Teachers’ two-way feedback interaction: Behaviours, predictors and outcomes

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Thesis Declaration

I, Fiona Tan, certify that:

This thesis has been substantially accomplished during enrolment in the degree.

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The research involving human data reported in this thesis was assessed and approved by The University of Western Australia Human Research Ethics Committee. Approval #: RA/4/1/7892.

Written participant consent has been received and archived for research involving student and teacher data reported in this thesis.

The work described in this thesis was funded by the University Postgraduate Award (UPA) and Safety Net Top-up Scholarship. This research was supported by an Australian Government Research Training Program (RTP) Scholarship.

I declare that this thesis is my original work and to the best of my knowledge, contains no material that has been accepted or submitted to any other institution for an academic award, or been previously published or written by another person, except where due references have been made.

Fiona Der Hui Tan
21/10/2019
Explanatory Note

The University of Western Australia Graduate Research School specify that Ph.D candidates may present their thesis as a series of manuscripts. As such, this thesis has been compiled in concordance with these guidelines and includes manuscripts that have been published or are in press. In light of this thesis being presented as a series of manuscripts, some degree of redundancy is inevitable between chapters. Consistent with the University of Western Australia Graduate Research School guidelines, the manuscripts have been amended for presentation in this thesis so as to remove material that may be repetitious and unnecessary.

The manuscripts include (a) a foreword that introduces each chapter and establishes links between previous chapters, and (b) references that cite previous chapters rather than references to published or submitted manuscripts. Throughout the thesis, tables are labelled in accordance to their number within each respective chapter. In addition, although the present thesis is the work of Fiona Der Hui Tan, the active voice (e.g., “we” instead of “I” or “my”) is used in thesis chapters as it is concordant with scientific guidelines and in recognition of collaborations with co-authors on the published and submitted manuscripts.
Statement of Candidate Contribution

DECLARATION FOR THESIS CONTAINING PUBLISHED WORK AND/OR WORK PREPARED FOR PUBLICATION

This thesis contains published work and/or work prepared for publication, all of which have been co-authored. The bibliographical details of the work and where it appears in the thesis are outlined below.

Chapter 2.

Student contribution:
Literature review, data collection and analyses, identification of future research directions, manuscript write-up.

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Chapter 3.

Student contribution:
Review of literature, data collection and analyses, identification of future research directions, manuscript write-up.

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Chapter 4.

Student contribution:
Review of literature, data collection and qualitative analyses, identification of future research directions, manuscript write-up.

We acknowledge the contribution of Miss Jane Chong, who assisted with the quantitative analyses of data.

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Summary

The aim of this thesis was to contribute to the literature an understanding of how teachers’ two-way feedback interactions influence student learning outcomes. In pursuing this aim, I began by using exploratory, qualitative research to examine student perceptions of effective teachers’ verbal and non-verbal behaviours in two-way feedback interaction through the lens of Respectful Inquiry (RI; Van Quaquebeke & Felps, 2018). Following this, teacher perceptions were corroborated, alongside with the perceived learning outcomes. Subsequently, empirical work was used to interrogate if the perceived teacher behaviours in two-way feedback interaction influence students’ motivation, metacognition, and self-efficacy.

In Chapter 2, I focus on student perceptions of teachers’ ancillary behaviours constitutive of two-way feedback interaction, and its outcomes on student learning. Anchored on the motivational framework of Self-Determination Theory (SDT), RI (van Quaquebeke & Felps, 2018) serves to provide additional hand-holds on the verbal and non-verbal behaviours related to dialogue during interaction. However, as RI (van Quaquebeke & Felps, 2018) is new to the education context, this necessitates qualitative work to explore its utility and relevance. Chapter 3 corroborates the findings from Chapter 2, with a focus on expert teacher perspectives that are concomitant in two-way feedback interaction and its outcomes. In addition, teacher perspectives of self-efficacy in enacting these behaviours and barriers to two-way feedback interaction are investigated. Chapter 4 examines through empirical work, teachers’ actual two-way feedback interaction in the classroom, and its predictive association with student learning outcomes such as motivation, metacognition, and self-efficacy. Finally, in Chapter 5, I review the information presented in Chapters 1 to 4, and consider the limitations and implications of this work, and present suggestions for future research.
This thesis comprises an analysis of qualitative and quantitative data collected across three separate studies, involving student participants and teachers from independent high schools within Perth, Western Australia. This thesis advances the literature by explicating how teachers’ verbal and non-verbal feedback behaviours augment students’ learning outcomes such as metacognition, motivation, and self-efficacy from feedback. Through semi-structured interviews and subsequent verification of teachers’ ancillary two-way feedback interaction behaviours in empirical study, support is demonstrated for its influence in accessing higher learning outcomes. Finally, this work advances extant literature and provides practical insights on how teachers’ attention to verbal and non-verbal behaviours during two-way feedback interaction serves to augment learning outcomes from feedback.
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CHAPTER 1.

General Introduction: Literature Review
Chapter 1 Foreword

In Chapter 1, a critical eye is cast on the importance of feedback to learning. In particular, the concerns surrounding one-way or monologic feedback (Boud & Molloy, 2013; Evans, 2013; Nicol, 2010) and the proposed need for feedback dialogue (Carless, 2013) to optimise students’ learning are discussed. Following which, broad research directions are identified and articulated to guide subsequent research.

Feedback is well-established to influence learning (Hattie & Gan, 2010) and in nurturing independent learners (Ferguson, 2011). However, while feedback aims to close performance gaps (Sadler, 1989), extant literature informs that monologic feedback hinders learning (Nicol, 2010) and is limited in its capacity to address the student’s misconceptions (Ajjawi & Boud, 2017; Boud & Molloy, 2013). A key issue raised within the literature is the persistent and ubiquitous feedback practice which is transmissive, monologic, or one-way (Nicol, 2010). To overcome the limitations of monologic feedback, dialogue has been recommended to clarify expectations, and share interpretations (Carless, 2013). While some studies have reported teachers’ attempts at feedback dialogue, evidence has continued to highlight that students’ learning and understanding from feedback has not been sufficiently interrogated, and teacher’s feedback dialogue has remained transmissive and teacher-centered (Blair & Ginty, 2013). Yet to be addressed, is the concomitant verbal and non-verbal aspects in two-way feedback interaction, and how these serve to undergird and nurture students’ learning from feedback.

In seeking to understand how teachers’ verbal and non-verbal behaviours facilitate learning, we anchor on the overarching, motivational underpinnings of Self-Determination Theory (Deci & Ryan, 2000), which will be discussed in detail throughout this literature review. In addition, this work brings a novel lens through its application of Respectful Inquiry (RI; Van Quaquebeke & Felps, 2018), a conceptual theory from the management literature, which outlines that when specific verbal and non-verbal behaviours (i.e., asking questions, question openness, and attentive listening) are enacted during interaction, these are instrumental in motivating followers.
As feedback entails not just content, but also social and emotional aspects (Small & Attree, 2016), focussed attention is given to the investigation of how teachers’ verbal and non-verbal behaviours optimise students’ learning from two-way feedback interaction. Therefore, Chapter 1 lays the foundation for this thesis by providing a broad understanding of the current feedback landscape, its challenges, and articulates subsequent research directions in Chapters 2, 3, and 4.
CHAPTER 1: GENERAL INTRODUCTION

1.1 Overview

Feedback is well-established being fundamental to teaching and influential in learning (Hattie & Timperley, 2007; Hattie, 2012). Defined, feedback is to close gaps between performance and the expected standard (Sadler, 1989). However, scholars maintain that there is dissonance between teachers’ feedback which is intended to bring about learning, and students’ actual learning from feedback (Blair & Ginty, 2013). Evidence informs that students are unable to understand teachers’ feedback comments to make learning evident (Chanock, 2000) and students are denied the opportunity to clarify the feedback offered (Blair & Ginty, 2013; Boud & Molloy, 2013; Price, Handley, & Millar, 2011). Moreover, critiques have raised concern that feedback is often reduced to a monologue rather than an iterative process of dialogue between teacher and student (Nicol, 2010). When this happens, “the potential for feedback to enhance student learning is considerably under-developed” (Price et al., 2011, p.879).

Despite caution that one-way, monologic feedback (Nicol, 2010), or unilateral feedback has the propensity to be unproductive and limited in effectiveness (Chanock, 2000; Lee, Keh, & Magill, 1993; Price et al., 2011), feedback still persists as transmissive rather than facilitative (Blair & Ginty, 2013; Nichols, 2014; van den Bergh, Ros, & Beijaard, 2013). As highlighted by Haggis (2006), feedback that is reduced to a “transmission of content knowledge is unproductive for both students and staff… (moreover, this) has largely ignored how learners themselves might make sense of and learn from pedagogical practices” (p. 531). As this disjuncture between feedback and learning is a growing concern, the literature has emphasised the need for dialogue in feedback, so as to engage students in learning, and to improve students’ understanding
from feedback (Black & McCormick, 2010; Carless, Salter, Yang, & Lam, 2011; Nicol & Macfarlane-Dick, 2006).

Feedback dialogue, according to Carless (2013), is defined as “interactive exchanges in which interpretations are shared, meanings negotiated, and expectations clarified” (p.90). To mitigate the shortcomings of monologic, or one-way, unilateral feedback, educators have been exhorted to consider feedback dialogue (Ajjawi & Boud, 2017; Boud & Molloy, 2013). Feedback dialogue has been opined to optimise learning through reflection (Sutton, 2009), engagement, and shift students from being passive receivers to partners in the learning process (Price et al., 2011).

To facilitate learners, feedback must be recognised as more than just providing information (Alexander, 2006). As feedback naturally raises emotional tension (King, Schrodt, & Weisel, 2009), scholars have cautioned that feedback involves more than content, and includes both relational and social aspects (Small & Attree, 2016). According to Carless (2013), trusting relationships in feedback dialogue are important as it provides a nurturing platform for learning to occur. This is echoed by Alexander (2006), who emphasises that meaningful feedback involves interactions that encourage discussion, probes, and extends thinking through questions during exchange. However, while current definitions of feedback dialogue describe what needs to be accomplished, we argue that the ancillary role of verbal and non-verbal behaviours that are closely interwoven with dialogue remain unclear. Hence, we build on previous definitions (Boud & Molloy, 2013; Carless, 2013) and propose that two-way feedback interactions might serve to provide greater comprehensiveness and clarity in terms of how teachers’ verbal and non-verbal behaviours might promote learning in the context of feedback dialogue.
To establish the importance of relationships and its concomitant verbal and non-verbal behaviours in two-way feedback interaction, we look to both Self-Determination Theory (SDT; Deci & Ryan, 2000) and Respectful Inquiry (RI; Van Quaquebeke & Felps, 2018). SDT (Deci & Ryan, 2000) is a macro-theory of human motivation, which underscores the significance of relationships and social interactions. SDT postulates that individuals are interested in learning and have a desire to develop knowledge (Niemiec & Ryan, 2009). SDT also advances that individuals have three psychological needs (autonomy, competence, and relatedness) which must be satisfied in social interactions in order to promote motivation, self-efficacy, competence, and self-regulation (Deci, Schwartz, Sheinman, & Ryan, 1981; Standage, Duda, Ntoumanis, 2006; Sparks, Dimmock, Whipp, Jackson, & Lonsdale, 2015).

However, although SDT provides the foundation to understand the importance of relationships and psychological needs satisfaction for learning and motivation, it falls short in explicating the specific verbal and non-verbal behaviours which may be facilitative in two-way feedback interaction. As such, we look to a theoretical construct derived from management literature, Respectful Inquiry (RI; Van Quaquebeke & Felps, 2018). RI stems from SDT (Deci & Ryan, 2000) and reports that verbal and non-verbal behaviours (i.e., asking questions, question openness, and attentive listening) in the context of supervisors and employees during conversation holds potential to motivate followers (La Guardia, Ryan, Couchman, & Deci, 2000). Whilst its application is in the leadership context, this research is underpinned by the parallels that may be drawn with teachers and students. The application of RI (Van Quaquebeke & Felps, 2018) to the education context is new, and this provides an innovative lens to interrogate the ascribed verbal and non-verbal behaviours, and to explore its utility and impact the context of two-way feedback interaction.
The influence of teachers’ verbal and non-verbal behaviours has been well established in the literature, but work that explores both students’ and teachers’ perspectives of what constitutes effective verbal and non-verbal behaviours in two-way feedback interaction has not been accessed. Extant literature outlines that teachers’ immediacy non-verbal behaviours such as eye-contact, smiling, open body position (Mehrabian 1969; 1971; Witt, Wheeless, & Allen, 2004) have been associated with an increase in students’ learning and state motivation (Christophel & Gorham, 1995; Kerssen-Griep & Witt, 2012; Witt et al., 2004). In addition, Sparks and colleagues (2015) investigated student motivation in the light of teachers’ relatedness supportive behaviours (e.g., individualised conversations, attentiveness, understanding, friendliness, and enthusiasm) and reported that these teacher behaviours were perceived by students as needs-supportive, and influential towards student engagement, motivation, and self-efficacy (Sparks et al., 2015). However, work that explores both secondary school students’ and teachers’ ancillary RI-related behaviours (i.e., asking questions, question openness, and attentive listening) in two-way feedback interaction remains under-researched.

Concomitant with teachers’ non-verbal behaviours, teachers’ verbal behaviours are also key to learning. In particular, open questions carry the ability to probe thinking, increase metacognitive awareness, encourage motivation and autonomy (Hargreaves, 2014; Serafini & Blasingame, 2012; Smith & Stein, 2011). Problematic within the literature, is the scarcity of teachers’ open questions to probe thinking (Howell & Wilson, 2014; Duschl & Osborne, 2002; Lemke, 1990; Nichols, 2014) and consistent evidence which shows that students’ thinking has not been adequately scrutinized through questioning (Dekker, Schönrock-Adema, Snoek, & Cohen-Schotanus, 2013; Nichols, 2014). Of concern, is the prevalence of closed questions (i.e.,
recall) which play a dominant role in feedback practices (Ford & Wargo, 2011; Galton 2008; Mehan & Cazden, 2015; Nichols, 2014; Resnick, Asterhan, & Clarke, 2015).
Moreover, research presents reports of students’ continued frustration that thinking is insufficiently examined, and teacher feedback persists as transmissive and teacher-dominated (Blair & McGinty, 2013; Pauli, 2010; Tuck, 2012).

While closed questions are a concern, feedback barriers such as class size, congested curriculum (Chin, 2006; Rink, 2013), and high stakes assessments have also been identified to encourage surface learning approaches, which undermines quality learning opportunities (Barret, 2009; Marsh, Farrell, & Bertrand, 2016; Ryan & Weinstein, 2009; Thompson, 2013; Yerdelen-Damar & Elby, 2016). When teachers teach to the test (Jones, 2008), understanding and depth of learning is inevitably compromised (Marsh et al., 2016; Ryan & Weinstein, 2009). As scholars have emphasised the need to refocus feedback on learning (Hattie, 2009; Voerman, Meijer, Korthagen, & Simons, 2012), work that examines secondary students’ and teachers’ perspective of RI-related, ancillary verbal and non-verbal behaviours, and the teacher-perceived barriers to two-way feedback interaction is meaningful.

In addition, we also seek to investigate how teachers’ verbal and non-verbal behaviours in two-way feedback interaction impact student learning outcomes such as motivation, metacognition, and self-efficacy. Motivation, according to Ryan and Deci (2000), relates to the sense of enjoyment in engaging in an activity, and has been associated with positive outcomes such as persistence in learning, deeper processing levels, and academic achievement (Black & Deci, 2000; Deci & Ryan, 1985; Vansteenkiste, Lens, & Deci, 2006). Of concern, is literature which has highlighted a declining trend in students’ motivation, particularly at the secondary context (Eccles, Wigfield, & Schiefele, 1998; Opdenakker, Maulana, & denBrok, 2012). As feedback is influential to learning
(Hattie, 2012) and holds a central role in gap closure (Sadler, 1989), empirical work that examines the impact of teachers’ verbal and non-verbal behaviours in two-way feedback interaction will provide insights to advance the feedback literature.

Metacognition is also a powerful outcome of learning (Wang, Haertel, & Walberg, 1990) as it is pivotal towards students’ critical thinking and academic success (Magno, 2010; Winne & Nesbit, 2010). Metacognition is defined by one’s self-awareness and knowledge about the cognitive processes which are necessary for learning and understanding (Flavell, 1976). Research informs that strong metacognitive awareness is positively associated with higher critical thinking skills (Ku & Ho, 2010), problem solving ability, and academic success (Schellenberg, Negishi, & Eggen, 2011; Sperling, Howard, Miller, & Murphy, 2002). Although research has urged educators to provide metacognitive feedback so as to enhance learning (Schellenberg et al., 2011; Lee, Irving, Pape, & Owens, 2015), students’ metacognitive skills still remain under-developed (Arts, Jaspers, & Joosten-ten Brinke, 2016; Hattie & Timperley, 2007). While research has explored metacognition and feedback (Lee et al., 2015; Mevarech & Fridkin, 2006) in e-learning environments and through hand-held devices, empirical work that interrogates teachers’ actual in-class, verbal and non-verbal behaviours in two-way feedback interaction remains limited.

Self-efficacy as a student learning outcome is also important because it is a contributing factor towards students’ learning achievements (Høigaard, Kovač, Øverby, & Haugen, 2014). Self-efficacy refers to an individual’s judgement of his or her performance capability to complete specific tasks (Bandura, 1986). When self-efficacy is enhanced, academic achievements (Sharma & Silbereisen, 2007) and academic resilience (Cassidy, 2015) ensue. Moreover, self-efficacy is a catalyst for metacognition, and metacognitive skills are applied to a greater degree when self-efficacy is promoted
(Bouffard-Bouchard, Parent, & Larivee, 1991). However, research highlights confounding results where self-efficacy is actually lowered when teachers provided more feedback (Duijnhouwer, Prins, & Stokking, 2012). As others have found positive self-efficacy outcomes from self-referenced and formative feedback (Chan & Lam, 2010; Lerdpornkulrat, Poondej, Koul, Khiawrod, & Prasertsirikul, 2017), this places relevant importance for an empirical investigation of teachers’ verbal and non-verbal behaviours in two-way feedback interaction.

In tandem with students’ self-efficacy as a learning outcome, teachers’ self-efficacy and teaching expertise in two-way feedback interaction is also pertinent. While teacher expertise is related to the ability to explicate concepts and unpack misconceptions more acutely (Berliner, 2004), teacher self-efficacy has been evidenced to influence learner-centred constructivist instruction and thinking skills (Dilekli & Tezci, 2016; Temiz & Topcu, 2013). Moreover, the literature has reported a positive and consistent relationship with teacher behaviour, instructional quality, and learning outcomes (Guo, Dynia, Pelatti, & Justice, 2014; Son et al., 2016). As feedback is a complex process which involves content, emotional, and social aspects, we hope to draw insights from expert teachers to progress the literature. Yet to be examined, is expert teachers’ self-efficacy in relation to two-way feedback interaction, their perspectives of effective behaviours in two-way feedback interaction, as well as students’ self-efficacy as an outcome.

Therefore, this work seeks to address existing gaps in the feedback literature by investigating verbal and non-verbal behaviours in two-way feedback interaction through the lens of RI (Van Quaquebeke & Felps, 2018), and the student learning outcomes such as motivation, metacognition, and self-efficacy. As the application of RI (Van Quaquebeke & Felps, 2018) in the education context is new, the methodological approach seeks to first investigate through qualitative work, student and expert teacher perceptions of verbal and
non-verbal behaviours during two-way feedback interaction that influence student learning outcomes. Subsequently, empirical work seeks to corroborate against qualitative findings and investigate the impact of teachers’ two-way feedback interaction on students’ motivation, self-efficacy, and metacognition. In the next section, we examine in greater depth, the literature on feedback practices, feedback dialogue, SDT (Deci & Ryan, 2000), RI (Van Quaquebeke & Felps, 2018), verbal and non-verbal behaviours, and student learning outcomes such as motivation, self-efficacy, and metacognition.

Literature Review

1.2 Feedback; its role and challenges

Feedback is core to the teaching process (Voerman, Korthagen, Meijer, & Simons, 2014), key in nurturing independent learners (Ferguson, 2011), and well-established as powerful in classrooms (Andrade, 2010; Hattie & Gan, 2010). According to Sadler (1989), feedback is about closing gaps between performance and the expected standard. While it is agreed that feedback is pivotal to learning, essential for knowledge building and skill proficiency (Black & William, 2009, 2018; Moreno, 2004), less attention has been given to the motivational aspects during feedback (Brookhart, 2008). Brookhart (2008) proposed that impactful feedback not only helps students understand cognitively “where they are in their learning and what to do next”, it also motivates them by facilitating “a feeling that they have control over their own learning” (p.2).

In Hattie’s (2009) meta-analysis of over 800 studies, feedback has the highest effect size (0.72) on student learning compared to direct instruction (0.59). When effectively executed, feedback has the potential to double the rate of learning and positively impact student performance (Shulman, 1987; Hattie, 2003; 2009).
Moreover, feedback is seen to be the gateway to develop students as independent learners, capable of self-monitoring, and evaluating their own learning (Ferguson, 2011). Effective feedback informs the learner about task performance, is directive, facilitative, useful, specific, timely, goal-related, and aims “to modify the learner's cognition, motivation, and/or behaviour for the purpose of improving performance” (Duijnhower, 2010, p.16).

Although feedback is valued and appreciated by students (Higgins, Hartley, & Skelton, 2002; Yang, Badger, & Yu, 2006), the literature is troubled by evidence which highlights that teachers’ feedback is not well understood (Chanock, 2000) and poorly received (Hattie & Gan, 2011). Brookhart (2008) argues that “even the most elegantly phrased feedback message will not improve learning unless both the teacher and student learn from the feedback process, and unless the student has, and takes advantage of, an opportunity to use the feedback” (p. 2). This is echoed by evidence which alerts that feedback does not necessarily result in improved learning (Bailey & Garner, 2010; Crisp, 2007; Lew, Alwis, & Schmidt, 2010; Wingate, 2010), and one-third of feedback interventions actually served to decrease learning (Kluger & DeNisi, 1996). Teachers’ feedback is often ambiguous, making comprehension difficult; subsequently, students are left to decode what they ought to do in post-feedback, which renders feedback unproductive (Brophy & McGill, 1998; Chanock, 2000; Ding, 1998; Laurillard, 1993; Sadler, 2010; Sutton & Gill, 2010).

1.3 Monologic feedback practices

Feedback ought to be seen as a “challenge tool, where learners clearly understand very well, and the feedback is an attempt to extend and refine their understandings” (Evans, 2013, p. 72). However, scholars have critiqued that the “impoverished
dialogue” (Nicol, 2010, p. 1) arising from monologic feedback debilitates learning. As the receipt of feedback does not necessarily equate to one’s ability to know what to do with it, and how to act on it (Higgins et al., 2002), transmissive feedback hinders learning (Nicol, 2010; Nicol & MacFarlane-Dick, 2006). For instance, students have been reported to give up, remain passive, confused, and unskilled in knowing how to improve their learning (Boud & Molloy, 2013; Chanock, 2000; Weaver, 2006). When students are unable to make sense of feedback (Boud, 2000; Pokorny & Pickford, 2010), feedback becomes susceptible to student assumption and interpretation of what is expected instead of what should and ought to be done (Chanock, 2000).

As feedback is only considered feedback if a gap has been closed and impact on learning has been achieved (Draper, 2009; William, 2011). Feedback that is not well understood is deemed useless (William, 2011) or “dangling data” (Sadler, 1989, p. 121). Sadler (2010) maintains, “(l)earning from being told is a flawed strategy … to depend on telling…is to rely on the information transmission model’ (p. 548). Moreover, “a student who automatically follows the diagnostic prescription of a teacher without understanding of its purpose will not learn” (Black & William, 1998, p. 54). This is a concern because such disconnect with feedback may further encourage low motivation to learn (Mutch, 2003), especially for the already disinterested or the academically weak. This situation has raised the urgency to “acknowledge the active role that students must play in such processes” (Nicol, Thompson, & Breslin, 2014, p. 103) because when feedback relies on “a unidirectional transmission of knowledge” (Price et a., 2011, p. 880), students remain passive recipients.

However, extant literature across the various educational levels continue to report that monologic feedback practices are still ubiquitous (Dowden, Pittaway, Yost, & McCarthy, 2013; Evans, 2013; Lee, 2008; Nicol, 2010; Noor, Aman, Mustaffa, &
Teo, 2010; Robinson, Pope & Holyoak, 2013). Across the various educational levels from primary to secondary and higher education, the feedback literature has consistently reported monologic feedback as the default practice among teachers. For example, Robinson and colleagues (2013) investigated undergraduate students’ (N=166) satisfaction of teachers’ written feedback in coursework through questionnaires. Some students expressed being upset by teachers’ written feedback, and experienced severe negative emotional responses towards teachers’ monologic feedback. In addition, teachers’ feedback was unclear, and students did not know how to use feedback to engage in independent, self-regulating behaviours to improve performance. While issues such as feedback timeliness and legibility were raised, students also expressed preference for verbal feedback to clarify written feedback. Although the miscommunication on written feedback was raised, how these may be done remain unclear.

Similarly, Dowden and colleagues (2013) investigated undergraduates’ perceptions of teachers’ written feedback (N=62) through surveys and focus-group interviews and found several dissatisfactions towards teachers’ monologic feedback. Students expressed frustration over teachers’ cryptic comments and the strong negative emotions arising from monologic feedback outweighed the benefits of feedback. Although warm and supportive teacher-student relationships were identified as corollary in mediating written feedback, the specific ways in which this may be accomplished remain vague.

In secondary schools, research also informs that students face difficulty understanding teachers’ feedback, and learning is hampered. For example, Lee (2008) documented Grade 7 secondary school students’ (N=58) reaction to teachers’ written feedback in second language writing in Hong Kong through quantitative and qualitative data (e.g., questionnaires, protocols, and checklists). Students reported teachers’ one-way,
written feedback relating to error correction as illegible and not well understood, thus hindering their ability to act on given feedback. Ironically, although students of a lower proficiency needed feedback to progress learning, these students became less interested in learning because feedback was not understood. Lee (2008) underscores that although error feedback is important for gap closure, an overemphasis may cause resistance to learning.

As teachers’ pedagogical approach and interpersonal contexts have been acknowledged as important to the feedback process, this situates the need for further work to explicate how teachers facilitate learning from feedback through interpersonal contexts. In Wilson and Czik (2016), a quasi-experimental study was implemented over 11 days using the automated essay evaluation (AEE) in English Language Arts classes. Teachers’ verbal feedback, students’ writing motivation, and final draft writing quality was examined using AEE. In this experiment, four 8th grade classes received both teacher’s verbal feedback and AEE, while another four classes only received teachers’ feedback on Google Docs. The AEE is aimed at providing immediate feedback to students in the U.S through essay ratings and suggestions for improvements (Shermis & Burstein, 2013). Advantages of the AEE include timeliness of feedback for students, enabling it to be immediately actionable (Foltz, Streeter, Lochbaum, & Landauer, 2013). Although technology was meant to free up teachers’ time to focus on higher level writing skills, teachers’ verbal feedback continues to be monologic and transmissive, focused on error correction rather than using questions to stimulate thinking. Although there was no difference in the final writing quality for both groups, students who received both AEE feedback and teachers’ verbal feedback increased in writing motivation. While this study informs us about certain advantages such as timeliness of feedback and potential time-saving gains through technology,
others have critiqued the use of technology as inadequate and argued that teachers are irreplaceable (Ericsson & Hasswell, 2006; Foltz, 2014). Higgins and Heilman (2014) raised reservations on such software programmes, as the psychometric properties of the software scores students’ work and allocates high scores based on students’ essay length, and complexity of word choice, which may not be entirely reflective of work quality, and may potentially not detect gaps in student understanding.

Within the primary school context, Noor and colleagues (2010) explored teachers’ (N=4) verbal feedback over a single 30-minute lesson in English as a Second Language (ESL) classrooms. The authors found that teachers’ verbal feedback remained monologic, evaluative, reliant on praise and corrective feedback (63%). Although the authors acknowledge and highlight that reliance on such forms of feedback do not provide sufficient support for students’ learning, and teachers’ dialogue related feedback was recommended (Noor et al., 2010), how this may facilitate learning remains uninterrogated.

As evidence has highlighted, monologic feedback is consistently prevalent, extensive, and incapable of communicating meaningful knowledge because it focusses on the product as opposed to the process (McFadden & Munns, 2002; Price et al., 2011). Its over-emphasis on error-correction has been argued as unbalanced as it only addresses content (Evans, 2013), and “fails to recognise… (the) complexity (of feedback) as a unique form of communication” (Higgins, Hartley, & Skelton, 2001, p. 269). Evans (2013) highlights that feedback should not be viewed in isolation as a mere product in content, but as a process, a continuum, where both cognitivist and constructivist perspectives are integral in feedback.

In a cognitivist approach, monologic feedback commonly occurs with direct telling, and corrective feedback is supplied by an expert to a passive learner. While error correction
is important for gap closure, studies have extensively reported that it is inadequate to enhance understanding (Dowden et al., 2013; Lee, 2008; Noor et al., 2010). The constructivist approach (Smith, Blakeslee, & Anderson, 1993) on the other hand is facilitative, involves dialogue, suggestions, and leads students towards understanding (Archer, 2010) as open questions are used to engage higher order thinking and elaboration of answers (Baird & Northfield, 1992). In this process, teachers are responsive towards students’ answers, yet maintain a non-evaluative stance and consciously encourage student thinking and evaluation using the metaphor of a “reflective toss” (van Zee & Minstrell, 1997). This metaphor describes how the teacher encourages the student to be actively engaged in the thinking process. First, the teacher seeks to understand a student’s prior statement or answer. However, instead of dispensing the solution, the teacher tosses the opportunity to rethink back to the student for evaluation. As suggested here, both cognitivist and constructivist approaches are not mutually exclusive, but they complement one another. We contend that when used in conjunction with verbal and non-verbal behaviours in feedback, meaningful insights may be gleaned.

Therefore, in order that students may be meaningfully engaged in the feedback process (Nicol, 2010; Price et al., 2011), the integration of cognitivist and constructivist approaches are necessary. To achieve this, students should be given the opportunity to respond and engage with the teacher so that learning, understanding, and improvements from feedback may occur (Cree, 2000; Gibbs & Simpson, 2005; Nicol & Macfarlane-Dick, 2006; Price et al., 2010). In response to these issues, feedback dialogue has been suggested to be pivotal to the learning process (Boud & Molloy, 2013; Carless, 2013; Mulliner & Tucker, 2017). Feedback dialogue is purported to be important because in its absence, students may not follow up on feedback (Crisp, 2007), thus debilitating
them from making useful connections and consolidating feedback into their learning (McCune & Hounsell, 2005; Merry, Price, Carless, & Taras, 2013; Orsmond, Merry, & Callaghan, 2004).

1.4 Feedback dialogue; its composition and challenges

Dialogue has been established as key in thinking and language, and holds potential to shape cognitive development (Bakhtin, 1981). As such, many have echoed the recommendation for feedback dialogue to facilitate students’ active reflection (Boud & Molloy, 2013; Handstedt, 2015; Nicol & Milligan, 2006). However, despite attempts to elucidate feedback dialogue, definitions remain inconclusive, and dialogue in its full composition (i.e., verbal and non-verbal aspects) has not been fully explicated. For example, some define it as a “two-way communicative exchange” (Dixon 2011, p. 73), “dialogue to support learning in both formal and informal situations” (Askew & Lodge, 2000, p. 1), and process which entails “elicit(ing) perceptions and judgements, and discerning what is needed for improved action” (Boud & Molloy, 2013, p. 709). While Boud and Molloy (2013) provide important clarity in explaining the aim of feedback dialogue, the ancillary verbal and non-verbal aspects of feedback dialogue that support learning remain unarticulated. Similarly, while Carless (2013) calls for feedback dialogue to be “an interactive exchange in which interpretations are shared, meanings negotiated, and expectations clarified” (Carless 2013, p. 90), what is unaddressed in these definitions are the verbal and non-verbal aspects that complement dialogue.

We contend that the close inspection of verbal and non-verbal aspects within feedback dialogue is pertinent for several reasons. As previously highlighted, feedback that is monologic is transmissive and only addresses content. Such one-way communication in feedback is often unclear (Chanock, 2000), incapable of clarifying misconceptions and
fails to support learning as students are unsure of how to proceed (Lee, 2008; Noor et al., 2010). Often neglected, are the social and emotional aspects of feedback (Small & Attree, 2016). As feedback also has the propensity to spark emotional tension (King et al., 2009), attention to these aspects are relevant. Moreover, despite current attempts at feedback dialogue, research informs that teachers still revert to the mode of transmission, rather than interactive communication that supports students’ learning and understanding. For instance, work by Blair and Ginty (2013) highlight that whilst teachers enact feedback dialogue, approaches have remained ‘top-down’ and transmissive, with teachers justifying written feedback rather than engaging students in explaining their thoughts. As “both the construction of feedback comments and their reconstruction by feedback recipients are influenced by the interaction between staff and students, as well as the feedback environment” (Price et al., 2011, p.880-881), we therefore argue that the intricacies of verbal and non-verbal behaviours during feedback dialogue deserve focused attention.

To support the interactional process of feedback dialogue, Carless (2013) underscores the importance of trusting relationships. According to Carless (2013), “feedback dialogue is facilitated when teachers and students enter into trusting relationships in which there are ample opportunities for interaction about learning and around notions of quality” (Carless, 2013, p. 90). As how students receive feedback is important (Smith & King, 2004), relationships are crucial because learning and cognitive development are facilitated through interactive, social communication (Alexander, 2008; Vgotsky, 1962). Moreover, while social relationships in the feedback context “shape the interpretation processes and make possible the development of shared understanding” (Price, Handley, O’Donovan, Rust, & Millar, 2013, p. 42), trusting relationships encourage feedback receptivity and uptake of feedback (Carless,
As the relational and interactional processes that accompany feedback are crucial (Alexander, 2006; Carless, 2013; Price et al., 2011), we turn to Self-Determination Theory (SDT; Deci & Ryan, 2000) and Respectful Inquiry (RI; van Quaquebeke & Felps, 2018) to frame this work and guide our understanding.

### 1.5 Theoretical framework: Self-determination Theory and Respectful Inquiry

#### 1.5.1 Self-Determination Theory (SDT)

SDT is a macro theory of human motivation, which postulates that individuals are interested to learn and grow in knowledge (Niemiec & Ryan, 2009). Importantly, SDT also explains how motivation is socially determined, and dependent on an individual’s interaction with the social environment (Legault, 2017). According to SDT, all individuals have three innate psychological needs (i.e., autonomy, competence, and relatedness) (Deci & Ryan, 2000) which when fulfilled, enhances students’ intrinsic motivation, self-efficacy, self-regulation, and well-being (Deci et al., 1981; Niemiec, Ryan, & Deci, 2010; Standage et al., 2006; Sparks et al., 2015). However, the extent to which individuals feel that these psychological needs are fulfilled depends on how it is interpreted within a social context (Ryan & Deci, 2002). The more the social environment satisfies psychological needs, more positive outcomes ensue (Deci & Ryan, 2012).

SDT has been shown to have relevant application across a wide array of sectors including health (Russel & Bray, 2010), sports (Gagné, Ryan, & Bargmann, 2003; Pelletier, Fortier, Vallerand, & Brière, 2001), work (Nie, Chua, Yeung, Ryan, & Chan, 2014; Fernet, 2013), and relationships (La Guardia & Patrick, 2008). Within the educational context, these psychological needs of autonomy, competence, and relatedness can be nurtured by teachers in the classroom (Guay & Vallerand, 1997). When students’
psychological needs are supported, positive learning outcomes such as motivation, self-regulation, perceived competence, enjoyment, and self-efficacy are reported (Chirkov & Ryan, 2001; Deci, Schwartz, Sheinman, & Ryan, 1981; Sparks et al., 2015; Standage et al., 2006; Tsai, Kuner, Lüdtke, Trautwein, & Ryan, 2008). Similarly, a large corpus of studies have highlighted the importance of providing supportive environments so that learning is meaningful, engaging, and motivating for students (for example see; Cox & Williams, 2008; Kiemer, Gröschner, Pehmer, & Seidel, 2015; Ntoumanis & Standage, 2009; Schuitema, Peetsma, & van der Veen, 2016; Sparks, Dimmock, Lonsdale, & Jackson, 2016; Sun, Li & Shen, 2017; Reeve & Lee, 2014; Roth, 2014; Ruzek, Hafen, Allen, Gregory, Mikami, & Pianta, 2016). Here, we outline each of these psychological needs, describe how teachers’ interactional behaviours demonstrate support for them, and the outcomes that follow.

1.5.2 Autonomy support

Autonomy refers to the volitional regulation of one’s self, or an individual’s experience of being self-governing and being the initiator of one’s own activities (deCharms, 1968). According to Ryan and Deci (2006), individuals who are autonomous are authentically motivated to engage in a continuous learning process about self. Self-determined motivation, or autonomous motivation refer to an individual’s execution of behaviours or tasks originating from a sense of volition and agency.

In the educational context, teacher behaviours that encourage choice and involvement in the learning process reflect autonomy support (Assor, Kaplan, & Roth, 2002; Reeve & Halusic, 2009). Autonomy supportive behaviours include the acknowledgement of perspectives, interpersonal tone of support and understanding
(Reeve, 2015), and an absence of controlling language (Su & Reeve, 2011). When teachers enact autonomy supportive behaviours that inform rather than dictate, and encourage personal initiative (Assor et al., 2002; Deci & Ryan 2000; Reeve 2006; 2009), several positive educational outcomes are evidenced. These include; improved academic performance, interest, persistence, intrinsic motivation, and lowered stress levels (Jang, Kim, & Reeve, 2012; Núñez, & León, 2015; Reeve & Jang, 2006; Standage et al., 2006; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Others concur that teachers’ provision of autonomy supportive classrooms foster a greater sense of capability and motivation in students with regard to their studies (Hein & Hagger, 2007; Litalien, & Guay, 2015; Pelletier et al., 2001).

Conversely, when autonomy suppressive behaviours are present, psychological needs are frustrated. Students perceive teachers as controlling, and detrimental outcomes such as anger and anxiety ensue, leading to increased controlled motivation, amotivation and extrinsic motivation (Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015).

1.5.3 Competence support

Competence relates to an individual’s sense of confidence in one’s interaction with the physical and social environment (Deci & Ryan, 2002). Competence support refers to the provision of optimal challenge, guidance, structure, immediate and non-evaluative feedback and teaching learning strategies (Deci & Ryan, 2000; Jang et al., 2010; Ryan, Patrick, Deci, & Williams, 2008). Research informs that the synergy between competence and autonomy support is important because when individuals are volitionally engaged, they are more receptive to learning and therefore, become more inclined to apply new strategies and competencies (Markland, Ryan, Tobin, & Rollnick, 2005). Moreover, as
competence itself is inadequate in ensuring adherence, autonomy helps to facilitate and promote the internalization of competence (Deci et al., 1981; Ryan et al., 2008).

1.5.4 Relatedness support

Relatedness is crucial to optimal human development (Baumeister & Leary, 1995) and refers to the quality of interpersonal relationships, the sense of being cared for, belonged, and feeling connected to significant others (Baumeister & Leary, 1995; Deci & Ryan, 2012; Ryan & Deci, 2002; Ryan, 1995). When teachers demonstrate relatedness supportive behaviours such as respect, care, and warmth, students show more confidence, persistence, and positive affect in school (Anderman, 1999; Anderman & Ander, 1999; Connell & Wellborn, 1991; Lynch & Cicchetti, 1992; Ryan, Stiller, & Lynch, 1994). The importance of relatedness has been highlighted as integral to the development of motivation (Furrer & Skinner, 2003), and students’ performance in academic subjects improve when they feel connected to their teachers (Martin & Dowson, 2009). Consequently, students are more likely to display autonomous motivation through identified and integrated regulation when they feel a sense of relatedness with teachers (Niemiec & Ryan, 2009).

However, whilst SDT provides the necessary foundation in understanding the significance of fulfilling psychological needs in social contexts, SDT does not elucidate how ancillary verbal and non-verbal behaviours contribute meaningfully in feedback dialogue. Consequently, we turn to Respectful Inquiry (RI) (Van Quaquebeke & Felps, 2018), a theoretical concept derived from management literature which stems from SDT (Deci & Ryan, 2000).
1.6 Respectful Inquiry (RI) framework

According to Van Quaquebeke and Felps (2018), the multidimensional construct of RI, which includes asking questions, question openness, and attentive listening (e.g., eye-contact, head nods, appropriate facial expressions) work synergistically to motivate by supporting one’s psychological needs. The salience of needs supportive environments, as highlighted by Deci and Ryan (2016), is supported by higher quality learning outcomes and development occurring in the presence of psychological needs support. These RI behaviours (i.e., asking questions, question openness, and attentive listening) have motivational power when enacted by the leader during social interactions (Van Quaquebeke & Felps, 2018). Although RI is a theory derived from management literature, its application with feedback dialogue in the educational context is particularly relevant in two ways. First, RI associates dialogue with inquiry through ancillary verbal and non-verbal behaviours. Second, RI is rooted in a theoretical underpinning (SDT) which has examined how teachers’ SDT-supportive behaviours serve to nurture psychological needs satisfaction, resulting in improved well-being, and performance (Jang, Reeve, & Deci, 2010; Reeve, 2015a; Sparks et al., 2015; Kiemer et al., 2015).

While SDT provides the foundational understanding on how individuals are motivated through the fulfilment of psychological needs, the application of RI in the education context is unique and serves to extend the literature by providing insights on the impact of teachers’ ancillary verbal and non-verbal behaviours in feedback. Moreover, as research has recommended for feedback dialogue (Boud & Molloy, 2013; Carless, 2013) and further examination of complexities in feedback such as the surrounding interpersonal contexts (Hyland & Hyland, 2006), we build on previous work and propose for ‘two-way
feedback interaction’ to capture both dialogic aspects of feedback (Boud & Molloy, 2013; Carless, 2013), including teachers’ verbal and non-verbal feedback interactions. Therefore, this work seeks to answer the call, extend knowledge, and provide insights into how teachers’ two-way feedback interaction through verbal and non-verbal behaviours may promote student learning outcomes. Specifically, this work seeks to investigate qualitatively, both student and teachers’ perspective of two-way feedback interaction using RI as a lens and its outcomes, and conduct empirical work to ascertain its impact on students’ self-efficacy, motivation, and metacognition.

1.6.1 Verbal behaviours

Verbal behaviours are essential to the dialogue process as learning occurs in social interaction (Vgotsky, 1978). For example, by asking questions, this conveys to the recipient an interest in opinion as it is posed with an intent to encourage a response (Hawkins & Power, 1999). The act of asking questions also denotes that the questioner has voluntarily ceased to take conversational control, thus supporting one’s autonomy needs, while making the questioner vulnerable (Lee, 1997). By doing so, autonomy support is rendered during interaction to the recipient. When open questions are used, this indicates to the recipient that one is keen to know more, and thought sharing is welcomed (Jablin, 1979). While benefits of open questions have been reported to encourage cognitive thinking, more complex use of vocabulary and syntax, motivation, ownership of learning, and increase metacognitive awareness (Franke et al., 2009; Lee & Kinzie, 2012; Serafini & Blasingame, 2012; Smith & Stein, 2011; Wheatley, 2002), investigation of its use in two-way feedback interaction has not been accessed.

Despite the strength of open questions in engaging, gaining access to insights, promoting thinking, and supporting student motivation (Jurik, Gröschner, & Seidel,
2014; Spitzer & Evans, 1997), research continually reports that students’ thinking in feedback is not sufficiently requested (Dekker et al., 2013; Nichols, 2014; Wilson & Czik, 2016). For example, Dekker and colleagues (2013) investigated the effect of teachers’ (N=43) written feedback in enhancing students’ reflective competence through essays in the context of higher education. Results report that only 25% of written feedback were classified as stimulating reflection as open questions were utilised. While more frequent use of open questions in a positive tone have been recommended, the specific verbal and non-verbal teacher behaviours that facilitate learning in two-way feedback interaction remain absent.

Of concern, is the predominance of teachers’ use of closed questions and the default feedback practice IRE (Mehan, 1979), which stands for initiation, response, and teacher evaluation. In this feedback routine, the teacher typically asks a recall question using a closed question, which has a predetermined answer. The teacher then evaluates by correcting student response and moves on with teaching. As the IRE discourages students’ articulation of thoughts or questions, this predominance of teacher talk and closed questions has been considered counterproductive, and a barrier to learning (Mercer & Dawes, 2014). Many have raised dissatisfaction with this discourse pattern in feedback (Duschl & Osborne, 2002; Ford & Wargo, 2011; Lemke 1990; Nichols, 2014) because of the restrictive effects on student thinking.

As closed questions hinge on recall or yes-no responses, they do not have the same capacity as open questions to invite elaboration of thought, draw insights nor engage the recipient in meaningful conversation (Döş, et al., 2016; Graesser & Person, 1994). Despite caution that students’ motivation in learning declines when understanding has not been sufficiently cross-examined (Dujnhower, 2010; Price et al., 2011), the use of IRE and
closed questions still persist (Mehan & Cazden, 2015; Resnick et al., 2015).

Consequently, students’ input and thinking are insufficiently stimulated through questioning (Dekker et al., 2013; Nichols, 2014), thereby reinforcing passive learning and dependence on teachers (Lee, 2008). Moreover, when thinking and reflection is not nurtured through feedback, this “wastes… cognitive and educational potential” (Alexander, 2018, p. 562).

Whilst the literature has raised dissatisfaction with the IRE and monologic feedback practices, there is also a need to understand the contextual challenges that drive teacher-centered behaviours (Barret, 2009). For instance, teachers face work pressures from high stakes testing, tight curriculum, large class sizes, and lack of training on effective feedback practices, this inadvertently compromises quality teaching and learning (Carless & Boud, 2018; Chin, 2006; Fitzgerald, Danaia, & McKinnon, 2016). Consequently, surface learning approaches ensue (Yerdelen-Damar & Elby, 2016), impacting motivation towards learning (Harlen & Crick, 2003; Ryan & Weinstein, 2009), and reduced conceptual depth of understanding for students (Comber, 2012; Grolnick & Ryan, 1987; Ryan & Weinstein, 2009; Thompson & Harbaugh, 2013). However, as feedback holds potential to influence learning (Hattie, 2012), and dialogue in feedback is opined to encourage reflection and engagement (Sutton, 2009; Price et al., 2011), it appears germane to investigate teacher perceptions on the possible barriers in two-way feedback interaction.

1.6.2 Non-verbal behaviours

In tandem with verbal behaviours, non-verbal behaviours are also ancillary to the dialogue process. Within the education literature, teachers’ non-verbal behaviours,
or immediacy non-verbal behaviours (e.g., physical proximity, frequent eye-contact, smiling, and open body position) (Andersen 1979; Mehrabian, 1969; 1971; Witt et al., 2004) have been acknowledged as powerful (Mackay, 2006) in impacting students’ interest and learning (Frymier, 1994; Mazer, 2012). These behaviours have been associated with reduced psychological distance between individuals (McCroskey, Valencic, & Richmond, 2004), and the ability to enhance positive relations including identity and affirmation (Mehrabian, 1969; 1971). For example, teachers’ non-verbal behaviours such as facial expressions, forward lean, tone of voice, and body language (Feldman, 1990; Martin & Mottet, 2011) have been reported to influence psychological attachment, impact rapport building, and influence students’ motivation to learn (Comadena, Hung, & Simonds, 2007; Christophel & Gorham, 1995; Frymier, 1993; 1994; Kerssen-Griep & Witt, 2012; Kerssen-Griep & Witt, 2012; Okon, 2011; Witt et al., 2004).

Given the influential qualities of teachers’ non-verbal behaviours towards students’ well-being and learning, this underscores the significance of this investigation because feedback is both interactional and relational (Carless, 2013; Nicol, 2010). However, the uniqueness of RI (Van Quaquebeke & Felps, 2018) lies in the dual combination of both verbal and non-verbal behaviours during feedback interaction, which has not been explored in the educational context.

According to RI scholars (Van Quaquebeke & Felps, 2018), non-verbal behaviours such as attentive listening (i.e., eye contact, head nods, and appropriate facial expression) is important because of the message it conveys during interaction. Attentive listening demonstrates to the other that the individual’s thoughts are valued and is of interest to the listener (Bavelas, Coates, & Johnson, 2000; Hargie & Dickson, 2004; Pasupathi & Billitteri, 2015). As feedback involves more than just delivery of content, but includes social and emotional aspects (Carless, 2013; Small & Attree, 2016), we contend
that teachers’ ancillary non-verbal behaviours in two-way feedback interaction are pivotal and cannot be neglected. By listening attentively, perceptions may be obtained and underlying misconceptions surfaced to address learning gaps more effectively.

While some contend that both empathy and assertiveness need to be present during feedback dialogue episodes (Orsini, Evans, Binnie, Ledezma, & Fuentes, 2016), others argue that listening provides greater leverage as it not only serves to heighten students’ sense of self-determination (Deci & Ryan, 2000; Gagné & Deci, 2005), it also strengthens their inner belief that they can proactively own their learning (Whipp, Taggart, & Jackson, 2014). Moreover, listening is linked to knowledge building, motivation, resilience, and sense of care (Frankel & Stein, 1999; Johnson, 2008; Ma, 2008; Schein, 2013).

However, although teachers’ listening behaviours have been the subject of interest and regarded as influential towards students’ learning motivations (McDonough & Clarke, 2003; Pöysä, Vasalampi, & Muotka, 2018; Wesely, 2009), the articulation of teachers’ RI-related (Van Quaquebeke & Felps, 2018) verbal and non-verbal behaviours in the context of two-way feedback interaction which are meaningful towards student learning outcomes remain under-researched. For example, McDonough and Clarke (2003) conducted one-on-one interviews with highly effective Mathematics teachers (N=6) from Prep to Grade 2. Amongst the twenty-five key themes identified, teacher practices under the category of learning community and classroom interaction were suggested to be effective. These include listening attentively, encouraging children to explain their thinking, using a range of questions to probe reasoning, and holding back from telling children everything. While these behavioural practices of effective teachers undergird the importance of teachers’ listening and use of questions to promote
learning, these attributes were more generic to teaching, and its application to two-way feedback interaction remain unclear.

Moreover, while studies have explored teachers’ non-verbal behaviours in feedback, the interrogation of teachers’ non-verbal and verbal behaviours in two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018) remains of interest. For example, Kerssen-Griep and Witt (2012) investigated undergraduate students’ ($N=269$) perceptions of teachers’ non-verbal immediacy cues (e.g., eye gaze, open body gestures, physical proximity) and face-threat mitigation tactics (i.e., qualifiers, tactful hedges, expressions of solidarity) through a pre-recorded video and its impact on learning motivation. Students were randomly assigned to one of four video scenarios (i.e., high face-threat mitigation, low face-threat mitigation, high non-verbal immediacy cues, low non-verbal immediacy cues) where they received one-way feedback through a pre-recorded video. Students subsequently reported their motivation and perceived fairness of the instructor’s feedback via surveys. Results reveal that students’ motivation to learn was heightened by high face-threat mitigation in the presence of non-verbal immediacy cues, demonstrating the importance of non-verbal behaviours in making feedback less threatening. However, this work was experimental and feedback was not two-way, in situ. Moreover, both student and teacher perceptions on how teachers’ verbal and non-verbal behaviours contribute towards learning from two-way feedback interaction are absent.

In Steen-Utheim and Hopfenbeck (2018), undergraduate students’ ($N=12$) experiences with oral and written feedback was explored via self-reflection logs within a portfolio assessment design. Feedback was received from five written assignments (written feedback) and two oral presentations (verbal feedback). While teachers’ verbal feedback and relational dimensions were reported as valuable in providing feedback clarity, engagement, motivation, self-confidence, and self-regulation, the actual verbal and non-
verbal teacher behaviours during such feedback interactions were not accessed. Unsurprisingly, teachers’ written feedback was also met with frustration and dissatisfaction due to a lack of specificity and elaboration. Although trusting relationships between teacher and student were highlighted as important in promoting understanding, how this may be fulfilled through specific verbal and non-verbal RI behaviours of asking questions, question openness, and attentive listening remain unreported.

Others have reported benefits of teachers’ listening behaviours in non-feedback contexts. For instance, work by Wesely (2009) with Grade 6 students’ (N=6) using interviews and surveys highlight that students’ learning motivations may be influenced by teacher relationships, especially when teachers demonstrate helpfulness and patience by listening. However, this was in the context of French language learning and teachers’ actual verbal and non-verbal behaviours (i.e., asking questions, question openness) in the context of two-way feedback interaction were not reported. Pöysä and colleagues (2018) also explored teacher-student interactions (i.e., emotional support, instructional support, and classroom organisation) and its impact on Grade 7 students’ (N=709) engagement in learning. Video recordings and surveys indicate that when teachers display higher emotional support (e.g., positive climate, teacher sensitivity, warmth, mutual respect, and regard for adolescent perspectives), this was associated with students’ higher emotional engagement and willingness to seek help and guidance. However, no significant relationships were found between teachers’ emotional support and students’ behavioural/cognitive engagement and competence. As the literature has highlighted positive effects of teachers’ non-verbal behaviours and verbal behaviours, this warrants further investigation of teachers’ two-way feedback interaction through RI
(Van Quaquebeke & Felps, 2018), to extend our understanding of how students’ higher learning outcomes may be effectively accessed and nurtured.

Importantly, the existing research aims to record student and teacher perceptions of RI (Van Quaquebeke & Felps, 2018), its definition and the components that they as educational stakeholders believe constitute RI (Van Quaquebeke & Felps, 2018). As “feedback is not simply a matter of linear communication, but involves a complex web of emotion, identity, power, authority, subjectivity, and discourse” (Higgins et al., 2001, p. 272), it appears germane to investigate how RI-defined behaviours such as asking questions, question openness, and attentive listening serve to support psychological needs, motivate and facilitate learning.

Furthermore, as student learning outcomes such as motivation (Deci & Ryan, 2008), self-efficacy (Bandura, 1986), and metacognition (Flavell, 1976) are important in education, this work seeks to examine if teachers’ RI-related verbal and non-verbal behaviours in two-way feedback interaction might advance the literature. Therefore, this research not only aims to use RI as a lens, but also to clarify its dimensions, elucidate its application to feedback and its potential predictive relationships with learning-related dispositions in the educational context.

1.7 Motivation

Motivation, according to SDT, ensues when an individual’s basic psychological needs (i.e., autonomy, competence, and relatedness) are satisfied through social interaction (Deci & Ryan, 2008b). Defined, intrinsic motivation refers to one’s inherent interest and enjoyment in engaging in an activity (Ryan & Deci, 2000). The impact of motivation has been well-established to support a host of benefits in the literature; it sustains student

However of concern, is evidence from extant literature which has documented a declining trend in students’ self-regulated learning behaviour (Peetsma, Hascher, Veen, & Roede, 2005) and intrinsic motivation over time (Corpus, McClintic-Gilbert, & Hayenga, 2009; Gottfried, Marcoulides, Gottfried, Oliver, & Guerin, 2007; Lepper et al., 2005; Opdenakker et al., 2012; Van der Werf, Opdenakker, & Kuyper, 2008). As students’ declining academic motivation in secondary education (Eccles et al., 1998) has been attributed to a mismatch of learning needs and traditional classroom practices (Ford & Wargo, 2011; Maulana et al., 2016; Nichols, 2014), this supports the need for empirical work pertaining to RI-related (Van Quaquebeke & Felps, 2018) two-way feedback interaction.

To date, only a few studies have considered motivation in relation to SDT and feedback (Katz, Assor, Kanat-Maymon, & Bereby-Meyer, 2006; Orsini, Binnie, Wilson, & Villegas, 2017). Katz and colleagues (2006) examined student interest and the effect of positive feedback on motivation Year 7 Israeli students ($N=91$) through logic puzzles. This experiment was, however, limited to two sessions, where feedback was provided to students after completing a set of ten questions. Results indicate that for students who had moderate levels of interest, positive feedback increased motivation in boys, but decreased with girls, indicating that girls perceive such feedback differently and regard it as more externally controlling (Deci, 1975; Kast, & Connor, 1988).
Although gender effects in feedback receptivity are also worthy of inspection, this aspect is beyond the scope of the current research. Whilst positive feedback was provided through verbal feedback in the Katz and colleagues (2006) study, empirical work was not done, and the specific teacher behaviours such as asking questions, question openness, and attentive listening (Van Quaquebeke & Felps, 2018) in two-way feedback interaction were not reported.

Orsini and colleagues (2017) explored how the fulfilment of basic psychological needs (i.e., autonomy, competence, and relatedness) mediated learning climate, feedback, and motivation. In this cross-sectional correlation study, self-reported questionnaires were obtained from Chilean students (N=924) in higher education, and results found that both feedback quantity and quality, alongside with autonomy supportive learning climate (i.e., warm, encouraging, provides choice and rationale) positively predicted students’ autonomous motivation. When feedback is delivered in a needs-supportive way that is constructive, positive, timely, and includes dialogue that encourages self-assessment and reflection, this promotes autonomous motivation. While this work shows the importance and potential effects that ensue when basic psychological needs are fulfilled in the context of feedback, empirical work that interrogates the specific verbal and non-verbal teacher behaviours in two-way feedback interaction has not been examined. As teachers’ non-verbal and verbal behaviours are influential in affecting learning (Kluger and Lehman, 2018; Martin & Mottet, 2011; Serafini & Blasingame, 2012), the exploration of how two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018) motivates learners deserves attention, and will also serve to address current gaps in the literature and provide insights for educators.
1.8 Metacognition

Metacognition is relevant in the feedback context as researchers contend that education should move beyond information acquisition and information processing; students should be taught metacognitive strategies such strategies in self-monitoring and self-regulation (Pintrich & García, 1994; Weinstein & Mayer, 1986). Metacognition, according to Flavell (1976), is an individual’s knowledge about his own cognition or his own self-assessment, and his self-management ability to control his cognitive development. In other words, it may simply be understood as “cognition about cognition” (Flavell, 1985, p. 104), or the awareness of one’s thinking and learning (Flavell, 1979; Pintrich, 2002; Schraw, Crippen, & Hartley, 2006). Brown (1987) further delineated metacognition as consisting of two major components: knowledge of cognition and control of cognition. Individuals who are metacognitively aware are cognizant of what they know and where they lack knowledge of; they also know how to regulate or adapt their cognitive mental processes, resulting in improved efforts to retain or seek out new information (Dunslosky & Metcalfe, 2009; Griffith & Ruan, 2005).

The acquisition of metacognitive skills is an important learning outcome in education as its acquisition not only influences students’ self-regulatory development, it is also significant to learning (McCormick, 2003; Winne & Nesbit, 2010; Zhao & Mo, 2016). According to Zimmerman (2001), “students are self-regulated to the degree that they are metacognitively, motivationally, and behaviourally active participants in their own learning process” (p.5). When students are actively involved in the learning process (Ozturk, 2017; Paris & Paris, 2001), they become more metacognitively aware, and higher learning outcomes ensue (Mayer, 2008). For example, it facilitates transfer from
one context to another (Bransford, Brown, & Cocking, 1999), and accounts for academic success (Nota, Sorei, & Zimmerman, 2005; Winne & Nesbit, 2010; Zohar & Peled, 2008). Moreover, meta-analyses have reported that students who are more metacognitively aware attain higher achievements in mathematical problem solving and scientific reasoning (Dinsmore, Alexander, & Loughlin, 2008; Donker, de Boer, Kostons, van Ewijk, & van der Werf, 2014).

While metacognitive skills may be developed from a young age and cultivated through adolescence (Schraw & Moshman, 1995), research informs that students’ metacognitive skills are not fully developed and they lack awareness about their learning deficits (Cao & Nietfeld, 2007). Moreover, a considerable body of work has indicated that feedback predominantly focuses at the task level, involving how well a task was performed and understood, rather than engaging students’ self-regulation in the metacognition process (Arts et al., 2016; Glover & Brown, 2006; Hattie & Timperley, 2007; Orsmund & Merry, 2011). This is problematic, because “students without metacognitive approaches are essentially learners without direction and ability to review their progress, accomplishments, and future learning directions” (Q'Malley et al., 1985, p.24). To overcome this, researchers have recommended that metacognitive awareness be fostered through instructional quality such as feedback (Callender, Franco-Watkins, & Roberts, 2016).

Currently, while studies have explored feedback on students’ metacognition in e-learning environments and hand-held devices (Ke, 2008; Kramaski & Gutman, 2006; Lee et al., 2015; Mevarech & Fridkin, 2006), empirical work that specifically examines the impact of teachers’ verbal and non-verbal behaviours in two-way feedback interaction has been scarce. For example, Kramarski and Gutman (2006) explored through experimental conditions, the effectiveness of computer-based, self-questioning on metacognition in
Mathematics. Metacognitive feedback questions such as ‘What is the difference between the expression X and the expression that you found?’ appeared on the computer screen, and students subsequently explained their reasoning through the computer. Students were also exposed to self-metacognitive questioning, which targeted four categories such as comprehension (e.g., What is the problem all about?), connection (What are the similarities and differences between the given problem and problems you have solved in the past, and why?), strategic (What are the strategies/tactics/principles appropriate for solving the problem and why?), and reflection (e.g., What did I do wrong here? Does the solution make sense?). The results indicated that students who utilised self-questioning in the experimental condition used more self-monitoring strategies and outperformed peers in the control group. These positive results further invite work to empirically evaluate teachers’ actual face-to-face, two-way feedback interaction using verbal and non-verbal behaviours (i.e., asking questions, question openness, attentive listening) that support learning.

Mevarech and Fridkin (2006) examined the effects of self-questions on metacognition and mathematical achievement (through knowledge and reasoning) using the same four categories of metacognitive questions (i.e., comprehension, connection, strategic, and reflection). Questions were first modelled by the teacher, and subsequently practiced by students during their mathematical tasks. Results found that students in the experimental condition significantly outperformed peers in metacognition, mathematical knowledge, and mathematical reasoning. Although teachers provided initial metacognitive guidance through asking questions and question openness, the close inspection of teachers’ ancillary non-verbal behaviours and individualised two-way feedback interaction were undistilled, and empirical work
remains absent. As teachers’ feedback carries potential to foster metacognition in students (Hattie & Timperley, 2007), extant literature supports an investigation into how this may be accessed and facilitated through teachers’ RI-related (Van Quaquebeke & Felps, 2018), verbal and non-verbal behaviours in two-way feedback interaction.

Lee and colleagues (2015) explored through student interviews (N=35) and surveys (N=206), the impact of a classroom communication technology (CCT), which linked student responses from hand-held devices to the teachers’ computer, on students’ learning and engagement. Results found that CCT served to raise students’ metacognitive regulation as the public display of their responses caused them to be more reflective. In addition, students perceived that the use of CCT increased opportunities for formative feedback as teacher awareness of their understanding was enhanced. However, whilst active interaction between teacher and peers was reported, teachers’ actual verbal and non-verbal behaviours in two-way feedback interaction was yet to be examined. Although technology in e-learning environments may assist students’ metacognitive awareness and regulation (Kramarski & Gutman, 2006; Lee et al., 2015), such a resource may not always be accessible. In the absence of technology, what teachers say and do matter as it impacts learning (Reeve & Jang, 2006). Besides, as empirical research exploring teachers’ two-way feedback interaction through verbal and non-verbal behaviours remain scarce (Kramarski & Gutman, 2006; Lee et al., 2015; Mevarech & Fridkin, 2006), this underscores the importance, relevance and meaningfulness of this work.

1.9 Self-efficacy and teacher expertise

In addition to motivation and metacognition, self-efficacy is also pertinent, because self-efficacy is a highly effective predictor of students’ motivation and learning (Zimmerman, 2000). Self-efficacy, according to Bandura (1997) is “the belief in one’s
capabilities to organize and execute courses of action required to produce given attainments" (p. 3). It relates to an individual’s sense of competence and confidence to organize and execute behaviours to achieve a desired outcome (Bandura, 1977). Self-efficacy has been well-acknowledged as instrumental towards student learning outcomes because it has leverage in unlocking other positive outcomes such as motivation and achievement (Chan & Lam, 2010; Lerdpornkulrat et al., 2017; Bray, Balaguer, & Duda, 2004; Escarti, & Guzman, 1999; Mahoney, Devonport, & Lane, 2008).

In a meta-analytic review of nearly 70 studies, student self-efficacy has significant positive effects on academic persistence and motivation (Multon, Brown, & Lent, 1991). Moreover, students with a high sense of self-efficacy demonstrate greater achievement, tenacity, persistence, and have fewer adverse emotional reactions when faced with challenges (Bandura, 1997; Schunk, 1981; Zimmerman, 1989; Bouffard-Bouchard, et al., 1991). Self-efficacy is also catalytic towards metacognitive skills, as students with stronger self-efficacy apply more metacognitive skills, resulting in improved performance compared to students with weaker self-efficacy (Bouffard-Bouchard et al., 1991).

Of equal importance, is literature that underscores the significance of teachers’ self-efficacy and its influence on student’s self-efficacy. Defined, teacher self-efficacy relates to “the extent to which the teacher believes he or she has the capacity to affect student performance” (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p. 137). Self-efficacy in teaching is closely related to many positive outcomes of teaching practice (Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998), and is a significant predictor of classroom practices and quality of instruction (Guo, Piasta, Justice, & Kaderavek, 2010; Justice, Mashburn, Hamre, & Pianta, 2008). For instance, teacher
self-efficacy has been found to have a positive and consistent relationship with teacher behaviour, instructional quality, and learning outcomes (Guo et al., 2014; Son, Han, Wang, Kang, & Kwon, 2016). This has also been supported by others who report that teachers with high self-efficacy demonstrate more positive classroom environment such as productive use of instructional time and evaluative feedback than teachers with lower self-efficacy (Guo, Connor, Yang, Roehring, & Morrison, 2012). Furthermore, teacher self-efficacy has been known to influence thinking skills and learner-centered constructivist instruction (Dilekli & Tezci, 2016; Eren, 2009; Ngidi, 2012; Nie, Tan, Liau, Lau, & Chua, 2013).

Synergistic with teacher self-efficacy is teaching expertise (Hattie, 2003; Palmer, Stough, Burdensky, & Gonzales, 2005). Teacher expertise is pertinent to this work in many ways. According to the literature, expert teachers are more skilful in monitoring and providing feedback, unpacking misconceptions, explicating concepts to the learner and demonstrating high care towards students’ affective needs (Berliner, 2004; Bond, Smith, Baker, & Hattie, 2000; Hattie, 2003). Moreover, teacher expertise may be validated through a combination of various attributes; qualification (3 years or more of relevant teaching experience), recognition (e.g., documented evidence of impact on student performance), and teaching capability (Palmer et al., 2005). With the established qualities of teacher self-efficacy and teacher expertise, attention to expert teachers’ self-efficacy in two-way feedback interaction and its impact on students’ self-efficacy highlights its relevance. Moreover, as feedback naturally carries emotional tension (King, Schrodt, & Weisel, 2009) and concerns surrounding the persistent lack of sufficient guidance in monologic, feedback practices (Blair & Ginty, 2013; Nichols, 2014; Price et al., 2011), this work aims to add knowledge to current literature.
To date, while studies have investigated the teaching behaviours of effective teachers, specific exploration of expert teachers’ self-efficacy in two-way feedback interaction has not been researched. McDonough and Clarke (2003) studied highly effective mathematics teachers (N=6) in elementary school and proposed a comprehensive framework describing effective teaching behaviours in ten domains (e.g., mathematical focus, features of tasks, materials, tools and representations, adaptations/connection/links, organisational style and teaching approaches, learning community and classroom interaction, expectations, reflection, and assessment methods), which were further distilled into 25 teaching behaviours. While effective teachers are considered to enact high quality behaviours that encourage students to explain their thinking through a range of question types alongside attentive listening, their self-efficacy in two-way feedback remains unassessed. Moreover, as the teacher participants were selected based on students’ subject-specific growth in mathematics established on the criterion set (e.g., number, measurement and space) in the Early Numeracy Research Project and not on scholarly-defined characteristics (Hattie, 2003; Palmer et al., 2005), this affects the utility of this finding.

Studies that have explored the utility of feedback on students’ self-efficacy have also reported diverse conclusions (Chan & Lam, 2010; Duijnhouwer et al., 2012). Some agree that feedback improves self-efficacy (Beghetto, 2006; Chan & Lam, 2010; Lerdpornkulrat et al., 2017) while others do not (Brophy, 1981; Duijnhouwer et al., 2012; Henderlong & Lepper, 2002). In an experimental study with undergraduates (N=41), teachers’ feedback and provision of improvement strategies were reported to attenuate students’ self-efficacy (Duijnhouwer et al., 2012). Interestingly, teachers’ feedback recommendations on improvement strategies in writing was perceived by
students as underestimating their capacities and transmissive. In an attempt to shift from merely dispensing prescriptive solutions, feedback dialogue was proposed so as to hear students’ thoughts on subsequent improvement plans. As presented by the literature review on the importance of self-efficacy and its influence towards motivation and learning, further work that clarifies the role of two-way feedback interaction is essential to understand how students’ learning may be actualised.

Others have claimed that feedback is useful in increasing self-efficacy (Chan & Lam, 2010; Lerdpornkulrat et al., 2017). For instance, Chan and Lam (2010) conducted two experimental studies in the secondary school context, examining the influence of four types of performance feedback (i.e., formative, summative, self-referenced, and norm-referenced) on Grade 8 ($N=79$) and Grade 7 ($N=77$) students’ vocabulary self-efficacy. Following an instructional session by the teacher, students engaged in a computer-based vocabulary test and received feedback administered through the computer. Results concluded that both formative and self-referenced feedback (focussed on learning goal) were more effective towards students’ self-efficacy than summative and norm-referenced feedback (focussed on performance goal). While this work highlights the importance of feedback to anchor on learning rather than on performance, this was conducted via computers in an experimental setting which is not representative of teachers’ actual classroom feedback. As such, it is valuable for empirical work to examine how teachers’ classroom feedback routines serve to enhance students’ learning through verbal and non-verbal behaviours.

Lerdpornkulrat and colleagues (2017) investigated through experimental study, the use of rubrics as a form of self-referenced feedback with undergraduates ($N=584$). While results indicate that rubrics increase students’ self-efficacy, information literacy and encourages students’ self-evaluation of current performance vis-à-vis performance goals,
expert teachers’ self-efficacy and concomitant verbal and non-verbal behaviours in two-way feedback interaction were also under-researched. Although feedback through rubrics is beneficial in helping students monitor task engagement and goal progress (Schunk, 2003) especially in large classes, others have cautioned against the full reliance on rubrics, as individualised feedback from teachers have still been preferred to clarify understanding (Chardon, Collins, Hammer, & Hart, 2011). As current work has yet to explicate how teachers’ RI-defined behaviours (Van Quaquebeke & Felps, 2018; i.e., asking questions, question openness, and attentive listening) in two-way feedback interaction impact students’ self-efficacy outcomes, this work fulfils a relevant need and provides furtherance to the feedback literature.

While the behavioural attributes of RI (Van Quaquebeke & Felps, 2018) are theorised to be visible during interaction (i.e. asking questions, question openness, and attentive listening), it is uncertain if teachers carry out these behaviours during two-way feedback interaction, and its impact on students’ self-efficacy remain unclear. As such, there is potential for this investigation to enrich our existing knowledge of feedback, advance our understanding, and provide useful knowledge to inform professional development of teachers.

1.10 Research questions

This research project focusses on investigating teachers’ verbal and non-verbal behaviours in two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018), and its impact on higher learning-related outcomes such as motivation, metacognition, and self-efficacy. A total of three chapters are dedicated to this investigation. However, as RI (Van Quaquebeke & Felps, 2018) is new to the education context, two chapters involve qualitative work to examine student and teacher
perspectives of effective teacher behaviours in two-way feedback interaction. In Chapter 2, student perspectives on teachers’ RI-related (Van Quaquebeke & Felps, 2018), verbal and non-verbal feedback behaviours that enhance learning in two-way feedback interaction are explored. In Chapter 3, teacher perspectives of RI-related (Van Quaquebeke & Felps, 2018) behaviours in two-way feedback interaction are examined and triangulated against that reported in Chapter 2. Finally, this project culminates in Chapter 4, which further interrogates the impact of teachers’ in-class, two-way feedback interaction through teacher-student class observations and student responses to a questionnaire. In accordance, students’ learning-related outcomes such as self-efficacy, motivation, and metacognition are examined. The research questions are:

1. **What are the student-identified, effective teachers’ verbal and non-verbal behaviours in two-way feedback interaction that enhance learning?**
2. **Do the student-identified teacher behaviours in two-way feedback interaction align with teacher perspectives?**
3. **Do expert teachers perceive high self-efficacy in two-way feedback interaction?**
4. **What are the expert teacher perceived barriers to two-way feedback interaction?**
5. **What is the predictive association of teachers’ two-way feedback interaction with students’ learning-related outcomes of motivation, metacognition, and self-efficacy?**

### 1.11 Thesis structure

This thesis is, in accordance with postgraduate and research scholarship regulations of the University of Western Australia, presented as a series of scientific papers that resulted from the research. There are five chapters to this thesis, which consist of an introductory account of the research, followed by three chapters, presented as scientific
papers, which further elucidate each research investigation under question. These three chapters contain an independent introduction, literature review, methods, results, and discussions. As each chapter is concerned with a related research question, there are some unavoidable overlap in the discussion of feedback. These three chapters may be read either as a part of the whole thesis, or as separate entities. Each chapter is independently referenced to acknowledge the contributions of previous related work. Finally, chapter five is a general discussion that summarises the work of these three chapters and recommendations for future work concludes this thesis.
References


Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175.


CHAPTER 2: Students' Perception of Teachers' Two-way Feedback Interactions that Impact Learning

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Chapter 2 Foreword

Previously in Chapter 1, I reviewed relevant literature pertaining to feedback, feedback dialogue, verbal and non-verbal teacher behaviours. Following this review, several directions for future research were identified. Here in Chapter 2, I address the first of these suggested research needs by exploring, through semi-structured focus group interviews, high school student perceptions of effective teacher behaviours in two-way feedback interaction, and the associated learning outcomes.
2.1 Abstract

Teacher-student interactions are fundamental to learning outcomes. However, the facilitation of student-defined, in-class two-way feedback interaction is under-researched. The purpose of this paper is to share insights from Year 9 students (N=32; age=14-15 years), describing effective teacher’s two-way feedback interaction through Respectful Inquiry (RI; asking questions, question openness, and attentive listening). Small-focussed group interviews were conducted and transcripts were inductively analysed to represent the conceptualised effective student-described teacher behaviour and associated learning outcomes. Findings confirm that two-way feedback, as opposed to unilateral teacher feedback, is facilitative of more diverse and higher-order learning outcomes. According to the students, RI is constitutive in two-way feedback interaction. When executed together, positive psychological needs support and metacognition are fostered. While this research was exploratory, the findings offer practical and novel insights on teachers’ two-way feedback interactions that can enhance students’ metacognition and indicates how specific feedback behaviours augment higher-order learning outcomes.

Key words: effective teacher, respectful inquiry, feedback
2.2 Introduction

Feedback enhances learning outcomes (Hattie 2009). However, classroom feedback is commonly delivered by the teacher through unilateral, one-way messages, thereby limiting learning opportunities for students (Boud and Molloy 2013; Sadler 2010). One-way, monologic feedback assumes students are passive learners and fails to address learning misconceptions (Ajjawi and Boud 2017; Boud and Molloy 2013; Van den Berghe et al. 2013). Furthermore, as feedback includes emotional, relational, and social aspects (Carless 2013; Pitt and Norton 2017; Small and Attree 2016), how teachers manage these through two-way, dialogic feedback (Ajjawi and Boud 2017; Boud and Molloy 2017) in a secondary school context remains absent. To access higher-order learning and psychosocial outcomes, the inclusion of cyclical, dialogic feedback has been recognised as important (Ajjawi and Boud 2017; Boud and Molloy 2013; Price et al. 2011). These involve interactions between the teacher and students to “elicit perceptions and judgements, and discerning what is needed for improved action” (Boud and Molloy 2013, p. 709). However, qualitative research involving secondary school students’ in-class perceptions and experiences of how effective teachers engage in such two-way feedback interactions to enhance learning outcomes such as metacognition has not been reported.

Pedagogical reasoning skills (Berliner 2004) that enable teachers to explicate particular concepts and highlight misconceptions (Gardner 1991) is reflective of quality teaching and learning. It is therefore imperative to understand students’ perspectives of how effective teachers enact two-way feedback interactions to motivate, build relationships, and access learning outcomes. As interactions include both verbal and non-verbal aspects, we broadly define such behaviours as ‘two-way feedback interactions’. In the present research, we explore teachers’ specific verbal and non-verbal behaviours such as asking questions, question openness, and attentive listening through ‘respectful inquiry’
(RI; Van Quaquebeke and Felps 2018), a theoretical framework rooted in self-determination theory (Deci and Ryan 2000).

2.3 Feedback

Feedback, broadly speaking, is about closing performance gaps (Nicol and Macfarlane-Dick 2006) by providing “information…regarding aspects of one’s performance or understanding” (Hattie and Timperley 2007, p. 102). Accordingly, positive outcomes are accentuated when feedback is informative, specific, directive, goal-related, and delivered in non-judgemental language (Duijnhoweer 2010; Shute 2008; Van der Kleij et al. 2012). Consistent with this, studies have shown that when feedback actively nurtures students’ ability to regulate their own learning (Nicol 2010; Price et al. 2010), this can accelerate the rate of learning through students’ reflection, self-regulation (Zimmerman 2000), and increase performance outcomes (Fonseca et al. 2011). Conversely, negative outcomes may ensue if feedback is heavily cued, vague, limited to praise, or incomprehensible to the learner (Burnett and Mandel, 2010; Hattie and Timperley 2007; Nett et al. 2012).

While the impact of feedback is well-established in extant literature, it is chiefly one-way (Sadler 2010; Van den Berghe et al. 2013), and its limitations must not be overlooked. Scholarly literature has argued that one-way feedback, while essential, is insufficient. Instead, scholars have advocated that feedback in general, should be viewed as a continuum (Knight 2003), and optimised through two-way dialogic feedback (Ajjiwai and Boud 2017; Boud and Molloy 2013; Price et al. 2011). Executed together, there appears potential to enhance active learning, facilitate capacities for self-regulation, and avoid demotivation (Askew and Lodge 2000; Carless et al. 2011; Zumbrunn et al. 2016). However, research investigating secondary school student
perceptions of teachers’ effective two-way feedback interactions has received far less attention.

2.4 Two-way feedback interaction

Literature discussing two-way feedback interaction highlights its importance; however, the infrequent use of teacher-student interaction during the feedback process is problematic. Moreover, the student-perceived learning outcomes of such interactions through RI have not been reported. For example, Gamlem and Smith (2013) highlighted that two-way feedback interaction was beneficial to the overall feedback process, although they reported its use was rare. Moreover, the specific verbal and non-verbal feedback behaviours that students define as effective in such interactions remain unclear. In instances where marking rubrics were used as a form of feedback, studies have similarly reported that two-way feedback interaction is still needed to clarify expectations and individualised interpretation of comments (Chardon et al. 2011). Although the absence of two-way feedback interaction has been emphasised, research has continued to report that teachers’ default mode of dispensing feedback remains unilateral rather than facilitative (Van den Berghe et al. 2013).

Given that “feedback without engagement is completely unproductive” (Price et al. 2011, p. 894) and students are accorded “little volition, little agency, and (perpetuates) dependence on teachers” (Boud and Molloy 2013, p. 703), these sentiments underscore the importance of student perspectives of two-way feedback interaction. Therefore, the aim of this paper is to offer an extension of current literature to provide clarity on student perceptions of effective two-way feedback interactions, and the associated teacher behaviours that facilitate student learning outcomes.
Two-way feedback interactions elicit perceptions and judgements, and assist learners to define future action (Boud and Molloy 2013). Such interactions indicate latent potential in offering students the opportunity to clarify feedback, ensure understanding, and become agentic, independent learners (Mulliner and Tucker 2017; Price et al. 2011). Moreover, how two-way feedback interaction is initiated is worthy of consideration. Researchers have reported students’ discomfort at initiating feedback dialogue with teachers (Small and Attree 2016) as they do not wish to impose on teachers’ busy schedules (Robinson et al. 2013). In addition, the power imbalance further hinders students from initiating discussion, thus teachers are encouraged to take the lead (Blair et al. 2014). Despite literature reporting students’ preference to interact with teachers on feedback (Chardon et al. 2011; Gamlem and Smith 2013), research that explicates from the students’ perspective to just how teachers enact this will assist to further clarify teaching effectiveness.

Thus this paper explores, from the students’ perspective, how teachers effectively enact these two-way feedback interactions through the lens of respectful inquiry (RI; Van Quaquebeke and Felps 2018). Whilst not previously used in educational research, RI (Van Quaquebeke and Felps 2018) articulates the verbal and non-verbal behaviours of two-way feedback interaction, as it occurs in the feedback process.

2.5 Theoretical framework

2.5.1 Respectful Inquiry (RI) and Self-Determination Theory (SDT)

RI (Van Quaquebeke and Felps 2018) originated in managerial contexts involving conversations between supervisors and employees, where it is theorised to
motivate followers (La Guardia et al. 2000). With its roots in self-determination theory (SDT; Deci and Ryan, 2000), its use is relevant to the current work in two ways. First, RI refers to dialogue through question asking, use of open questions, and attentive listening when delivered in conjunction with feedback. Second, RI is based on SDT, a theoretical underpinning which has consistently served to explore supportive teacher behaviours that nurture psychological needs satisfaction, well-being, and performance (Jang et al. 2010; Reeve 2015a; Sparks et al. 2015; Whipp et al. 2014). Although SDT lays the foundation in explaining the nutriments for motivation and self-regulation, RI articulates in more specific ways, the actual behaviours that might be useful during two-way feedback interaction, thus providing us with more tangible handholds to aid our understanding on teacher-student interactive, dialogue-related feedback behaviours.

SDT states that all individuals have three basic and essential psychological needs – autonomy, competence and relatedness (Deci and Ryan 2000). Within SDT, studies have consistently shown that supportive environments and interpersonal relationships enhance need satisfaction, facilitates autonomous self-regulation, and positively relates to optimal performance (Gagné 2003; Gagné and Deci 2005; Ryan and Deci 2000; Ryan and Deci 2002).

Autonomy refers to a sense of feeling free from pressures and having the possibility to make choices among several courses of action (Guay et al. 2000). Autonomy supportive behaviours signal an interpersonal tone of support and understanding (Reeve 2015a), where student perspectives are acknowledged and non-controlling language is used (Reeve 2015b; Su and Reeve 2011). When autonomy is offered, students experience increased engagement, quality learning, greater intrinsic motivation, and enhanced academic achievement (Guay et al. 2008; Reeve et al. 2004).
Competence refers to the ability to effectively carry out certain planned behaviour, feeling accomplished and skilled in a specific domain. Competence support relates to the provision of structure, guidance, and feedback that influences students’ perceptions that they have the ability to take charge of their learning, and are capable of self-regulating their learning strategies (Jang et al. 2010; Sierens et al. 2009; Skinner et al. 1998). Studies have reported its positive association with students’ behavioural, cognitive, and emotional engagement (Jang et al. 2010; Sierens et al. 2009; Skinner et al. 2008).

Finally, relatedness represents one’s need for belonging, interpersonal security and connectedness. The provision of relatedness support occurs in the presence of affective support, commitment and friendliness in interpersonal relationships, which promotes student motivation, engagement, and self-efficacy towards learning (Sparks et al. 2015). Studies have also reported its positive influence on student motivation, engagement, learning, and its ability to mitigate academic failure (Davis 2003; Wang 2009).

These psycho-social relationships suitably underpin this research, because the provision of one-way feedback in isolation is not sufficient to accelerate learning outcomes (Lew et al. 2010), and as earlier mentioned, feedback is multifaceted – it includes the content, relational (Carless 2013; Watzlawick et al. 1967), and emotional aspect (Small and Attree 2016). Thus, our rationale for the use of RI is relevant when we consider the multifaceted complexity of feedback (Carless 2013; Small and Attree 2016; Pitt & Norton 2017). Here, we propose that through student perceptions of teacher’s RI, further insight will be gleaned. While RI has not been utilised in educational research, its synergy with desirable teacher-student relationships solidifies its research potential.
2.5.2 Verbal behaviours (Asking questions, and use of open questions)

To understand how two-way feedback interactions facilitate learning, we first examine the literature on verbal behaviours, with specific focus on two aspects; the function of asking questions and question openness (Van Quaquebeke and Felps 2018). Defined, the intent of asking questions is to elicit an answer (Hawkins and Power 1999). The usefulness of teachers’ RI in steering student thinking towards self-correction and repair during whole classroom settings (Chin 2006) is not new, though it has not yet been defined so precisely. While research has suggested that teachers’ questions need to be genuine, supportive, neutral, and responsive towards students’ utterances to promote self-correction (Chin 2006), students’ perspective on teachers’ two-way feedback interaction behaviours is unreported.

Whether questions are closed or open also matters. While all questions are aimed at inviting or “elicit(ing) a verbal response from those to whom the question is addressed” (Hawkins and Power 1999, p. 236), there are different degrees of openness eliciting different degrees of elaboration in the receiver’s answer (Kearsley 1976; Reeve and Jang 2006; Thompson 1995). Question openness signals to the recipient that the listener is willing to listen. Closed questions, however, typically elicit a pre-determined answer, or yes/no response (Düş et al. 2016). Despite question openness potentially promoting reflective skills and quality thinking through explanations (Johnston et al. 2007; Lee and Kinzie 2012; Ogu and Schmidt 2009; Searle and Vanderveken 1985), these benefits have not been specifically addressed in the context of two-way feedback classroom interactions. Teachers’ frequent use of closed, convergent and low-level cognitive questions that solicit factual recall, rules or procedures remain a concern (Bay and Alisinanoğlu 2013; Blatchford and Mani 2008; Düş et al. 2016; Wilen 1991). This is because the privation of question openness and lack of intellectual stimulation potentially reduces learning to
superficial forms of learning such as memory-recall (Lee and Kinzie 2012). The limited use of question openness by teachers (Massey et al. 2008; Walsh and Sattes 2005) potentially deprives students of a robust, engaging, and stimulating educational environment (Lee and Kinzie 2012). As such, this research seeks to determine from the students’ perspective, how effective teachers use question asking and question openness during two-way feedback interaction, and the self-perceived learning outcomes that ensue.

2.5.3 Non-verbal behaviours

According to Van Quaquebeke and Felps (2018), apart from verbal behaviours, RI-related non-verbal behaviours are also salient. These include attentive listening behaviours such as eye contact, head nods, or appropriate facial expressions. Teachers’ non-verbal behaviours have also been suggested to influence student perceptions of psychological closeness and attitudes towards learning (Andersen 1979; Witt et al. 2004). For example, a meta-analysis of 55 studies found a correlation of .49 between teachers’ non-verbal behaviours and students’ perceived attitudes towards learning (Witt et al. 2004). Moreover, it raises student motivation, enhances prosocial classroom learning outcomes, energy, and promotes engagement with the subject (Allen et al. 2006; Frymier 1994; Mazer 2013). However, what remains unknown is the student-perceived, teachers’ non-verbal, two-way feedback interaction behaviours that are effective in facilitating students’ higher learning outcomes such as metacognition. This is important because teachers’ quality interaction and instruction forms an intricate, complex web of interconnected experiences for students that define, shape, affect, and impact motivation towards learning (Jackson et al. 2013; Kyriakides et al. 2013; Sparks et al. 2015). As such, this research seeks to address this lacuna by investigating students’ perspectives on how teachers’ two-way feedback interaction (verbal and
non-verbal behaviours) might facilitate learning outcomes.

2.6  Metacognition

Instrumental to student development and academic success (Winne and Nesbit 2010) are learning outcomes such as metacognition (Jansen et al. 2015; Magno 2010). Metacognition is a disposition of thinking and learning (Harpaz 2007), exemplified by “the knowledge, awareness, and control of one’s own learning” (Baird 1990, p. 184). According to Flavell (1976), metacognition relates to an individual’s self-awareness and knowledge about the cognitive processes necessary for understanding and learning. It consists of two key aspects, namely knowledge of cognition, and regulation of cognition (Flavell 1987). Individuals who are metacognitively aware are cognizant of what they know and where they lack knowledge of; they know how to regulate or adapt their cognitive mental processes, resulting in improved efforts to retain or seek out new information (Dunlosky and Metcalfe 2009; Zhao and Mo 2016). Although feedback effectiveness is dependent on a student’s ability to self-regulate their learning (Kluger and DeNisi 1996), there has been little attention on how this may be achieved (Hattie and Timperley 2007).

For instance, while research has explored metacognition in the feedback literature through computer-based learning environments (Lee et al. 2010) and experimental settings (Labuhn et al. 2010; Miller and Geraci 2011), little is known about teachers’ two-way feedback from the students’ perspective, and how it enhances metacognition. For example, in Miller and Geraci (2011), the provision of explicit and concrete strategies as feedback was useful in raising students’ awareness of cognition, but insufficient to promote the other
aspect of metacognition, that is, the regulation of cognition. Lee and colleagues (2010) suggested that the provision of corrective feedback on right/wrong answers and feedback statement prompts to revise learning material would serve to raise students’ cognitive awareness. However, these feedback prompts were administered as statements rather than questions through a computer, and teachers’ actual two-way feedback interactions and associated behaviours remain unreported. As feedback carries more than just content (Carless 2013) and connects the student to teacher, it is also meaningful to investigate how students receive it (Hattie and Gan 2011), and how it influences metacognition.

2.7 The present study

This study closes gaps in the above literature by exploring student perceptions of teachers’ two-way feedback interactions through the utility of RI, and how they serve to impact students’ metacognitions. Qualitative research involving interviews with small groups of students was employed.

2.8 Method

2.8.1 Participants and procedure

Participants (N=32) were Year 9 students (16 male and 16 female) from six independent schools within the Perth metropolitan area of Western Australia, comprising two all-girls, two all-boys and two co-ed schools. Student volunteers participated in one semi-structured interview session, lasting approximately forty-five minutes in length. With teacher guidance, participants were screened to ensure a range of academic performance across classes from each school. Interviews were conducted in groups of three or four and all identifiable information of students, teachers or schools has been removed to protect and uphold participant confidentiality.
With permission and approval from the Human Research Ethics Board, research letters were sent to the Principals of independent secondary schools in Perth metropolitan area. Participants-to-be were invited with an information letter identifying the purpose, procedures, benefits and risks. Participants’ passive consent was approved given the study’s non-invasive and confidential nature, as well as the maturity level of the student participants. Parent information sheets included the study requirements with a withdrawal form attached, should they exercise a preference for their son/daughter not to participate in the study. All participation was voluntary, with capacity to withdraw at any time, and confidentiality assured. The interviews were held in the final two weeks of the year, as participants had experienced the full length of the year and therefore were better positioned to share their classroom experiences. All interviews were audio-recorded using a digital voice recorder and conducted during school hours in a designated quiet room on school campus.

Correspondingly, student interviews provided insight and depth in understanding through probing questions (Tuckman 1972) on what effective teachers say and do that serves to facilitate learning. The interview guide was peer-reviewed by experienced academic staff and researchers ($N=3$) for suitability, comprehension and rigour. Interviews were conducted by highly-experienced research staff ($N=2$). To facilitate discussion, an interview guide, with a definitions page and interview questions was provided to the student participants at the time of recruitment, and at the beginning of each interview, with opportunity for clarification during the interview.

The interview questions focused on two-way feedback interactions through RI, investigating teacher behaviours that were perceived by students as facilitative towards their learning. Students were asked to reflect on teachers whom they experienced as effective in enhancing their learning through feedback. Examples of questions include;
“Do teachers ask you to talk about how you could improve your work?”, “How do effective teachers engage you in feedback conversation?”, “How do effective teachers use questions to help you during feedback?”. Students were encouraged to discuss and elaborate their answers through the researcher asking questions such as, “What do effective teachers say and do that help you to engage with feedback?”, “How do you know if teachers are genuinely interested in what you have to say?”. Saturation, as indicated by no new themes, issues or data emerging from the final interviews (Miles and Huberman 1990), was applied to prevent incomplete data collection (Cavanagh 1997; Guest et al. 2006).

2.8.2 Data analysis

In order to ensure trustworthiness of the data collected, a variety of methods was utilised. Student responses were paraphrased by the interviewer, and students were given the opportunity to clarify their comments. Saturation was confirmed upon analysis of the final four transcripts, where all data collected replicated existing themes, and there were no new meaningful codes emerging (Cresswell 2007).

The first author transcribed the interviews verbatim, analysed the RI concepts inductively and placed them into categories which adequately represent the conceptualised behaviour and the outcomes (Elo and Kyngäs 2008). Repeated reading and listening of audio-recordings assisted to ascertain a general sense of content prior to in-depth reflection of their collective meaning (Creswell 2007). Data were subsequently reviewed for content and coded for correspondence according to the identified categories (Polit and Beck 2012).

Subsequently, clusters of meaning units were used in theme development (Braun and Clarke 2006) as initial conclusions. Units were represented by phrases,
words, letters, sentences (Robson 1993) or a paragraph containing conceptually relevant information. In order to establish accuracy in interpretation, direct quotations from participants are presented in the results section, alongside detailed descriptions of theme definitions (Cresswell 2007).

Coding sheets were subsequently cross validated (Burns 1997) using three experienced research experienced university staff after initial conclusions were made by the first author. Meaning units were checked for consistency in themes, behavioural indicators and outcomes. Discussions were held with the second and third authors, experienced researchers knowledgeable in qualitative methodology, to examine the interpretations of initial coding and themes and methodological procedures (Patton 1990). Initially, 86% agreement was reached between independent coders. This percentage agreement was calculated based on the number of quotes that the coders were in agreement with, out of the total number of quotes. Further corrections were made until final agreement was reached between researchers and coders.

2.9 Results

Fourteen small-group interviews were undertaken, resulting in 75 pages of 11-point, single-spaced transcribed text. A total of 82 meaning units were recorded for two-way feedback interactions. Themes were classified according to effective teachers’ two-way feedback behaviours through RI (Table 1), and the student-perceived outcomes (Table 2). The rate of recurrence in meaning units provide awareness to the recurring themes as perceived by students, and are not an indicator of importance, they are presented for illustrative purposes (Sparks et al. 2015).
Student perceptions of effective teachers’ two-way feedback interaction behaviours

Effective teachers’ feedback interaction behaviours are summarised in Table 1. Three themes were constructed within RI: Asking questions, question openness, and attentive listening. The first theme, asking questions, refers to an invitation for an answer (Hawkins and Power 1999). Citing student commentary, students reported that teachers’ questions invited them to respond. For example, “Teachers are interested…they ask you more questions…they genuinely want to listen to your answer” (F, all-girls), and “(Teachers) asking questions can be a good thing because they make you feel like they are really interested in what you have to say” (M, co-ed).

The second theme, question openness, was related to a genuine interest in opinion seeking, characterised by open questions (Van Quaquebeke and Felps 2018). Examples of teachers’ question openness during two-way feedback interaction include; “What are your thoughts on this?” (M, all-boys), and “Why is this so? You’ve got more” (F, co-ed). Another student believed metacognition during feedback interaction was encouraged;

Researcher: “So how did your teacher explain the areas of improvement in your work?”

Student: “…before she gives us any ideas, she’ll come to us and ask, ‘Where are you going next? What are you going to…how can you make this better without me?’…that kind of thing” (F, all-girls).

The use of open questions was also explicitly highlighted by students that it encouraged them to express their opinions. An example includes;
“Generally the question’s open-ended… ‘Why is that?’, extending the question, making you give (an) open-ended response. Makes it sound like they want to hear your views … not just a yes or no answer” (M, all-boys).

Table 1: Student perceptions of effective teachers’ two-way feedback interaction behaviours

<table>
<thead>
<tr>
<th>Theme</th>
<th>Definition</th>
<th>Meaning Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asking questions (6)</td>
<td>Examples of teachers’ questions that invite an answer.</td>
<td>“…they ask you questions to expand on it…” (M, all boys)</td>
</tr>
<tr>
<td>Question openness (12)</td>
<td>Examples of teacher-student interactions characterised by open questions, and a genuine interest in opinion seeking.</td>
<td>“She starts a discussion with you, not just tell you to do this. She goes, ‘what else do you think you could add here?’” (F, all-girls)</td>
</tr>
<tr>
<td>Attentive listening (24)</td>
<td>Examples of teacher behaviour that demonstrates adequate eye contact and appropriate facial expressions or head movements that reflect understanding.</td>
<td>“They’re engaged with you…eye contact and show a lot of facial expressions…show that you are on the right track and they like what they are hearing” (F, all-girls)</td>
</tr>
</tbody>
</table>

The third theme was attentive listening (Van Quaquebeke and Felps 2018), evidenced by behaviours which include eye-contact, appropriate facial expressions and head nods. Citing two examples; “.a lot of eye contact, nodding” (F, all-girls), and “they do not stop looking at your eyes….kind of …I am really listening. I’m so involved in what you are saying” (F, co-ed). Others expressed the sense of care felt when teachers enacted attentive listening behaviours. For example, “When they nod or comment back or do those things that make them seem involved…its good - you know they are listening and …makes you feel quite nice because they want to help” (F, co-ed).
2.9.2 Student perceptions on the outcomes of teachers’ two-way feedback interaction

The outcomes of teachers’ two-way feedback interaction (RI) outcomes (Table 2) were coded according to two themes within metacognition: Knowledge of cognition, and regulation of cognition (Flavell 1979). Student commentaries confirm that teachers’ two-way feedback interactions through RI helped create deeper awareness of student thinking and understanding of feedback. For example, “…(my teacher) asks me questions…it really encourages you to expand your reasoning and explain your reasoning rather than just stating something” (M, all-boys), “…sometimes they can make you think like from different points of view” (F, all-girls), and “I think (RI) motivates you to think critically about what you’re doing” (M, all-boys).

Coded under the theme of regulation of cognition, students described how teachers’ two-way feedback interactions helped to guide their own understanding and learning to improve learning outcomes. For example, two students reported that when the feedback process included submission of self-reflection from one-way feedback and subsequent two-way feedback interaction unfolded with teachers, this was beneficial towards learning. For example; “I find in English, like after our test … you have to write … like what could I improve and how can I improve… that really helps, because then you’d spot your mistakes as well” (F, all-girls). Another example includes, “My teachers’ (two-way) feedback makes me think about it and say, yes, I could’ve …done that better…yeah, I understand where I went wrong and …you do your own personal reflection” (F, co-ed). Other students also reported that being engaged in one’s own self- reflection has developed an awareness of mistakes and deeper understanding of learning gaps.
Table 2: Student perceptions on the outcomes of effective teachers’ two-way feedback interaction

<table>
<thead>
<tr>
<th>Theme</th>
<th>Definition</th>
<th>Meaning Unit</th>
</tr>
</thead>
</table>
| Metacognition (self-awareness of cognition) (16) | Student commentary that teachers’ open questions have been helpful in facilitating awareness of cognitive processes. | *(Researcher: Does your teacher’s use of open questions during feedback enhance your understanding of class work?)*  
“*It does. Because it like really requires you to think about it. So when they ask you, you need to think about it the answer so it challenges you, like pushes you to think about and find the answer.*” (M, all-boys) |
| Metacognition (regulation of cognition) (24) | Direct student commentary on their confidence in adapting their cognitive processes resulting in improved efforts. | “*Well it helps because then if we’re doing it at home, and we’re kind of stuck, we can kind of say hey, we can do it for ourselves, we know what to look for …and don’t always need the teacher’s help.*” (F, co-ed) |

2.10 Discussion

This study explored student perceptions of teachers’ two-way feedback interactions through RI (Van Quaquebeke and Felps 2018), and the associated self-perceived student learning outcomes. Considerable research has detailed that metacognition, that being the capacity to control one’s own learning (Baird 1990), may be supported by various types of feedback (Schunk and Swartz 1993; Shih and Alexander 2000; Labuhn et al. 2010). This study offers practical insights, based on student perspectives, on the specific two-way feedback interaction behaviours which are perceived as effective in augmenting students’ metacognition.

As this research was exploratory, the methodology used in this study enabled students to articulate more descriptively, how teachers used supportive RI behaviours (Van Quaquebeke and Felps 2018) when enacting two-way feedback. Analyses identified three behaviours supportive in feedback.
First, teachers’ use of verbal behaviours in question asking and question openness conveyed intent to listen and understand students’ thinking. Effective teachers provided routinised opportunities for students to articulate their opinions and construct self-determined improvements. According to student commentary, these teacher behaviours encouraged regular reflective thinking, and not just episodically. Furthermore, teachers’ acknowledgement of students’ input during the feedback process reported in this study has synergy with behaviours that facilitate autonomy support (Reeve 2015a; Reeve 2015b; Su and Reeve 2011). When two-way feedback is enacted, students reported feeling empowered; students felt more capable, engaged, and agentic in their ability to evaluate their work, suggest corrective repair, and regulate their learning. These results are in agreement with others that positive outcomes ensue when students’ autonomy is supported (Jang et al. 2010; Sierens et al. 2009; Skinner et al. 1998; Reeve 2015b). Although there has been little focus in the literature on how teachers successfully promote students’ cognitive self-regulation through feedback (Hattie and Timperley 2007), the results of this study articulates possibilities through RI (Van Quaquebeke and Felps 2018).

Second, teachers’ non-verbal attentive listening behaviours were ascribed by students to communicate care, understanding and support. Teachers’ eye-contact, smiles, and head nods during two-way feedback interaction encouraged rapport and were ancillary in fulfilling the relational aspect of feedback (Carless 2013; Pitt and Norton 2017; Small and Attree 2016). These results are also in agreement with recent literature that meaningful teacher-student relationships create supportive learning environments (Sparks et al. 2015; Davis 2003; Wang 2009). Interestingly, these results also demonstrate that students are keenly aware of effective teachers’ supportive behaviours that facilitate learning through feedback. While Sparks and colleagues
(2015) also contend that teachers who nurture students’ psychological needs satisfaction enhance intrinsic motivation, engagement, and self-efficacy, these outcome variables were not investigated here. As an extension to this work, future research could examine these variables to enhance our understanding.

While RI has been theorised to motivate followers (La Guardia et al. 2000) in the business context, this study offers furtherance by explicating the specific ways in which this is realised within the educational context. According to students, two-way feedback interaction through RI provides clarity of task, raises awareness in current thinking, augments independent repair of learning gaps, and inspires self-regulation of cognition in students. As scholars have previously lamented that one-way or unilateral feedback perpetuates dependence on teachers (Boud and Molloy 2013), these practices by effective teachers are noteworthy. In addition, this study provides teachers with practical strategies to model RI (Van Quaquebeke and Felps 2018), underscored by the student-reported influence it has on supporting their metacognition, which is instrumental to the attainment of academic success (Jansen et al. 2015). Executed routinely, RI (Van Quaquebeke and Felps 2018) has the potential of honing students’ thinking skills and self-regulatory processes.

Lastly, interesting parallels may be drawn between effective teachers and business leaders. As effective business leaders are characterised by their involvement, skilful questioning and follow up (Goldsmith and Morgan 2004; Schein 2013), this study reveals that the student-identified effective teachers bear similar attributes in the way they carry out two-way feedback interaction. However, as these teachers are unverified experts or leaders, future research to confirm this appears warranted.
2.11 Limitations and implications for future research

These findings, while insightful, provide only partial understanding as only student perspectives were sought and may hold unqualified assumptions. In addition, although interviewing students at the end of the year may provide a more holistic account of how students perceive feedback, it is unclear if sentiments would remain constant if interviewed at other times. Moreover, in typical classrooms, teachers may not have a lot of time one-on-one to provide such feedback. Different subject areas may also be predisposed to greater opportunity for discussion and inquiry. Future empirical observations may extend our understanding of how teachers do this effectively in class sizes ranging from 20 to 35. Hence, triangulation of what these effective teachers themselves say would be needed to confirm this. The findings here also need to be read with caution as they lack cross-cultural research verification (e.g., Western and non-Western countries).

We suggest our study has some practical implications for teachers. To nurture students’ metacognition, teachers need to be intentional and seek out opportunities to facilitate two-way feedback interactions underpinned by RI. However, teachers may need support in utilising question openness, and possibly a less crowded curriculum for two-way feedback interactions to occur. In contrast to one-way feedback, two-way feedback interaction is individualised, contextualised and unique to each student. To begin, professional development programmes on the use of RI may provide useful support in helping teachers become effective. We hope that this work illuminates the specific two-way feedback interaction behaviours that influence student learning, and encourage the propagation of more empirical research to advance our growing knowledge in this area.
As two-way feedback interactions through RI is nascent in the educational context, we propose five research avenues. First, as this is the first research exploring student perceptions on RI in two-way feedback, we recommend similar interviews with students (Year 9) of different abilities such as low and high ability, across different time frames in the school year such as the middle and at the end, to ascertain if results would differ from our findings. The inclusion of performance-based outcomes could also be included to supplement qualitative findings. Second, empirical research investigating classroom observation of teachers to record the occurrence of two-way feedback interactions across different subject areas would be beneficial. This knowledge could afford practical benefits for educators and administrators interested in raising the quality of learning in the classrooms. Third, empirical research evaluating the interactive strength and effect of teachers’ two-way feedback interaction through RI, together with the comparison of its utility on students with high ability and low ability with metacognition, self-efficacy and motivation would provide valuable knowledge. Fourth, a comparison of early career teachers and experienced teachers’ use of two-way feedback interaction through RI, and its impact on students’ self-efficacy, metacognition, and motivation would further extend our growing knowledge of the impact of teaching experience on the utility of two-way feedback interactions. Finally, as there is currently no validated evaluative tool to measure the prevalence or impact of RI in schools, the development of such an instrument would provide researchers greater access to insights on teachers’ two-way feedback interactions to support student learning.

2.12 Conclusion

In sum, RI (Van Quaquebeke and Felps 2018) provides an innovative lens to view the ecology of two-way feedback interaction and suggests that effective teachers enact these to augment students’ metacognition. This work has contributed to the literature by
articulating the specific teacher behaviours pivotal in the two-way feedback interaction process and demonstrates that the utility of RI (Van Quaquebeke and Felps 2018), underpinned by SDT psychological need supportive behaviours (Deci and Ryan 2000), provides greater clarity for educators in terms of how and why it is impactful.
References


Cavanagh, J. W. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher, 4*, 5-16. doi: [10.7748/nr.4.3.5.s2](https://doi.org/10.7748/nr.4.3.5.s2)


CHAPTER 3:

Expert Teacher Perceptions of Two-way Feedback Interaction

Chapter 3:

Chapter 3 Foreword

In Chapter 2, qualitative work through student interviews fostered the suggestion that teachers enact RI-related verbal and non-verbal behaviours (i.e., asking questions, question openness, and attentive listening) which are facilitative towards nurturing students’ higher learning outcomes such as metacognition. Here in Chapter 3, we triangulate findings with the student-identified teachers of Chapter 2, to ascertain if teachers’ perceptions of ancillary verbal and non-verbal behaviours in two-way feedback interactions agree with students’ perspectives and access higher learning outcomes such as metacognition. To validate teacher perspectives, expert teacher gates according to scholarly criterion are used (Hattie, 2003; Palmer, Stough, Burdensky, & Gonzales, 2005) which included verification with line managers. Concurrently, teachers’ self-efficacy and perceived barriers in two-way feedback interaction are explored.
3.1 Abstract

Teachers’ two-way feedback interaction through Respectful Inquiry (RI) and high teacher self-efficacy are catalytic to student learning outcomes. This study reports expert teachers’ two-way feedback interaction behaviours, their self-efficacy, perceived outcomes, and barriers in the process. Individual interviews with verified expert teachers ($N=9$) were conducted and transcripts inductively analysed. Results indicate three new RI factors (appraisal respect, recognition respect, and a safe learning space). In sum, when RI behaviours in two-way feedback are jointly executed, outcomes related to students’ metacognition are enhanced. Barriers such as time, class size, and the overcrowded curriculum thwart inquiry-related feedback.

Key words: Respectful inquiry, feedback, expert teacher, barriers
3.2 Introduction

The importance and influence of feedback is well-established in the literature (Hattie, 2009). The purpose of feedback is to improve learning (Voerman, Meijer, Korthagen, & Simons, 2012) by reducing discrepancies (Hattie, 2007), closing gaps (Sadler, 2010), and improving one’s knowledge, and skill acquisition (Moreno, 2004). However, there is disjuncture concerning the effectiveness of unilateral or one-way feedback. Unilateral feedback has been critiqued for its failure to productively engage, guide learning, and monitor performance (Price, Handley, & Millar, 2011; Sadler, 1989). Despite calls to focus feedback on student learning outcomes (Hattie, 2009; Voerman et al., 2012), a third of feedback interventions have reported a decrease in student performance (Kluger & DeNisi, 1996). Research informs that feedback that focuses on self instead of task inhibits learning (Kluger & DeNisi, 1996; Shute, 2008). On the other hand, feedback that focuses on self-regulation, task, and cognitive processing enhances learning (Hattie & Timperley, 2007; Shute, 2008). However, teachers are observed directing feedback, rather than facilitating learning (Blair & Ginty, 2013; van den Bergh, Ros, & Beijaard, 2013), and appear ‘to close down opportunities for exploring student learning rather than opening them up’ (Torrance & Pryor, 2001, p. 621). That is, self-focussed unilateral feedback thwarts the potential to advance learning (Burke, 2009).

As such, researchers have emphatically advocated for two-way, dialogic feedback, which involves ‘elicit(ing) perceptions… and discerning what is needed for improved action’ (Boud & Molloy, 2013, p.709). Also referred to as dialogic feedback, two-way feedback is opined to optimise learning; to mitigate learning misconceptions and encourage students to be independent learners (Ajjawi & Boud, 2017; Boud & Molloy, 2013). Although the literature has progressed with the advocacy of dialogic feedback, exploration of two-way feedback interaction has been nascent, and the literature is scant on
understanding how interactional dimensions in dialogic feedback support students’ learning (Hargreaves, 2013). In Chapter 2, we described teachers’ two-way feedback interaction through Respectful Inquiry (RI; i.e., asking questions, question openness and attentive listening) and reported that high school students believe it is facilitative of motivation, learning and in accessing students’ higher learning outcomes such as metacognition. Whilst student-centred feedback using questions is encouraged (Ajjawi & Boud, 2018; Dekker, Schönrock-Adema, Snoek, & Cohen-Schotanus, 2013), and questions help to “clarify confusion, ...(and) propel (students) forward” (Harvey & Goudvis, 2000, p. 81), the literature has not adequately described how teachers perceive the potential value and impact of two-way interactive verbal and non-verbal behaviours (i.e., RI behaviours and how students perceive these actions influence psychological needs support (Deci & Ryan, 2000).

In addition, teacher expertise and quality feedback are synergistic, as it is characterised by pedagogical reasoning skills, the ability to explicate concepts and unpack misconceptions more acutely (Berliner, 2004). However, it remains unclear if the student-identified teachers in Chapter 2 agree with student perceptions, hold expert teaching qualities (Hattie, 2003; Palmer, Stough, Burdensky, & Gonzales, 2005) and declare self-efficacy in two-way feedback interaction. Thus, consistent with earlier work in Chapter 2, this work seeks to triangulate student perspectives with verified teacher experts (Hattie, 2003; Palmer et al., 2005) who are effective at providing RI related behaviours in two-way feedback interaction. Correspondingly, as teacher self-efficacy has a positive and consistent relationship with teachers’ instructional behaviour and student learning outcomes (Son, Han, Kang, & Kwon, 2016), accessing expert teacher perceptions of two-way feedback interaction through RI, the behaviours, outcomes, barriers, and self-efficacy will serve to address these gaps in the literature.
Respectful Inquiry and the associated behaviours identified in Chapter 2 provides a novel and potentially rich lens to understand how teachers’ two-way feedback interaction serves to facilitate higher learning outcomes. Moreover, the question remains whether the student-described two-way interactive behaviours and the associated learning outcomes in Chapter 2 align with teachers’ descriptions of RI. Therefore, this work aims to verify these findings, using RI as a model to analyse teachers’ two-way feedback interaction, and report teachers’ self-efficacy for these described actions. In the following sections of this paper, the theoretical framework, two-way feedback interaction, teacher expertise, metacognition, and barriers to feedback will be discussed.

3.3 Theoretical framework

3.3.1 Self-determination Theory (SDT) and Respectful Inquiry (RI)

Respectful Inquiry (RI; Tan, Whipp, Gagné, & Van Quaquebeke, 2018) describes verbal and non-verbal behaviours such as asking questions, question openness, and attentive listening during interaction. It is a theoretical concept underpinned by Self Determination Theory (SDT; Deci & Ryan, 2000), which postulates that all individuals have three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2000). In educational settings, teachers’ SDT-supportive behaviours have been known to nurture students’ psychological needs satisfaction, promote well-being, and performance (Chapter 2; Jang, Reeve, & Deci, 2010; Reeve, 2015a).

Autonomy relates to a sense of feeling pressure-free, and the self-perception that one is able to make choices volitionally and to be the source of one’s own behaviour (Ryan & Deci, 2000). Autonomy supportive behaviours correspondingly convey to individuals a sense of psychological freedom to enact self-determined behaviours (Assor, Kaplan, & Roth, 2002). Teachers fulfil this need by providing support and understanding (Reeve,
2015a) through the acknowledgement of different perspectives and use of non-controlling language (Reeve, 2015b; Su & Reeve, 2011). When enacted, positive outcomes such as increased motivation, engagement and academic achievements ensue (Guay, Ratelle, & Chanal, 2008; Kiemer, Gröschner, Kunter, & Seidel, 2018).

Competence refers to one’s ability to execute a particular behaviour skilfully and feeling accomplished in a specific domain. Teachers correspondingly provide competence support through the provision of structure, feedback, and optimal challenge (Jang et al., 2010; Reeve, 2006; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009). Consistent with this, literature has reported positive associations with students’ cognitive, emotional, and behavioural engagement when competence support is evidenced (Jang et al., 2010; Sierens et al., 2009). Last, relatedness refers to one’s basic need for interpersonal connectedness and support by significant others (Deci & Ryan, 2000). Relatedness support is correspondingly conveyed through affective support, friendliness, and commitment in interpersonal relationships. Findings in Chapter 2 support educational research that the provision of relatedness support not only promotes students’ intrinsic motivation, engagement, and higher academic achievement, it is also influential in mitigating academic failure (Wang, 2009; Furrer & Skinner, 2003).

While SDT lays the foundation in explaining how teachers’ supportive behaviours serve to nurture psychological needs satisfaction and performance (Jang et al., 2010), and findings in Chapter 2 are in agreement with these, RI articulates a specific set of verbal and non-verbal behaviours that fulfil these through two-way feedback interaction. Although RI is used to analyse dialogue in managerial contexts (Van Quaquebeke & Felps, 2018) it brings an innovative lens to the present study of two-way feedback interaction in an educational context.
According to previous work in Chapter 2, three behavioural components of RI, question asking, question openness, and attentive listening, are suggested to be closely interconnected in forming the SDT-supportive communication. First, question asking is a question posed by a questioner to a recipient, with an intent to elicit an answer (Hawkins & Power, 1999). It is opinion seeking, and by virtue of asking a question, demonstrates interest in the recipient.

Second, question openness (whether closed or open) determines the extensiveness of any given response (Kearsley, 1976). For example, open versus closed questions elicit different responses. Open questions encourage reflective skills (Ogu & Schmidt, 2009), articulation of thinking, and provide access to insights (Lee & Kinzie, 2012; Searle & Vanderveken, 1985). Conversely, closed questions elicit surface level responses such as recall or procedures (Döş, Bay, Aslansoy, Tiryaki, Çetin, & Duman, 2016). While studies have reported that neutral and genuine questions facilitate the extension of students’ thinking during feedback (Chin, 2006), expert teachers’ non-verbal feedback behaviours through RI provides an innovative lens to explore higher order understanding.

Third, the accompanying non-verbal behaviours considered salient in RI involve attentive listening (Van Quaquebeke & Felps, 2018). These include eye-contact, head nods, and appropriate facial expressions. Meta-analyses of teachers’ non-verbal behaviours, including those currently identified in Chapter 2, have reported a positive influence on student learning outcomes, engagement and interest (Allen, Witt, & Wheeless, 2006). However, to date, expert teachers’ perceptions of RI-related behaviours and their efficacy to display these during two-way feedback interaction have not been explored.
3.4 Two-way feedback interaction

Previous work in Chapter 2 revealed that school-based, two-way feedback interaction which occurs between teacher and student should be individualised, contextualised, and involve ancillary verbal and non-verbal teacher behaviours to be effective. Distilled, it is similar to dialogic feedback, which involves “elicit(ing) perceptions and judgements, and discerning what is needed for improved action” (Boud & Molloy 2013, p.709). Such “two-way communicative exchange” (Dixon, 2011, p. 73) is recommended to encourage students’ responsibility in active learning, develop self-assessment capabilities, and raise students’ awareness of quality performance (Carless, Salter, Yang, & Lam, 2011; Lee & Kinzie, 2012; Mulliner & Tucker, 2017; Winstone, Nash, Parker, & Rowntree, 2017).

Shaping students’ thinking and understanding with feedback interaction is echoed by Alexander (2018) and others who also add that the inclusion of open questions during feedback is catalytic in encouraging students’ thinking and learning (Hargreaves, 2014). Alexander (2018) also underscores the importance of developing teachers’ dialogic skills, as it is instrumental in nurturing students’ cognitive capacities. While we acknowledge the relevance and potential impact this can bring by developing teachers’ dialogic skills, we contend that it might be premature as the literature has yet to define, triangulate, and articulate teachers’ ancillary RI-related behaviours in two-way feedback interaction behaviours. How teachers facilitate this in the context of feedback through RI-defined behaviours such as question asking, question openness, and attentive listening (Chapter 2) currently remain unknown, and the need to verify findings of Chapter 2 is timely. Furthermore, while the recommendation of dialogic feedback stem from contexts in higher education (Boud & Molloy, 2013; Carless et al., 2011), Alexander (2018) defines dialogic teaching broadly within primary schools.
However, what remains under-represented is how dialogic feedback relates to the high school context.

The investigation of two-way feedback interaction through RI is pertinent because feedback involves more than just content. It also carries emotional, relational, and social aspects (Carless, 2013; Pitt & Norton, 2017; Small & Attree, 2016). Justification for this work is further underscored by literature reporting discontent with unilateral feedback. For example, unilateral feedback fails to repair learning, encourages an imbalanced, myopic focus on grade validation, leaves misconceptions unaddressed, lacks feedforward input, and does not enhance self-regulation (Boud & Molloy, 2013; Burke, 2009; Engelsen & Smith, 2010; Gamlem & Smith, 2013; Hattie & Timperley, 2007; Li & De Luca, 2014). As such, this work serves to shed light on how teachers demonstrate this, and serves to supplement an important gap in the literature. While students have reported teachers’ two-way feedback through RI (e.g., asking questions, open questions, attentive listening) as effective in nurturing metacognition (Chapter 2), what remains unknown are the actual teacher’s perceptions that these identified behaviours are also aimed at nurturing students’ metacognition, their sense of self-efficacy for enacting these behaviours, and barriers to classroom implementation.

3.5 Teacher self-efficacy

Teacher self-efficacy is domain specific and refers to “the extent to which the teacher believes he or she has the capacity to affect student performance” (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p. 137). Well-established in extant literature is the impact of high teacher self-efficacy, where more learner-centred constructivist instruction (Temiz & Topcu, 2013) and teaching of thinking skills are evidenced (Dilekli & Tezci, 2016). While teacher self-efficacy is based on one’s self-referent perceptions and
beliefs in their teaching capability (Woolfolk Hoy & Burke-Spero, 2005), actual competence in expertise can be validated and cross-checked (Hattie, 2003; Palmer et al., 2005) by verifying with line managers.

Seeking out expert teachers’ self-efficacy in two-way feedback interaction offers a novel and potentially valuable insight because among the many teaching competencies, expert teachers are skilful in providing an optimal classroom environment for learning, and are proficient at providing useful feedback (Hattie, 2003). However, to date, the exploration of expert teachers’ self-efficacy in two-way feedback interaction has been under-researched. Dixon (2011) reported that teachers with high self-efficacy believed it was their responsibility to promote student self-regulation through feedback rather than dispensing solutions by telling. However, this data was sampled from primary school teachers, and teacher expertise was not validated. Rahimi and Gheitasi (2010) reported that students who received one-way, written feedback from teachers with high self-efficacy outperformed in writing tasks compared to peers taught by teachers with low self-efficacy. The teacher sample, however, was not validated as expert teachers; thereby affecting the utility of this finding. As teacher self-efficacy has a positive and consistent relationship with teacher behaviour, instructional quality, and learning outcomes (Guo, Dynia, Pelatti, & Justice, 2014; Son et al., 2016), the specific investigation of expert teachers’ self-efficacy in two-way feedback interaction solidifies the innovation, importance, and relevance of this research.

3.6 Expert teachers

Literature describes expert teachers, when compared to non-experts, as having more extensive pedagogical content knowledge, including deep representations of subject matter knowledge, and skill at monitoring and providing feedback (Bond,
Expert teachers are proficient in creating an optimal learning environment, demonstrate skill in monitoring students’ learning, provide useful feedback, and at the same time, demonstrate high care towards students’ affective needs (Hattie, 2003). Importantly, teacher expertise may also be validated through a combination of various attributes with line managers; qualification (3 years or more of relevant teaching experience), recognition (e.g., documented evidence of impact on student performance), and teaching capability (Palmer et al., 2005). As expert teachers have advanced cognitive schemata and are more skillful in guiding students’ understanding (Berliner, 2004; Bian & Schempp, 2004; Meyer, 2004), we postulate that expert teachers may also possess high teacher self-efficacy for RI-related behaviours, as they are better able to demonstrate quality instruction (Barber & Mourshed, 2007; Hattie, 2009), possess extensive subject knowledge (Bond et al., 2000), and are more involved in helping students reach for deep learning and mastery over performance (Hattie, 2003). Therefore, through interview with the verified expert teachers, this work seeks to report practitioners’ perceptions of the role of RI in two-way feedback, and the teacher behaviours that facilitate higher learning outcomes such as metacognition.

3.7 Metacognition through feedback

Metacognition involves an individual’s self-awareness of cognitive processes and strategies (Flavell, 1979; Flavell, Green, & Flavell, 1995). It is a powerful outcome of learning (Wang, Haertel, & Walberg, 1990) as it builds students’ critical thinking skills and learning strategies (Ku & Ho, 2010). Metacognition is a disposition of thinking and learning (Harpaz, 2007), instrumental in impacting students’ cognitive development and academic success (Aurah, Cassady, & McConnell, 2014; Sperling, Richmond, Ramsay, & Klapp, 2012). Although teachers are catalytic in raising students’ metacognitive awareness (Ozturk, 2017), teachers rarely engage students in actual discourse to reflect about the
quality of their thinking or to critically evaluate reasoning (Teo, 2016; van den Bergh et al., 2013), which means opportunities for deep learning remain under exploited. As student-centered constructivist teaching fosters the promotion of deep learning strategies in students (Nijhuis, Segers, & Gijselaers, 2008), research that explicates how expert teachers facilitate two-way feedback interaction to augment metacognition during feedback would be valuable.

Studies of metacognition and feedback are reported for computerised environments (Kapa, 2001; Kramasrki & Zeichner, 2001; Roll, Aleven, McLaren, & Koedinger, 2011). These studies provide evidence that the integrated use of technology in educational software to perform feedback through questioning is useful and has yielded positive gains such as transfer of learning to new domain areas (Roll et al., 2011). As echoed by Cardelle-Elewarr (1995), “to learn, the student must practice thinking and not just apply procedures in rote fashion… students learn best through teacher mediation that permeates their thinking process” (p. 94). Recursive cycles of cognitive thinking are needed to develop self-regulatory skills (Butler & Winne, 1995), and learning is most effectively optimised within a context of social interaction through co-construction of meaning (Vygotsky, 1978). This underscores the importance of teachers’ actual face-to-face involvement in the feedback process, compared to computerised environments. Whilst learning outcomes through e-technology-supported feedback are positive, exploration of expert teachers’ actual two-way feedback behaviours, and how these lead to student learning outcomes such as metacognition are the focus of this investigation.
3.8 Feedback barriers

Within the literature, many barriers pertaining to unilateral, one-way feedback have been reported. These include issues such as insufficient feedback literacy, time, tight time-tabling, examination-oriented culture, work pressures from high stakes testing, lack of support from school administrators, and lack of training on effective feedback practices (Carless & Boud, 2018; Chin, 2006; Fitzgerald, Danaia, & McKinnon, 2016; Price et al., 2011). Scholars have contended that insufficient guidance in promoting students’ feedback literacy (i.e., how students receive interpret and utilise feedback (see Sutton, 2012) is problematic (Carless & Boud, 2018). This is because teachers’ feedback remains largely transmissive (van den Bergh, Ros, & Beijaard, 2013), a view which accords findings from Blair and Ginty (2013), that teachers tend to supply justification of feedback without pursuing students’ understanding. This lack of guidance from feedback impairs students from learning how to act on feedback (Price et al., 2011). On the other hand, issues such as students’ ‘blunt approaches’ in asking teachers for help might be perceived as challenging teachers’ authority (Price et al., 2011, p. 891), which again, inhibits students’ learning from feedback.

Other barriers to the provision of feedback include class size and that teachers are often stretched by the congested curriculum (Chin, 2006; Rink, 2013). In addition, high accountability, government examination systems also drive certain teacher behaviours which in turn, influence classroom learning experiences (Ryan & Weinstein, 2009; Marsh, Farrell, & Bertrand, 2016). Some examples include mirroring teaching to the test and surface learning approaches, which inevitably compromises conceptual depth of understanding and undermines quality learning (Marsh et al., 2016; Ryan & Weinstein, 2009; Thompson, 2013; Yerdelen-Damar & Elby, 2016).
However, what remains under-researched is expert teachers’ perceived barriers to two-way feedback interaction. Despite recent scholarly recommendation (Ajjawi & Boud, 2017; Mulliner & Tucker, 2017) and student preference for two-way feedback, reasons for its limited occurrence remain unclear (Gamlem & Smith, 2013; van den Bergh et al., 2013). Expert teachers’ perceived ability to access higher order learning outcomes such as metacognition through RI has not been investigated, and therefore this exploration appears warranted.

3.9 The present study

The purpose of this study was to verify and extend previous work in Chapter 2. Specifically, we sought to expand the current understanding of expert teachers’ behaviours and outcomes of two-way feedback interaction through RI (Tan et al., 2018; Van Quaquebeke & Felps, 2018), their associated self-efficacy, and perceived barriers to implementation. The use of interviews, through qualitative methodology, provide scope for clarification, in-depth exploration, and data richness (Tolan & Deutsch, 2015).

3.10 Method

3.10.1 Participants

Nine teacher participants (N=9), 7 females and 2 males, identified by students from a previous study (Author, 2001) were interviewed. Participants came from four independent high schools (2 all-girls and 2 co-ed schools) in Western Australia. This pool of teachers were previously identified by students to be effective in displaying RI-related feedback behaviours, but were not previously validated as possessing expert teacher qualities in Chapter 2. Hence, participants were informed that a verification process based on the expert teacher criteria (Hattie, 2003; Palmer et al., 2005) would be
required from their line managers (i.e. Heads of Departments or Deputy Principal), where appropriate. In response to the verification process, three potential participants were not included in this study. The participant teachers specialised in teaching Physical Education (n=4), Humanities and Social Science (n=2), Mathematics (n=1), English Language (n=1), and Physics (n=1), respectively. All participants had between 3 to 16 years of teaching experience and taught students from Years 7 to 11, with some also teaching Year 12.

3.10.2 Interviews

As qualitative research allow participants’ voice and perspectives to be expressed (Tolan & Deutsch, 2015), a one-on-one 60-minute semi-structured interview was utilised. Interviews were conducted by the first author and probing questions (Tuckman, 1972) used to gain deeper understanding. The two-part, interview guide was peer-reviewed by academic staff (N=2) for suitability, comprehension and rigour.

The first part, a scenario-based vignette relating to a hypothetical student (Jim) in a classroom context was extracted from the Motivators’ Orientations Questionnaires (Deci, Schwartz, Sheinman, & Ryan, 1981; Reeve, Bolt, & Cai, 1999) with four given options to choose, which would reflect if teachers were highly controlling, moderately controlling, highly autonomous or moderately autonomous (Deci & Ryan, 2000). The scenario presented to teachers related to a hypothetical average student, Jim, who had been displaying disinterest in class and not been handing in assignments over the past two weeks. Prior contact with his mother via telephone call yielded no insightful detail. Teachers were asked to respond to this scenario and explicate how the two-way feedback interaction would potentially unfold. This vignette was chosen because experts have highly automatized actions (Norris, 1985), otherwise understood as reflection that is situated in action or reflect-in-action (Schön, 1983). The use of a scenario-based situation and open-
ended, semi-structured interview was previously used to draw insights on how educators think on their feet and respond (Bond, 2011). Thus, this vignette provides insight to the thought process of expert teachers, as “…competent practitioners usually know more than they can say…they exhibit a kind of knowing-in-practice, most of which is tacit” (Schön, 1983, p.7). Teachers’ responses to the four given options would also suggest if they were controlling or autonomous in their feedback approach. This is important because teachers’ level autonomy during feedback is important in promoting learning (Hargreaves, 2014). Examples of interview questions include; “What went through your mind as you thought about what you would say to Jim, and how would you respond to him?”, and “Can you share reasons for your responses?”.

The second part of the interview focussed solely on teachers’ self-efficacy for instructional strategies, informed partially by Tschannen-Moran and Woolfolk Hoy (2001), as other dimensions were beyond the scope of this research. Interview questions focused on exploring expert teachers’ behaviours, outcomes, self-efficacy, and barriers in two-way feedback interaction through RI. Respectful Inquiry was defined for teachers, as ‘referring to dialogue through question asking, use of open questions, and the actual behaviours that might be useful during two-way feedback interaction’ (Chapter 2). Alongside a brief definition of Respectful Inquiry, interview questions included, “What does Respectful Inquiry (RI) look like for you in the context of two-way feedback?”, “To what extent can you provide two-way feedback through RI when students are confused?”, and “How well can you implement two-way feedback through RI in your classroom?”. To explore teachers’ self-efficacy and barriers in RI, sample questions include, “How confident and effective are you at using two-way feedback through RI to facilitate student learning?” and “What barriers might prevent you from using two-way feedback through RI?”
3.10.3 Procedures

With permission and approval from the first author’s university Human Research Ethics Board, expert teachers identified from previous research (Chapter 2) were invited to participate in a one-on-one 60 minute interview. The study’s purpose, procedures, benefits, risks and process gates to verify expert teacher status through their line manager or deputy principal were detailed in writing. Participation was voluntary, with confidentiality assured. Participants could withdraw at any time, without pursuit of reasons.

Expert teacher gates and competencies (Palmer et al., 2005; Hattie, 2003) were verified by the lead researcher either through confidential reply email, or face-to-face with the teacher’s self-identified line managers (direct Head of Department or the Deputy Principal). Interviews were audio-recorded using a handheld voice recorder and participants could seek clarification where needed. At the beginning and end of each interview, confidentiality of personal information and confidentiality was reiterated.

To ensure trustworthiness of data, interview responses were paraphrased to ascertain accuracy of understanding. Interviews were transcribed verbatim, data analysed inductively, and coded according to themes (Lincoln & Guba, 1985). Repeated reading and listening of audio-recordings helped ensure clarity of content prior to subsequent analysis (Creswell, 2003). Cluster of meaning units were utilised in theme development (Braun & Clarke, 2006). These units contained conceptually relevant information, represented by phrases, words, letters, sentences (Robson, 1993) or a paragraph containing conceptually relevant information. To ensure authenticity, integrity, and credibility, direct quotations have been coded thematically (Whittemore, Chase, & Mandle, 2001) and presented in the results section.
Coding sheets were cross validated (Burns, 1997), with initial coding and themes examined (Patton, 1990) by two academic university researchers. Meaning units were cross-checked for theme consistency. Where differences prevailed, revisions were made to ensure appropriate fit of meaning units to the identified themes. An initial 90% agreement was reached between independent coders. Upon further refinement, consensus was reached regarding concepts and themes (Boeije, 2010) after two rounds of independent coding (Schreier, 2012).

3.11 Results

Nine one-on-one interviews resulted in 136 pages of 11-point, single-spaced transcribed text. A total of 147 meaning units were recorded and grouped into 4 tables. Themes were categorised according to RI (Tan et al., 2018; Van Quaquebeke & Felps, 2018) and barriers to two-way feedback interaction. The frequency of meaning units provide awareness of recurring themes; they are present for illustrative purposes and do not imply degree of importance (Sparks et al., 2015). To protect teacher confidentiality, pseudonyms have been given to teacher participants.

3.11.1 Expert teachers’ two-way feedback behaviours through RI

Expert teachers’ RI behaviours in two-way feedback have been summarised in Table 1. Three original RI attributes were confirmed (i.e., question asking, question openness, attentive listening), and three additional themes were identified; appraisalal respect (Darwall, 1977), recognition respect (Darwall, 1977; Dillon, 2007), and a safe learning space (Latting, 1990; Fassinger, 1995).
<table>
<thead>
<tr>
<th>Theme</th>
<th>Definition</th>
<th>Exemplar Meaning Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asking questions</td>
<td>Examples of teachers’ effort in asking questions so as to invite an answer.</td>
<td>“… it’s questions that seek students’ thoughts and perceptions or information” (Audrey, co-ed).</td>
</tr>
<tr>
<td>Question openness</td>
<td>Examples of teacher questions that show a genuine interest in student opinion.</td>
<td>“…for me, I try to keep it as open as possible, and not specify what I want out of it, or what the end goal is. Here’s a scenario or here’s a situation … what comes to mind? What do you think about that?” (Bryan, co-ed).</td>
</tr>
<tr>
<td>Attentive listening</td>
<td>Examples of teacher behaviour that demonstrates adequate eye contact and appropriate facial expressions or head movements.</td>
<td>“… nodding, smiling… and I think even showing that you’re thinking about things” (Fumiko, co-ed).</td>
</tr>
<tr>
<td>Appraisal respect</td>
<td>Appraisal respect involves positive appraisal of others.</td>
<td>“I would string all of their responses together so when we got to the end, I strung all their responses together and as I said each part, that that belonged to each student, I pointed to them. I just said it continuously, but they owned their part, and I guess it’s an approach that I do use quite often too, as I congratulate them on their response” (Grace, all-girls).</td>
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<tr>
<td>Recognition respect</td>
<td>Recognition respect is the disposition of giving weight to an individual, taking the person seriously as that presented self, in a specific role within a social context, and according moral worth.</td>
<td>“Waiting, acknowledging them by name that’s really important” (Hannah, all-girls).</td>
</tr>
<tr>
<td>Safe learning space</td>
<td>A safe learning space characterised by teacher behaviours which are non-judgemental, approachable, supportive, and welcoming of discussion.</td>
<td>“…asking students questions…not bringing them emotional discomfort….yeah, it’s the safety” (Isaiah, co-ed).</td>
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</table>
The first theme, question asking, was evidenced by expert teachers who reported how they would invite student answers through two-way feedback interaction. For example, “Is there anything you don’t understand well and the mark you got?” (Fumiko, all-girls). The second theme, question openness, defined as questions that demonstrate a genuine interest in opinions, was evidenced through examples identified by expert teachers’. For instance, “What do you think?” (Grace, all-girls) and “Why is this something we need to consider?” (Fumiko, all-girls).

The presence of these two themes, question asking and question openness remained consistent in teachers’ response to the scenario-based vignette (Table 2). For instance, “I would ask him (the student) if he is enjoying class… based on his response, I would then work towards asking him which part or why he didn’t enjoy class… how can I support him in doing his assignment…” (Audrey, co-ed). Another example includes, “Can you explain to me your response?... What can I do to help you?” (Fumiko, all-girls).

The third theme in RI behaviours (non-verbal) was attentive listening, where expert teacher behaviours conveyed attentive listening during two-way feedback interaction. These include eye-contact, head nods, and appropriate facial expressions such as smiles. For instance, “a level of warmth, level of eye contact, a level of interest” (Audrey, co-ed), and “With me, its lots of smiling, lots of nodding…. showing that you’re engaged” (Chloe, co-ed).

The fourth, fifth, and sixth themes were previously unrecorded in Chapter 2, but identified by expert teachers as foundational in promoting two-way feedback interaction through RI. They are appraisal feedback, recognition feedback (Darwall, 1977; Dillion, 2007), and a safe learning space (Latting, 1990; Fassinger, 1995). An
example of appraisal feedback, which is defined as the positive appraisal of others (Darwall; 1977; Dillon, 2007), includes;

“…we were talking about a character, and why the character was represented like they were. And a girl gave an answer …that was really quite different, and so I just said to her – ‘Look…I never even thought of that, or considered that. Could you tell me, why you’ve come to that conclusion, or why you think that?’ …Oh she was excited! I think she was excited because I said I hadn’t thought about that- you know, I know something that the teacher doesn’t! (laughs) And I think that’s about showing respect, about showing them that hey, I value your opinion and I value what you’ve got to offer to the class, and then I guess you know it’s asking them to reveal how they came to that, or the process that allowed them to come to that conclusion. (Chloe, co-ed)

Recognition respect (Darwall, 1977; Dillon, 2007), defined as the disposition of giving weight to an individual, taking the person seriously as that presented self and according moral worth, was highlighted as key in two-way feedback interaction. For example, “…mention their name first (before asking them the question) …that will make them (students) feel valued, important, and that what they (students) are going to say is important and valued…it is about that relationship” (Fumiko, all-girls).

The sixth theme of a safe learning space, characterised by teacher behaviours which are non-judgemental, approachable, supportive, and welcoming of discussion (Latting, 1990; Fassinger,1995). For instance;

“… it is done in a way that is positive, it’s safe…providing an environment where kids want to think about thinking and want to learn… an environment where it is safe to do it and it’s promoted” (Bryan, co-ed).
Expert teachers’ commentary through the vignette further supports this theme through one-on-one communication (Table 2). For example, “…what I’d do is talk to him in private, showing the student that hey, I am worried about you and I have noticed these things… we do need to do something to get you out of this situation” (Chloe, co-ed).

Table 2: Two-way feedback interaction (Scenario-based vignette)

<table>
<thead>
<tr>
<th>Theme</th>
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<th>Exemplar Meaning Unit</th>
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<tbody>
<tr>
<td>Relatedness support through caring behaviours (20)</td>
<td>Teacher responding to class events in a way that demonstrates a level of caring or that the teacher is concerned with the students’ well-being.</td>
<td>“Firstly I’d just check in with him, I’d start with – ‘Are you okay? I’ve noticed that … your approach to class has changed a little bit lately.’ I’d probably ask first if there’s anything that he didn’t understand, or maybe if there was something that he wasn’t happy with. My first approach would be the care-approach… I want to make sure that he is alright” (Grace, all-girls).</td>
</tr>
<tr>
<td>Relatedness support through individualised conversations (9)</td>
<td>Direct commentary provided by the teacher that is individualised and unique to the student; showing deeper understanding and apparent interest in the student outside of the task at hand.</td>
<td>“I would probably ask him to have a chat with me, so I would ask him to wait behind after class, or I’d ask him to come see me at lunch time, and it would just be a one-on-one discussion” (Grace, all-girls).</td>
</tr>
<tr>
<td>Teachers’ help seeking behaviours to support students (9)</td>
<td>Teacher commentary of support seeking behaviours from other members of staff to help students in need.</td>
<td>“I would … chat to other staff in other learning areas and say, look – I’ve had Jim for the last two weeks in soccer and he seems really distant or listless … have you noticed anything in English or Science? Or see his tutor teacher or his Head of House, is there something going on, or something we should know about. So just trying to get a few facts from others” (Bryan, co-ed).</td>
</tr>
<tr>
<td>Asking questions (9)</td>
<td>Examples of teachers’ effort in asking questions so as to invite an answer.</td>
<td>“I have seen that things haven’t quite been working. Is there something going on that I can help you with?” (Hannah, all-girls).</td>
</tr>
<tr>
<td>Open-ended questions (6)</td>
<td>Examples of teacher questions that are perceived to show a genuine interest in finding out more about students’ opinion.</td>
<td>“…I’d be encouraging them, ‘what is it that I can do that will make that so much easier?’” (Hannah, all-girls).</td>
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</table>
In addition, teachers’ effort in ensuring sustained care and support (Table 2) for students was also expressed. For example,

“…to get support from say a college counsellor for example, or … a tutor teacher, or from a range of different teachers… they (students) are quite open to getting that level of support so I am confident that an approach like that – that sees students have input, and not just to be told by the teacher, ‘you should be doing this’… but more so to realise that there is someone there that cares about how you’re going… is interested in you and will keep checking in and following up” (Audrey, co-ed).

3.11.2 Expert teachers’ perceived outcomes of two-way feedback interaction through RI

Expert teachers described the role of RI during two-way feedback interaction. Three themes were derived: knowledge of cognition, regulation of cognition, and feedforward information (Table 3). The first theme, knowledge of cognition, relates to the development of students’ awareness of their thinking. For example, a teacher described how it served to elicit deeper learning from students during two-way feedback interaction;

“… feedback is a bit of one-way…whereas with the questioning during feedback, you can hit more … deeper learning… at a different level of learning there. You’ve got the skills now and you got the knowledge behind them, what about these things now?” (Danna, co-ed).

The second theme, regulation of cognition, relates to one’s ability to adapt cognitive processes in order to achieve improved outcomes (Flavell, 1987). For example, expert teacher commentary explains how this occurs through verbal behaviours in RI;

“…if I’m asking them (students) those questions …. they could then ask themselves those questions. If they are getting examples like … ‘How did that work for you?
How is this going?’, they could then look at their own work and say ‘How is this going for me?’ … So I think that can help them to self-regulate. I think it can also help them to understand what it is they want to achieve and to set their own ways of achieving what they want … and how they are going to achieve it” (Audrey, co-ed).

The final theme, feedforward information, was reported by expert teachers for its utility in checking for understanding. Teacher commentary included;

“I do authentically value what they (students) are saying and I think … when I am inviting their opinions, I am also able to start to assess where they’re at and what level of insight they are able to give. And that’s also like a form of assessing as well…” (Grace, all-girls).

Table 3: Expert teachers’ perceived outcomes of two-way feedback interaction through RI

<table>
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<tr>
<th>Theme</th>
<th>Definition</th>
<th>Exemplar Meaning Unit</th>
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<tr>
<td>Metacognition (awareness of cognition) (5)</td>
<td>Teacher commentary that RI facilitates students’ awareness of cognitive processes.</td>
<td>“I’m trying to get the students to think about what we are doing, rather than just be spoon-fed… not squashing any answers that are wrong, but just trying to get them to think…” (Bryan, co-ed).</td>
</tr>
<tr>
<td>Metacognition (regulation of cognition)(6)</td>
<td>Teacher commentary that RI facilitates student cognitive regulation to enable improved outcomes.</td>
<td>“I think if you are positive in the way you ask questions…I think it (RI) makes them more aware of what they are doing. More of their learning and how they are going about certain tasks which allow them to regulate what they are doing better” (Eloise, co-ed).</td>
</tr>
<tr>
<td>Feedforward information to teachers (3)</td>
<td>Teacher commentary on how RI provides feedforward information on students’ current learning.</td>
<td>“… my questions … try work out two things: to push them, but also for me to work out whether they truly understand where we are going” (Hannah, all-girls).</td>
</tr>
</tbody>
</table>
3.11.3 Expert teachers’ self-efficacy in two-way feedback interaction through RI

Self-efficacy ratings for two-way feedback interaction through RI remained consistently high among expert teachers’ self-report (from a scale of 1 to 10, with 10 being the highest rating). That is, all expert teachers scored themselves between ‘7’ and ‘9’ out of ‘10’. Examples of expert teachers’ high self-efficacy commentary included:

“I feel I am quite effective at it …I think learning is a process, I think that’s quite important. I would say an ‘8’ or ‘9’. I feel quite confident” (Chloe, co-ed).

“I’m very confident in getting them (students) to see their own ability and being able to reinforce their strengths and help them work through … I’ll say an ‘8’… my feedback is very in-depth…” (Audrey, co-ed).

“Very confident, a ‘9’. So deep learning versus surface learning… (For example) … that is a good response …can you think about how that can be broken down further?” (Fumiko, all-girls).

3.11.4 Expert teachers’ perceived barriers to two-way feedback interaction

Three themes were identified by expert teachers as barriers to two-way feedback interaction (Table 4). These include: time, curriculum, and class size. First, the time barrier was opined as a major hindrance in two-way feedback interaction. Examples include; “it’s the time factor … trying to sit down with every single one of them and go through it” (ET8, F, all-girls), and “Time. It is really time consuming” (Fumiko, all-girls). Second, the heavy curriculum workload was reported as another barrier to two-way feedback interaction. For instance, “… a very tight curriculum…I think that barrier in terms of what most teachers say they feel under pressure to get through the content… that can stop you” (Hannah, all-girls). Third, class size was considered a key barrier by expert teachers. An
example of teacher commentary reports; “… the number of kids in a class…having 30 or more, it’s difficult to have that with every single kid. That’s challenging” (Audrey, co-ed).

Table 4: Expert teachers’ perceptions of barriers to two-way feedback interaction

<table>
<thead>
<tr>
<th>Theme</th>
<th>Definition</th>
<th>Exemplar Meaning Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (9)</td>
<td>Teacher commentary that the lack of time prevents two-way feedback.</td>
<td>“…time would be a big thing… we are always time-poor, and I would love to give my students more feedback, but we’re only one person” (Chloe, co-ed).</td>
</tr>
<tr>
<td>Curriculum (5)</td>
<td>Teacher commentary that heavy curriculum content may prevent two-way feedback in class.</td>
<td>“Getting through work... a heavy content-laden course, that can be challenging and sometimes just needing to get on with it” (Audrey, co-ed).</td>
</tr>
<tr>
<td>Class size (6)</td>
<td>Teacher commentary that class size can be a potential barrier to two-way feedback.</td>
<td>“Class size does affect that… if you’ve got a really big class, then sometimes it’s hard to get that one-on-one feedback situation, but it’s not impossible, you’d just have to work a bit harder for it” (Hannah, all-girls).</td>
</tr>
</tbody>
</table>

3.12 Discussion

The purpose of this study was to explore expert teacher perceptions of two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018; Tan et al., 2018). The behaviours, teacher self-efficacy in the behaviours, outcomes, and barriers of two-way feedback interaction were investigated. While recent work in Chapter 2 has indicated that effective teachers enact two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018; Tan et al., 2018), only student perceptions were reported, and expert teacher perceptions remain unknown. Substantial research has recommended
two-way feedback over unilateral feedback (Ajjawi & Boud, 2017; Boud & Molloy, 2013), and Chapter 2 confirms that two-way feedback facilitates higher learning outcomes for students. Importantly, this study seeks to verify previous work in Chapter 2 and offers a new lens through expert teacher perspectives, on the utility of two-way feedback interaction, the perceived barriers that thwart its implementation, and teachers’ self-efficacy in this regard.

The methodology used in this study was exploratory, which allowed expert teachers to articulate more descriptively in greater detail, the dynamics of teacher behaviours which augment higher learning outcomes for students during two-way feedback interaction through RI. Analyses identified six facilitative behaviours.

Results align with findings from Chapter 2 that expert teachers engage in RI behaviours during two-way feedback interaction to promote metacognition. The use of question asking, question openness, and attentive listening not only models for students how they can independently monitor and evaluate their own work, it also stimulates their thinking, raises self-awareness, and promotes agency in self-regulation. While this study concurs with recent work in Chapter 2, three new factors were identified, a safe learning space (Latting, 1990; Fassinger, 1995), recognition respect (Darwall, 1977; Dillon, 2007) and appraisal respect (Darwall, 1977). Though previously unreported (Chapter 2), we argue that they provide greater clarity in explicating how expert teachers’ feedback behaviours, as defined by RI, serve to facilitate psychological needs through relatedness support (Sparks et al., 2015; Cox & Williams, 2008), competence support (Jang et al., 2010; Reeve, 2006; Sierens et al, 2009) and autonomy support (Kiemer et al., 2018; Su & Reeve, 2011). These results are consistent with literature that meaningful teacher-student
relationships promote relatedness and enhance learning environments (Wang, 2009; Furrer & Skinner, 2003; McAllister & Irvine, 2002).

While these results are in agreement with literature that report dialogue in feedback activates students’ cognitive awareness and develops their self-assessment capabilities (Carless et al., 2011; Mulliner & Tucker, 2017; Tan et al., 2018; Winstone et al., 2017), this work explicates in greater detail, the associated verbal and non-verbal teacher behaviours that facilitate such higher order learning outcomes. Furthermore, this work underscores the importance of social interaction through co-construction of meaning (Vgotsky, 1978), facilitated by the fulfilment of psychological needs support that augments learning (Sparks et al., 2015; Jang et al., 2010).

In addition, expert teachers’ self-assessed rating of self-efficacy in two-way feedback interaction remained consistently high. This supports previous research (Guo et al., 2014; Rimm-Kaufman & Sawyer, 2004; Son et al., 2016) that high teacher self-efficacy impacts students’ learning outcomes through positive classroom environments, characterized by supportive and learner-centred approaches (Guo et al., 2012; Temiz & Topcu, 2013). However, as self-efficacy is a personal judgement which relates to perception (Woolfolk Hoy & Burke-Spero, 2005) rather than objective performances (Usher & Pajares, 2008), empirical research on expert teachers’ effectiveness in two-way feedback interaction through RI will be necessary to corroborate findings.

Lastly, while two-way feedback interaction was acknowledged by expert teachers as highly desirable, it was significantly thwarted by time pressures, the crowded curriculum, and class size. Barriers of time, heavy curriculum, and class size identified by expert teachers in two-way feedback interaction resonates with existing educational literature that these impact quality teaching (Chin, 2006; Fitzgerald et al.,
2016; Rink, 2013). Despite evidence-based literature that highlight the persistence of such teaching barriers, unless schools review the crowded curriculum and prioritize time for two-way feedback interaction, this may insidiously thwart teachers’ pursuit of quality two-way feedback and the associated autonomously-regulated and higher order student learning outcomes.

3.13 Limitations and future research

We acknowledge that this study is not without limitations. The use of face-to-face interviews can elicit self-perceived biases and the effect of social desirability (Nederhof, 2006). While the strength of this study lies in the focussed sample of verified expert teachers, the relatively small sample size (N= 9) and low diversity in terms of subject area limit its generalisability. Hence, findings from this study need to be interpreted with caution and not be generalized beyond this context. As this study involved expert teachers’ self-reports on RI behaviours in the context of providing feedback, it remains to be seen if empirical studies corroborate expert teachers’ classroom feedback behaviours and the subsequent impact on student learning.

Five recommendations are proposed for future research. First, further understanding could be gleaned from direct observation of high school, expert teachers’ classroom two-way feedback interaction behaviours, with the investigation of teachers’ self-efficacy and student learning outcomes such as metacognition, self-efficacy and motivation. Second, an intervention study highlighting two-way feedback interaction and RI behaviours could be explored among expert teachers, more experienced teachers and early-career teachers. Comparisons of quality, frequency, impact on student learning outcomes and teachers’ self-efficacy levels could provide useful data to supplement knowledge in this area. Third, with the validation of the above suggested studies, the
development of a two-way feedback questionnaire for students and/or observation instrument of classroom practice, underpinned by RI and specific to the educational context, could provide rich possibilities. Fourth, given the different learning contexts of traditional academic class settings such as science or mathematics (STEM), and that of non-academic subjects such as physical education, comparison of two-way feedback interaction through RI and its frequency may produce subject-specific outcomes. In addition, further research is needed to confirm the relative ease or opportunity to provide RI-related, two-way feedback interaction in different disciplines. Fifth, correlation studies could explore the strength and effect of RI and two-way feedback interaction in different cross-cultural settings, among different school-age groups, from primary to high school.

3.14 Practical implications

These findings confirm past work in Chapter 2 that expert teachers seem thoughtful and conscious in using RI during feedback. In order to promote the efficacy and optimization of two-way feedback, attention to the six RI elements (asking questions, open questions, attentive listening, appraisal respect, recognition respect and a safe learning space appear pivotal to improve student learning opportunities.

This study provides substantial practical utility for educators and school administrators to consider. For sustainable, quality teaching and learning, it is imperative that schools continually adapt to support teachers’ two-way feedback interaction in the classroom. The congested curriculum needs review to facilitate opportunity for more inquiry-related feedback in order to optimize student learning outcomes. That is – reducing course content quantity will facilitate a return of diminished teaching and learning quality. In addition, teachers may require additional
professional development to build new understandings of inquiry-related feedback and its implementation. While this study affords a springboard for future feedback intervention programs, and future observations are needful to further our knowledge of these expert-level teaching strategies.

3.15 Conclusion

In summary, this work contributes important detail and extends our understanding of how teachers perceive metacognition may be facilitated through two-way feedback interaction. Moreover, this work reinforces the importance of previously reported RI behaviours; asking questions, open questions, attentive listening (Chapter 2), and it also identifies the unreported aspects salient in two-way feedback interaction such as a safe learning space, recognition respect, and appraisal respect in two-way feedback interaction. Collectively, these behaviours can be shown to enhance learning, nurture relatedness supportive needs satisfaction and develop self-regulatory behaviours.

However, further work through observation is necessary to ascertain that teachers execute these behaviours as described. These results also support scholarly work that teachers with high self-efficacy perceive themselves as having the capacity to positively impact learning (Thoonen et al., 2011). In advancing Chapter 2, we have also confirmed that expert teachers’ high self-efficacy and two-way feedback interaction through RI (Tan et al., 2018; Van Quaquebeke & Felps, 2018) provides a strong architectural foundation for quality teaching and learning. Consistent with others (Dixon, 2011), expert teachers acknowledged that two-way feedback practices are deliberate, intentional and indeed effortful. We hope the findings of this work will inform future classroom studies, teacher-education, and professional development programmes to explicitly teach two-way feedback interaction so as to enrich student learning outcomes.
References


the early years of teaching: A comparison of four measures. Teaching and

high-stakes tests: How do elite high school students respond to competing
influence about how to learn physics? Physical Review Physics Education
Research, 12, 1-21.
CHAPTER 4:

Teachers’ Two-way Feedback Interactions: Its Impact on Students’ Motivation, Self-efficacy, and Metacognition
Chapter 4 Foreword

In Chapter 3, qualitative work with teachers through semi-structured interviews corroborated against student perspectives in Chapter 2, and further identified three additional behaviours (recognition respect, appraisal respect, and a safe learning space) effective in two-way feedback interaction. However, yet to be verified, is whether teachers enact these ascribed behaviours in the classroom, and its impact on students’ motivation, metacognition, and self-efficacy in two-way feedback interaction has also not been accessed. Therefore, in order to validate findings of Chapters 2 and 3, Chapter 4 seeks to interrogate through empirical work, teachers’ actual verbal and non-verbal behaviours during in-class, two-way feedback interaction. Concurrently, the predictive association of teachers’ two-way feedback interaction is examined against students’ motivation, metacognition, and self-efficacy.
4.1 Abstract

Teachers’ two-way feedback interaction through Respectful Inquiry (RI; i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and a safe learning space) is influential to learning. However, examination of student learning-related outcomes has not been reported. Thirty-six (N=36) lesson observations and student questionnaire responses (N=216) examined teacher behaviours in two-way feedback interaction and the predictive association with student’s metacognition, self-efficacy and motivation. Multiple regression analyses found that one-way feedback only predicted metacognition (knowledge), whereas two-way feedback interaction through RI predicted metacognition (knowledge), metacognition (regulation), and motivation. Findings underscore the significance of teachers’ RI-related behaviours during two-way feedback.

Key words: Two-way feedback interaction, respectful inquiry, learning
4.2 Introduction

Feedback is critical to learning and influential to achievement (Black & William, 1998; Hattie & Timperley, 2007). While the aim of feedback is to facilitate learning and progress students in their understanding (Adcroft, 2011; Black & William, 2009; Tunstall & Gipps, 1996), there is concern that not all feedback leads to learning (Sadler, 2010; Hattie, 2009, Voerman, Meijer, Korthagen, & Simons, 2012). Monologic (Nichol, 2010), or one-way feedback in particular, is considered problematic due to its incapacity to engage (Price, Handley, & Millar, 2011), clarify misconceptions (Boud & Molloy, 2013), and enhance learning (Pauli, 2010; Voerman et al., 2012).

On the other hand, recent research on two-way feedback interaction (Tan, Whipp, Gagné, Van Quaquebeke, 2018; Tan, Whipp, Gagné, Van Quaquebeke, in press) through Respectful Inquiry (RI; Tan et al., in press; Van Quaquebeke & Felps, 2018) has reported practical utility in accessing higher learning outcomes such as metacognition, which relates to a disposition of thinking and learning (Harpaz, 2007). However, while Tan and colleagues (in press) report that teachers’ ancillary feedback behaviours through RI (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) encourage students’ metacognition, these have been based on teacher perceptions and empirical research is lacking. As student learning-related outcomes such as motivation, metacognition, and self-efficacy play a pivotal role in contributing towards students’ academic success (Chan & Lam, 2010; Pat El, Tillema, & Van Koppen, 2012; Van den Bergh, Ros, & Beijaard, 2013), work that examines these outcomes in the context of two-way feedback interaction (Tan et al., in press; Van Quaquebeke & Felps, 2018) is nascent.
Therefore, this research is focussed on how teachers communicate feedback through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) to impact students’ motivation, metacognition, and self-efficacy. As RI is rooted in Self-Determination Theory (SDT; Deci & Ryan, 2000), this paper discusses the relevance of verbal and non-verbal feedback behaviours, motivation, metacognition, and self-efficacy.

4.3. **Theoretical framework: Respectful Inquiry (RI), Self-Determination Theory (SDT), and verbal and non-verbal behaviours**

4.3.1 **Respectful Inquiry**

Respectful Inquiry (RI) (Van Quaquebeke & Felps, 2018) is a theoretical construct with origins in managerial settings and was reported to have motivational power when verbal and non-verbal behaviours (i.e., asking questions, question openness, and attentive listening) are enacted by the leader during interaction. Although RI is specific to the leadership literature, parallels to the education context are worthy of further investigation. For example, the leader-follower relationship is akin to the teacher-student relationship whereby the teacher is the one who leads, and the student, who follows. Moreover, its application in the context of two-way feedback interaction is novel, and recent work has reported practical and valuable insights pertaining to student learning outcomes (Tan et al., 2018; Tan et al., in press).

Importantly, RI (Van Quaquebeke & Felps, 2018) is underpinned by Self-Determination Theory (SDT; Deci & Ryan, 2000), a macro-theory of human motivation, which postulates that individuals are interested in learning and desire to develop knowledge (Niemiec & Ryan, 2009). However, the facilitation of one’s learning and motivation is dependent on the fulfilment of basic psychological needs
such as autonomy, competence, and relatedness (Deci & Ryan, 2000). Therefore, understanding how SDT undergirds the RI process is necessary because the extent to which these psychological needs are fulfilled may “either facilitate or forestall the assimilative and growth-oriented processes” in individuals (Niemiec & Ryan, 2009; p.134).

4.3.2 Self-Determination Theory

The three tenets of SDT (i.e., autonomy, competence, and relatedness) postulate that individuals have innate psychological needs that must be satisfied so as to promote growth, integrity, and personal well-being (Ryan & Deci, 2000). The educational literature has presented findings that demonstrate when these psychological needs are satisfied, many positive outcomes ensue. These include; positive affect in school, enjoyment, engagement, interest, motivation, perceived competence, and self-regulation (Chirkov & Ryan, 2001; Jang, Reeve, & Deci, 2010; Standage, Duda, & Ntoumanis, 2006; Sparks, Dimmock, Whipp, Jackson, & Lonsdale, 2015; Tian, Chen, & Huebner, 2014; Tsai, Kunter, Lüdtke, Trautwein, & Ryan, 2008; Yu, Li, Wang, & Zhang, 2016).

Here, we briefly define each of these psychological needs, explain how teachers support these behaviourally, and the outcomes that ensue when respective psychological needs are fulfilled. First, autonomy relates to the experience of volition and being the agent of one’s own behaviour (Ryan & Deci, 2000; deCharms, 1968). Autonomy supportive behaviours relay the sense of psychological freedom to enact self-determined behaviours (Assor, Kaplan, & Roth, 2002) by acknowledging perspectives, providing understanding, and using non-controlling language (Reeve 2015; Su & Reeve, 2011). Research has established that the fulfilment of autonomy promotes satisfying learning experiences, motivation, self-determination, engagement, and academic achievement.
Competition relates to an individual’s sense of confidence in one’s interaction with the physical and social environment (Deci & Ryan, 2002). The provision of competence support is enacted through feedback, guidance, structure, and optimal challenge (Jang et al., 2010; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009). When fulfilled, students are more emotionally, behaviourally, and cognitively engaged (Jang et al., 2010; Sierens, 2009).

Lastly, relatedness refers to an individual’s experience of interpersonal connectedness, satisfactory relationships, sense of belonging, and support from significant others (Deci & Ryan, 2002; Deci & Ryan, 2000). Relatedness is key to optimal human development (Baumeister & Leary, 1995) and relatedness support is communicated through high levels of warmth, care, and support. The presence of teachers’ relatedness supportive behaviours promotes several positive outcomes such as students’ self-efficacy, higher levels of engagement, positive emotions, intrinsic motivation and improved affective mood states (Sparks et al., 2015; Cox & Williams, 2008; Furrer & Skinner, 2003).

4.4 Verbal behaviours

Whilst SDT (Ryan & Deci, 2000) provides the groundwork in understanding how teachers’ need supportive behaviours nurture student’s psychological needs satisfaction to enhance motivation and performance (Sparks et al., 2015; Jang et al., 2010), we propose that RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) offers a unique lens as it explicates how teachers’ verbal and non-verbal behaviours fulfil these through two-way feedback interaction (Tan et al., 2018; Tan et al., in press). The
multi-dimensional construct of RI focuses on verbal and non-verbal behaviours (e.g., asking questions, question openness, and attentive listening), which has synergy with SDT supportive communication. Moreover, the salience of needs supportive environments, as highlighted by Deci and Ryan (2016), is reinforced by higher quality learning outcomes and development occurring in the presence of psychological needs support.

Verbal behaviours, such as asking questions, convey to the recipient an interest in opinion if it is posed with an intent to encourage a response (Hawkins & Power, 1999). As learning occurs through social interaction (Vgotsky, 1978), this underscores the importance of questions. However, teacher talk dominates classroom discourse two-thirds of the time (Cazden, 2001; Flanders, 1970), and most of teacher questions target low-level recall, procedures, and rules (Graesser & Person, 1994). The openness of questions (i.e., open or close) is important as they elicit different responses. As suggested by Kearsley (1976), the extensiveness of any given response is determined by the openness of the question. Underpinned by SDT, open questions are autonomy supportive as they convey a willingness to listen to opinions and perspectives (Searle & Vanderveken, 1985). Moreover, evidence shows that open questions engage and support student motivation (Jurik, Gröschner, & Seidel, 2014), and have the ability to promote thinking, reflection, and access to insights (Franke, Webb, Chan, Ing, Freund, & Battey, 2009; Lee, & Kinzie, 2012). Conversely, closed questions are incapable of drawing on insights as they hinge on memory recall (Düş, Bay, Aslansoy, Tiryaki, Çetin, & Duman, 2016; Graesser & Person, 1994).

However, the use of open questions to encourage thinking is sparse (Howell & Wilson, 2014; Lee & Kinzie, 2012), and empirical work that examines the impact of open-ended questioning on students’ thinking is rare (Lee & Kinzie, 2012). Others have also
highlighted that students’ thinking is often not facilitated through teachers’ feedback practice (Nichols, 2014). For example, concerns have been raised regarding teachers’ default feedback practice of IRE (Mehan, 1979), which stands for: initiation, response, and teacher evaluation. The IRE is typified by a closed question (recall), which is evaluated by the teacher when the student gives a response. Such discourse in feedback practice focuses on retrieval, which does not facilitate higher order student thinking (Nichols, 2014; Ford & Wargo, 2011; Lemke, 1990; Duschl & Osborne, 2002), and ‘wastes … cognitive and educational potential’ (Alexander, 2018, p. 562). While the IRE process might raise students’ factual and procedural knowledge, it does little to enhance students’ conceptual and metacognitive abilities (Anderson & Krathwohl, 2001). Despite evidence that students’ motivation towards learning declines because understanding is not fully interrogated (Duijnhower, 2010; Price et al., 2011), teacher-centred talk persists (Mehan & Cazden, 2015; Resnick, Asterhan, & Clarke, 2015).

4.5 Non-verbal behaviours

Alongside verbal behaviours, teachers’ non-verbal behaviours also influence how students respond to teachers and affect students’ motivation to learn (Kerssen-Griep & Witt, 2012). Research has informed that cues like facial expressions and body language (Feldman, 1990) impact student-teacher relations (Okon, 2011) and psychological attachment (Comadena, Hung, & Simonds, 2007). Martin and Mottet (2011) comment that teachers’ forward lean, smile, and pleasant tone of voice aids rapport-building, especially if students are more sensitive to direct feedback. This is important to note as we argue that before learning gaps may be addressed, the behavioural approach of the teacher may either promote or forestall the learning process.
While teachers’ non-verbal behaviours are important, empirical work investigating teachers’ classroom-observed RI-related behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018) (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and a safe learning space) has not been reported. Comadena and colleagues (2007) explored the effects of teachers’ caring, non-verbal behaviours (e.g., animated facial expressions, gestures, voice, and eye-contact), and clarity of presentation in course content towards students’ motivation, affective, and cognitive learning. While teachers’ high versus low energy levels, responsiveness to students’ well-being and clear presentation of content forged teacher-student relations, which impacted the development of students’ academic performance, the validity of this work is limited as students were only read descriptions of hypothetical instructors, and actual classroom experiences of two-way feedback interaction was absent. Teven and McCroskey (1996) assert that when teachers communicate in ways that demonstrate empathy, understanding, and responsiveness (McCroskey, 1992), students perceive these as caring and their affective evaluations for the course and instructor is enhanced, resulting in higher levels of cognitive learning. Although work by Teven and McCroskey (1996) was done in naturalistic settings, the perception of teachers’ caring non-verbal behaviours was conducted through surveys in a university context, and teachers’ actual ancillary feedback behaviours in two-way feedback remain unreported.

As feedback is a complex composite involving content, social, and emotional aspects (Pitt & Norton, 2017; Small & Attree, 2016), understanding teachers’ non-verbal behaviours through RI in two-way feedback interaction could provide educators with practical insights on becoming more competent classroom communicators. To date, only two studies (Tan et al., in press; Tan et al., 2018) has distilled supportive verbal and non-verbal teacher behaviours germane to two-way feedback interaction through RI (Tan et al.,
(i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space). Importantly, RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) brings communicative clarity through its verbal and non-verbal teacher behaviours in the context of two-way feedback interaction.

Here, we briefly explicate how each of these verbal and non-verbal behaviours are SDT needs supportive. The attribute of attentive listening is relatedness supportive as it conveys to the speaker that full attention is accorded, as these listening cues signal to the speaker that what is said is important and valuable (Pasupathi, & Billitteri, 2015). Importantly, Kluger and Lehman (2018) highlight that listening is on the other end of the feedback continuum (as opposed to telling), as it opens the door for feedback to be better received, and attenuates self-defensiveness. In agreement, Itzchakov and Kluger (2017) found through field studies with employees (including teachers) and supervisors that listening carries a host of benefits: listening enhances feedback receptivity, relaxes individuals, encourages reflection, self-awareness of strengths and weaknesses, and makes individuals feel psychologically safe. Although this is in the context of employee-supervisor relationship, we argue that similar parallels are evident for the school context in student-teacher relationships. Whilst meaningful learning is desired from feedback, empirical work that verifies the impact of teachers’ attentive listening behaviours in two-way feedback interaction remains absent.

Apart from attentive listening, recognition respect (Darwall, 1977; Dillon, 2007), which involves the disposition of according moral worth and taking an individual seriously in their presented self is also important. This characteristic is most representative of SDT’s definition of relatedness support because when individuals are accorded such value and respect in a social context, it conveys a sense of acceptance,
inclusion, and connection with others (Renger & Simon, 2011; Shapiro, 2010). Likewise, appraisal respect (Darwall, 1977), is reflective of SDT’s definition of competence support (Henderlong & Lepper, 2002) because it relates to the positive appraisal of others, evidenced by the verbal affirmation teachers provide on students’ understanding or performance, and attributing their efforts to learning (Tan et al., in press). Lastly, the provision of a safe learning space is characterised by teacher behaviours which are non-judgemental, approachable, supportive, and welcoming of discussion (Fassinger, 1995; Latting, 1990). These attributes relate to the perception that one feels secure and safe to express one’s views, which concurs with SDT’s definition of autonomy support (Deci & Ryan, 2016).

Mouratidis, Lens, and Vansteenkiste (2010) contend that when corrective feedback is delivered in a way that is perceived to be respectful, accepting, and sympathetic, it is associated to optimal forms of motivation and emotional regulation. Four feedback communicative characteristics were identified; providing a rationale for behavioural change, considering perspectives, providing choices of solutions, and avoiding controlling styles such as punishments or criticisms. However, we argue that although the ‘what’ has been identified, the question that remains is ‘how’ verbal and non-verbal behaviours serve to complement and augment feedback. Building on work by Mouratidis and colleagues (2010), Carpentier and Mageau (2013) created The Quality of Change-Oriented Feedback Scale. Six characteristics that enable corrective feedback to be delivered in an autonomy-supportive manner were identified; being empathic, paired with choices of solutions, clear and attainable objectives, devoid of person-related statements, paired with tips, and in a considerate tone of voice. Again, while these objectives were identified, teachers’ actual verbal and non-verbal behaviours that convey these messages during two-way feedback interaction remain unaddressed. Furthermore, as the fulfilment of
all three psychological needs are important for optimal well-being, growth, and motivation, it appears relevant to pursue through empirical research, how teachers’ verbal and non-verbal two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) may fulfil these needs so as to optimise students’ learning from feedback.

In the next section, we highlight concerns regarding one-way feedback, the shift towards feedback dialogue, and how two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) addresses these gaps.

4.6. Feedback

4.6.1 Issues surrounding one-way feedback

Well-established in the literature, is the centrality of feedback to learning (Hattie, & Timperley, 2007), and its usefulness in helping students find out what they need to know in order to progress (Ehrlinger, Mitchum, & Dweck, 2016). However, while feedback is “information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning” (Shute, 2008, p. 154), one-way feedback has been argued as ineffective (Mulliner & Tucker, 2017; Zumbrunn, Mars, & Newborn, 2016). When feedback practices remain one-way or transmissive, research informs that it negatively reinforces student passivity, fails to engage learning, and demotivates because students are unable to clarify misconceptions (Boud & Molloy, 2013; Ferrell, 2013; Mulliner & Tucker, 2017; Price et al., 2011). Consequently, this hinders students from engaging in self-regulating behaviours to improve performance (Carless, Salter, Yang, & Lam, 2011; Dowden, Pittaway, Yost, & McCarthy, 2013; Hattie & Timperley, 2007; Lee, 2008).
Given the disjuncture of one-way feedback from achieving optimal student learning outcomes, dialogue in feedback has been repeatedly advocated (Carless et al., 2011; Molloy & Boud, 2013; Price et al., 2011) to shift students’ mindset from being mere “receivers…to partners in (the) learning process” (Price et al., 2011, p. 891). Moreover, as one-way feedback “accords learners with…little volition, limited agency, and dependence on teachers” (Boud & Molloy, 2013, p. 703), researchers have entreated for feedback practices to actively involve students through dialogue (Boud & Molloy, 2013). In particular, attention to students’ social and emotional needs through supportive relationships have been argued as pivotal in nurturing self-regulation through feedback (Butler & Winne, 1995; Dowden et al., 2013; Evans, 2013; Värlander, 2008). Supported by Vgotsky (1978), cognitive development is facilitated through social interaction, and “feedback without engagement is completely unproductive” (Price et al., 2011, p. 894), the need for research to focus on dialogue in feedback has been stressed (Molloy & Boud, 2013).

4.6.2 Feedback dialogue

Feedback dialogue is opined to optimize student learning (Mulliner & Tucker, 2017), foster students’ self-regulation (Carless et al., 2011), and is argued to “be a vehicle for further learning” (Orrell 2006, p. 443). While the literature has attempted to define feedback dialogue, definitions remain generic and the ancillary verbal and non-verbal behaviours in the feedback process remain unarticulated. For example, feedback dialogue has been defined as a “two-way communicative exchange” (Dixon, 2011, p.73), “dialogue to support learning in both formal and informal situations” (Askew & Lodge, 2000, p.1), or as “an interactive exchange in which interpretations are shared, meanings negotiated, and expectations clarified” (Carless, Salter, Yang, & Lam, 2011, p.397). While the purpose of
feedback dialogue has been explained (Carless et al., 2011), the contribution of how teachers’ ancillary verbal and non-verbal behaviours facilitate higher learning outcomes remain unclear.

Work by Blair and Ginty (2013) found that although feedback dialogues occur, dialogue often remained transmissive, teacher-dominated and ‘top-down’ in approach rather than engaging students in deeper conversations directed at facilitating learning and encouraging student agency. Students reported frustration at not being able to explain their thoughts during feedback dialogue as teachers were often justifying written feedback in dialogue. Moreover, verbal and non-verbal teacher behaviours during feedback dialogue remain undistilled. These findings echo Pauli (2010), who found that teachers often gave explanations without deeply inspecting students’ answers. As how feedback is received is important (Smith & King, 2004), and teachers’ verbal and non-verbal behaviours influence how students respond to teachers and learning (Kerssen-Griep & Witt, 2012; Lee & Kinzie, 2012), empirical research that examines teachers’ in-class, two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) appears timely.

To date, only two studies (Tan et al., 2018; Tan et al., in press) have explored this concept of feedback dialogue through the application of RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) in two-way feedback interaction. Tan and colleagues contend that as dialogue entails an interactive process, teachers’ verbal and non-verbal behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018) play a pivotal role in the communication process. Interviews with students revealed that when teachers display behaviours such as attentive listening, asking questions, and
question openness, these enhanced metacognition in students (Tan et al., 2018). In a follow-up study (Tan et al., in press), teacher interviews verified ancillary RI behaviours during two-way feedback interaction. That is, teachers reported three other constituents necessary in two-way feedback interaction; recognition respect, appraisal respect, and a safe learning space. Though these two studies were qualitative, importantly they add to the literature as student and teacher perspectives of two-way feedback interaction through RI are new. Three original constituents of RI were confirmed by students (Tan et al., 2018; i.e., asking questions, question openness, and attentive listening), and teachers reported the three additional behaviours necessary for feedback to be effective (i.e., recognition respect, appraisal respect, and a safe learning space).

However, yet to be corroborated through empirical research, is whether teachers action these verbal and non-verbal behaviours during two-way feedback interaction in the classroom. As “feedback is not simply a matter of linear communication, but involves a complex web of emotion, identity, power, authority, subjectivity, and discourse” (Higgins, Hartley, & Skelton, 2001, p.272), it appears germane to corroborate against empirical research, and determine its impact on students’ metacognition (Flavell, 1976), motivation (Deci & Ryan, 2008), and self-efficacy (Bandura, 1986).

Therefore, the aim of this research is focussed on how teachers communicate feedback through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) to impact students’ motivation, metacognition, and self-efficacy. Concurrently, while we also acknowledge the presence of different types of feedback (Siedentop & Tannehill, 2000; e.g., corrective feedback, constructive feedback) in two-way feedback interaction, our spotlight is on teachers’ ancillary RI behaviours. In the next section, we discuss the importance of the student learning outcomes such as motivation, metacognition, and self-efficacy.
4.7 Motivation

Self-Determination Theory (SDT), posits that when an individual’s basic psychological needs (i.e., autonomy, competence and relatedness) (Deci & Ryan, 2000) are satisfied through social contexts, intrinsic motivation is promoted (Deci & Ryan, 2008). Intrinsic motivation, according to Ryan and Deci (2000), refers to the inherent enjoyment of doing an activity and has been associated with positive outcomes such as deeper levels of processing, persistence in learning (Deci & Ryan, 1985; Vansteenkiste, Lens, & Deci, 2006), academic performance (Kaufman, Agars, & Lopez-Wagner, 2008), self-esteem (Baker, 2004), enjoyment and sustained student involvement (Ames & Archer, 1988).

Literature reports that feedback can promote motivation, which has a positive impact on academic achievement (Black & Deci, 2000; Saeed et al., 2013). However, extant literature has evidenced a declining trend in school students’ motivation (Corpus, McClintic-Gilbert, & Hayenga, 2009; Eccles, Wigfield, & Schiefele, 1998; Opdenakker, Maulana, & denBrok, 2012) and self-regulated behaviour (Peetsma, Hascher, Veen, & Roede, 2005). While some have speculated that the misalignment between students’ learning needs and classroom practices could be contributing factors (Maulana, Opdenakker, & Bosker, 2016; Nichols, 2014), research has yet to examine if two-way feedback interaction might lead to different outcomes. For example, Pat El and colleagues (2012) investigated teachers’ formative feedback among Dutch secondary school students (N=558) and found that teachers’ feedback behaviours (i.e., guidance, goal-related feedback) and interpersonal behaviours (level of support or degree of control) were strong predictors of student motivation. While teachers’ relatedness and proximity had a positive effect on intrinsic motivation by enhancing receptivity of
feedback, the actual verbal and non-verbal feedback behaviours in two-way feedback remain unarticulated.

Kiemer, Gröschner, Pehmer and Seidel (2015) conducted a year long, video-based, teacher professional development intervention (Germany) \( (N=10) \) to improve teachers’ classroom feedback discourse practices and Year 9 students’ \( (N=226) \) motivation to learn Mathematics and Science. Workshops guided teachers’ lesson plans to consider productive classroom dialogue and communication strategies, such as open questioning and scaffolding through feedback. Results found that students’ intrinsic motivation was significantly predicted by perceived autonomy and competence, facilitated by teachers’ constructive feedback (compared to simple feedback) and open questions. However, the interrogation of teachers’ ancillary non-verbal behaviours that accompany this feedback process were not examined. As teachers’ non-verbal behaviours are influential in affecting learning (Kluger & Lehman, 2018; Martin & Mottet, 2011), the exploration of how RI operates (Tan et al., in press; Van Quaquebeke & Felps, 2018) in conjunction with feedback to motivate learners serves to address current gaps in the literature and provide insights for educators.

4.8 Metacognition

Metacognition is a powerful outcome of the learning process (Wang, Haertel, & Walberg, 1990) and is instrumental in students’ scholarship, critical thinking, and academic success (Black & William, 2009; Magno, 2010; Winne & Nesbit, 2010). Metacognition is a disposition of thinking and learning (Harpaz, 2007), exemplified by “the knowledge, awareness, and control of one’s own learning” (Baird, p.184, 1990). According to Flavell (1976), metacognition involves both monitoring and regulation. Metacognition relates to an individual’s “active monitoring and consequent regulation and
orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in service of some concrete goal or objective.” (Flavell, 1976; p.232).

Individuals who are metacognitively aware are cognizant of what they know and where they lack knowledge of; they know how to regulate or adapt their cognitive mental processes, resulting in improved efforts to retain or seek out new information (Dunlosky & Metcalfe, 2009; Zhao & Mo, 2016). Strong metacognitive awareness has been associated with higher critical thinking skills (Ku & Ho, 2010), whereas poor metacognitive awareness often results in ineffective learning strategies (Joseph, 2009; Williams, Blythe, White, Li, Gardner, & Sternberg, 2002). When students are metacognitively aware, they are more strategic, better problem solvers, and experience greater academic success (Aurah, Cassady, & McConnell, 2014; Schellenberg, Negishi, & Eggen, 2011; Sperling, Richmond, Ramsay, & Klapp, 2012). As feedback is acknowledged as crucial in developing students’ ability to monitor, evaluate, and regulate learning (Ferguson, 2011), researchers have adjured teachers to be purposeful in providing metacognitive feedback through guided practice (Lee, Irving, Pape, & Owens, 2015; Schellenberg, et al., 2011; Van den Bergh, et al., 2013).

However, evidence demonstrates that students’ metacognitive skills remain under-developed (Arts, Jaspers, & Joosten-ten Brinke, 2016; Cao & Nietfeld, 2007) and empirical work that investigates how teachers’ two-way feedback interaction impact metacognition remains absent. For example, Van den Bergh and colleagues (2013) investigated Dutch primary school teachers’ (N=32) development of students’ (Year 6, 7 and 8) metacognition through in-class feedback during active learning (e.g., projects) using video observations. Results concluded that while 50% of the teacher–student
interactions contained guidance and feedback, these were largely focused on task or process feedback, with only 1% of feedback interactions anchored on developing students’ metacognition. Despite the importance of enhancing students’ metacognition in learning, teacher feedback has still been directive and transmissive, rather than facilitating understanding and learning (Blair & Ginty, 2013). Such a gap remains a concern because when students are not skilled in metacognition, learning and academic success are impeded. As underscored by Q’Malley, Chamot, Stewner-Marizanares, Kupper, and Russo (1985); “students without metacognitive approaches are essentially learners without direction and ability to review their progress, accomplishments, and future learning directions” (p.24).

Crimmins and colleagues (2014) investigated the effect of in-class, dialogic feedback on an argumentative essay through a Written, Reflective, Dialogic Feedback (WRDF) strategy in Australia. Dialogic feedback was given two weeks following written feedback to undergraduates. This time gap encouraged students to reflect on written feedback and consider strengths or areas which needed clarification. While results reported its utility in enhancing teacher-student relationships, teachers’ actual ancillary verbal and non-verbal feedback behaviours that facilitate these outcomes were unreported. Moreover, while qualitative data suggested that teachers’ feedback dialogue was helpful in nurturing students’ ability to self-regulate, this was only speculative and unverified by empirical work. To date, empirical research on feedback dialogue remains scarce (Crimmins et al., 2014; Lee et al., 2015; Van den Bergh et al., 2013), and under-researched is work that examines the utility of teachers’ RI-related feedback behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018) in influencing students’ metacognition.
4.9 **Self-efficacy**

Self-efficacy plays a key role in influencing students’ learning achievements (Høigaard, Kovač, Øverby, & Haugen, 2014). Broadly defined, self-efficacy relates to one’s judgment of his or her performance capability to complete specific tasks (Bandura, 1986), and has a bearing on subsequent effort and persistence (Pintrich & Schunk, 1996). For instance, when students have stronger self-efficacy, it fosters a host of benefits: academic resilience (Cassidy, 2015), academic success, higher aspirations, and prepares individuals for vocational challenges (Bandura, Caprara, Barbaranelli, Pastorelli, & Regali, 2001).

To further highlight its relevance, several studies have reported a direct and positive relationship between self-efficacy and academic achievement (Greene, Miller, Crowson, Duke, & Akey, 2004; Sharma, & Silbereisen, 2007). Moreover, self-efficacy is a catalyst for metacognition, for when students experience higher self-efficacy, metacognitive skills are applied to a greater degree (Bouffard-Bouchard, Parent, & Larivee, 1991). However, there appears to be conflicting views regarding the effectiveness of feedback on self-efficacy in the literature and the student learning outcomes (i.e., motivation, metacognition, self-efficacy) of two-way feedback interaction are unknown. For example, Duijnhouwer, Prins, and Stokking (2012) explored the effect of teachers’ feedback on students’ L2 writing (N=41) in experimental conditions and found that when students were provided with more feedback on writing strategies, self-efficacy was attenuated. Rather than benefitting from teachers’ feedback for improvement, teachers’ feedback was construed as prescriptive and therefore, underestimating students’ capabilities. With feedback dialogue recommended, reporting the intricacies of teachers’ verbal and non-verbal behaviours appears worthy.
Others have found that when self-referenced and formative feedback is provided, these have an impact on students’ self-efficacy (Chan & Lam, 2010; Lerdpornkulrat, Poondej, Koul, Khiawrod, & Prasertsirikul, 2017). Chan and Lam (2010), reported the provision of formative and self-referenced feedback on vocabulary to benefit high school students’ (N=79, Grade 8) self-efficacy. However, feedback was administered under experimental conditions through a computerized environment, and teachers’ feedback dialogue was not reported. Lerdpornkulrat and colleagues (2017) conducted experimental research which investigated the use of rubrics as a form of self-referenced feedback with undergraduates (N=584). While results indicated that rubrics promoted self-efficacy through the encouragement of self-evaluation, others argue that its utility is limited, and contest that individualized feedback between teacher and student to clarify understanding still remains needful (Chardon, Collins, Hammer, & Hart, 2011). Although the exploration of RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) may be nascent, the interrogation of verbal and non-verbal attributes through empirical research may yield useful insights and advance the feedback literature.

4.10 Research aims and hypotheses

The overarching aims of this work were three-fold. First, to examine if teachers indeed display the ascribed behaviours in two-way feedback interaction (Tan et al., in press). Second, to explore whether teachers’ feedback predicted student’s metacognition, self-efficacy and motivation. Third, to determine whether teachers’ two-way feedback through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) predicted students’ metacognition, self-efficacy and motivation. Considering the importance of teachers’ verbal and non-verbal behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018), and student learning outcomes such as motivation (Deci & Ryan, 2008), self-efficacy (Bandura, 1986), and metacognition (Flavell, 1976), we hypothesized that
teachers’ two-way feedback interaction through RI, rather than feedback alone, would be a more salient predictor of students’ metacognition, self-efficacy and motivation.

4.11 Methods and Procedure

This empirical study involved audio-recorded lessons, an in-class observation sheet, and surveys at the end of three lesson observations per class. In order to validate teachers’ two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018), teachers’ feedback occurrence (i.e., general positive feedback, positive specific feedback, corrective feedback, and constructive specific feedback; Siedentop & Tannehill, 2000) was also coded. The audio recordings served to facilitate accurate feedback and RI analysis (section 4.4.1). The frequency of teachers’ feedback and RI-related behaviours were subsequently averaged and analysed using regression, with results described in section 5.0.

4.11.1 Participants

This study was conducted in four independent high schools in Western Australia. A total of thirty-six (N=36), 55-60-minute classroom lessons were observed from twelve teachers over a period of six months (March to August), and students (N=236) ranged from Years 7 to 12. As 20 student surveys were incomplete, n=216 student responses are reported. Participating teachers had varied teaching experience from one to sixteen years, with a mean of 7.8 years and a standard deviation of 5.4 years.

4.11.2 Procedure

With approval granted from the Human Research Ethics Board, permission was secured from school principals, teachers, parents and students. Electronic mail was
sent to school principals and teachers, explaining the purpose, procedures, benefits and risks of the study. Additional material such as classroom observation sheets to be used by the researcher and students’ survey questions were also provided. The role of the researcher in the classroom was explained as a non-participatory observer, sitting silently at the back of the class during these visits. Teachers were requested to wear a microphone lapel to capture verbal feedback provided to students during lessons. This recorded information was important for accuracy of coding and for validation purposes. Parents’ information sheet included passive consent and a withdrawal option, as the nature of the study was non-invasive. Both teacher and student participation were voluntary, and withdrawal was permitted at any time, without pursuit of reasons and confidentiality assured. Consistent with ethical approval, data collected was assured to be strictly for research purposes and results de-identified for all participants, and schools.

With permission obtained from the respective school principals, classroom visits were directly arranged between the first author and teachers. Teachers were observed three times, separated by a week between each observation. A self-reporting student survey was subsequently administered at the end of the third lesson observation, which took no longer than fifteen minutes to complete.

### 4.11.3 Classroom observation instrument

Teachers’ naturally occurring classroom feedback behaviours (Siedentop & Tannehill, 2000) through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) were recorded through an observation sheet which captured the frequency of teachers’ observed feedback behaviour in contiguous blocks of five minutes. Four rating scales (0 to 3) were used to denote the frequency of the observed behaviour. For example, 0=never observed, 1=observed sometimes, 2=observed often, 3=observed all the time. The
observation instrument included both feedback and RI elements: general positive feedback, positive specific feedback, constructive feedback, corrective feedback, asking questions, question openness, attentive listening, recognition respect, and appraisal respect (Darwall, 1977; Dillion, 2007; Siedentop & Tannehill, 2000; Tan et al., in press; Van Quaquebeke & Felps, 2018) (see results section for specific examples).

Subsequent transcript analysis and coding was done through NVIVO 11, which provided clarity to each code and its attributes. Sample observation findings were also corroborated with an external rater, who was present during the lesson observations. Both the external rater and first author coded the in-class observations individually and results were subsequently compared for discrepancy and consistency, with an inter-rater agreement of 86.4% achieved. The mean frequency of RI and feedback was calculated by dividing the total number of epochs per teacher, which came to 2.44 for RI and 0.77 for feedback, respectively.

4.11.4 Quantitative instruments

Student surveys were collected at the end of the third classroom observation. In order to understand how strongly teachers’ feedback through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) predicted students’ metacognition, self-efficacy, and motivation, a total of three instruments were utilized. They are; Junior Metacognitive Awareness Inventory (Jr. MAI) (Sperling, Howard, Miller, & Murphy, 2002) (18-items), the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, and McKeachie, 1993) (8 items), and the Self-Regulation Questionnaire (Academic) (SRQ-A; Ryan & Connell, 1989) (32 items).
Metacognition

Metacognition was measured by an 18-item, Junior Metacognitive Awareness Inventory (Jr. MAI; Sperling, Howard, Miller, & Murphy, 2002) which consists of two domains - knowledge of cognition (9 items) and regulation of cognition (9 items). The Jr. MAI (Sperling et al., 2002) was developed from the adult instrument MAI (Schraw & Dennison, 1994), and remains grounded in Brown’s (1978) theoretical framework of metacognition, which includes two components; knowledge of cognition and regulation of cognition. The knowledge of cognition component includes declarative, procedural, and conditional knowledge of cognition. The regulation of cognition component involves planning, monitoring, and evaluation. The Jr. MAI (Sperling et al., 2002) is suitable for students from grades to 6-9, has a Cronbach alpha reliability coefficient of .85, and a strong internal consistency reliability (Sperling et al., 2012; Sperling et al., 2002). Instrument validity with primary school children has also been recently reported (Ning, 2019). Participants responded to a 5-point Likert-scale ranging from 1 (never) to 5 (always) to sample items such as “I ask myself about how well I am doing while I am learning something new”.

Self-efficacy

Students’ task-related self-efficacy in learning and performance was measured by 8-items from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1993). The Chronbach’s alpha for these items are reported as .93 for college students and participants rated statements on a 5-point scale ranging from 1 (not true at all of me) to 5 (very true of me). Construct validity among high school students has also been recently confirmed (Chow & Chapman, 2017) and a sample item includes, “I’m certain I can master the skills being taught in this class.”
**Motivation**

Students’ motivation was measured using the 32-item Self-Regulation Questionnaire (Academic) (SRQ-A; Ryan & Connell, 1989). The SRQ-A is suitable for students in high school (Patrick, Skinner, & Connell, 1993; Grolnick, Ryan, & Deci, 1991). Each item starts with a stem question, “Why do I do my homework?” and sample response items includes “…because I will feel bad about myself if I don’t do it”. Students rated statements on a 4-point scale, from 1 (not true at all) to 4 (very true). The SRQ-A uses four subscales: external regulation, introjected regulation, identified regulation, and intrinsic motivation. Motivation is calculated using the Relative Autonomy Index (RAI) formula $2 \times \text{Intrinsic motivation} + \text{Identified} – \text{Introjected} – 2 \times \text{External}$. The RAI carries a range from -5.41 to 7.02 (for psychometric properties, see Patrick et al., 1993; Grolnick et al., 1991).

4.12 **Analysis**

This analysis focused on the impact of teachers’ actual feedback, and two-way feedback interaction behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018), and the predictive relationship to students’ in metacognition, motivation, and self-efficacy. Teachers’ classroom teaching was transcribed verbatim and teachers’ feedback behaviours (Siedentop, & Tannehill, 2000) through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) were inductively analysed and clustered into appropriate themes which represented the conceptualized behaviours (Elo & Kyngäs, 2008; Strauss & Corbin, 1988). Described, inductive analysis is where “(t)he researcher begins with an area of study and allows the theory to emerge from the data” (Strauss & Corbin, 1998; p. 12). Inductive approach was used as it relates to “a systematic procedure for analyzing qualitative data in which the analysis is likely to be guided by
specific evaluation objective (Thomas, 2006, p. 238). Meaning units were represented in the form of phrases, words, and sentences (Robson, 1993). Data were subsequently reviewed for content and coded according to the identified categories (Polit & Beck, 2012). NVivo 11 qualitative data analysis software was used to code the transcripts into its appropriate categories. Coding sheets were subsequently validated by two experienced university research staff, and meaning units checked for thematic consistency. An agreement of 95% was reached between independent coders. Themes from the audio-recording was verified with the in-class observation sheet for consistency.

Next, student surveys were analysed using path analysis in Mplus 7.3 (Muthén & Muthén, 2014). Three hypotheses were predicted for the regression analyses. In the first hypothesis, we predicted that teachers’ two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) would predict students’ metacognition more strongly than feedback. The second hypothesis predicts that teachers’ two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) would predict students’ self-efficacy more strongly than feedback. The third hypotheses predicts that teachers’ two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) would predict students’ motivation more strongly than feedback. As such, the dependent variables were metacognition (knowledge), metacognition (regulation) (Sperling et al., 2002; Flavell, 1976), self-efficacy (Bandura, 1986), and motivation (Deci & Ryan, 2008). Independent variables were the averaged frequency of teachers’ observed classroom feedback and RI.

4.13 Results

Thirty-six lesson observations (N=36) were undertaken with twelve teachers, resulting in 291 pages of 11-point, single-spaced transcribed text. A total of 2089 meaning units were recorded and analysed for feedback (Siedentop & Tannehill, 2000) and RI
behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018). To protect participant confidentiality, pseudonyms have been used.

Teachers’ feedback was coded and categorized into four themes (Table 1). The first theme, general positive feedback refers to teachers’ feedback which aims to encourage and build a positive learning climate. For example, “good” (Emma), and “well done, good job!” (Andrea). The second theme, positive specific feedback relates to feedback which is positive and provides information about what was done well. Examples include; “This was a very good response…really clear” (Daisy) and “excellent detail!” (Hayden). Corrective feedback was the third theme, which refers to feedback which focuses on correcting errors. For instance, “Correct, that’s it!” (Grant) and “the arrow should point to what they are eating … your arrows are back to front… this means the long-necked tortoise is eaten by the larvae! …you might want to flip that” (Daisy). The fourth theme, constructive specific feedback, refers to feedback which provides correction as well as positive feedback on what was done well. For example, “That is a good serve, but don’t stop your follow through. Make sure your follow through is there” (Flynn), and “your case study is really interesting but the point you are trying to make is not strong enough. Let’s try to find a stronger entry…” (Cathey).

The verbal behaviours of RI were coded and categorized into themes (Table 2). The first theme, asking questions, refers to an invitation for an answer (Hawkins & Power, 1999). Examples include; “What is magnetic flux density? In a bar magnet, where is that the greatest?” (Grant), and “what should we be looking for in a reliable website?” (Emma). The second theme, question openness, relate to questions that demonstrate a genuine interest in the opinion of others. For instance, “how are we going
to give this poster substance?” (Andrea), “in terms of your engagement with the question, how could you improve that?” (Bella), and “what worked well for you?” (Flynn). The third theme, appraisal respect (Darwall, 1977; Dillion, 2007), refers to the positive appraisal of others. For example;

Hayden: Why would they (the actors) isolate body part movements?

Student: It would be uncomfortable (because) you might not be able to move the rest of your body due to scar tissues.

Hayden: Well done! You said it well! might not even be able to move parts of your body. That scar tissue…on the back is literally holding the body down, hence the hips might be the only thing that can move.

Another example includes;

Andrea: What symptoms do we display in cognitive anxiety?

Student: Nervousness, apprehension, and worry.

Andrea: Perfect, well done! Hence, we need mental techniques to reduce those feelings of nervousness, apprehension, and worry, like what (student’s name) has mentioned.

The three other non-verbal attributes of recognition respect (Darwall, 1977; Dillion, 2007), attentive listening (Van Quaquebeke & Felps, 2018), and provision of a safe learning space (Latting, 1990; Fassinger, 1995) were observed for presence during in-class feedback. Teachers’ eye-contact, positive body language and facial expressions were in concert with attributes of attentive listening. Recognition respect (Darwall, 1977; Dillion, 2007), which is defined as the disposition of giving weight to an individual, taking
the person seriously as that presented self and according moral worth, was observed when teachers called students by name and maintained positive body language during interaction with the individual. A safe learning space (Latting, 1990; Fassinger, 1995), is characterised by teacher behaviours that are non-judgemental, approachable, supportive, and welcoming of discussion. This was evident through teachers’ face-to-face interactions, sitting on a chair next to the student, smiles, forward lean, and positive body language. Classroom atmosphere was generally positive; students were responsive to their teachers, and classroom management issues was close to nil.

**Table 1: Teachers’ feedback**

<table>
<thead>
<tr>
<th>Theme (frequency)</th>
<th>Definitions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>General positive feedback (138)</td>
<td>Feedback that supports student effort and builds a positive learning climate through encouraging feedback</td>
<td>‘Excellent, well done!’ (Bella)</td>
</tr>
<tr>
<td>Positive specific feedback (194)</td>
<td>Feedback that provides specific information on what was done well.</td>
<td>‘That was quality, that dig-set-spike was brilliant!’ (Flynn)</td>
</tr>
<tr>
<td>Corrective feedback (423)</td>
<td>Feedback that corrects errors with specific information.</td>
<td>‘Avoid colloquial language …remember when you write, it needs to be really formal.’ (Cathey)</td>
</tr>
<tr>
<td>Constructive specific feedback (15)</td>
<td>Feedback that includes both positive feedback and error correction.</td>
<td>‘The feet and glove position was perfect, just didn’t close those hands quick enough.’ (Flynn)</td>
</tr>
</tbody>
</table>
Table 2: Teachers’ verbal Respectful Inquiry behaviours

<table>
<thead>
<tr>
<th>Theme (Frequency)</th>
<th>Definitions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asking questions (750)</td>
<td>Refers to teachers’ effort in asking questions so as to invite an answer.</td>
<td>‘What is a blog?’ (Cathey)</td>
</tr>
<tr>
<td>Question openness (527)</td>
<td>Refers to teacher questions that show a genuine interest in student opinion.</td>
<td>‘How would you check to see if the food web is accurate?’ (Daisy)</td>
</tr>
</tbody>
</table>
| Appraisal respect (42) | Refers to the positive appraisal of others | Andrea: ‘What is motivation?’  
Student X: ‘How well we do something …relative to our ability.’  
Andrea: ‘X has been spot on that motivation is about how good we are at a certain thing, relative to our ability.’ (Andrea) |

4.14 Descriptive statistics and correlations

Table 3 reports the descriptive statistics and correlations for our study variables. Interestingly, the mean for frequency of observed teachers’ RI behaviours (\(M = 2.44\) per lesson) compared to teachers’ feedback appear to be three times more than feedback (\(M = 0.77\)), demonstrating the salience of RI during in-class feedback. Both means for student responses to the Jr. MAI (Sperling et al., 2002) for metacognition (knowledge) (\(M = 3.94\)) and metacognition (regulation) (\(M = 3.29\)) were high, but only RI positively correlated with student metacognition (knowledge) and metacognition (regulation), whereas one-way feedback was only positively correlated with metacognition (knowledge). While the means for self-efficacy (MSLQ; Pintrich et al., 1993) appear relatively high (3.68 out of a
maximum of 5), there was no positive correlation between teachers’ RI and feedback with students’ self-efficacy. The means for student motivation (SRQ-A; Ryan & Connell, 1989) appear relatively low (RAI = -0.43) compared to previous work (Patrick et al., 1993). However, teachers’ RI was strongly correlated with students’ motivation, whereas teacher’s feedback negatively predicted students’ motivation.

### Table 3. Means, standard deviations, and correlations between measured variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>1. Teacher RI</td>
<td>2.44</td>
<td>0.26</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Teacher Feedback</td>
<td>0.77</td>
<td>0.42</td>
<td>-0.26**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Student metacognition (K)</td>
<td>3.94</td>
<td>0.47</td>
<td>0.17*</td>
<td>0.15*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Student metacognition (R)</td>
<td>3.29</td>
<td>0.66</td>
<td>0.14*</td>
<td>0.01</td>
<td>0.67**</td>
<td>0.77</td>
</tr>
<tr>
<td>5. Student motivation^</td>
<td>0.43</td>
<td>2.23</td>
<td>0.15*</td>
<td>-0.09</td>
<td>0.32**</td>
<td>0.31**</td>
</tr>
<tr>
<td>6. Student self-efficacy</td>
<td>3.68</td>
<td>0.78</td>
<td>0.02</td>
<td>0.20**</td>
<td>0.58**</td>
<td>0.59**</td>
</tr>
</tbody>
</table>

Note. N = 216. * p < .05. **p < .01. Alpha reliabilities in parentheses.

^RAI was used to calculate students’ motivation.

### 4.15 Path analysis

To investigate if teachers’ two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) predicted students’ metacognition, self-efficacy, and motivation, a path analysis using maximum-likelihood estimation was
conducted using Mplus 7.3 (Muthén & Muthén, 2014). Figure 1. depicts the path model and standardized path coefficients. Model fit was excellent ($\chi^2(14) = 188.98, p < .001$, CFI = 1.00, TLI = 1.00 RMSEA = .00, SRMR = .00).

The results of the path analysis (Figure 1) indicated that teachers’ respectful inquiry significantly predicted students’ metacognition (knowledge; $\beta = .22, p < .001$) and metacognition (regulation) ($\beta = .15, p < .05$). Teacher’s RI further predicted students’ motivation ($\beta = .137, p < .05$), but not self-efficacy ($\beta = -.01, p = .849$). In relation to when teachers’ provide one-way feedback in isolation, the path analysis significantly predicted students’ metacognition for knowledge ($\beta = .208, p < .01$), but not students’ metacognition for regulation ($\beta = .046, p = .510$), motivation ($\beta = -.056, p = .423$), and self-efficacy ($\beta = .037, p = .601$). As such, the analysis supports our hypothesis that RI is a stronger predictor of motivation and metacognition (knowledge and regulation) than feedback. However, RI and feedback did not predict student’s self-efficacy. When the teacher provides one-way feedback, as opposed to two-way feedback interaction in association with RI behaviours, it only predicts students’ metacognition (knowledge). Altogether, both RI and feedback accounted for 6.9% variance in students’ metacognition (knowledge), 2.2% variance in students’ metacognition (regulation), 2.6% variance in motivation, and 0.2% variance in self-efficacy.
4.16 Discussion

This study reports teachers’ observed in-class, RI behaviours during two-way feedback interaction, and examines how strongly they predict students’ motivation, metacognition, and self-efficacy. Although two-way feedback interaction has previously been opined to access students’ metacognition (Tan et al., 2018; Tan et al., in press), work that verifies teachers’ utility of RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and a safe learning space) are novel to this work. Of importance, this study seeks to corroborate previous work, that teachers actioned these RI-related behaviours organically during feedback (Tan et al., in press), and provide practical insights for educators to be more effective in feedback delivery. The methodology involved recording teachers’ actual in-class verbal and non-verbal RI-related two-way feedback interaction behaviours. Students’ learning

Figure 1. Path analysis for RI and feedback. Significant effects are displayed only. N=216, *p < .05. **p < .01 Dotted lines represent non-significant pathways.
outcomes were accessed through surveys and analysed using multiple regression to predict outcomes in metacognition, motivation, and self-efficacy.

Findings ratify previous work that reports teacher’s perceptions that they engage in RI behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018) during two-way feedback interaction. While one-way feedback with closed questions are reported to be a teacher’s default practice (Mehan, 1979; Nichols, 2014), the current findings show that teachers are able to display higher-order feedback skills. Moreover, results advocate that when implemented in the classroom, teachers’ two-way feedback interaction through RI strongly predict students’ motivation, metacognition (knowledge) and metacognition (regulation) but not self-efficacy. In contrast, one-way feedback only predicts metacognition (knowledge). Findings are consistent with the literature, which outlines that attention to the social and emotional aspects of feedback (Small & Attree, 2016) and social interaction (Vgotsky, 1978) facilitates cognitive development and learning. When teachers display SDT-supportive behaviours, they, according to student survey responses, promote higher quality learning (Deci & Ryan, 2016) such as understanding, thinking, reflection (Franke et al., 2009; Lee & Kinzie, 2012), and deeper levels of processing (Vansteenkiste et al., 2006). Two-way feedback interaction has the potential to encourage feedback receptivity, activate self-regulatory processes, and fortify learning.

Worthy of note, our findings are also in accord with SDT literature (Deci & Ryan, 2000) supporting the proposition that when teachers jointly enact RI behaviours during feedback, these verbal and non-verbal behaviours serve to undergird, motivate and promote psychological needs through relatedness support (Sparks et al., 2015; Cox & Williams, 2008), competence support (Jang et al., 2010; Sierens et al., 2009), and autonomy support (Su & Reeve, 2011). While our results concur with the literature that
one-way feedback does not predict metacognition (regulation) (Carless et al., 2011; Hattie, 2007; Lee & Kinzie, 2012), but because RI did, we contend that the fulfilment of psychological needs-support through RI appears to have the motivational capacity to advance students’ learning by accessing deeper cognitive levels and self-regulation.

Contrary to our hypotheses, teacher RI behaviours did not predict student self-efficacy, possibly because self-efficacy is more likely be mediated by factors beyond the classroom context. We also postulate that because self-efficacy is closely related to task competence (Bandura, 1986). Hence this might require extended time, iterative cycles of two-way feedback interaction, and consistency of feedback practice amongst all teachers to upskill students’ ability in knowing how to approach, understand, interpret, and learn from feedback (Blair & Ginty, 2013; Sadler, 1989). The non-significant results pertaining to feedback and self-efficacy also align with others (Duijnhouwer et al., 2012) who report that while feedback itself raises cognitive awareness in terms of gaps, it reinforces passivity, dependence on teachers to dispense solutions, and does not facilitate active learning from feedback (Boud & Molloy, 2013).

Although the observed classroom teacher-student interactions were generally positive, the non-significant predictive capacity of one-way feedback with motivation are also in accordance with the literature which reports that one-way feedback alone is ineffective in engaging learning and demotivates students (Ferrell, 2013; Nicol, 2010; Price et al., 2011; Zumbrunn et al., 2016). However, in order for optimal learning gains to be achieved, teachers’ enactment of two-way feedback interaction through its verbal and non-verbal behaviours appear facilitative in motivating students to be actively and productively engaged with feedback.
In summary, this current work advances previous scholarship (Tan et al., 2018; Tan et al., in press) confirming that when teachers enact feedback and two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018), higher learning outcomes such as metacognition and motivation are facilitated. Together, these findings support the claim that for learning to be augmented from feedback, RI-related, two-way feedback interaction (Tan et al., in press; Van Quaquebeke & Felps, 2018) is imperative. These RI behaviours (Tan et al., in press; Van Quaquebeke & Felps, 2018) (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) are catalytic in two-way feedback interaction, and educators are encouraged to consciously enact these in order to foster students’ learning from feedback. Understanding these behavioural parameters that enable students to thrive in two-way feedback interaction through RI (Tan et al., in press; Van Quaquebeke & Felps, 2018) holds potential to optimise learning and provides further opportunities in teacher professional development programs.

4.17 Limitations

While this study holds promise for future work, we caution against generalisation, and acknowledge its limitations. First, the homogeneity of the student participants, their private schooling, similar ethnic and linguistic backgrounds within Western Australia limit the findings within these contexts. Second, the survey instruments involved self-reported measures, which can introduce certain response bias as it was not corroborated with qualitative research. Future work could include interviews alongside empirical work to advance current understanding of how the intricacies of two-way feedback interaction through RI (Van Quaquebeke & Felps, 2018; Tan et al., in press) foster learning for students. Third, we do not know the extent to which these observed teachers may have adjusted their classroom instructional behaviours with the presence of
raters. Whist we tried to overcome this by averaging three classroom observations per teacher, we acknowledge it could be a limitation. Fourth, the relatively small sample size is a limiting factor for path analysis. Notwithstanding these limitations, this study has progressed current literature to explicate the specific feedback behaviours that augment learning for students in the classroom, and its impact on student learning outcomes.

4.18 Future recommendations

Five recommendations for further research emanate from the results of this study. First, empirical research should extend and verify if these results may be replicated in non-Western contexts. Second, the inclusion of students’ subject-based, performance indicators is needed to confirm the effectiveness of teachers’ two-way feedback interaction. Third, examining the mediating impact of two-way feedback interaction with students of differential subject interest (low or high), and its gender-related effect might generate interesting lines of inquiry. Fourth, a longitudinal study comparing expert versus beginning teachers’ two-way feedback interaction and its impact on students’ metacognition, self-efficacy, and motivation also deserves exploration. Lastly, teacher professional development programs using two-way feedback interaction could enhance teaching practices in the classroom and promote quality teaching and learning in this area.

4.19 Conclusion

While one-way feedback with closed questions are reported to be teachers’ default practice (Mehan, 1979; Nichols, 2014), the current findings show that teachers are able to display higher-order feedback skills. Our results demonstrate that teachers’
two-way feedback interaction through RI significantly predicted students’ metacognition (knowledge and regulation) and students’ motivation. We therefore assert that when two-way feedback interaction through RI is executed as part of teachers’ skilful instructional feedback, this can be potentially catalytic and empowering: that is, teachers are able to harness and augment students’ learning from feedback more effectively, and encourage students to engage with feedback more productively. Without two-way feedback interaction through RI, opportunities for meaningful engagement, co-construction, and actualization of learning remain latent.

Finally, this work offers insights to guide teaching practice and encourages critical reflection for teachers. Specifically, teachers’ consciousness in enacting RI behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) during two-way feedback interaction serves to facilitate students’ learning.
References


CHAPTER 5:

GENERAL DISCUSSION
Chapter 5 Foreword

Chapter 5 is the final chapter of this thesis. Within this chapter, consideration is given to the key findings reported in the preceding chapters and the importance of this information as a whole. The chapter includes a summary of the work completed, detailed accounts of the implications of this work, its limitations, subsequent research opportunities, and potential applications.
5.1 Research Summary

The purpose of the research presented within this thesis was to gain insight on the utility of two-way feedback interaction and examine its impact on students’ higher order learning outcomes. In seeking to advance the feedback literature in this area, we first proposed qualitative work which explored both student and teacher perceptions of Respectful Inquiry (RI; Van Quaquebeke & Felps, 2018) (i.e., asking questions, question openness, and attentive listening) during feedback (Chapters 2 & 3). Subsequently, empirical work further interrogated the utility of teachers’ verbal and non-verbal behaviours, and examined its predictive association with students’ motivation, metacognition, and self-efficacy.

Anchored on the motivational theory of Self-Determination Theory (SDT; Deci & Ryan, 2000), Chapter 2 described student perspectives of how teachers’ verbal and non-verbal behaviours during two-way feedback interaction facilitate learning through RI (Van Quaquebeke & Felps, 2018), and the perceived learning outcomes that ensue. Based on these findings, Chapter 3 focussed on following up on the student-identified, teacher perspectives of two-way feedback interaction, and its student learning outcomes. To ensure validity of teacher expertise, scholarly criterion (Hattie, 2003; Palmer, Stough, Burdensky, & Gonzales, 2005) was applied, and these were endorsed by line managers. Concurrently, expert teachers’ self-efficacy and perceived barriers to two-way feedback interaction were investigated. While findings indicate support for teachers’ verbal and non-verbal behaviours (Chapter 2), three additional behaviours were identified as instrumental (i.e, recognition respect (Darwall, 1977; Dillon, 2007), appraisal respect (Dillon, 2007), and a safe learning space (Latting, 1990; Fassinger, 1995). Findings from this work also confirm that teachers enact two-way feedback interaction with the intent to nurture students’ metacognition and active learning from
feedback. With regards to the perceived teacher barriers in two-way feedback interaction, factors such as time, heavy curriculum, and class size were identified which thwart teachers’ pursuit of quality two-way feedback interaction.

In Chapter 4, we verified findings from Chapters 2 and 3 and advanced the literature through empirical classroom observations. Teachers’ in-class two-way feedback interaction behaviours were observed and regression analysis was used to determine the predictive associations of teachers’ two-way feedback interaction with students’ learning outcomes such as motivation, metacognition, and self-efficacy. Path analysis revealed that when teachers’ enacted RI behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) in two-way feedback interaction, students’ motivation, metacognition (knowledge), and metacognition (regulation) was positively predicted. However, one-way feedback only predicted students’ metacognition (knowledge). These findings demonstrate the importance of teachers’ supportive verbal and non-verbal behaviours in two-way feedback interaction, and demonstrate that when these are salient, students’ learning from feedback may be optimised.

5.2 Implications

The development of, and support for two-way feedback interaction through its verbal and non-verbal behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) through the motivational frameworks studied (SDT; Deci & Ryan, 2000; RI; Van Quaquebeke & Felps, 2018) has important conceptual, methodological, and practical implications. In this section, we draw from the findings reported from Chapters 2 to 4 to elaborate on these implications.
5.2.1 Conceptual implications

Although previous work on feedback dialogue (Boud & Molloy, 2013; Carless, 2013) has highlighted the importance of relationships in facilitating feedback (Carless, 2013), earlier work did not explicate how teachers’ ancillary verbal and non-verbal behaviours contribute towards students’ learning from feedback (Blair & Ginty, 2013; Dowden, Pittaway, Yost, & McCarthy, 2013; van den Berghe, Ros & Beijaard, 2013).

The proposed application of RI (Van Quaquebeke & Felps, 2018) is not only grounded in theory (SDT; Deci & Ryan, 2000), it also recognises that certain behaviours enacted by the leader (i.e., teacher, in this instance) have motivational influence on followers (i.e., student) during inquiry. Thus, the application of RI in the education context not only advances and extends the literature through evidence-based, verbal and non-verbal constituents in two-way feedback interaction, it also serves to inform how these behaviours meaningfully undergird SDT-needs fulfilment to promote motivation (Ryan & Deci, 2000) and metacognition (Flavell, 1976).

This thesis has also made important advancements in the literature through its unique application of RI (Van Quaquebeke & Felps, 2018) to the education context. By considering student perspectives through the lens of RI (Van Quaquebeke & Felps, 2018), and triangulating its findings with teacher perspectives ( Chapters 2 & 3), this thesis has provided deeper knowledge and understanding of how teacher behaviours work in synergy with SDT (Deci & Ryan, 2000) to support students’ learning from feedback. Additionally, our findings through empirical work ( Chapter 4) provide further support that two-way feedback interaction is influential in accessing students’ higher learning outcomes such as motivation and metacognition.
In addition, this thesis has also served to address scholarly recommendations (Carless, 2013; Boud & Molloy, 2013) that researchers move beyond feedback monologue (Nicol, 2010) to promote students’ learning. Using the lens of RI (Van Quaquebeke & Felps, 2018), the examination of two-way feedback interaction has evidenced support for SDT-needs fulfilment and extended the literature by explicating how specific verbal and non-verbal behaviours promote learning and overcome complexities in feedback (i.e., social, emotional, and content) (Pitt & Norton, 2017; Small & Attree, 2016).

5.2.2 Practical implications

The thesis findings indicate that teachers’ ancillary verbal and non-verbal behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space) are catalytic and efficacious in accessing students’ higher learning outcomes during feedback. Importantly, Chapter 2 demonstrates that students do notice teachers’ ancillary feedback behaviours and it is beneficial in supporting their psychological needs during feedback. When social interactions fulfil psychological needs, this promotes motivation, competence, and self-regulation (Deci, Schwartz, Sheinman, & Ryan, 1981; Standage, Duda, & Ntoumanis, 2006; Sparks, Dimmock, Whipp, Jackson, & Lonsdale, 2015). Chapter 3 further informs that whilst teacher behaviours such as asking questions, using open questions and listening attentively are key, without the provision of a safe learning environment where recognition and appraisal respect is included, the effectiveness of feedback may be potentially undermined.

This information may be important for educators interested in understanding how students’ higher learning outcomes may be fostered through two-way feedback interaction. Given that feedback can actively nurture students’ ability to regulate their own learning,
encourage reflection, and increase performance outcomes (Fonseca et al., 2011; Nicol, 2010; Price et al., 2010; Zimmerman, 2000), iterative cycles and intentional application of the verbal and non-verbal constituents in two-way feedback interaction may afford greater gains in students’ metacognition, motivation, and self-efficacy towards learning.

The work presented in Chapter 4 is thus an important foundation for future exploration and intervention in teacher professional development programs. Results not only demonstrate the feasibility of teachers enacting two-way feedback interaction in the classrooms, the results further affirm that students learning is optimised when teachers engage in such meaningful feedback efforts (Chapter 2 and 3).

5.2.3 Methodological implications and limitations

The research reported in Chapters 2 to 4 has several methodological implications. Regarding methodology, two notable contributions that this thesis makes to the field is the exploratory application of RI (Van Quaquebeke & Felps, 2018) in the education context through qualitative (Chapters 2 and 3) and empirical work (Chapter 4).

The purpose of using a qualitative approach was to develop the theoretical concept of RI by gathering descriptions and interpretations from participants about their perspectives in two-way feedback interaction. Through face-to-face, semi-structured interviews and open-ended questions, this provided participants room for dialogue, and for researchers to access thoughts, and in-depth insights (Kendall, 2008; Opdennakker, 2006) which is important in theory building. Moreover, interviews provide an avenue for mutual clarification and allow participants the opportunity to share perspectives and importantly, to allow new information to emerge. This was necessary as RI (Van
Quaquebeke & Felps, 2018) has not been applied in the education context before. Based on the student interviews (Chapter 2), preliminary evidence was found to support the conceptual theory of RI (Van Quaquebeke & Felps, 2018). Teacher interviews (Chapter 3) further elucidated and extended understanding of verbal and non-verbal constituents in two-way feedback interaction to include recognition respect (Darwall, 1977; Dillon, 2007), appraisal respect (Darwall, 1977), and the provision of a safe learning space (Latting, 1990; Fassinger, 1995).

However, as interviews may also encourage participants to respond in ways that are perceived to be socially desirable (Richman, Keisler, Weisband, & Drasgow, 1999; Yin, 2009), the need for objective measures was required to validate findings. As such, Chapter 4 relied on more objective measures (i.e., classroom observations and audio-recording) together with self-reporting measures to examine the degree in which teachers utilise the ascribed verbal and non-verbal behaviours in two-way feedback interaction, and its predictive association with students’ motivation, metacognition, and self-efficacy.

Although a clearer picture of how teachers’ ancillary behaviours in two-way feedback interaction influence students’ learning outcomes has been established throughout this work, the use of self-reporting instruments remain either prospective or retrospective measures. For instance, while self-reporting measures have merits, they are inadequate in accessing detailed information on students’ actual metacognitive, self-regulatory thinking processes that occur in the moment, during a learning task (Hadwin, Nesbit, Jamieson-Noel, Code, & Winne, 2007; Veenman, 2011). Moreover, as metacognition progresses and changes over time when engaged with a task (Winne & Perry, 2000), tracing how this unfolds could potentially afford new opportunities for measuring and analysing data, and enrich our understanding of how teachers’ iterative
cycles of two-way feedback interaction affect and impact students’ higher learning outcomes over time.

Hence, we advocate future consideration of think-aloud protocols (Ericsson & Simon, 1980) to complement “inventory-generated self-report data” (Winne, 2010, p. 271). In think-aloud protocols, students are encouraged to report on their learning process (Yoshida, 2008) by verbalising their thoughts while thinking, problem solving, or learning during an activity (Pressley & Afflerbach, 1995). By including this protocol, it could provide richer access to the spontaneous, cognitive, metacognitive, and self-regulatory thinking processes that occur when students engage in a learning task (Greene, Robertson, & Croker Costa, 2011; Pressley & Afflerbach, 1995; Veenman, 2011). Data may subsequently be transcribed and coded to track students’ metacognitive progress (i.e., planning, monitoring, evaluating), and useful information may be gleaned to inform teachers’ feedback practice.

Moreover, as empirical work has informed that students’ metacognitive regulation is correlated to their cognitive actions and performance (Greene & Azevedo, 2009), the inclusion of think-aloud protocols alongside self-reporting measures might provide useful data in eliciting, isolating and examining in detail, how students’ metacognition is shaped over time. As this may also be traced over time in longitudinal studies, this method might be valuable for researchers and educators interested in fostering metacognition through teachers’ two-way feedback interaction.

Notwithstanding the advantages and benefits of think-aloud protocols, some have critiqued its limitations. For example, the act of students verbalising their thinking processes might evidence heightened attention to cognitive processes than normal, and increase the risk of reactivity (Greene et al., 2011). In addition, there is also the
possibility where students’ metacognitive utterances may not be fully articulated and captured because students are not accustomed to express their thinking and regulation overtly (Meijer, Veenman, & van Hout-Wolter, 2006). While we acknowledge these potential limitations, we contend that the strength of the think-aloud protocol lies in data that is collected concurrently in the moment. This attribute, according to Veenman (2005), minimises inaccuracies of prospective measures where participants do not do what they say they will, or do not accurately recall what they have done in retrospective measures. As such, the think-aloud protocol may be useful for future research as it allows data to be tracked and inspected at a granular level in a more profound and detailed way. When combined with self-report measures, the data from think-aloud protocols may also strengthen the reliability of results and provide a more robust and comprehensive picture of how teachers’ two-way feedback interaction is associated with students’ development of metacognition.

5.3 Other limitations

This thesis should be viewed as a preliminary step in the study of two-way feedback interaction. Despite the novel and interesting results, some limitations warrant attention. First, our studies relied only on high school students and teachers from Australian private schools, whose demographics and homogeneity of student profile may limit generalisability contexts similar to these. Second, the relatively small number of classes observed and high schools involved prevents broad conclusions from being drawn. Furthermore, as described in the section above, although empirical work has established that teachers enact the ascribed behaviours in two-way feedback interaction, the absence of the think-aloud protocol to capture students’ growth in metacognition through verbalisation limits the retrospective and prospective concerns relating to self-reporting measures.
5.4 Future research

Moving forward, there are several recommendations worthy of future consideration. We encourage the extension and verification of current findings by enlisting a wider spectrum of student perspectives from public and private, primary and secondary school settings. The comparison of results from both Western and non-Western countries may also provide further interesting insight to cultural differences and its impact on learning from feedback. Another important direction for future research would be to use the recommendations derived from this study to develop an intervention program with in-service and pre-service teachers in professional development programs and evaluate its outcomes. Importantly, an intervention program may also reflect the concerns and utility of two-way feedback interaction in the classroom, and facilitate the pedagogic changes instrumental in mitigating the challenges of monologic feedback. In addition, it may also inform administrators and receive institutional support on how the existing curriculum may be refined, re-designed and re-aligned so as to create space for meaningful, two-way feedback interaction.

A potential area future research may consider is whether two-way feedback interaction is feasible for teachers in public school settings, where class sizes are usually larger. As such, researchers might want to consider the utility of experimental research or pilot studies to investigate its feasibility, impact, and value. In addition, subject-specific, experimental research focusing on students’ higher learning outcomes such as metacognition may yield useful information for educators interested in fostering students’ learning from two-way feedback interaction. The think-aloud protocol could be applied, alongside quantitative measures to understand more deeply, how students’
cognitive processes have been shaped. Further exploration and comparison of learning effects on different student ability groupings might also supply meaningful insights to subsequent research.

Alongside these recommendations, future studies may also benefit from exploring the gender effect of teachers’ two-way feedback interaction in different school settings and cultures, so as to broaden understanding in this area. Lastly, as this work did not evidence effect on students’ self-efficacy, perhaps future exploration using longitudinal research could consider if teachers’ iterative cycles of two-way feedback interaction might yield different outcomes.

5.4.1 Explore antecedents

We also wish to acknowledge that antecedents were unexplored in this thesis. Specifically, antecedents such as teachers’ perceived metacognitive awareness and autonomy support which could possibly support or thwart teachers’ sustained efforts in two-way feedback interaction were not examined. The investigation of teachers’ metacognitive awareness is pertinent as research has highlighted that unless teachers themselves are cognizant of metacognitive skills, it remains a challenge for students to hone those skills (Abhakorn, 2014). As students’ ability to think metacognitively distinguishes between low and high achieving students (Pogrow, 2004), metacognitive teaching has the potential to activate and develop students’ metacognition by encouraging them to consider their own thinking as learners (Hartman, 2001). Hence, scholars have adjured teachers to be more purposeful in metacognitive feedback (Lee, Irving, Pape, & Owens, 2015; Van den Bergh et al., 2013), and teaching metacognition through guided practice (Schellenberg et al., 2011; Van den Bergh et al., 2013).
However, to the authors’ knowledge, research exploring the predictive association between teachers’ metacognition and students’ metacognitive learning outcomes in two-way feedback interaction has not been accessed. For example, work by Curwen, Miller, White-Smith, and Calfee (2010) investigated the effect of the Read-Write Cycle Project on teachers (N=18) metacognition and primary school students’ (N=1024) learning (metacognition, reflection, depth of learning, and integration of literacy). This three-year professional development program incorporated two years of instructional implementation where classroom observations, interviews, and quantitative data were accessed. As teachers themselves were engaged in reflective practices as they revised their teaching strategies during the professional development program, this led to students’ gains in metacognitive learning, deeper understanding of content and literacy. Yet to be addressed, is teachers’ metacognitive awareness in two-way feedback interaction, and its effect on students’ metacognition.

The other antecedent which would be meaningful to examine is the role of teachers’ perceived autonomy fulfilment in the context of the educational institution. This is relevant because teachers’ need fulfilment in autonomy has been evidenced with efforts to gain an understanding of students’ needs, support, and promotion of students’ autonomous behaviours (Roth, Assor, Kanat-Maymon, & Kaplan, 2007; Taylor, Ntoumanis, & Standage, 2008).

Given the manifold job demands on teachers’ time and accountability in high stakes’ assessments (Marsh, Farrell, & Bertrand, 2016; Ryan & Weinstein, 2009), it would be relevant to understand the effect of teachers’ perceived autonomy support on two-way feedback interaction. Earlier work by Pelletier, Séguin-Lévesque and Legault
(2002) with 1st to 12th grade teachers (N=254) reported that teachers’ perceived pressure from above (e.g., performance standards) resulted in more controlling teaching behaviours. While the literature has highlighted that these behaviours include behaviours such as teaching to the test (Jones & Egley, 2006) which undermines quality learning (Ryan & Weinstein, 2009) and possibly the default practice of feedback monologue (Nicol, 2010), we contend that future research on how teachers’ perceived autonomy support impacts two-way feedback interaction deserves attention.

5.4.2 Explore outcomes

In terms of outcomes, the work presented in this thesis has currently only focused on the perceived impact of teachers’ two-way feedback interaction on students’ higher learning outcomes such as metacognition, motivation, and self-efficacy. This focus was chosen because the feedback literature has informed many inadequacies of monologic feedback in enhancing learning. As findings in this thesis holds promise to influence of two-way feedback interaction on students’ metacognition and motivation, future research could draw from the present findings to broaden the study to explore other potential outcomes. One avenue to consider in the extension of this work could include students’ test anxiety.

Anxiety is a common mental health problem which afflicts children and adolescents (Niel & Christensen, 2009). According to Carver and Scheier (1991), test anxiety happens when there is a major discrepancy between current behaviours and progress towards desired goals. Zeidner (1998), further delineates test anxiety as the emotional, physiological, and behavioural responses that occur in association with concern over negative evaluation resulting from failure or poor performance. Test anxiety is typically viewed by researchers as a trait, a relatively stable personality characteristic that
prompts an individual to react to threatening situations with sometimes debilitating psychological, physiological, and behavioural responses (Spielberger, 1972; Trent & Maxwell, 1980; Sarason, 1975). In evaluative situations, these students entertain self-deprecating thoughts, self-doubt about their ability to perform, and misinterpret cues, and demonstrate inadequacy in processing information (Benjamin, McKeachie, & Lin, 1987; Zeidner, 1998), which thwart their academic performance.

Of concern, is research which inform the effects of high stakes testing on students’ anxiety levels. These include effects such as lowered motivation, poor or impaired academic performance (Barksdale-Ladd & Thomas, 2000; Jones & Egley, 2006; Sub & Prabha, 2003; Turner, Beidel, Hughes, & Turner, 1993; Zeidner, 1998). Moreover, meta-analyses of 562 studies found test anxiety to be a predominant cause of poor performance (Hembree, 1988), affecting stress levels, and reducing students’ motivation (Cizek & Berg, 2006; Hancock, 2001; Hembree, 1988). Alarmingly, test anxiety not only affects 10% to 40% of students (Gregor, 2005), it can also affect students as young as age 7 (Connor, 2003), and predispose school dropout (Cizek & Berg, 2006). Despite the potential disruption of test anxiety to knowledge acquisition and academic performance (Sub & Prabha, 2003; Turner, Beidel, Hughes, & Turner, 1993; Zeidner, 1998), systematic literature reviews on recent 10 years of test-anxiety interventions report few studies focusing on elementary and secondary school students (von der Embse, Barterian, & Segool, 2013).

Given that our findings from Chapters 2 through to 4 revealed that teachers’ two-way feedback interaction has encouraged students’ metacognition and motivation, we surmise that understanding and learning would also improve. Thus, the future
exploration of test anxiety might be meaningful to add to our nascent understanding. Currently, interventions have been applied on cognitive behavioural therapy, guided mastery with positive and negative feedback, and the application of biofeedback (Bradley, McCraty, Atkinson, Tomasino, Daugherty, & Arguelles, 2010; Gregor, 2005; Lal Zinta, 2008), but the effect of teachers’ two-way feedback interactions on student’ test anxiety has been under-researched. For example, intervention work involving a quasi-experimental design undertaken by Lal Zinta (2008) with senior secondary students ($N=240$) reported that no significant difference with teachers’ positive and negative feedback to students’ test anxiety. As teachers’ feedback is well-established to be influential towards learning (Hattie, 2007), with the ability to enhance students’ confidence when students perceive control over their achievement outcomes (Stiggins, 1997; Stipek, 1988), it appears germane to explore how teachers’ two-way feedback interaction would mitigate students’ perception of test anxiety. Future work may wish to consider extending findings from this thesis to conduct intervention work with elementary and secondary school students. This examination warrants attention as it may also provide insights to inform administrators, educators, and counsellors of how classroom teaching and learning may be more effectively designed to empower students to learn, and thereby reduce test anxiety in students.

5.5 Applications

Therefore, the findings of this thesis reinforce that teachers’ verbal and non-verbal behaviours during two-way feedback interaction have the motivational capacity to optimise students’ higher learning outcomes from feedback. The results from this thesis indicate that when attention is given to the relational (Carless, 2013), social and emotional aspects of feedback (Small & Attree, 2016), those actions are motivational and augment students’
motivation, metacognition (knowledge) and metacognition (regulation) from feedback. Whilst this thesis reported that feedback alone only augments metacognition (knowledge) and not self-efficacy or motivation, the findings also align with literature that feedback alone is limited in its capacity to promote learning (Ferrell, 2013; Nichol, 2010; Price et al., 2011; Zumbrunn et al., 2016). However, when teachers intentionally elicit students’ thinking through verbal and non-verbal behaviours during two-way feedback interaction, this fulfils students’ psychological needs of relatedness, autonomy, and competence. In accord with the literature, when psychological needs are fulfilled, motivation ensues (Jang et al., 2010; Sparks et al., 2015; Su & Reeve, 2011).

5.6 Summary

Below, a summary of information reported on within each of the five chapters that comprise this thesis is presented. A final conclusion that focuses on the significance of the work documented within this thesis then follows this summary.

In Chapter 1, a review of relevant work from the feedback literature, teachers’ verbal and non-verbal behaviours, SDT framework, conceptual theory of RI, and student learning outcomes of motivation, metacognition, and self-efficacy was presented. In seeking to understand how SDT and RI undergird learning from feedback through teachers’ need-supportive behaviours, Chapter 1 describes the motivational dynamics theorised to support learning during social interaction. Special attention and emphasis has also been given to the discussion of limitations posed by monologic feedback in promoting students’ active learning, and proposes to answer the call for feedback dialogue. In addition, given the complexities that surround feedback (i.e., social, emotional, and content), we sought to advance the literature by focussing on how
teachers’ verbal and non-verbal behaviours in *two-way feedback interaction* through the lens of RI influence student motivation, metacognition, and self-efficacy.

In Chapter 2, we focused on exploring student perceptions of specific teacher behaviours during two-way feedback interaction that motivate and encourage learning. Utilising qualitative techniques, semi-structured focused group interviews were conducted, and students were asked to identify teacher behaviours which were perceived as motivating in feedback. Preliminary findings from student perceptions suggest three salient teacher behaviours in support of RI (e.g., asking questions, question openness, and attentive listening) which were considered to be motivating and nurturing of metacognition during two-way feedback interaction.

Chapter 3 sought to build directly on the findings of Chapter 2, by exploring with the student-identified, teacher perceptions of behaviours that facilitate learning during two-way feedback interaction. Upon verification of teacher expertise with scholarly gates and line managers, one-on-one, semi-structured interviews were conducted with the expert teachers. Expert teachers were asked to elucidate how RI would look like in the context of two-way feedback interaction in their classrooms. A scenario-based vignette was also utilised to distil teachers’ thinking behind their actions. Expert teachers confirmed findings from Chapter 2, and further identified three additional attributes instrumental to two-way feedback interaction – recognition respect, appraisal respect, and the provision of a safe learning space. In addition, expert teachers’ self-efficacy in enacting the described behaviours were sought, alongside their perceptions of barriers that thwart two-way feedback interaction.

Based on the findings of Chapters 2 and 3, we sought to further corroborate results through empirical work in Chapter 4. As empirical observations would have greater
ecological validity, teachers’ actual in-class behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and a safe learning space) in two-way feedback interaction were observed for salience, and students’ self-reported learning outcomes in motivation, metacognition, and self-efficacy were reported. Chapter 4 verified that teachers demonstrated the ascribed verbal and non-verbal behaviours during two-way feedback interaction, and positive associations were predicted toward students’ motivation and metacognition (knowledge and regulation). However, these teacher behaviours were not significant in predicting students’ self-efficacy. Comparatively, feedback alone was only positively associated with students’ metacognition (knowledge), and feedback remained non-significant with students’ motivation, metacognition (regulation), and self-efficacy. Work in Chapter 4 provides insight that teachers’ verbal and non-verbal behaviours during two-way feedback interaction may predict students’ higher learning outcomes.

Finally, Chapter 5, the present and final chapter, included a review and critique of the work that was performed in Chapters 1 to 4. A number of implications of the thesis findings were identified, particularly the conceptual, and practical issues related to our results. As well as identifying limitations and applications of the thesis as a whole, future research was encouraged to further explore its utility in different educational contexts, as well as the benefits and application of two-way feedback interaction through teacher professional development programmes.

5.7 Conclusion

The unique contribution this thesis presents to the literature lies in its novel application of RI to the classroom context through two-way feedback interaction. Through qualitative and empirical work, findings provide support that the identification
of verbal and non-verbal behaviours appear meaningful in optimising students’ higher learning outcomes from feedback. This work also adds to an emerging line of inquiry that whilst feedback dialogue is necessary, when accompanied with intentional, verbal and non-verbal behaviours (i.e., asking questions, question openness, attentive listening, recognition respect, appraisal respect, and provision of a safe learning space), students’ learning may be deepened, enriched, and augmented. While results from this thesis provide preliminary findings, work that explores two-way feedback interaction through the lens of RI is nascent, and findings should be considered in light of its limitations. Nonetheless, the practical insights gleaned from this body of work holds promise in progressing the feedback literature, and makes strides in understanding the importance of concomitant, verbal and non-verbal behaviours in two-way feedback interaction.
References


http://www.education.auckland.ac.nz/uoa/education/staff/j.hattie/presentations.cfm


APPENDICES
Appendix A. Information sheets and interview questions for Chapter 2

Principal Information Sheet

<table>
<thead>
<tr>
<th>Full Title</th>
<th>The expert teacher: Students’ perception of teachers’ motivating feedback behaviours and the resultant psychosocial outcomes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Institution</td>
<td>School of Human Sciences (SHS), The University of Western Australia (UWA)</td>
</tr>
<tr>
<td>Research Location</td>
<td>Perth, Western Australia</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>Associate Professor Peter Whipp</td>
</tr>
<tr>
<td>Researcher</td>
<td>Fiona Tan</td>
</tr>
<tr>
<td>Contact number</td>
<td>93602091</td>
</tr>
</tbody>
</table>

Project Background

The University of Western Australia is currently running a research project focusing on student-perceived, feedback-related, motivating behaviours of teachers within the classroom context. For this project, we will be inviting students to participate in a 30 minute, focus group interview. A random sample of students (N=4) will be selected to share their learning experiences, support, and motivation in the classroom context.

In line with our ongoing research efforts focused on understanding and enhancing student motivation and engagement in the classroom, the aim of this study is to determine the teacher feedback behaviours that influence student engagement and motivation in the classroom context.

All information provided to the study will remain confidential. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. At no point will the participating school, teachers, or students be identified. We envisage that the results of this study will provide important and novel information about how teacher-behaviours serve to influence motivation and engagement.

Participation in this research is entirely voluntary; the school and students are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable.

If you have any questions at all concerning the project, please feel free to contact the researchers named above at any time.
Specific Information – Introduction

- You have been approached to participate in this study (on behalf of your school) due to your role as principal.
- Taking part in this research project is optional.
- If you are unsure about anything, please feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Human Sciences (SHS) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to investigate students’ perceptions of motivating expert teacher feedback behaviours in the classroom context.

Procedures

- Your students will be asked to participate in one interview lasting about 30 minutes. Semi-structured interviews will guide the discussion as students share on their learning experiences, classroom support, motivation and engagement.
- Student responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone’s standing in their class in any way. All responses will be kept highly confidential and persons will not be identifiable. Participation is voluntary and students may, at any time withdraw from the study without prejudice.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

Risks

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.
Benefits

- Research shows that students’ experiences in school have the potential to influence attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.
- We hope the information gained from this research will be of practical relevance to educators in relation to understanding students’ perceptions of motivating teacher behaviours within the classroom context.

Confidentiality

- All information will remain strictly confidential.
- Student responses will not be visible to teachers or classmates at any time.
- All data will be kept in a secure location at the School of Human Sciences, at UWA.
- All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and the school / students are free to withdraw from the study at any time.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your school will be destroyed.
- Your school’s participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to contact the researchers.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Principal Consent Form

I, _______________________________________________ (BLOCK CAPS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to allow students and teachers from my school to participate in this study, realising that I may withdraw this consent at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator/s unless required by law
- Am aware that no individuals or location / school will be identified at any point in any reports associated with this project
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Understand that my school’s participation in this project is purely for research purposes only, and nothing else is required of the school / teachers / students
- Understand that all teachers, students, and parents will also be made fully aware of the nature of the project, and will be given the opportunity to make an informed decision about their child’s participation

Signed : ________________________________________

School : _________________________________________

Date (day/month/year) : ______ / _______ / ________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
**Teacher Information Sheet**

<table>
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<td>Fiona Tan</td>
</tr>
<tr>
<td><strong>Contact number</strong></td>
<td>93602091</td>
</tr>
</tbody>
</table>

**Introduction**

- You have been approached to participate in this study due to your role as subject teacher of this class.
- Taking part in this research project is optional. You will receive the best possible care whether or not you take part. Your standing in this class and your relationship with the school will not be affected in any way by your choice to participate.
- Please read this information carefully, as it will inform you about the research, its procedures, risks and benefits. If you are unsure about anything, please feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Human Sciences (SHS) of the University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

**Purpose**

- The aim of the study is to investigate students’ perception of teachers’ motivating feedback behaviours in the classroom context.
Procedures

- Your students will be asked to participate a 30-minute interview. Semi-structured interviews will guide the discussion as students share on their learning experiences, classroom support, motivation and engagement.
- Student responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone’s standing in their class in any way. All responses will be kept confidential and persons will not be identifiable. Participation is voluntary and students may, at any time withdraw from the study without prejudice.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

Risks

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Research shows that students’ experiences in school have the potential to influence attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.
- We hope the information gained from this research will be of practical relevance to educators in relation to understanding students’ perceptions of motivating teacher behaviours within the classroom context.

Confidentiality

- All information will remain strictly confidential.
- Student responses will not be visible to teachers or classmates at any time.
- All data will be kept in a secure location at the School of Human Sciences (SHS) at UWA.
- All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.
**Participant Rights**

- Participation in this research is voluntary and the school / you / students are free to withdraw from the study at any time.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your school will be destroyed.
- Your school’s participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to contact the researchers.

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Motivation and Learning in the Classroom

Teacher Consent Form

I, _______________________________ (BLOCK CAPS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at anytime without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator/s unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Understand that my participation in this project is purely for research purposes only, and nothing else is required of the school / teachers / students
- Understand that all teachers, students, and parents will also be made fully aware of the nature of the project, and will be given the opportunity to make an informed decision about their child’s participation

Signed : ____________________________________________
School : ____________________________________________
Date (day/month/year) : _________ / _________ / _________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Parent Information Sheet

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<tr>
<td>Research Location</td>
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</tr>
<tr>
<td>Principal Investigator</td>
<td>Associate Professor Peter Whipp</td>
</tr>
<tr>
<td>Contact number</td>
<td>93602091</td>
</tr>
</tbody>
</table>

Project Background

The University of Western Australia is currently running a research project focusing on student-perceived, motivating feedback behaviours of teachers within the classroom context. For this project, we will be inviting students to participate in a 30-minute, focus group interview. A random sample of students (N=4) will be selected to participate in this interview. They will be invited to share their learning experiences, support and motivation in the class.

In line with our ongoing research efforts focused on understanding and enhancing student motivation and engagement in the classroom, the aim of this study is to determine the student perceived, feedback-related, teacher behaviours that influence student engagement and motivation in the classroom context.

All responses provided to the study will remain confidential at all times. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. At no point will the participating school, teachers or students be identified. We envisage that the results of this study will provide important and novel information about how teacher-behaviours serve to influence motivation and engagement.
Participation in this research is entirely voluntary; the school and students are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable.

If you are happy for us to include the information provided by your child in our study, you do not need to do anything at all in response to this letter. However, should you prefer to withdraw the participation of your child, please complete and sign the form at the end of this letter and send it back to us through your child’s teacher. If you have any questions at all concerning the project (before or after making a decision) please feel free to contact the researchers or the principal investigator at any time.

**Specific Information – Introduction**

- Your child has been invited to participate in this study.
- Your child’s participation in this research project is optional. Your child’s standing in the class and relationship with the school will not be affected in any way by your choice to participate or withdraw your child from the study.
- Please read this information carefully, as it will tell you about the research, procedures, risks and benefits. If you are unsure about anything, please feel free to talk to the school or the researchers at any time.
- This study is being conducted by the School of Human Sciences (SHS) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

**Purpose**

- The aim of the study is to investigate students’ perception of feedback-related, motivating expert teacher behaviours in the classroom context.

**Procedures**

- Your child will be asked to participate in a 30-minute, focus group interview. No teacher will be present in the interview. Semi-structured interviews will guide the discussion as students share on their learning experiences, classroom support, motivation and engagement.
- Student responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone’s standing in their class in any way. All responses will be
kept confidential and persons will not be identifiable. Participation is voluntary and students may, at any time withdraw from the study without prejudice.

- Your child’s response to the interviews will not be seen by his/her teacher and classmates at any time, and will not impact upon anyone’s standing in their class in any way.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

**Risks**

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

- Research shows that students’ experiences in school have the potential to influence attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.
- We hope the information gained from this research will be of practical relevance to educators in relation to understanding students’ perceptions of motivating teacher behaviours within the classroom context.

**Confidentiality**

- All information will remain strictly confidential.
- Your child’s responses will not be visible to his/her teachers or classmates at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.
- All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

**Participant Rights**

- Participation in this research is voluntary and the school / students are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not impact your child’s standing or grade in this class in any way.
- You can withdraw your child for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your child will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
• If you have any questions concerning the research at any time please feel free to contact the researchers.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 64883703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.

PLEASE COMPLETE THE FORM ON THE NEXT PAGE ONLY IF YOU WISH TO WITHDRAW YOUR SON/DAUGHTER FROM THE RESEARCH PROJECT…
PLEASE COMPLETE THE FORM ON THIS PAGE ONLY IF YOU WISH TO WITHDRAW YOUR CHILD FROM THIS RESEARCH PROJECT

Thank you for your consideration. Please only complete and return this form if you wish to withdraw your child from participation in this research project.

If you have any questions prior to making a decision, please feel free to contact the researchers with any questions you might have (contact details provided previously).

Your child’s name : __________________________________________

School : __________________________________________

Parent/Guardian’s signature : __________________________________________

Date (dd/mm/yy) : _______ / _______ / _______

Please return this form to the school through your child’s teacher. Thank you.
**Student Information Sheet**

<table>
<thead>
<tr>
<th>Full Title</th>
<th>The expert teacher: Students’ perception of teachers’ feedback-related, motivating behaviours and the resultant psychosocial outcomes.</th>
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</thead>
</table>
| Research Institution | School of Human Sciences (SHS)  
The University of Western Australia (UWA) |
| Research Location | Perth, Western Australia |
| Principal Investigator | Associate Professor Peter Whipp  
Researcher Fiona Tan |
| Contact number | 93602091 |

**Introduction**

- You are invited to participate in this study.
- Taking part in this research project is optional. You will receive the best possible care whether or not you take part. Your standing in this class and your relationship with the school will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, please feel free to talk with a relative, friend, or your teacher before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he/she can provide you some assistance.
- This study is being conducted by the School of Human Sciences (SHS) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

**Purpose**

- The aim of the study is to investigate students’ perception of motivating expert teachers’ feedback-related behaviours in the classroom.
Procedures

• As a participant, you will be invited to participate in a 30-minute, focus group interview. No teacher will be present in the interview. Semi-structured interviews will guide the discussion as you share about your classroom learning experiences, support, motivation and engagement.

• Your responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone’s standing in their class in any way. All responses will be kept highly confidential and persons will not be identifiable. Participation is voluntary and students may, at any time withdraw from the study without prejudice.

• Your response to the interviews will not be seen by your teacher and classmates at any time, and will not impact upon your standing in class in any way.

• A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

Risks

• There are no anticipated risks at all associated with taking part in the study.

• All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

• Participating in this interview process will give you the opportunity to consider your thoughts about learning and what motivates you in class.

Confidentiality

• All information will remain strictly confidential.

• Your responses will not be visible to your teacher or classmates at any time.

• All data will be kept in a secure location at the School of Human Sciences at UWA.

• Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

• Participation in this research is voluntary and you are free to withdraw from the study at any time.

• Your decision to participate or not to participate will not impact your standing or grade in this class in any way.

• You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
• Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
• If you have any questions concerning the research at any time please feel free to ask the researcher.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Motivation and Learning in the Classroom

Student Consent Form

I, ________________________________ (BLOCK CAPS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Am aware that my teachers and or/classmates will not be made aware of my responses at any time
- Understand that my participation in this research will not influence any standing in my classes or school in any way
- Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed : ________________________________

Date (day/month/year) : _______ / ________ / ________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Chapter 2 Interview Questions

1. Do teachers ask you to talk about how you could improve your work? Can you describe what happens and give an example?

2. How do effective teachers engage you in feedback conversation?

3. What do effective teachers say and do that help you to engage with feedback? When teachers ask you questions during feedback, how does that make you feel?

4. How do you know if teachers are genuinely interested in what you have to say?

5. How important is it that your teacher keeps eye-contact with you when you answer a question? If yes, what message do you get from this eye-contact?

6. How do effective teachers use questions to help you during feedback?

7. How does your teachers’ questioning enhance your understanding?

8. When teachers ask you questions, do you feel recognised and valued? What actions or words are said that make you feel that way?

9. When teachers ask for your response/views during feedback, are you encouraged to share more?

10. Do the questions your teachers ask during feedback motivate you to work harder in class or be more confident in evaluating your own work?

11. To what extent does your teachers’ use of questions during feedback motivate, inspire and challenge you to think deeply about your work/subject?

~End of Interview~
Appendix B. Information sheets and interview questions for Chapter 3

Dear

**Request for Interview**

Your school, through small-group student interview, participated in the first phase this research, *‘The expert teacher: Student’s perception of teachers’ motivating behaviours and the resultant psychosocial outcomes’* in November/December 2015. This research has been approved by UWA’s Human Ethics Research Committee.

You have been identified by your students as an expert teacher who meets their learning needs effectively. As such, we would like to request a **one-on-one 45 minute interview** with you to explore a deeper understanding of the motivating factors that help you as a teacher, as well as the barriers that hinder you from classroom effectiveness. The interview will be held in your school, at a time convenient for you.

The standards of an expert teacher as defined by scholarly research are listed below.

<table>
<thead>
<tr>
<th>Qualification</th>
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<tbody>
<tr>
<td>• 3 to 5 years of experience in specific teaching content area with a particular population of students</td>
<td></td>
</tr>
<tr>
<td>• Teacher knowledge as reflected in relevant certification and degrees that correspond to the field that the teacher is currently teaching</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Recognition</th>
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</thead>
<tbody>
<tr>
<td>• Multiple constituencies eg. fellow teachers, researchers, administrators, teacher educators, based on recent and relevant indicators of teaching effectiveness to include teacher knowledge and skills;</td>
<td></td>
</tr>
<tr>
<td>• Confirmed with documented evidence of teacher impact on student performance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ability to</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Identify essential representations of their subject</td>
<td></td>
</tr>
<tr>
<td>• Guide learning through classroom interactions</td>
<td></td>
</tr>
<tr>
<td>• Monitor learning and provide feedback</td>
<td></td>
</tr>
<tr>
<td>• Attend to affective attributes</td>
<td></td>
</tr>
<tr>
<td>• Influence student outcomes</td>
<td></td>
</tr>
</tbody>
</table>
If you believe you satisfy these conditions and are comfortable with us confirming it with your line manager and a member of your school administration, we are very keen to meet you. The following pages will provide further details of the purpose, benefits and confidentiality matters concerning your participation.
Introduction

- You have been approached to participate in this study due to your role as teacher in this school.
- Taking part in this research project is optional. You will receive the best possible care whether or not you take part. Your standing in this class and your relationship with the school will not be affected in any way by your choice to participate.
- Please read this information carefully, as it will inform you about the research, its procedures, risks and benefits. If you are unsure about anything, please feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Sports Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- A fundamental aim of the study is to investigate students’ perceptions of motivating expert teacher behaviours in the classroom context. However, the teacher interview will serve to understand the motivating factors of expert teachers and the potential barriers to effective classroom teaching.

Procedures

- You will be asked to participate in one 45-minute interview with the researcher. Semi-structured interviews will guide the discussion and you will be invited to share your teaching experiences, in particular - classroom support, motivation and engagement associated with your students. You will also be invited to respond to the possible barriers that limit effectiveness in the classroom.
- Your responses will not be seen by anyone outside the research team at any time, and will not impact your standing in the school in any way. All responses will be kept highly confidential and persons will not be identifiable. Participation is voluntary and you may, at any time withdraw from the study without prejudice.
A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

**Risks**

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

- Research shows that students’ experiences in school have the potential to influence attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.
- We hope the information gained from this research will be of practical relevance to educators in relation to understanding students’ perception of motivating teacher behaviours within the classroom context.

**Confidentiality**

- All information will remain strictly confidential.
- Your responses will not be visible to teachers or school administration at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.
- All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

**Participant Rights**

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your school will be destroyed.
- Your school’s participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to contact the researchers.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

*Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person*
considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Motivation and Learning in the Classroom

Teacher Interview Consent Form

I, ________________________________ (please write your name clearly in BLOCK CAPS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction

- Agree to participate in this study, realising that I may withdraw at anytime without reason and without prejudice

- Understand that all information provided is treated as strictly confidential and will not be released by the investigator/s unless required by law

- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research

- Understand that my participation in this project is purely for research purposes only, and nothing else is required of the school / teachers / students

- Understand that all teachers, students, and parents will also be made fully aware of the nature of the project, and will be given the opportunity to make an informed decision about their child’s participation

Signed : ________________________________

School : ________________________________

Date (day/month/year) : _______ / _______ / _______

Name of Line Manager : ________________________________

Email of Line Manager : ________________________________

Name of Deputy Principal : ________________________________

Email of Deputy Principal : ________________________________
Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
CHAPTER 3 INTERVIEW (PART ONE)

Please read the scenario below and share, as authentically as possible, how the conversation would unfold between you and the student (Jim).

Jim is an average student who has been working at grade level. During the past two weeks he has appeared listless and has not been participating during reading group. The work he does is accurate but he has not been completing assignments. A phone conversation with his mother revealed no useful information. PIS questionnaire (Deci, Schwartz, Sheinman, & Ryan, 1981; Reeve, Bolt, & Cai, 1999)

Questions

1) Based on this scenario, please share what went through your mind as you thought about what you would say, and how you would respond to the student.

2) How confident are you that it will work?

3) Of the four options (a-d) below, which would you choose, and why?

   The most appropriate thing for Jim’s teacher to do is:

   a. She should impress upon him the importance of finishing his assignments since he needs to learn this material for his own good.

   b. Let him know that he doesn’t have to finish all of his work now and see if she can help him work out the cause of the listlessness.

   c. Make him stay after school (within school rules or policy) until that day’s assignments are done.

   d. Let him see how he compares with the other children in terms of his assignments and encourage him to catch up with the others.

4) Having just discussed about feedback and RI, how differently, if at all, might you respond (verbally and non-verbally)? What difference would it make, compared to your initial response?
INTERVIEW (PART TWO)

1. How confident and effective are you at getting students to believe they can do well in your subject?

2. How effective are you at monitoring student learning?

3. Respectful Inquiry (RI), according to students, relates to the following attributes during two-way feedback interaction: asking questions, open questions, and attentive listening (e.g., smiling, head nodding, appropriate facial expressions).

3a. What does Respectful Inquiry (RI) look like for you in the context of two-way feedback interaction? How well can you implement two-way feedback through RI in your classroom?

4. To what extent can you provide two-way feedback through RI to when students are confused?

5. How effective are you at enhancing deep learning/understanding and self-regulation through RI?

6. To what extent can you craft good feedback questions for your students?

7. How much can you do to adjust feedback for individual students?

8. To what extent can you gauge students’ comprehension of what you have taught?

10. How confident and effective are you at using RI in two-way feedback to facilitate student learning?

11. What enhances your confidence in using RI during two-way feedback interaction?

12. What barriers might prevent you from using two-way feedback interaction through RI?
### Appendix C. Information sheets, surveys, and classroom observation sheet for Chapter 4

**Information Sheet for School Principal**

<table>
<thead>
<tr>
<th><strong>Full Title</strong></th>
<th>Teachers’ two-way feedback practice and students’ learning outcomes</th>
</tr>
</thead>
</table>
| **Research Institution** | School Human Sciences  
The University of Western Australia |
| **Research Location** | Perth, Western Australia |
| **Principal Investigator** | Associate Professor Peter Whipp  
Researcher Fiona Tan |
| **Contact number** | 93602091 |

**Project Background**

The University of Western Australia is currently running a research project focusing on expert teachers’ and beginning teachers’ two-way feedback practice within the classroom. This project involves 2 classes, with three lesson observations each. Lesson observations will be carried out by one researcher over a 3-week period, and teachers will be attired with an audio-recording device. The purpose of the audio recording is to facilitate accuracy of teachers’ two-way feedback frequency at post-lesson for research purposes.

Teachers will be invited to respond to an 84-item questionnaire, while students will be invited to respond to a 58-item questionnaire. This will be administered only once. These instruments seek to investigate teachers’ autonomy support, self-efficacy, metacognition and motivation, as well as students’ metacognition, motivation, and self-efficacy.

All answers provided in the study remain strictly confidential. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. At no point will the participating school, teachers, or students be identified. We envisage that the results of this study will provide important and novel information about how teachers’ two-way feedback serves to influence student learning outcomes in metacognition, self-efficacy and motivation.

Participation in this research is entirely voluntary; the school, students, and teachers are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable.
If you have any questions at all concerning the project, please feel free to contact the researchers named above at any time.

**Specific Information – Introduction**

- You have been approached to participate in this study (on behalf of your school) due to your role as Principal.
- Taking part in this research project is optional.
- If you are unsure about anything, please feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Human Sciences (SHS), The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed and approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research (RA/4/20/4024). The ethics committee members are independent of the study team.

**Purpose**

- Despite the said benefits of two-way feedback, little research has been published investigating secondary school teachers’ motivation of its use, and its impact on students’ metacognition, self-efficacy, and motivation. As such, the aim of the study is to investigate teachers’ two-way feedback practice in the classroom, and to measure these student outcomes accordingly.

**Procedures**

- Teachers will be invited to complete a questionnaire (84-items) relating to self-efficacy. It is estimated to require no more than 15 minutes to complete.
- Students will be invited to complete a questionnaire (58-items) relating to metacognition and self-regulation. It is estimated to require no more than 10 minutes to complete.
- Student and teacher responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone’s standing in the school or class in any way.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

**Risks**

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers. Your teachers and students’ responses will not be identified at any time, and the questions asked are not of a sensitive nature.
Benefits

• Research shows that quality feedback has the potential for significant gains on student learning outcomes and performance. This research will enable us to understand how expert teachers utilise two-way feedback, and its effectiveness for students.
• We hope the information gained from this research will be of practical relevance to educators in relation to the optimisation of feedback uptake through expert teachers’ two-way feedback.
• The principal of participating schools will be given an executive summary report of the findings.

Confidentiality

• All information remain strictly confidential.
• Student responses will not be visible to teachers or classmates at any time.
• Teacher responses will not be made visible to colleagues or students at any time.
• All data will be kept in a secure location at the School of Health Sciences at UWA.
• All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

• Participation in this research is voluntary and the school / teachers / students are free to withdraw from the study at any time.
• You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your school will be destroyed.
• Your school’s participation in this study does not prejudice any right to compensation that you may have under statute of common law.
• If you have any questions concerning the research at any time please feel free to contact the researchers.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Feedback and Learning in the Classroom

Consent Form (School Principal)

I, ______________________________________________ (BLOCK CAPS)

• Have read the information provided, and any questions I have asked have been answered to my satisfaction

• Agree to allow students and teachers from my school to participate in this study, realising that I may withdraw this consent at any time without reason and without prejudice

• Understand that all information provided is treated as strictly confidential and will not be released by the investigator/s unless required by law

• Am aware that no individuals or location / school will be identified at any point in any reports associated with this project

• Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research

• Understand that my school’s participation in this project is purely for research purposes only, and nothing else is required of the school / teachers / students

• Understand that all teachers, students, and parents will also be made fully aware of the nature of the project, and will be given the opportunity to make an informed decision about their child’s participation

Signature : ______________________________________

School : ______________________________________

Date (day/month/year) : ________ / ________ / ________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
**Teacher Information Sheet**

<table>
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<th><strong>Full Title</strong></th>
<th>Teachers’ two-way feedback practice and students’ learning outcomes</th>
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</thead>
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<td><strong>Research Institution</strong></td>
<td>School Human Sciences</td>
</tr>
<tr>
<td></td>
<td>The University of Western Australia</td>
</tr>
<tr>
<td><strong>Research Location</strong></td>
<td>Perth, Western Australia</td>
</tr>
<tr>
<td><strong>Principal Investigator</strong></td>
<td>Associate Professor Peter Whipp</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Fiona Tan</td>
</tr>
<tr>
<td><strong>Contact number</strong></td>
<td>93602091</td>
</tr>
</tbody>
</table>

**Introduction**

- You are invited to participate in this study due to your role as the subject teacher of this class.
- Taking part in this research project is optional. Your standing in this class and your relationship with the school will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, please feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Human Sciences (SHS) at The University of Western Australia (UWA).
- This study has been approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research (RA/4/20/4024). The ethics committee members are independent of the study team.

**Purpose**

- Despite the said benefits of two-way feedback, little research has been published investigating secondary school teachers’ motivation of its use, and its impact on students’ metacognition, self-efficacy, and motivation. As such, the aim of the study is to investigate teachers’ two-way feedback practice in the classroom, autonomy support, and to measure these student outcomes accordingly.
**Procedures**

- As a participant, you will be observed in two different classes (3 lessons each) by a researcher and be required to wear a voice recording device during the lesson observations. The purpose of the audio recording is to facilitate accurate data of teachers’ two-way feedback frequency at post-lesson for research purposes. You will also be asked to complete a questionnaire (84 items), which will take no longer than 10 minutes to complete.
- Your responses to the questionnaire will be strictly confidential. A report based on the information gained from this study will be provided to the school principal and the teacher participants. Information may also be used for publication in academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual or your class/school.
- The most important thing for us is that you are completely honest when answering all questions.
- This is NOT designed in any way as an assessment of teachers’ abilities – we are simply examining how students learn in response to classroom feedback.

**Risks**

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

- Research shows that students’ experiences in school have the potential to influence learning and thinking. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.
- Participating schools will be given an executive summary report of the findings.
- We hope the information gained from this research will be of practical relevance to educators in relation to the optimisation and uptake of feedback.

**Confidentiality**

- All information will remain strictly confidential.
- Your responses will not be visible to your school at any time.
- All data will be kept in a secure location at the School of Human Sciences (SHS) at UWA.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.
**Participant Rights**

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not impact your standing in the school in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Feedback and Learning in the Classroom
Teacher Consent Form

I, _______________________________________________ (BLOCK CAPS)

• Have read the information provided, and any questions I have asked have been answered to my satisfaction

• Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice

• Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law

• Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research

• Am aware that my principal, colleagues, and students will not be made aware of my responses at any time

• Understand that my questionnaire responses and audio recording will not be used for anything other than for research purposes

• Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signature : __________________________________________

Date (day/month/year) : ________ / ________ / ________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Parent Information Sheet

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<td></td>
<td>Fiona Tan</td>
</tr>
<tr>
<td>Contact number</td>
<td>93602091</td>
</tr>
</tbody>
</table>

Project Background

The University of Western Australia is currently running a research project focusing on teachers’ two-way feedback practice within the classroom. This project entails only three lesson observations and one questionnaire.

Lesson observations will be carried out over a 3-week period, and your child will be invited to complete a questionnaire (58-items) which would take no longer than 15 minutes to complete. This will be administered only once. The questionnaire will seek to investigate students’ metacognition, self-efficacy, and motivation. Your child’s teacher will wear an audio-recording device, and researcher will be present in the classroom to observe the frequency of the teachers’ feedback. The audio recording is to facilitate accuracy of teachers’ two-way feedback frequency for research purposes.

All data collected and provided to the study will remain strictly confidential. At no point will the participating school, teachers, or students be identified. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. Data collected or information provided by your child will not be disclosed to the teachers or the school, and all responses will be kept confidential. We envisage that the results of this study will provide important and novel information about how expert teachers’ dialogic feedback serves to influence student learning outcomes.
Participation in this research is entirely voluntary; the school, students, and teachers are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable.

If you are happy for us to include the information provided by your child in our study, you do not need to do anything at all in response to this letter. However, should you prefer to withdraw the participation of your child, please complete and sign the form at the end of this letter and send it back to us through your child’s teacher. If you have any questions at all concerning the project (before or after making a decision) please feel free to contact the researchers or the principal investigator at any time.

Specific Information – Introduction

- Your child will be / has been invited to participate in this study.
- Your child’s participation in this research project is optional. Your child’s standing in the class and relationship with the school will not be affected in any way by your choice to participate or withdraw your child from the study.
- Please read this information carefully, as it will tell you about the research, procedures, risks and benefits. If you are unsure about anything, please feel free to talk to the school or the researchers at any time.
- This study is being conducted by the School Human Sciences (SHS) at The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed and approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research (RA/4/20/4024). The ethics committee members are independent of the study team.

Purpose

- Despite the said benefits of two-way feedback, little research has been published investigating secondary school teachers’ motivation of its use, and its impact on students’ metacognition, self-efficacy, and motivation. As such, the aim of the study is to investigate teachers’ two-way feedback practice in the classroom, and to measure these student outcomes accordingly.

Procedures

- As a participant, your child will be asked to complete a 58-item questionnaire which will take no more than 15 minutes.
• Your child’s responses on the questionnaire will not be seen by his/her teacher or classmates at any time, and will not impact upon anyone’s class standing in any way.

• A report based on information gained from this study will be provided to the school principal. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

**Risks**

• There are no anticipated risks at all associated with taking part in the study.

• All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

• Research shows that students’ experiences in school have the potential to influence attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater engagement and motivation in class.

• We hope the information gained from this research will be of practical relevance to educators in relation to understanding student perceptions of motivating teacher behaviours within the classroom context.

**Confidentiality**

• All information will remain strictly confidential.

• Your child’s responses will not be visible to his/her teachers or classmates at any time.

• All data will be kept in a secure location at the School of Human Sciences (SHS) at UWA.

• All information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

**Participant Rights**

• Participation in this research is voluntary and your child is free to withdraw from the study at any time.

• Your decision to participate or not to participate will not impact your child’s standing or grade in this class in any way.

• You can withdraw your child for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your child will be destroyed.

• Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.

• If you have any questions concerning the research at any time please feel free to contact the researchers.
PLEASE COMPLETE THE FORM ON THE NEXT PAGE ONLY IF YOU WISH TO WITHDRAW YOUR SON/DAUGHTER FROM THE RESEARCH PROJECT...

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Parent Withdrawal Form

Participation in Research Project

Information to Parents

1 Please note that your non-reply indicates passive consent.

2 You are invited to complete this form only if you wish to withdraw your child from this research project.

3 If you choose to withdraw your child from participating in this project, your child will not be asked to complete the questionnaire. Normal participation in lessons will be facilitated for him/her.

4 If you have any questions prior to making a decision, please feel free to contact the researchers with any questions you might have (contact details provided previously).

Your child’s name : ____________________________________________

School : ____________________________________________

Parent/Guardian’s signature : ____________________________________________

Date (dd/mm/yy) : _______ / _______ / _______

Please return this form to the school through your child’s teacher. Thank you.
Student Information Sheet

<table>
<thead>
<tr>
<th><strong>Full Title</strong></th>
<th>Teachers’ two-way feedback practice and students’ learning outcomes</th>
</tr>
</thead>
</table>
| **Research Institution** | School of Human Sciences  
The University of Western Australia |
| **Research Location** | Perth, Western Australia                                      |
| **Principal Investigator** | Associate Professor  
Peter Whipp  
| **Researcher** | Fiona Tan |
| **Contact number** | 93602091 |

**Introduction**

- You are invited to participate in this study.
- Taking part in this research project is optional. Your standing in this class and your relationship with the school will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, please feel free to talk with a relative, friend, or your teacher before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he/she can get you some assistance.
- This study is being conducted by the School of Human Sciences (SHS) at The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research (RA/4/20/4024). The ethics committee members are independent of the study team.

**Purpose**

- The aim of the study is to investigate how your teachers’ feedback influences your motivation and learning in the classroom.
**Procedures**

- As a participant, you will be asked simply to complete one questionnaire, which will take no more than 15 minutes to complete.
- Your responses to the questionnaire will not be seen by your teacher or your classmates at any time, and will not impact upon your standing or grade in your class in any way.
- Your teacher will wear an audio-recording device, and a university researcher will be present in the classroom to observe the frequency of your teacher’s feedback. The audio recording is to confirm teacher’s feedback for research purposes. This recording is focused on your teacher, not you.
- Data or information provided by you will not be disclosed to the teachers or the school, and all responses will be kept confidential.
- A report based on the information gained from this study will be made. Information may also be used for publication in academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual or your class/school.
- The most important thing for us is that you are completely honest when answering all questions.

**Risks**

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers; you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

- Completing this survey will give you the opportunity to consider your thoughts and learning behaviours during your lessons. For example, you may gain insight on what motivates you to learn and how effective that is for you.

**Confidentiality**

- All information will remain strictly confidential.
- Your responses will not be visible to your teacher or classmates at any time.
- All data will be kept in a secure location at the School of Human Sciences (SHS) at UWA.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.
**Participant Rights**

- Participation in this research is voluntary and you are free to withdraw from the study at any time. Should you choose to withdraw, you will not be required to complete the questionnaire. Your decision to participate or not to participate will not impact your standing or grade in this class in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researcher at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.
Feedback and Learning in the Classroom

Student Consent Form

I, ______________________________________________________ (BLOCK CAPS)

• Have read the information provided, and any questions I have asked have been
  answered to my satisfaction

• Agree to participate in this study, realising that I may withdraw at any time
  without reason and without prejudice

• Understand that all information provided is treated as strictly confidential and
  will not be released by the investigator unless required by law

• Have been advised as to what data are being collected, what the purpose is, and
  what will be done with the data upon completion of the research

• Am aware that my teachers and/or classmates will not be made aware of my
  responses at any time

• Understand that my participation in this research will not influence any standing
  in my classes or school in any way

• Agree that the research data gathered from the study may be published, provided
  my name or other identifying information is not used

Your signature : __________________________________________

Date (day/month/year) : _______ / _______ / _______

Approval to conduct this research has been provided by The University of Western
Australia, in accordance with its ethics review and approval procedures. Any person
considering participation in this research project, or agreeing to participate, may raise
any questions or issues with the researchers at any time. In addition, any person not
satisfied with the response of researchers may raise ethics issues or concerns, and may
make any complaints about this research project by contacting the Human Research
Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to
humanethics@uwa.edu.au. All research participants are entitled to retain a copy of any
Participant Information for and/or Participant Consent Form relating to this research project.
Thank you for completing this questionnaire. For the answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to the teachers or school. If you have any questions, please feel free to discuss these with the person administering the questionnaire.

**How old are you? (years)**

13  14  15  16  17  18

**Which grade are you at?**

7  8  9  10  11  12

-Please turn the page to begin.
A. We are interested in what you do when you study. Please read the following sentences and circle the answer that relates to you and the way you are when doing school work or homework for this subject.

<table>
<thead>
<tr>
<th>When I am with this teacher, ...</th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I know when I understand something.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 I can make myself learn when I need to.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 I try to use ways of studying that have worked for me before.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 I know what the teacher expects me to learn.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 I learn best when I already know something about the topic.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 I draw pictures or diagrams to help me understand while learning.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 When I am done with my schoolwork, I ask myself if I learned what I wanted to learn.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 I think of several ways to solve a problem and then choose the best one.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 I think about what I need to learn before I start working.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 I ask myself how well I am doing while I am learning something new.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 I really pay attention to important information.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Never</td>
<td>Seldom</td>
<td>Sometimes</td>
<td>Often</td>
<td>Always</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------</td>
<td>--------</td>
<td>-----------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>12 I learn more when I am interested in the topic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13 I use my learning strengths to make up for my weaknesses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14 I use different learning strategies depending on the task.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15 I occasionally check to make sure I’ll get my work done on time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16 I sometimes use learning strategies without thinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17 I ask myself if there was an easier way to do things after I finish a task.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18 I decide what I need to get done before I start a task.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
B. The following statements relate to reasons for your active participation in this teacher’s lesson. Please circle the response that indicates how true each reason is for you.

<table>
<thead>
<tr>
<th></th>
<th>Why do I do my homework?</th>
<th>Not at all</th>
<th>Not very true</th>
<th>Sort of true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Because I want the teacher to think I’m a good student.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Because I’ll get in trouble if I don’t.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Because it’s fun.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Because I will feel bad about myself if I don’t do it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Because I want to understand the subject.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Because that’s what I’m supposed to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Because I enjoy doing my homework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Because it’s important to me to do my homework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
### ii) Why do I do my class work?

<table>
<thead>
<tr>
<th>1</th>
<th>So that the teacher won’t yell at me.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Because I want the teacher to think I’m a good student.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Because I want to learn new things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Because I’ll be ashamed of myself if it didn’t get done.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Because it’s fun.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Because that’s the rule.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Because I enjoy doing my classwork.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Because it’s important to me to work on my classwork.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
### iii) Why do I try to answer hard questions in class?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all</th>
<th>Not very true</th>
<th>Sort of true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Because I want the other students to think I’m smart.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Because I feel ashamed of myself when I don’t try.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Because I enjoy answering hard questions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Because that’s what I’m supposed to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>To find out if I’m right or wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Because it’s fun to answer hard questions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Because it’s important to me to try to answer hard questions in class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Because I want the teacher to say nice things about me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>iv) Why do I try to do well in school?</td>
<td>Not at all</td>
<td>Not very true</td>
<td>Sort of true</td>
<td>Very true</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------</td>
<td>---------------</td>
<td>-------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>1 Because that’s what I’m supposed to do.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 So my teachers will think I’m a good student.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Because I enjoy doing my school work well.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Because I will get in trouble if I don’t do well.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Because I’ll feel really bad about myself if I don’t do well.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Because it’s important to me to try to do well in school.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Because I will feel really proud of myself if I do well.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Because I might get a reward if I do well.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. These statements relate to your learning and performance in this particular subject. Circle the answer that best describes you at this point in time.

<table>
<thead>
<tr>
<th>When I am with this teacher, …</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I believe I will receive an excellent grade in this class.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2 I’m certain I can understand the most difficult material presented in the readings for this subject.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3 I’m confident I can understand the basic concepts taught in this class.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4 I’m confident I can understand the most complex material presented by the teacher in this subject.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5 I’m confident I can do an excellent job on the assignments and tests in this subject.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6 I expect to do well in this class.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7 I’m certain I can master the skills being taught in this class.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8 Considering the difficulty of this subject, the teacher, and my skills, I think I will do well in this class.</td>
<td>Strongly disagree</td>
<td>1</td>
<td>2</td>
<td>3</td>
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### Feedback & RI Classroom Observation Schedule

<table>
<thead>
<tr>
<th>S/N</th>
<th>During feedback, the teacher uses RI through…</th>
<th>0-05mins/30-35mins</th>
<th>5-10mins/35-40mins</th>
<th>10-15mins/40-45mins</th>
<th>15-20mins/45-50mins</th>
<th>20-25mins/50-55mins</th>
<th>25-30mins/55-60mins</th>
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<td>1</td>
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<td>0 1 2 3</td>
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<td>Attentive listening</td>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
<td>4</td>
<td>Recognition respect</td>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
<td>6</td>
<td>Emotional safety</td>
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<td>0 1 2 3</td>
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<table>
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</thead>
<tbody>
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<td>0 1 2 3</td>
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<td>0 1 2 3</td>
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</tr>
<tr>
<td>2</td>
<td>Positive specific feedback</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>3</td>
<td>Constructive specific feedback</td>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<td>4</td>
<td>Corrective feedback</td>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
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### IN-CLASS OBSERVATION DETAILS

TEACHER: ___________________________  DATE: ___________________________

SCHOOL: ___________________________  SUBJECT: ___________________________
MPLUS OUTPUT FOR CHAPTER 4

Mplus VERSION 7.3
MUTHEN & MUTHEN

INPUT INSTRUCTIONS
File is mplus.csv;

Variable:
Names are number teacher RI RIave
Fdback FdbackAve MetaK MetaR
Ext Intro Indent Intrin Aut Control

RAI Efficacy;
Usevariables are RIave Fdbackave MetaK MetaR
RAI Efficacy;
Analysis:
Estimator = ML;
Model:

MetaK MetaR RAI Efficacy on RIave FdbackAve

Output: Standardized;

SUMMARY OF ANALYSIS

Number of groups 1
Number of observations 216
Number of dependent variables 4
Number of independent variables 2
Number of continuous latent variables 0

Observed dependent variables

Continuous
METAK METAK RAI EFFICACY

Observed independent variables
RIAVE FDBACKAV
Estimator: ML
Information matrix: OBSERVED
Maximum number of iterations: 1000
Convergence criterion: 0.500D-04
Maximum number of steepest descent iterations: 20

Input data file(s)

Mplus.csv

Input data format: FREE

MODEL FIT INFORMATION

Number of Free Parameters: 22

Loglikelihood
H0 Value: -1595.668
H1 Value: -1595.668

Information Criteria
Akaike (AIC): 3235.337
Bayesian (BIC): 3309.593
Sample-Size Adjusted BIC: 3239.878
(n* = (n + 2) / 24)

Chi-Square Test of Model Fit
Value: 0.000
Degrees of Freedom: 0
P-Value: 0.0000

RMSEA (Root Mean Square Error of Approximation)
Estimate: 0.000
90 Percent C.I.: 0.000 0.000
Probability RMSEA <= .05: 0.000

CFI/TLI
CFI: 1.000
TLI: 1.000
Chi-Square Test of Model Fit for the Baseline Model

<table>
<thead>
<tr>
<th>Value</th>
<th>188.979</th>
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</thead>
<tbody>
<tr>
<td>Degrees of Freedom</td>
<td>14</td>
</tr>
<tr>
<td>P-Value</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

SRMR (Standardized Root Mean Square Residual)

| Value | 0.000 |

MODEL RESULTS

<table>
<thead>
<tr>
<th>Estimate</th>
<th>S.E.</th>
<th>Est./S.E.</th>
<th>Two-tailed P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>METAK ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIAVE</td>
<td>0.410</td>
<td>0.125</td>
<td>3.287</td>
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<tr>
<td>FDBACKAVE</td>
<td>0.232</td>
<td>0.076</td>
<td>3.062</td>
</tr>
<tr>
<td>METAR ON</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>0.180</td>
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<td>0.110</td>
<td>0.658</td>
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<tr>
<td>RAI ON</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>0.606</td>
<td>1.973</td>
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<td>FDBACKAVE</td>
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<td>0.369</td>
<td>-0.801</td>
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<tr>
<td>EFFICACY ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<td>2.031</td>
<td>0.523</td>
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<td></td>
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<td>0.024</td>
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<td></td>
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<tr>
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### Residual Variances

<table>
<thead>
<tr>
<th></th>
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<th>0.207</th>
<th>0.020</th>
<th>10.392</th>
<th>0.000</th>
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</thead>
<tbody>
<tr>
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### STANDARDIZED MODEL RESULTS

**STDYX Standardization**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Estimate</th>
<th>S.E.</th>
<th>Est./S.E.</th>
<th>Two-tailed P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>METAK ON</td>
<td></td>
<td>RIAVE</td>
<td>0.223</td>
<td>0.066</td>
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<td>0.152</td>
<td>0.069</td>
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<td>FDBACKAVE</td>
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<td>0.659</td>
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<td>RAI ON</td>
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<td>RIAVE</td>
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</tr>
<tr>
<td></td>
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<tr>
<td>EFFICACY ON</td>
<td></td>
<td>RIAVE</td>
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<td>0.070</td>
<td>-0.190</td>
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<tr>
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<td>FDBACKAVE</td>
<td>0.037</td>
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### METAR WITH METAK

<table>
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<th>Est./ S.E.</th>
<th>P-Value</th>
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<tr>
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### RAI WITH METAK

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<tbody>
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### EFFICACY WITH METAK

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### Intercepts

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### Residual Variances

<table>
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<th>Est./ S.E.</th>
<th>P-Value</th>
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### R-SQUARE

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### QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix

0.217E-05

(ratio of smallest to largest eigenvalue)