Page numbers should be centred at the bottom of the page. Preliminary pages should be numbered in lower case Roman numerals and subsequent pages should be numbered with Arabic numerals as indicated in Boxes 1-3. All pages including the title page should be numbered. 120

5.8 Referencing

Supervisors have the freedom to decide the type of citation of references but there must be consistence. This is mainly applicable to the standard type of thesis. In the case of thesis by manuscripts or publications, individual papers will maintain the reference system of the journal but the supervisor can decide on the type of referencing for the introductory and synthesis chapters.

6. Final thesis submission

The thesis should be submitted for examination in a loose bound form accompanied by a PDF copy. After the examination process the final version PDF copy of the thesis must be submitted to PG office for onward submission to the library. It is not a requirement to submit a copy fully bound in leather cloth or similar material.

APPENDIX 2: HUMAN ETHICS APPROVAL

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

28 November 2017

Dr Reina Abraham 207510565
School of Clinical Medicine
Nelson Mandela School of Medical School
Medical School

Dear Dr Abraham

Protocol reference number: HSS/2213/017D
Project title: The use of feedback and feed-forward action plans on the development of clinical skills in undergraduate medical students.

Expedited Approval

In response to your application dated 21 November 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Naidoo
.....
Dr Shamila Naidoo (Deputy Chair)

/px

cc Supervisor: Dr VS Singaram
cc Academic Leader Research: Prof C Aldous
cc School Administrator: Veronica Janjties

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
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Website: www.ukzn.ac.za

APPENDIX 3: GATEKEEPER PERMISSION

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

21 November 2017

Dr. Reina Mary Abraham
School of Clinical Medicine
College of Health Sciences
NRMSM Campus
UKZN
Email: abrahamr@ukzn.ac.za jantjies@ukzn.ac.za

Dear Dr. Abraham

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN), towards your postgraduate degree, provided Ethical clearance has been obtained. We note the title of your research project is:

"The use of feedback and feed-forward action plans on the development of Clinical Skills in Undergraduate Medical students".

It is noted that you will be constituting your sample by handing out questionnaires and/or focus groups with undergraduate medical students on the NRMSM campus.

Please ensure that the following appears on your notice/questionnaire:

- Ethical clearance number;
- Research title and details of the research, the researcher and the supervisor;
- Consent form is attached to the notice/questionnaire and to be signed by user before he/she fills in questionnaire;
- gatekeepers approval by the Registrar.

You are not authorized to contact staff and students using 'Microsoft Outlook' address book. Identity numbers and email addresses of individuals are not a matter of public record and are protected according to Section 14 of the South African Constitution, as well as the Protection of Public Information Act. For the release of such information over to yourself for research purposes, the University of KwaZulu-Natal will need express consent from the relevant data subjects. Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

MR SS MOKOENA
REGISTRAR

Office of the Registrar
Postal Address: Private Bag X54001, Durban, South Africa
Telephone: +27 (0) 31 260 8005/2206 **Facsimile:** +27 (0) 31 260 7824/2204 **Email:** registrar@ukzn.ac.za
Website: www.ukzn.ac.za

APPENDIX 4: INFORMED CONSENT

My Name is Dr R Abraham. I am a clinical skills lecturer in the School of Clinical Medicine, University of KwaZulu-Natal. I am undertaking a DOCTOR OF PHILOSOPHY IN MEDICINE (PhD in Medicine) study on student learning experiences.

The study will be used to ascertain insight into how assessment feedback might be improved in undergraduate Clinical Skills. The aim of the research is to identify and explore the perceptions and action plans of medical students regarding their engagement with feedback received from their clinical tutors and peers during their clinical skills training sessions. Hence your participation is necessary.

You are hereby invited to please complete the following questions on the basis of your experience studying at the university. There are no right or wrong answers in this questionnaire. Kindly answer all questions. Any information or personal details gathered in the course of this study will be kept confidential and will remain anonymous in any subsequent dissemination of the information.

Your participation in this study is completely voluntary. Thank you. Your input is most valued.

Should you have any queries you may contact:

Dr R Abraham- Tel: 0832912357 - Email: abrahamr@ukzn.ac.za

Dr VS Singaram (Research Supervisor) - Email: singaram@ukzn.ac.za.

HSS Research Office contact details: Prem Mohun, University of KwaZulu-Natal,Research Office: Ethics, Govan Mbeki Centre,Tel +27312604557, Fax +2731260460,Email mohunp@ukzn.ac.za

DECLARATION

I…… (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project and for any interviews to be audio-taped.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT DATE

…… ……

APPENDIX 5: FOCUS GROUP QUESTIONS

(The aim is to get a deeper insight into student's perceptions of feedback and strategies for using feedback in clinical skills)

1. Do you receive feedback in clinical skills? What type of feedback do you normally receive? Which feedback did you expect to receive after your last skills logbook session? What do you think about the way the feedback has been formulated? If you had given this feedback, would you have formulated it differently? If yes, how would you have formulated it?

Why do you think you receive feedback?

2. How do you feel about receiving and giving feedback? Elaborate.

Do you always accept the feedback you receive? Elaborate. Is there an instance when you rejected feedback?

When giving and receiving feedbacks during a logbook session are you able to reflect and access your performance and determine gaps in your knowledge or skills? If yes, elaborate with an example

After performing your skill, would you prefer that your tutor first asks you what you thought about your performance before he/she gives you feedback? If yes, elaborate how this may be helpful.

Do you react differently based on the ratings you receive on your feedback? How does the rating affect you?

Can you describe challenges encountered when you give or receive feedback?

3. Do you understand the feedback received? Does reading the comments enable you to unpack the necessary information from the feedback i.e. unpack the meaning/interpretation to facilitate the use of feedback? If yes, what conclusions did you draw from the feedback.

4. Do you know what to do with feedback provided to you? If yes, what do you do with the feedback?

If you do acknowledge feedback, do you do anything more than just read it? – E.g. receive feedback, but don't read it? Receive feedback, read it and take no action? Or Receive feedback, read it and take action?

What actions, if any, did you take as a result of the feedback? OR If you do act on feedback then please talk me through what you did with the feedback you received on your work after the logbook sessions. What do you do with feedback on e.g. physical examination and procedural skills?

If you ignore feedback, why do you ignore it?

5. What challenges have you faced with engaging and acting on feedback received? Give an example.

Why do some students <u>not use</u> the feedback they receive? Why do some students <u>use</u> the feedback they receive?

Does your relationship with your tutor affect the way you receive and respond to feedback?

Does your knowledge of the learning objectives/learning outcomes for a task performed affect the way you respond to and use feedback?

6. Do you recognise the importance of feedback? Elaborate.

Is the feedback you receive from tutor/peer helpful for your learning?

Does the feedback you receive inform you of your learning gaps/needs? If yes, how has feedback helped you to learn?

Does feedback motivate you to engage in appropriate learning activities? If yes, elaborate how it did by reflecting on a particular logbook session.

Has feedback facilitated your future learning and performance? Elaborate.

Has the feedback made you think about how you would approach a particular skill in a different way in future? Elaborate.

Does the feedback increase your confidence in preparing for future logbook assessments, end of theme tests and end of semester clinical examination/OSCE?

Are you satisfied with the feedback you receive in clinical skills?

7. Do you seek feedback? If yes, was it effective? If no, what are the reasons for not seeking it? Elaborate.

8. How would you compare the feedback you receive in clinical methods with feedback from clinical skills? Elaborate with an example. What challenges if any have you faced?

9. What kind of feedback would you consider useful? OR What would be useful feedback for you? Elaborate.

What are the strengths and weaknesses of the current feedback system in clinical skills?

Can you suggest strategies to improve the feedback culture in clinical skills?

10. Would you like a structured approach to assist you to engage with and use the feedback received? Elaborate.

How would a tool that can help you reflect on feedback and guide you on how to engage critically with feedback to unpack its meaning and develop appropriate learning activities to close the gap in your learning be useful after every logbook skill? If yes, elaborate how it would be useful.

APPENDIX 6: CLINICAL SKILLS MINI-LOGBOOK

CLINICAL SKILLS

MBChB 3
2014
Clinical Examination Skills
Mini-Logbook
Students' Copy

Student Name:…….

Student Number:……

Contents

Instructions and Notes to Students

This mini-logbook has been designed to reinforce your knowledge of and ability in certain examination skills, and to improve your confidence in examining patients as you approach your clinical years. Only a few key skills have been identified, which are particularly important for you to master as soon as possible.

There are 4 new skills in the mini-logbook. During the course of the year, each of which you will be required to perform certain skills satisfactorily in the presence of one of the clinicians or Skills Lab staff in order for these to be signed off.

The new 3rd Year examination skills for this semester are:

1) Neuro 1 - motor examination

2) Neuro 2 - sensory examination

3) Neuro 3 - examination of co-ordination

4) Neuro 4 - examination of the cranial nerves

In addition, you may be called upon to perform your 2nd Year examination skills, as follows:

1) Detailed examination of the pulses and measurement of BP

2) Examination of the JVP and praecordium (including general exam)

3) Examination of the chest (including general exam)

4) Examination of the abdomen (including general exam)

Times will be made available in some themes, and you will need to be present at these sessions for assessment. You will be given 8 minutes to carry out the skill, demonstrating it once sequentially in this time. A student who fails to perform the examination successfully in the session will be asked to repeat the session, at least a week later, to ensure that s/he revises and practises adequately in preparation. In this case, you will need to make a special arrangement with one of the clinicians to assess you in a lunch hour or on a Saturday, subject to availability, and provide a patient for the session. Each skill may only be examined twice. Students who do not attend in a booked repeat slot (which is not cancelled at least the day before) will be marked as unsuccessful for that skill.

Completion of the logbooks is a DP requirement, and logbooks must be handed in by a date to be announced. For this reason, please make sure to practise and book your slots timeously. You will need to be marked as (at least) "Satisfactory" (see below) in all scheduled logbook sessions during the course of the year. Please do not lose your logbooks, as these are your proof of satisfactory completion. Note also that no pages may be removed from the logbook under any circumstances.

These assessments are intended to be formative, but are not teaching sessions. Each examiner will have available a list of minimum requirements for the skill to be deemed to have been performed satisfactorily. These are not OSCE checklists, but are considered to be the minimum requirements for a student who has passed through the MBChB 3 Skills programme. The student is required to mention/perform these for a "Satisfactory performance" to be recorded. If not met, performance is rated "Inadequate", and the student should re-book an assessment as described above. (A comment will be provided to guide you as to what was deficient or performed incorrectly). If the student's performance of all points is fluid and well-executed in the allocated time, or if additional salient points are included, s/he will be rated as "Exceeds expectations".

Note that we will be assessing you as an MBChB 3 student. Please remember that examination skills require ongoing repetition in order to master techniques, to continue to improve and to reach the level of competence expected of you in the clinical years and in practice. Thus, even if your skill is marked as satisfactory or above average for 3rd Year, there is much further improvement expected.

Please note:

General requirements of students in the logbook sessions include the following, but be guided by your examiner:

1) Attends well presented, appropriately dressed in a clean and ironed white coat with gloves and stethoscope
2) Greets patient professionally (introduces him- or herself and obtains patient's name), explains nature of examination and obtains consent
3) Mentions privacy, positions patient correctly and comfortably, and exposes him/her correctly (according to nature of examination)
4) Performs a focused general examination and briefly mentions relevant features to look for (where relevant)
5) Performs the examination in an appropriate and logical sequence, remembering to cover important aspects of inspection, palpation, percussion and auscultation as relevant and required
6) Completes all important parts of the relevant examination and demonstrates correct technique
7) Explains correctly to and shows the patient what is required of him/ her during the examination
8) Treats patient courteously and gently throughout the examination, informs him/her of the findings, and thanks and makes patient comfortable on completion eg "Thank you, Mrs Pather – your reflexes are normal."
9) Uses correct terminology when explaining his/ her actions and findings to the examiner
10) Briefly summarises findings to the examiner egg "The motor examination normal, with no wasting, normal tone and power, and reflexes present and equal."

I hope that this will be a useful exercise and look forward to assisting you as you continue to improve your examination skills. Please remember to refer to your Clinical Skills resource material, including that available on the LAN, and to keep practising new techniques and revising skills previously acquired.

4th December 2013

Summary

Student Name:…….

Student Number:…….

List of New Skills:

DATE COMPLETED SATISFACTORILY

1) **Neuro 1 – motor examination……**
2) **Neuro 2 – sensory examination……**
3) **Neuro 3 – examination of co-ordination……**
4) **Neuro 4 – examination of the cranial nerves……**

List of Revision Skills:

1) **Detailed examination of pulses and measurement of BP**
   …….....
2) **Examination of the JVP and praecordium (including general examination)**
   ……
3) **Examination of the chest (including general examination)**
   ……
4) **Examination of the abdomen (including general examination)**
   ……

ASSESSMENT OF CLINICAL EXAMINATION SKILLS

SKILL ASSESSED:_____

ASSESSED BY:_____

DATE:_____

GLOBAL ASSESSMENT (MBChB 3 level):

INADEQUATE	**SATISFACTORY**	**EXCEEDED EXPECTATION**

COMMENTS:_____

_____

SIGNED:_____

REPEAT ASSESSMENT:

ASSESSED BY:_____

DATE:_____

GLOBAL ASSESSMENT (MBChB 3 level):

INADEQUATE	**SATISFACTORY**	**EXCEEDED EXPECTATION**

COMMENTS:_____

_____

SIGNED:_____

APPENDIX 7: CLINICAL SKILL LOGBOOK (UPDATED)

CLINICAL SKILLS

MBChB 3

2018

Clinical Skills

Logbook

Students' Copy

Updated December 2017

Student Name:……..

Student Number:……

Contents

Modifications and additions in December 2014

Modifications and additions December 2017

Instructions and Notes to Students

This logbook has been designed to reinforce your knowledge of and ability in certain clinical skills, and to improve your confidence in examining patients as you approach your clinical years. Key skills have been identified, which are particularly important for you to master as soon as possible.

There are 4 new examination skills in the logbook. During the course of the year, each of which you will be required to perform certain skills satisfactorily in the presence of one of the clinicians or Skills Lab staff in order for these to be signed off.

The new 3rd Year examination skills for this semester are:

1) Neuro 1 - motor examination

2) Neuro 2 - sensory examination

3) Neuro 3 - examination of co-ordination

4) Neuro 4 - examination of the cranial nerves

In addition, you may be called upon to perform your 2nd Year examination skills, as follows:

1) Detailed examination of the pulses and measurement of BP

2) Examination of the JVP and praecordium (including general exam)

3) Examination of the chest (including general exam)

4) Examination of the abdomen (including general exam)

Times will be made available in some themes, and you will need to be present at these sessions for assessment. You will be given 8 minutes to carry out the skill, demonstrating it once sequentially in this time. A student who fails to perform the examination successfully in the session will be asked to repeat the session, at least a week later, to ensure that s/he revises and practises adequately in preparation. In this case, you will need to make a special arrangement with one of the clinicians to assess you in a lunch hour or on a Saturday, subject to availability, and provide a patient for the session. Each skill may only be examined twice. Students who do not attend in a booked repeat slot (which is not cancelled at least the day before) will be marked as unsuccessful for that skill.

Completion of the logbooks is a DP requirement, and logbooks must be handed in by a date to be announced. For this reason, please make sure to practise and book your slots timeously. In terms of performance, there are 4 zones: zone of failure, weak pass, competence or superior performance. You will need to be marked as (at least) *Competent* in specified logbook sessions during the course of the year. Please do not lose your logbooks, as these are your proof of satisfactory completion. Note also that no pages may be removed from the logbook under any circumstances.

These assessments are intended to be formative, but are not teaching sessions. Each examiner will have available a list of minimum requirements for the skill to be deemed to have been performed satisfactorily. These are not OSCE checklists, but are considered to be the minimum requirements for a student who has passed through the MBChB 3 Skills programme. If core competencies are missing or unreliable, performance is rated as *Failure*, and the student should re-book an assessment as described above. (Written feedback will be provided to guide you in your learning). If the student's performance within the allocated time demonstrates a confident technique with good knowledge and understanding of the clinical skill, s/he will be rated as *Superior performance*.

Though you will not be given a mark, to assist you in understanding your level of mastery of the skill, in summary the zones relate to the following:

Zone of failure < 48%:
Core competencies are missing or unreliable

Zone of weak pass relates to 50-58%
Weak pass

Zone of competence approximately 60%:
Competent pass

Zone of superior performance approximately 80%:
Confident technique
Good knowledge and understanding

Note that we will be assessing you as an MBChB 3 student. Please remember that clinical skills require ongoing repetition in order to master techniques, to continue to improve and to reach the level of competence expected of you in the clinical years and in practice. Thus, even if your skill is marked as satisfactory or above average for 3rd Year, there is much further improvement expected.

Please note:

General requirements of students in the logbook sessions include the following, but be guided by your examiner:

1) Attends well presented, appropriately dressed in a clean and ironed white coat with gloves and stethoscope

2) Greets patient professionally (introduces him- or herself and obtains patient's name), explains nature of examination/ procedure and obtains consent

3) Mentions privacy, positions patient correctly and comfortably, and exposes him/her correctly (according to nature of examination/ procedure)

4) Mentions focused general examination (where relevant)

5) Performs the examination/ procedure in an appropriate and logical sequence

6) Completes all important parts of the relevant examination/ procedure and demonstrates correct technique.

7) Explains correctly to and shows the patient what is required of him/ her during the examination/ procedure

8) Treats patient courteously and gently throughout the examination/ procedure, informs him/her of the findings, and thanks and makes patient comfortable on completion eg “Thank you, Mrs Pather – your reflexes are normal.”

9) Uses correct terminology when explaining his/ her actions and findings to the examiner

10) Briefly summarises findings to the examiner eg “The motor examination was normal, with no wasting, normal tone and power, and reflexes present and equal.”

I hope that this will be a useful exercise and look forward to assisting you as you continue to improve your clinical skills. Please remember to refer to your Clinical Skills resource material, including that available on the LAN, and to keep practising new techniques and revising skills previously acquired. Best wishes to you all for the 3rd Year.

December 2017

Summary Page

Student Name:…….

Student Number:…….

List of New Examination Skills:

DATE COMPLETED SATISFACTORILY

1. Neuro 1 – motor examination……

2. Neuro 2 – sensory examination……

3. Neuro 3 – examination of co-ordination……

4. Neuro 4 – examination of the cranial nerves……

List of Revision Skills:

1) **Detailed examination of pulses and measurement of BP**
2) **Examination of the JVP and praecordium (including general examination)**
3) **Examination of the chest (including general examination)**
4) **Examination of the abdomen (including general examination)**

List of Procedural Skills:

1. **Developmental assessment (infant/child)**
2. **Lumbar puncture**
3. **A practical approach to fundoscopy**
4. **A basic approach to X-Rays of the spine, bones and joints**
5. **Gynaecological Examination**
6. **Pap smear**

7. **Obstetric Abdominal exam**
8. **Partogram & Mechanism of labour and delivery**
9. **Examination of the male genitalia and rectal examination**
10. **Bedside haemoglobin test**
11. **Rapid HIV testing**
12. **TB testing in children: Mantoux, sputum collection, gastric washing**
13. **Specimen collection: urine & stool specimens, nasal and throat swabs, sputum specimens, wound specimens, fungal scrape and pus aspirate, genital specimens - male and female, blood culture + blood collection using the vacutainer**
14. **Neonatal resuscitation**
15. **Hand hygiene, gloving and gowning**

THEME 3.1

ASSESSMENT OF CLINICAL EXAMINATION SKILLS

SKILL ASSESSED:_____

ASSESSED BY:_____

DATE:_____

ZONE OF PERFORMANCE (MBChB 3 level):

FAILURE	WEAK PASS	COMPETENT	SUPERIOR PERFORMANCE

COMMENTS:

1) WHAT WAS DONE WELL?

_____

_____

2) WHAT WAS NOT DONE WELL?

_____
_____
_____

3) WHAT CAN BE IMPROVED?

_____
_____
_____

SIGNED:_____

REPEAT ASSESSMENT:

ASSESSED BY:_____

DATE:_____

ZONE OF PERFORMANCE (MBChB 3 level):

FAILURE	**WEAK PASS**	**COMPETENT**	**SUPERIOR PERFORMANCE**

COMMENTS:

1) WHAT WAS DONE WELL?

_____

_____

2) WHAT WAS NOT DONE WELL?

_____

_____

_____

3) WHAT CAN BE IMPROVED?

_____

_____

_____

_____

SIGNED:_____

APPENDIX 8: LANGUAGE EDITING CERTIFICATE

THE WRITING STUDIO

Writing and Editing Practice

Certificate 2019/13

TO WHOM IT MAY CONCERN

25 NOVEMBER 2019

This dissertation, entitled: *The use of feedback and feed-forward action plans on the development of clinical skills in undergraduate medical students, has been edited and reviewed to ensure technically accurate and contextually* appropriate use of language for research at this level of study.

Yours sincerely

CM ISRAEL, BA Hons (UDW) MA (UND) MA (US) PhD (UNH)

LANGUAGE EDITOR AND WRITING CONSULTANT

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APPENDIX 9: PUBLISHED ARTICLE

Title: Using deliberate practice framework to assess the quality of feedback in undergraduate clinical skills training.

Reina M Abraham[1*] and Veena S Singaram[1]

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BMC Medical Education

RESEARCH ARTICLE Open Access

Using deliberate practice framework to assess the quality of feedback in undergraduate clinical skills training

Reina M. Abraham* and Veena S. Singaram

Abstract

Background: In this research paper we report on the quality of feedback provided in the logbooks of pre-clinical undergraduate students based on a model of 'actionable feedback'. Feedback to clinical learners about their performance is crucial to their learning, which ultimately impacts on their development into competent clinicians. Due to students' concerns regarding the inconsistency and quality of feedback provided by clinicians, a structured feedback improvement strategy to move feedback forward was added to the clinical skills logbook. The instrument was also extended for peer assessment. This study aims to assess the quality of feedback using the deliberate practice framework.

Methods: A feedback scoring system was used to retrospectively assess the quality of tutor and peer logbook feedback provided to second and third year medical students to identify deliberate practice components i.e. task, performance gap and action plan. The sample consisted of 425 second year and 600 third year feedback responses over a year.

Results: All three deliberate practice components were observed in the majority of the written feedback for both classes. The frequency was higher in peer (83%, 89%) than tutor logbook assessments (51%, 67%) in both classes respectively. Average tutor and peer task, gap and action feedback scores ranged from 1.84–2.07 and 1.93–2.21 respectively. The overall quality of feedback provided by the tutor and peer was moderate and less specific (average score < or = 2). The absence of the three components was noted in only 1% of the feedback responses in both 2nd and 3rd year.

Conclusion: This study found that adding in a feed-forward strategy to the logbooks increased the overall quality of tutor and peer feedback as the task, gap and action plans were described. Deliberate practice framework provides an objective assessment of tutor and peer feedback quality and can be used for faculty development and training. The findings from our study suggest that the ratings from the tool can also be used as guidelines to provide feedback providers with feedback on the quality of feedback they provided. This includes specifically describing a task, performance gap and providing a learning plan as feed-forward to enhance feedback given.

Keywords: Medical education, Feedback, Evaluation, Deliberate practice, Feed-forward, Clinical skills

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Clinical and Professional Practice, School of Clinical Medicine, College of Health Sciences, University of KwaZulu-Natal, Durban 4000, South Africa

Background

Medical students view feedback as a valuable component for improving their learning [1, 2]. In medical education feedback is defined as "specific information about the comparison between trainees' observed performance and a standard, given with the intent to improve the trainee's performance" [3]. Without feedback good performances are not supported and mistakes remain [4]. How feedback translates into improved clinical performance is poorly studied [5]. There is the need to understand the mechanism by which feedback leads to improved performance [3]. A good assessment not just evaluates whether competencies are defined alongside the related learning, it likewise creates new learning and is oriented towards improvement. There is a need for change from an assessment "of" learning to an assessment "for" learning [6]. Apart from developing different assessment tasks to accomplish this shift, there is likewise a need to change the manner in which students are informed about the learning evaluation results (feedback) and how to make decisions from these results (feed-forward) [5, 6, 26]. Studies have described both feedback process [7–10] and content [3, 10, 11] as important factors for improved clinical performance. The use of these factors to assess the quality of feedback is less common [5].

Student doctor's clinical skills development is affected by many factors making it difficult to directly study the impact of feedback on clinical performance. If expertise development is the goal of formative assessment then using Ericsson's model of deliberate practice to evaluate feedback quality would be useful [12]. Ericsson introduced the concept of 'deliberate practice' characterizing training as "highly structured activities explicitly directed at improvement of performance in a particular domain" with the aim of reaching a well-defined goal to improve skills performance [12]. Deliberate practice, a way of competency-based skills development includes baseline assessment of clinical performance, immediate specific directly observed feedback, opportunities to improve through repetition and subsequent measurement of clinical performance [13–15]. Deliberate practice with clear specific tasks and feedback following oral presentations [16] and objective structured clinical examination (OSCE) [17] has had a positive effect on the acquisition of skills and improved clinical performance.

Feedback quality was often evaluated in medical education as confirmative or corrective based on the presence or absence of features of an effective feedback [18, 19]. To promote learning, effective feedback processes should also contain elements that facilitate deliberate practice to help learners understand their subject area and give them clear guidelines on how to improve their learning. The belief that feedback can be used by students to enhance their learning and inform their efforts in future assessments encapsulates the notion of 'feed-forward'. Learners therefore need to know the task related learning goals, their performances directly observed and compared with this standard to inform them of their learning needs and knowledge gaps. Prompt action to motivate learners to drive learning forward by reducing this performance gap is also necessary [1, 20].

Despite educators striving to provide high quality feedback, students frequently report poor quality feedback [20–22]. Providing continuous effective feedback from different sources such as tutors and peers can also increase the impact of the logbook as a formative assessment tool and feedback instrument to guide learning, reduce the assessment gap and increase reflection and reliability [23–25]. It is important for feedback to contain specific comments that facilitate reflection and action plans [26]. Early simulation of deliberate practice in a simulated setting such as the clinical skills laboratory also enhances competency-based skills development and transference of skills to the clinical setting [15, 26].

As described in the literature, logbooks are used globally to "provide a clear setting of learning objectives and give trainees and clinical teachers a quick overview of the requirements of training and an idea of the learning progress" [27]. However, in a previous study on student's perceptions of logbook feedback in our clinical skills setting, comments were found to be vague and inconsistent [22]. To address this, a structured feedback improvement strategy providing a forward direction was added to the logbook [22]. Using Ericsson's theory of deliberate practice, a key component of expertise development, this study aims to evaluate the quality of written feedback provided to pre-clinical undergraduate medical students in the clinical skills laboratory during formative logbook assessments following the feedback improvement intervention. A modified and adapted feedback-scoring tool based on a deliberate practice framework [5] was used to investigate and provide answers to the following: Can components that facilitate deliberate practice be identified in the feedback provided to medical learners? To what extent does the feedback provided contain elements that facilitate deliberate practice? Is there a difference in the quality of feedback provided by the tutors and peers?

Methods

Context and setting

This study was carried out at the Nelson R Mandela School of Medicine (NRMSM), University of KwaZulu-Natal (UKZN) clinical skills laboratory. The role of the clinical tutors during the clinical skills sessions follows the same teaching stages as proposed by Barr: The tutor first demonstrates the skill while the student's observes [28]. The tutor then discusses the outcomes of the skill with the students. The students

demonstrate the skill while the tutor observes and coaches the students. The students then receive feedback on their clinical performance from the tutor and finally the student is left to work independently once they have mastered the necessary clinical skills. At the end of a six-week theme students are assessed formatively and provided with immediate directly observed verbal and written feedback in their logbooks for later reference along with a global rating of superior performance, competent or failure by supervising clinical tutors and peers. Students are informed that a mark will not be given being a formative assessment but the rating will assist in understanding their level of skill mastery. To enhance the logbook feedback a feed-forward strategy on what was done well, what was not done well and what can be improved was incorporated into the logbook which allowed clinicians and peers to provide students with learning goals/action plans targeting the performance assessment process and not just the assessment product. These changes to enhance constructive feedback were communicated to both the tutors and students via formal information sessions. All clinical skills protocols are included in the logbooks to ensure that students are familiar with the expected performance standards. Students are often supervised and assessed by more than one clinical tutor and peer and each clinical tutor and peer assesses more than one student during each theme.

Study design

Study population, sample size and sampling method

This retrospective cross-sectional study analysed the logbooks from twenty five 2nd and thirty 3rd year students that were randomly selected from each category of high achievers (HA) (> 70%), average achievers (AA) (50–69%) and low achievers (LA) (< 50%) based on their end of year summative OSCE assessment performance. A maximum variation sampling approach ensured the sample included logbooks of students with a wide ranch of achievement in clinical skills and who had at least one year of exposure to the clinical skills logbook formative assessment feedback. Logbook feedback forms (Additional files 1 and 2) for each student category completed over a year were included in the study. A total of 425 second year and 600 third year entries were included in the study sample.

Data collection and adaptation of the scoring tool

The logbook feedback was analysed using a tool designed by Gauthier et al. based on the deliberate practice framework to determine for the presence and extent of the three components that facilitate deliberate practice [5]. This tool was adapted and modified to our learning environment (Table 1) and used to assess all feedback responses for the presence of deliberate practice components as outlined in Table 1: (1) Task: What was done well with regards to a well-defined goal/task, (2) Gap: What was not done well and identification of a gap between observed current performance and a standard, (3) Action: What can be improved and if a learning or action plan was provided. Each component was scored from 0 to 3 (0 = absent, 1 = alluded to the component or vaguely described, 2 = general mention of the component, 3 = specific mention of the component) to ensure components could be objectively separated by specificity to warrant rater reliability and to differentiate a good from a poor quality feedback [5].

Two clinician raters independently assessed all written feedback included in the study for the presence of the three components of deliberate practice. The raters included the researcher and one clinician in the faculty with direct involvement in educational activities in the clinical skills laboratory. The raters initially familiarised themselves with the original feedback scoring tool developed by Gauthier et al. [5]. To increase reliability raters independently scored a small selection of the same logbook written feedback responses followed by comparing scores and discussions about difficulties and discrepancies with the descriptions of each scoring element. To enhance the discrimination between scores, specific behavioural anchors for each scoring item was added to the individual descriptions of the deliberate practice elements to adapt the scoring tool to our clinical skills environment (Table 1) as this has been shown to increase clarity [29] and inter-rater reliability [30]. The feedback responses were then scored separately using the modified task, gap and action grading tool. Inter-rater reliability was analysed by averaging discrepancies between scores and the Cohen's kappa coefficient (k) calculated to measure inter-rater agreement [31].

Data analysis

Written comments that was evaluated using the adapted scoring system [5] identified and discriminated a low quality feedback (score 0–1) from a moderate quality (score of 2) and a more specific high quality feedback (score of 3). The primary outcome measures for our study included the frequency distribution (i.e. the number of comments in each feedback category of task, gap and action (TGA) was counted and aggregated on a percentage (frequency) basis) and average scores of TGA as indicated in the written feedback of all logbook skills encounters assessed in the three categories (HA, AA and LA) of 2nd (17 skills/student) and 3rd year (20 skills/student) medical students.

A Z-test for difference of two proportions was conducted separately on each of the variables (task, gap and action) as well as variations with year of study and feedback source. The Kolmogorov Smirnov test was used to

Table 1 Task, gap and action feedback scoring table adapted from Gauthier et al. (2015)

	0	1	2	3
Task – What was done well? (A description of the event around which feedback was given)	Task not Described	*Vague*. Lacking either content or value. (No specific behaviour was identified with regards to the learning goal for the task e.g. 'You did great')	Content or value described *generally* (A general description of the behaviour was identified with regards to the learning goal for the task e.g. 'General examination done, Inspection of the chest done, auscultation done')	*Specific*. Content or value specifically described. (A good description of the steps to the particular task/skill provided e.g. Positioned the patient correctly to examine the chest, when examining for aortic regurgitation had the patient lean forward and exhale)
Gap – What was not done well? (The recognition of a difference between their performance and that of a comparative standard)	No gap Described	Gap *alluded to*. (No suggestions geared toward identified behaviour. e.g. 'Your technique was awful')	Gap *generally* described. (Concise issue raised but limited suggestions provided to learner e.g. You looked very uncomfortable examining that chest')	*Specific* gap identified. (Concise issues identified and learner provided with information to close a gap in knowledge e.g. 'Your exam of the chest was appropriate but percussion technique was inadequate. You may be more comfortable if you position your fingers on the chest this way')
Action – What can be improved? (Using the feedback to create a future learning goal or plan)	No learning goal or plan.	Learning goal or plan *alluded to*. (Feedback terminated with no plans for follow-up or re-evaluation e.g. 'Great job')	*General* goal or plan described. (Broad action plan is suggested but not specific to behaviour or encounter e.g. 'Read more around your cases')	*Specific* goal or plan described. (Clear plan to modify or reinforce behaviour e.g. 'Read this article on chest examination, practice the percussion technique and I will watch you examine the next patient with pneumonia')

assess the normality of feedback scores. The Kruskal Wallis test was then used to compare the average deliberate practice component scores based on academic performance for the three categories of students (HA, AA and LA). Proportions between the global ratings and component scores (TGA) was investigated using the Fischer's exact test. A p value less than 0.05 were deemed statistically significant. All statistical analyses were performed using SPSS version 25.

Results

One thousand and twenty five written feedback responses from 55 logbooks were assessed. Table 2 represents characteristics of the feedback entries. Eight evaluations in the 2nd year category and 35 evaluations in the 3rd year category were left blank as the students did not attempt these skills.

The kappa correlation coefficient obtained between ratings assigned by the two raters were all high ($r > 0.8$

Table 2 Characteristics of the 2nd and 3rd year clinical skills logbook encounters

Time period Jan 2017 – Dec 2017	2nd year evaluations	3rd year evaluations
Feedback entries, N:	425	600
Participant/Evaluator characteristics:		
Number of students/logbooks	25	30
Number of tasks assessed per student (range)	1–17	1–20
Number of clinical tutors	10	10
Number of tasks assessed per clinical tutor (range)	1–12	1–10
Number of peers (range)	50–100	50–100
Number of tasks assessed per peer (range)	1–30	1–30
Encounter focus:		
Physical examination skills (2 tutor and 4 peer assessed)	7 (40%)	6 (30%)
Procedural skills (all peer assessed)	10 (60%)	14 (70%)
Category of students assessed based on end of year OSCE marks:		
Low achievers (< 50%)	5 (20%)	10 (38%)
Average achievers (50–69%)	10 (40%)	10 (30%)
High achievers (> 70%)	10 (40%)	10 (31%)

for all comparisons) with no significant differences between raters suggesting a near perfect agreement with both raters producing similar scores to the same data item while using the feedback scoring Table.

A. Assessment of proportion of deliberate practice elements identified in the written feedback comments

We measured the frequency with which none, one, two or all three components of deliberate practice (TGA) were identified in the feedback. The frequency with which it was possible to identify these components in the written feedback evaluation is represented in Figs. 1 and 2.

All feedback – 2nd and 3rd year

In this study we found that all three components of deliberate practice were identified in 78% of the 2nd and 82% of the 3rd year logbooks (Fig. 1). The absence of three components was noted in only 1% of the feedback responses in both 2nd and 3rd year.

Tutors and peer feedback

All three components of deliberate practice were identified in 51% of the tutor and 87% of peer feedback responses in 2nd year logbooks. Similarly 67% of tutor and 89% of peer feedback contained all three components of deliberate practice in the 3rd year logbooks. The absence of the three components were noted in only 4% and 1% of the tutor and peer feedback respectively (Fig. 2).

B. Assessment of the degree of each component of deliberate practice identified in the written feedback comments

We assessed the degree of each component of deliberate practice (TGA) in the feedback comments as follows: 0–3 (0 = not described, 1 = vaguely described, 2 = generally described, 3 = specifically described). The results are illustrated in Figs. 3 and 4.

Tutor feedback – 2nd and 3rd year

Figure 3 summarizes the degree of deliberate practice components in tutor feedback in the 2nd and 3rd year logbooks. The tutor feedback on the task, gap and action to the 3rd year students were more specifically described compared to the 2nd year students.

Specific task (40%, 31%), gap (55%, 40%) and action (31%, 19%) were identified more often in the 3rd year feedback compared to the 2nd year feedback comments respectively. General task (33%, 29%) and action (40%, 36%) were identified more frequently in 2nd year compared to the 3rd year feedback respectively. No gap (45%, 31%) was identified more often in the 2nd year compared to the 3rd year feedback responses respectively. The difference of proportions between the deliberate practice task, gap and action feedback scores for each skill assessed was statistically significant ($p < 0.05$) between the 2nd and 3rd year feedback responses. A significant decrease in the specific description of task, gap and action in the 2nd year feedback was found when compared to the 3rd year feedback responses.

Tutor and peer feedback

Specific task, gap and action were identified more often in the tutor than the peer feedback as illustrated in Fig. 4.

Specific task (31%, 25%), gap (40%, 31%) and action (19%, 17%) were identified more often in tutor compared to peer feedback respectively. General task (46%, 33%) and action (44%, 40%) were identified more frequently in peer comments compared to the tutor comments respectively. No gap (45%, 15%) was identified more often in tutor feedback compared to peer feedback

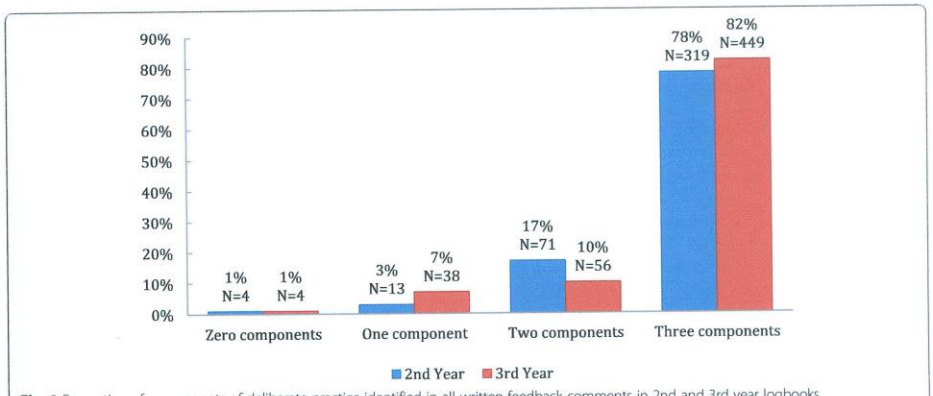

Fig. 1 Proportion of components of deliberate practice identified in all written feedback comments in 2nd and 3rd year logbooks

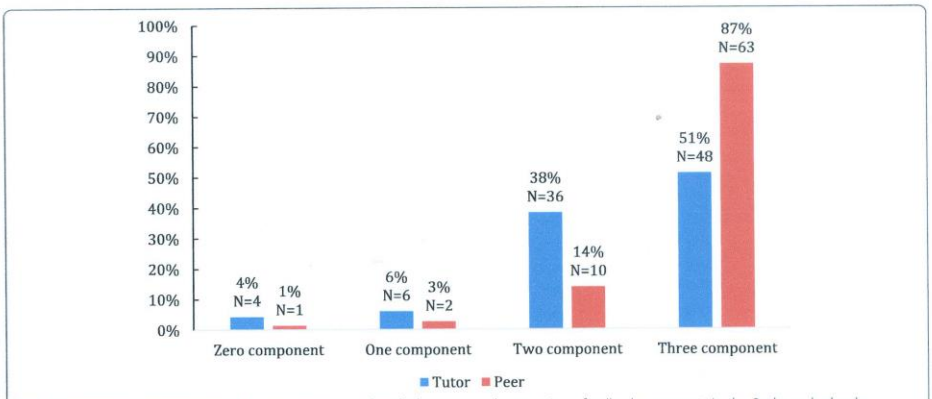

Fig. 2 Proportion of components of deliberate practice identified in tutor and peer written feedback comments in the 2nd year logbooks

respectively. When comparing the tutor and peer feedback responses the difference of proportions between the deliberate practice task, gap and action feedback scores for each skill assessed was statistically significant (p value < 0.05) indicating a significant decrease in the specific description of task, gap and action in the peer feedback compared to the tutor feedback responses.

C. Assessment of average deliberate practice component scores based on academic performance

We assessed the average deliberate practice component scores in the feedback for the three categories of students (HA, AA and LA) based on their level of achievement and summative marks. The results are illustrated in Figs. 5 and 6.

Tutor feedback – 2nd and 3rd year

Average component scores for skills assessed by the tutors plotted for the three different assessment categories of 2nd and 3rd year students is shown in Fig. 5. Overall a statistically significant inverse trend was found when comparing the 3rd year student achievement category with the average task gap and action feedback scores – the higher the student marks the lower was the task, gap and action feedback scores ($p < 0.05$).

The average component scores for tutor feedback on the task, gap and action provided to the LA in the 3rd year were higher than in the 2nd year. The overall quality of the feedback provided by the tutors to the 3rd year was better than that provided to the 2nd year students. The overall quality of feedback provided by the tutors was moderate and less specific (average score < or = 2).

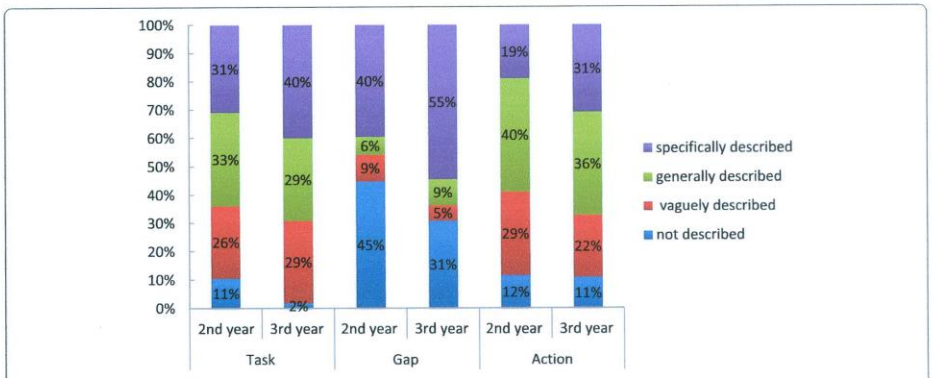

Fig. 3 Assessment of degree of each component of deliberate practice in 2nd and 3rd year tutor feedback

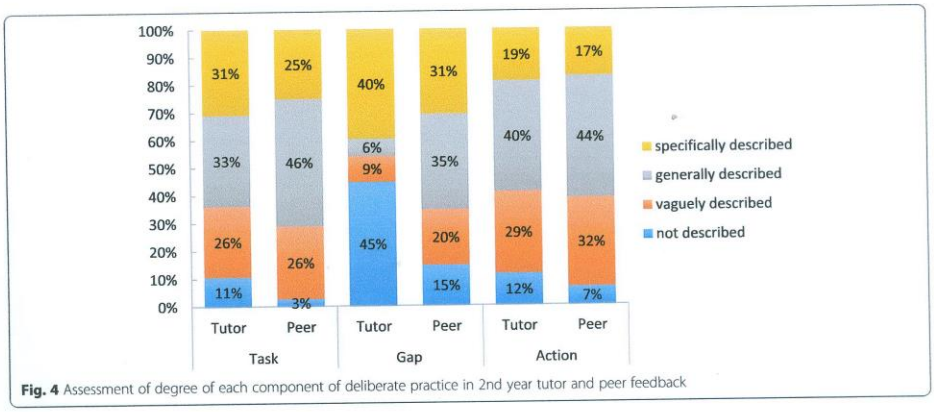

Fig. 4 Assessment of degree of each component of deliberate practice in 2nd year tutor and peer feedback

Peer feedback – 2nd and 3rd year

The average 2nd and 3rd year peer feedback component scores for the three categories of students are illustrated in Fig. 6. Overall an opposite trend to the tutors is found when comparing the student achievement category with the average task gap and action scores – as the level of achievement increases the task gap and action scores increases ($p < 0.05$).

Similarly the average deliberate practice component scores for peer feedback on the task and gap provided to the HA, AA and LA in the 3rd year were higher than in the 2nd year. The overall quality of the feedback provided by the peers to the 3rd year was better than that provided to the 2nd year students. The overall quality of feedback provided by the peers was moderate and less specific (average score < or = 2).

Global rating An association between the global rating of the students clinical skills development as 'failure', 'competent' and 'superior performance' provided by the tutors and peers and each of the components of deliberate practice was assessed statistically using the Fischer's test. All the 2nd and 3rd year students were rated as either 'superior performance' or 'competent'. No student was rated 'failure'. The association between global rating for each skill and the deliberate practice task, gap and action feedback score was statistically significant with a p value < 0.05 indicating a statistically significant decrease in gap and action scores as global ratings increased.

Discussion

High quality feedback motivates learners, is corrective as it confirms learners are on the right path and promotes

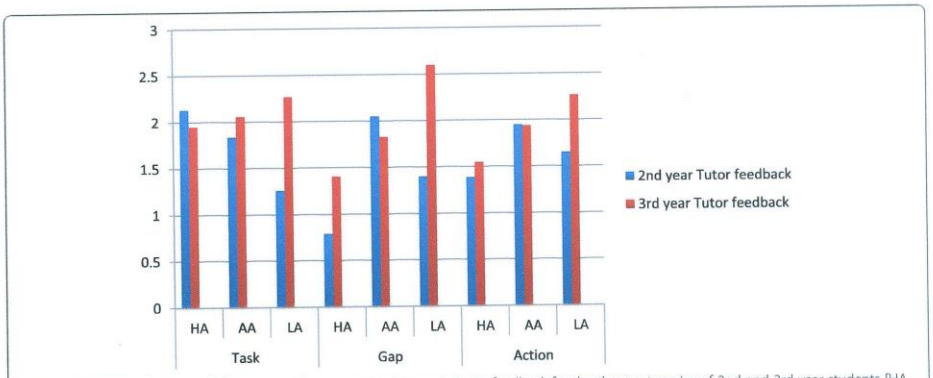

Fig. 5 Assessment of average deliberate practice component scores in tutor feedback for the three categories of 2nd and 3rd year students [HA (> 70%); AA (50–69%); LA (< 50%)]

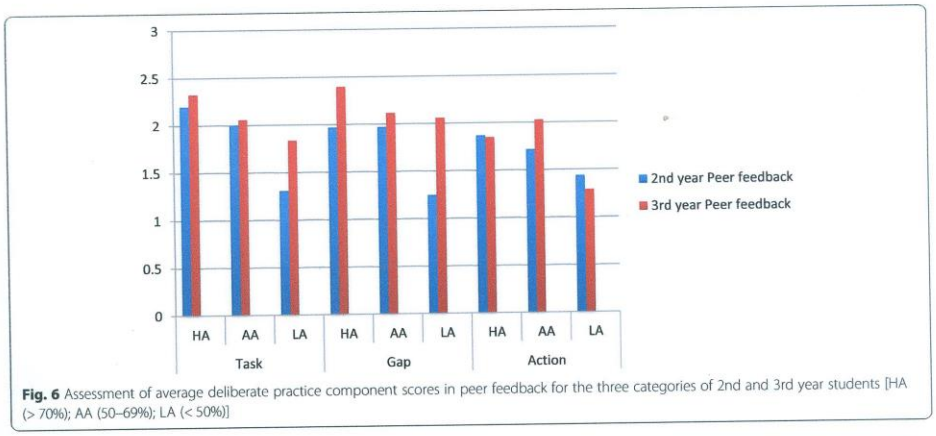

Fig. 6 Assessment of average deliberate practice component scores in peer feedback for the three categories of 2nd and 3rd year students [HA (> 70%); AA (50–69%); LA (< 50%)]

self-reflection [1]. Since feedback has been shown to be of variable quality and effectiveness, an objective assessment of feedback quality identifies competence in feedback provision and features of highly effective feedback [32]. This study found that majority of the tutor and peer written logbook feedback provided to the medical students contained all three components likely to facilitate deliberate practice, suggesting an implicit adoption of a deliberate practice framework. They were however found more often in the peer than the tutor feedback. Our findings are similar to a previous study by Falchikov who reported that peers provided more positive feedback as well as more prompts and suggestions for improvement than tutors [33]. Nicol indicated that peers tackling the same skill might be able to write more meaningful and relevant comments in a student-centred discourse and get to see examples of good and poor work produced by other students [34]. Engaging students to comment on the work of their peers has the advantage of enhancing their ability to evaluate their own work and improve their self-regulatory skills.

In order for feedback to be effective and of good quality it should be specific [3, 11, 35]. Analysis of both the tutor and peer feedback quality in this study found the performance gap component most often specifically described while the task and action component generally described. Tutors and peers should aim to provide 'perfectly accurate' feedback as described by Ericsson with clearly described gaps in knowledge and general strategies for improvement in order for students to undertake sustained 'deliberate practice' to progress towards expertise [13]. However it is important to note that developing a learning and action plan should be the responsibility of the feedback receiver. The feedback provider may only facilitate this process as providing too much feedback may inhibit self-directed learning.

The overall quality of the tutor feedback provided to the 3rd year students was better than that provided to the 2nd year students. This finding may be influenced by the student-teacher relationship that plays an important role in the delivery and acceptance of feedback. As the time spent between the two increases, the students mature and become more open minded and accepting of the teaching methods and feedback supplied by the teachers. Additionally, with greater time spent, the teachers begin to understand students and adapt their delivery of feedback in a manner that the student receives and accepts the said feedback better. Bok et al. showed that when medical students build a relationship over time with their clinical tutors there is alignment of the tutor's goals with their own and they trust the credibility of the feedback they receive [36]. A study exploring medical student's perceptions of assessment and feedback in a longitudinal integrated clerkship found that a trusting teacher-learner relationship that develops allows "constructive interpretation of critical feedback" with students often supportive of even challenging or corrective feedback [37] making it easier for teachers to provide corrective feedback. The concept of the 'educational alliance' framework further recognises the centrality of teacher-learner relationship in the feedback process and its link to the impact of feedback generated within it [38].

In our study, there were certain factors associated with variation in the identification of feedback components and hence the quality of feedback provided. Feedback components of task, performance gap and action plan provided by tutors were often identified in the low achieving-students compared to the higher achieving-students in both second and third-years. The decreased identification of these deliberate practice elements in the feedback with increasing level

of achievement is attributed to students having no or fewer gaps and hence a decreased need for action plans. Tutor's cognitive resources and energy was hence directed to the lower-achieving students who needed more of his/her attention. This is similar to other studies in clinical practice where increasing student achievement better directs supervisor's cognitive resources to patient care instead of educational assessment on a single skill [5]. Advanced learners require feedback focusing more on higher-order integrated learning tasks such as problem solving and clinical reasoning [1].

Specific task was the most frequent component provided to our second-year higher-achieving students as compared to the gap and action feedback component. A reason that may explain this is that the task is the easiest to describe by simply recording a detailed account of the task performed while feedback on the gap and action may be low because the students are performing at a competent level to which they are being evaluated and the feedback instrument may be used primarily to identify competency gaps rather than promoting expertise development. In contrast, tutors focus on the knowledge gap and action plan of students who perform poorly, instead of spending time describing the event.

An overall trend is apparent when comparing student achievement category with the average task gap and action scores in peer feedback. With increasing student achievement, the task, gap and action scores increase, opposite to what we found with the tutor feedback. There is the possibility of peers tending to over-rate the work of their peers so as not to appear too critical and may explain why sometimes students' lack confidence in their peer's feedback. Though studies confirm tutor-student feedback dialogue as essential for learning enhancement with tutors perceived as authoritative feedback source and the best person to scaffold student learning [33, 39], Orsmond and Merry in their investigation of high- and low- achieving third-year biology students' perceptions of teacher feedback, indicated potential disadvantages when teachers are the sole source of feedback input [40]. The low-achieving students depended highly on the teacher to make improvements in their work by consistently focusing on the surface features of feedback messages compared to the high-achieving students who try to seek the meaning behind the feedback message [41]. Nicol suggested peer feedback processes be strengthened for weaker students as peers generating and receiving feedback in relation to the same assessment task learn not only about their own work but also about how it compares with the work of other students [34].

The study has demonstrated an improvement in the written feedback provided to students in clinical skills. Tutors previously provided general comments which were vague and inconsistent [22]. The implementation of a structured feedback improvement strategy encouraged tutors to provide timely and balanced feedback. However despite this intervention there was high variability with regards to specific description of each component as indicated by the low component average scores (2 or < 2). Using the feedback scoring system has also allowed us to identify tutors providing particularly low quality written feedback and hence the need for individualised faculty feedback and development.

An interesting finding in our study was tutor's provision of global rating on student's performance of 'competent' or 'superior performance' with no 'failure' suggesting difficulty giving negative feedback. Possible reasons are either tutors don't want to hurt student's feelings as this can damage their relationship or the fact that remediation may not be available [42]. Previous studies have reported feedback comments failing to distinguish the competence level of learners [43]. However in this study we found an association between the global rating and quality of feedback. Therefore tutors who tend to put time and thought into providing meaningful comments may also be accurately assessing the performance level of the learner.

Clinical tutors may not be hostile to providing useful feedback but working in an environment that limits their opportunity to do so may explain the low quality of feedback especially in heterogeneous diverse settings. The increasing class population and shortage of tutors necessitated the need to capitalise on peer feedback which has had significant benefits by having different feedback providers commenting on different clinical skills providing students with multiple perspectives as well as multiple opportunities for scaffolding their learning [33].

Limitations

The study measured the elements of deliberate practice in written feedback, it is however possible that tutors provided more feedback orally to students and this could underestimate the extent of deliberate practice components reported.

Though most of the feedback comments were obvious to score, a distinction between certain components was not always clear such as the gap and action components of deliberate practice. It was sometimes difficult to separate the components from a single comment field. For example a student received the comment "remember: auscultation of the precordium for heart sounds after palpating the position of the apex beat". This could confirm a gap in the student's knowledge but also using the term "remember" may imply an instruction for changing future behavior. Both raters scored this as a gap of 1 (alluded to the gap) and an action of 3 (specific plan described) though it may not be necessary to separate these two components.

The feedback process depends on various other external factors such as self-assessment, relationship factors,

feedback-seeking behavior, self-reflection, feedback source credibility [11, 20] which were not measured as in this study we only focused on the components of deliberate practice described by Ericsson [13].

Conclusion and recommendations

The introduction of a feedback improvement strategy to the logbooks increased the quality of the feedback provided as the task, gap and action plans were all included. Formal feedback quality assessment using the deliberate practice framework fosters reflections about the quality of feedback provided and hence its usefulness. Based on the findings of this study we suggest that providing clinical tutors and peers with a feedback-scoring tool to review and score their own feedback for the presence of features of high-quality feedback is likely to guide them to give good quality feedback enhancing their feedback skills [1, 44]. Faculty development to improve delivery of quality feedback is important but not sufficient. Possible reasons as to why quality of feedback remains a challenge might be because focus continues to be on how clinical tutors should construct and deliver feedback, rather than how students receive, respond and use feedback along with creating learning environments with individual follow-up feed-forward improvement plans. Investing in the development of peer assessment and feedback skills is of valuable resource in resource constrained and diverse educational settings enhancing student's engagement with feedback, self-reflection, self-assessment, development of assessment literacy and self-regulated learning skills that are necessary throughout their clinical career [33]. Hence to overcome barriers to meaningful feedback both institutional and individual efforts are required.

While poor quality feedback is a common problem, this study was conducted in a simulated clinical environment hence caution needs to be taken while generalizing our results to other specialties. This study will however serve as a useful theoretical guide to the planning and evaluation of feedback interventions that would be useful for educational purposes.

Additional files

Additional file 1: 2nd year clinical skills logbook. (DOC 109 kb)
Additional file 2: 3rd year clinical skills logbook. (DOC 144 kb)

Abbreviations

AA: Average Achievers; HA: High Achievers; LA: Lower Achievers; NRMSM: Nelson R Mandela School of Medicine; OSCE: Objective Structured Clinical Examination; TGA: Task, Gap and Action; UKZN: University of KwaZulu-Natal

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Availability of data and materials

The datasets used and/or analysed are available from the corresponding author on reasonable request.

Authors' contributions

Both RMA and VSS have made substantial contribution to the conception, design, data collection, analysis and interpretation of data. They have been involved in drafting the manuscript and critically revising it and have approved the manuscript for publication.

Authors' information

RMA (MBBS, PGDip (Anaest), PGDip (Public Health), MMed) and VSS (BMedsc, MMedsc, PhD) are academics in the Clinical and Professional Practice Discipline at the Nelson R Mandela School of Medicine, University of KwaZulu-Natal. Dr. Reina Abraham a clinician coordinates the undergraduate clinical skills programme and Dr. Singaram a science-trained medical educator supervises a cohort of postgraduate students doing research in Health Professions Education.

Ethics approval and consent to participate

Ethical approval for this study was granted (HSS/2213/017D) by University of KwaZulu- Natal's ethics committee.

Consent for publication

Not applicable

Competing interests

The authors RMA and VSS declare that they have no competing interests.

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